



DEVELOPING INDICATORS FOR THE EDUCATED POPULACE DOMAIN OF THE CANADIAN INDEX OF WELLBEING

BACKGROUND INFORMATION LITERATURE REVIEW

DOCUMENT 2

PARTS IV – VI (OF VI) & APPENDICES

For
Atkinson Charitable Foundation

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August 2007

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PART IV

LEARNING OUTCOMES:

LITERACIES

16. Introduction to Literacies

Knowledge can be a powerful agent of change when it is developed from reliable sources, studies and regular, timely collection of data, when it is analyzed and translated into practical advice that can be used by service-providers and decision-makers and when it is accompanied by meaningful and useful monitoring of progress.

Douglas McCall, Joan Wharf Higgins, Irving Rootman¹

16.1 Importance of literacies

In order to assess how educated the Canadian populace is, we are defining literacy very broadly to include the knowledge and skills required to foster wellbeing. Thus, we are asking: what do Canadians need to learn and to know in order to live healthy lives; have decent jobs; participate actively in their communities, in cultural activities, and as citizens; and understand the world in which they live? The framework of the educated populace domain of the Canadian Index of Wellbeing, like that of the new Composite Learning Index of the Canadian Council on Learning, is also concerned to explore whether learning outcomes are effectively translated into desired social outcomes.

In the following chapters we explore—among other key literacies—knowledge of the natural world, of science, and of ways of learning about, understanding, and living in the natural world that rely on and also go beyond the rational, scientific approach. Because the CIW has defined wellbeing outcomes to include the wellbeing of future generations, one core theme and question of the following chapters is: are Canadians learning what they need to know in order to live sustainably and to ensure that future generations experience at least the level of wellbeing we take for granted today? We also ask: what do Canadians need to know in order to live healthy lives, to participate actively in their communities, and to be informed citizens, and how effective are our present learning systems in transmitting this knowledge?

In order to answer such questions, we need to examine lifelong learning levels of understanding and knowledge among Canadians in areas such as ecology, Indigenous knowledge, science, health, citizenship, multiculturalism, the media, statistics, and the arts. In short, to determine how educated the Canadian populace actually is requires a far more profound and wide-reaching analysis than is possible through conventional education indicator assessments of school and university enrolment, graduation rates, and standardized test results.

¹ McCall, Douglas, Joan Wharf Higgins, and Irving Rootman. *All Ages Health Learning Systems (Draft)*, Canadian Knowledge Centre (Network) on Health and Learning, 2005; accessed February 2007; available from http://www.healthandlearning.ca/downloads/foundation_paper.pdf. p. 3.

As previously noted, since lifelong learning is not tied to institutions, Albert Tuijnman of Stockholm University advises that evaluations need to take a large, holistic perspective: “[m]ultiple indicators organised in a multilevel framework—and hence multiple information sources—are required for the monitoring of progress towards the implementation of life-long learning for all.”²

Tuijnman notes that the most important information gap is the lack of data on multiple learning outcomes, and that new measurement instruments are required:

To be able to steer in this new role government will need access to information not hitherto supplied by the statistical system. [...] In order to monitor progress in life-long learning governments require new information on learning outcomes, information that goes well beyond indirect measures based on qualifications conferred by the education system. Information on educational attainment does not suffice as a measure of human capital stock, given that people continue to learn beyond schooling. The knowledge and skills that are acquired at work and elsewhere are not normally reflected in conventional measures of educational attainment. In comprehending the full extent of the learning efforts made by people of all ages, account must be taken of the fact that learning is a defining characteristic of all human activity. The learning that goes on in schools, colleges and universities, adult education centres and employer-sponsored training is only a part, albeit an important one, of the total learning effort of the population. [...]

In addition to this, a large challenge for the statistical system is to extend measurement along the life-wide axis of life-long learning. This will require moving beyond the formal, institutional setting and into the uncharted terrain of non-formal learning at work and informal learning in daily life. Because learning pathways are individually defined and because adults—as opposed to school children—are a non-captive population, this will require the development of new measurement instruments combined with a labour force or household survey approach to data collection.³

Literacy involves more than individual knowledge and behaviours. UNESCO notes that “we must face the challenge of creating literate societies, not just making individuals literate.”⁴ The United Nations endorses the view that “there are many practices of literacy embedded in different cultural processes, personal circumstances and collective structures.”⁵ Referring mainly to basic literacy, but also to literacies in multiple domains, UNESCO notes:

² Tuijnman, Albert. "Measuring the Impact of the New Economy on Education Sector Outputs." Paper presented at the "Official Statistics and the New Economy" Conference, London, August 27 - 29, 2002, Institute of International Education, Stockholm University; accessed March 2005; available from http://www.statistics.gov.uk/iaoslondon2002/contributed_papers/IP_Tuijnman.asp. p. 13.

³ Ibid. pp. 5, 6, 9

⁴ United Nations Educational, Scientific, and Cultural Organization (UNESCO). *The Plurality of Literacy and Its Implications for Policies and Programmes*, Paris, UNESCO Education Sector Position Paper, 2004; accessed January 2006; available from <http://unesdoc.unesco.org/images/0013/001362/136246e.pdf>. p. 15.

⁵ Ibid., accessed. p. 1.

The plurality of literacy refers to the many ways in which literacy is employed and the many things with which it is associated in a community or society and throughout the life of an individual. People acquire and apply literacy for different purposes in different situations, all of which are shaped by culture, history, language, religion and socio-economic conditions. The plural notion of literacy latches upon these different purposes and situations. Rather than seeing literacy as only a generic set of technical skills, it looks at the social dimensions of acquiring and applying literacy. It emphasizes that literacy is not uniform, but is instead culturally and linguistically and even temporally diverse. It is shaped by social as well as educational institutions: the family, community, workplace, religious establishments and the state. Constraints on its acquisition and application lie not simply in the individual, but also in relations and patterns of communication structured by society. Numerous examples from the critical literature on the diverse social practices of literacy substantiate this view of literacy as essentially situational, yet dynamic.⁶

U.S. educator J.L. Lemke also emphasizes the interdependent nature of literacies, which he describes as social practices that link people and society.⁷ He points to the importance of informal, lifelong learning, as well as to the contextual knowledge needed for learning to occur, and argues that literacies cannot be adequately analyzed as simply what individuals do. Rather, we need to understand literacies as “larger systems of practices that hold a society together.”⁸

[L]iteracies provide essential links between meanings and doings. [...] They also provide a key link between self and society: the means through which we act on, participate in, and become shaped by larger ‘ecosocial’ systems and networks. [...] It is no longer sufficient to imagine that societies are made up of isolated human individuals, tentatively linked by voluntary social contacts, with individual and autonomous ‘minds’ somehow dissociated from the material world. [...] Literacies are always social: we learn them by participating in social relationships; their conventional forms evolved historically in particular societies; the meanings we make with them always tie us back into the fabric of meanings made by others.⁹

Lemke argues that in order to be literate, having only basic knowledge is not enough. Also important is having a deeper understanding of the contexts within which the literacy domain operates, which leads one to a broader understanding of the meaning of the given literacy. He provides a very simple and personal example of understanding a cricket match:

⁶ Ibid., accessed. p. 5.

⁷ Lemke, J.L. "Metamedia Literacy: Transforming Meanings and Media," in *Handbook of Literacy and Technology: Transformations in a Post-Typographic World*, ed. Reinking, D., M.C. McKenna, L.D. Labbo and R.D. Kieffer, 283-301. Mahwah, New Jersey: Erlbaum, 1998, accessed November 2005; available from <http://www.schools.ash.org.au/litweb/page500.html>. p. 1.

⁸ Ibid. p. 6.

⁹ Ibid. pp. 1, 4.

Literacies are legion. Each different register, genre, or discourse formation is the product of some particular subcommunity going about its special business. Being a native speaker, knowing the grammar, checking the dictionary, is not enough to understand the texts of these specialized communities as their members understand them, unless we also know their contexts of use. Broadcast accounts of cricket test matches are mostly incomprehensible to me even with a rudimentary knowledge of terms and rules and an hour or two watching; even when watching a match as I hear the commentary. I'm not sufficiently a member of this community, don't have enough experience, haven't heard enough commentaries, seen enough matches, understood the strategies of the game, the culture of this community. It's no different if you pick up a research article on quantum cosmology or biotechnology development, or a technical report on needed equipment repairs in an electrical generating station, or a Japanese 'manga' comic book. It doesn't matter if the medium is voice or video, diagram or text. What matters is knowing how to make meaning like the natives do.¹⁰

16.1.1 Criteria for literacies

In 1997, in order to develop a framework to serve as a guide for assessments and indicators of key competencies among young people and adults, the Organisation of Economic Co-operation and Development (OECD) initiated an interdisciplinary program to identify "key competencies" that are "necessary for individuals to lead an overall successful life, and for society to face the challenges of the present and the future."¹¹ OECD emphasizes that competence levels provide a strong rationale for lifelong learning and adult education, since competencies can only be developed gradually from childhood into adulthood.¹² In 2003, after extensive and multidisciplinary consultations, the program, called *DeSeCo—Definition and Selection of Competencies: Theoretical and Conceptual Foundations*, released its final report.¹³

In the DeSeCo report, OECD makes a distinction between competence and skill:

A competence is defined as the ability to successfully meet complex demands in a particular context. Competent performance or effective action implies the mobilization of knowledge, cognitive and practical skills, as well as social and behavior components such as attitudes, emotions, and values and motivations. A

¹⁰ Ibid. pp. 4–5.

¹¹ Rychen, D.S., and L.H. Salganik. *Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo). Summary of the Final Report: Key Competencies for a Successful Life and a Well-Functioning Society*, Organisation for Co-operation and Development (OECD), 2003; accessed January 2006; available from http://www.portal-stat.admin.ch/deseco/deseco_finalreport_summary.pdf p. 2.

¹² Ibid., accessed.

¹³ Rychen, D.S., and L.H. Salganik, eds. *Key Competencies for a Successful Life and a Well-Functioning Society*. Göttingen, Germany, Hogrefe & Huber Publishers, 2003.

competence—a holistic notion—is therefore not reducible to its cognitive dimension, and thus the terms competence and skill are not synonymous.¹⁴

The OECD further defines key competencies as those that contribute to a “well-functioning society”:

Key competencies are defined by the demands of modern life and conceptualized as contributing to a successful life and a well-functioning society, as expressed by universal values such as respect for human rights, integrated economic, environmental, and social development, and democratic processes.¹⁵

The DeSeCo program identifies three criteria for competencies that are sufficiently broad to enable their use in a variety of contexts, and stresses that the specific nature of competencies are shaped by cultural, situational, and other contextual factors:

Key competencies:

- contribute to highly valued outcomes at the individual and societal level
- are instrumental for meeting important, complex demands and challenges in a wide spectrum of contexts
- are important for all individuals¹⁶

In this literature review, we use the OECD criteria for competencies within the multiple literacies presented, and more specifically define these criteria on the basis of the main criterion of an educated populace as proposed by John McMurtry, and discussed in Chapter 1 of this literature review. McMurtry formalizes a “principled ground,” which can be applied as a criterion to formal, nonformal, and informal education, as follows:

The principled ground and criterion of education that has been proposed is: those processes of the society that enable learning which is not instrumental to a non-learning goal such as private profit, sectarian belief, or other ulterior purpose that does not enable a more inclusively coherent understanding of human and natural phenomena.¹⁷

In applying the principled ground to informal learning, McMurtry argues that the learning or lack of knowledge of Canadians in matters of gender, race, cultural tolerance, ecological awareness, corporate responsibility, and so on can all be evaluated on the basis of this criterion:

All of these are forms of understanding express educational attainment or lack of it insofar as they enable a more inclusively coherent understanding of human and

¹⁴ Rychen, and Salganik. *Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo). Summary of the Final Report: Key Competencies for a Successful Life and a Well-Functioning Society*, accessed. p. 2.

¹⁵ Ibid., accessed. p. 3.

¹⁶ Ibid., accessed. p. 3.

¹⁷ McMurtry, John, Professor of Philosophy, University of Guelph, personal communication with Karen Hayward, Reviewer comments, email correspondence, July 27 and August 23, 2006.

natural phenomena. The same principle holds across all spheres, and allows us to include these very important forms of understanding as far as we are able in a consistent manner. For example, sexism or racism score very badly on the criterion of education, and [the principled ground] explains exactly why. Both are incoherent in principle and non-inclusive in what they take into account as fact and as value. The same is true of ecological or corporate irresponsibility. Consistent and exact principled grounds enable us to identify attainments, shortfalls, and trends across informal and formal education spheres as far as is logistically feasible. In all cases, the prior state of the sphere in question can provide a basic reference body from which to evaluate or measure an educated populace.¹⁸

Therefore, the criteria for competencies in the various literacies presented here is that they “enable a more inclusively coherent understanding of human and natural phenomena,” as per McMurtry, and “contribute to highly valued outcomes at the individual and societal level,” as per OECD. Additional criteria for valued outcomes specifically involve the sustainability of ecological processes, as well as outcomes based on values of collectivity—or the interdependent nature of reality—as defined by C.A. Bowers in Chapter 5 of this literature review.

Within the various literacies, we have also included critical thinking skills as important competencies for an educated populace to develop. As McMurtry argues: “Human learning in the species sense develops in proportion to the extent that this critical intelligence is able to flourish.”¹⁹

The OECD also notes that “recalling accumulated knowledge, thinking abstractly, and being well socialized are not sufficient [...] to meet the multifaceted demands of modern life in a responsible way.”²⁰ Rather, reflectivity, which the OECD defines as “a critical stance and reflective practice,” was named as the “required competence level.”²¹ The OECD continues:

Thus, reflectivity represents a transversal characteristic of key competencies. The development of the identified key competencies and the underlying level of mental complexity does not presuppose either a very high degree of cognitive skills or a high level of education, but requires an overall development of critical thinking and a reflective, integrated practice based on formal and informal knowledge and experience in life.²²

¹⁸ Ibid., personal communication.

¹⁹ McMurtry, John “The History of Inquiry and Social Reproduction: Educating for Critical Thought,” *Interchange*, vol. 19, no. 1, 1988: 31-45. p. 33.

²⁰ Rychen, and Salganik. *Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo). Summary of the Final Report: Key Competencies for a Successful Life and a Well-Functioning Society*, accessed. p. 4.

²¹ Ibid., accessed. p. 4.

²² Ibid., accessed. pp. 3–4.

The Canadian Index of Wellbeing is committed to fostering the types of critical reflection that McMurtry, Lemke, OECD, and UNESCO point out are necessary for an educated populace, as well as the principled ground that enables an inclusive understanding of human and natural phenomena as a learning goal, divorced from goals such as those of private profit and sectarian beliefs that do not have learning as their primary focus. In addition, the CIW views that this understanding must be translated into action and social outcomes that foster an inclusive, healthy, and sustainable society.

16.2 Dimensions of cultural literacy

The term “cultural literacy” is often used broadly to indicate what the population needs to know about its culture or society. In fact, as U.S. analyst P.L. McLaren notes, cultural literacy is at the centre of the debate in society about what is necessary for people to know to be informed and educated citizens.²³ A report from a conference organized in part by UNESCO, titled *Culture Counts: Financing Resources and the Economics of Culture in Sustainable Development*, summarizes the contribution of culture to sustainable development:

We must [...] envision development in terms that encompass cultural growth and community well-being. Thus purely economic opportunities must be reconciled with meanings and values—including non-use values. Once this is recognised, then poverty of spirit, of belief and of expression are bound to be perceived to be as debilitating as poverty of goods. By the same token, the safeguard of cultural diversity is as important as the achievement of economic self-sufficiency.²⁴

McLaren divides this broad view of cultural literacy into two types: prescriptive and pluralistic.²⁵ The first is a response to the need for “excellence” in education, and calls for all students to know a stock body of knowledge, or “core knowledge.” The second refers to the importance of understanding multicultures and appreciating diversity. McLaren makes the following distinction:

Two radically different positions characterize cultural literacy. The first advances the establishment of a cultural index or a cultural canon of literacy works prescribed for all students. [...] The second advocates using the language standards and cultural information students bring into the classroom as legitimate and important constituents of learning. [...] Both of these orientations reflect an understanding of literacy which incorporates, along with the mastery of technical skill, the explicit recognition of the importance of some form of shared cultural knowledge.²⁶

According to McLaren, prescriptive cultural literacy is often monocultural and specifies the content that should be mastered in order for people to be able to assimilate into the mainstream structures of society. McLaren notes that prescriptive cultural literacy often is the language of the economic and political elite. Pluralistic cultural literacy, by contrast, calls for learning content that reflects the diversity of culture, and thereby tends to

²³ McLaren, P. L. "Culture or Canon? Critical Pedagogy and the Politics of Literacy," *Harvard Educational Review*, vol. 58, 1988: 213-234.

²⁴ Culturelink. "The Role of Culture in Development." Paper presented at the Heart of Florence Conference: Culture Counts: Financing Resources and the Economics of Culture in Sustainable Development, November, 1999, Government of Italy and the World Bank with the co-operation of UNESCO; accessed October 2005; available from <http://www.culturelink.org/review/29/cl29un.html>.

²⁵ McLaren. "Culture or Canon? Critical Pedagogy and the Politics of Literacy."

²⁶ Ibid. p. 213–215

challenge the monocultural beliefs and practices that often characterize mainstream educational institutions.²⁷

Both dimensions of cultural literacy are explored in this section of the literature review—Part IV, which is concerned with learning outcomes in a variety of areas. We look at the second type of cultural literacy—multicultural literacy—in Chapter 25. The remainder of Part IV is concerned primarily with what might be considered a body of “core knowledge,” and is an attempt to assess what the public needs to know to enhance wellbeing and create a sustainable society. For example, if health is considered a wellbeing outcome, then health literacy describes the types of knowledge necessary to promote health—such as *knowing* that physical inactivity, high-fat food, and smoking are associated with higher rates of heart disease. This knowledge is a first step towards developing healthy behaviours, as well as towards developing a society that fosters positive social determinants of health.

However, the description of core knowledge in this literature review goes beyond McLaren’s own definition of “prescriptive cultural literacy,” particularly in so far as a key focus here is on sustainability, rather than on assimilation into the mainstream structures of society. In addition, the knowledge and language that comprise the body of “core knowledge” considered in Part IV are not particularly those of the economic and political elite. In sum, we have considerably broadened McLaren’s notion of “core knowledge” and “prescriptive cultural literacy,” though the terms are still seen to be useful in assessing what an educated populace needs to know in order to enhance wellbeing and sustainability.

The following section on prescriptive cultural literacy, or core knowledge, discusses some of the controversies in establishing what constitutes a body of “core knowledge.” The remaining chapters in this section explore key areas of knowledge that analysts have identified as important for the populace to know in order to enhance societal wellbeing and sustainability. Within each of these “literacies,” we have looked at some key aspects of core knowledge that have been identified in each area, and at some measurement possibilities for understanding the extent and penetration of this knowledge in the populace.

It must be emphasized that there is no pretence that the literacies described in the following pages represent a comprehensive assessment of what the Canadian public needs to know in order to be considered “educated.” Rather they can be considered as “markers” or “indicators” of an educated populace. In other words, it is reasonable to consider a populace “educated” if it can read, write, and do basic math; if it has a reasonably high level of understanding about health issues, science, the environment, its own and other cultures and histories; if it can analyse the meaning of statistics, and how the media presents information; if it knows enough to make informed decisions when voting, and so on. We have labelled these kinds of knowledge “literacies” in their various fields.

²⁷ Ibid.

There is much else, including knowledge of considerable importance, than an educated person might know that is not considered in the following pages. However, based on the available literature, the literacies described in the following pages are widely considered reasonable markers of an educated populace, and can therefore provide a suitable basis for development of indicators of learning outcomes for the CIW educated populace domain. In other words, if a small number of indicators could be developed for each of the literacies described below, it might then be possible to combine or aggregate these indicators to provide an overall evaluation of the extent to which our educational processes have succeeded in providing Canadians with the education needed to contribute to their own wellbeing and that of their children. It will be recalled that learning outcomes are one of the key elements of the recommended framework for the CIW educated populace domain presented earlier, and so the following exploration seeks to assess the potential for indicators in this particular area through the concept of “literacies” described here.

Unfortunately, as we shall see, there is presently very little data available—aside from measures of basic literacy and numeracy—on which to base valid indicators of public knowledge in important areas like science literacy, ecological literacy, civic literacy, and health literacy. There are some survey instruments and numerous *ad hoc* public opinion surveys that have attempted to assess aspects of public awareness on key issues, which we reference and discuss in this section on literacies, and which might be used at least on an interim basis as proxies for knowledge in some areas. Fortunately, as we shall see, many researchers are working to develop more systematic and research-based knowledge surveys in their particular areas; areas that could eventually form the basis of a more comprehensive Canadian Knowledge Survey, providing the data needed for the Canadian Index of Wellbeing educated populace domain to report effectively on the knowledge levels of the populace.

As the need for such a new national survey became increasingly apparent in the course of preparing this literature review, a proposal was formulated by the authors in mid-2006 to develop the template for such a new Canadian Knowledge Survey as one of the outputs of this present research, incorporating the best of the existing survey and measurement tools uncovered in this literature review. Unfortunately, funding for this task could not be secured in the time available before release of this report, but the authors of this literature review and of the accompanying indicator report strongly recommend that such a comprehensive Canadian Knowledge Survey be developed in the very near future. Taking a long-term view of the development of the Canadian Index of Wellbeing, we see such a survey as essential to provide the data needed to assess learning outcomes for the CIW educated populace domain in a consistent way over time, and particularly to assess whether the Canadian public is become more or less knowledgeable in key areas associated with wellbeing and sustainability.

16.3 Core knowledge

16.3.1 Prescriptive cultural literacy

Core knowledge is often referred to as cultural literacy, and vice versa.²⁸ The word *culture* is derived from the Latin verbs *colere*; *colo*; *colui*; *cultus* and the noun *cultura*.²⁹ It originally meant both the cultivation and taming of inner nature—of mind and soul, *cultura animi*—and of outer nature—*agri-culture*. In the nineteenth century, the idea of culture in Western societies became that of “high culture,” or the manners, excellent taste, and social graces in which the elite and well-educated were rigorously trained.³⁰ At that time, culture, which also included the arts and intellectual life, was the idea of a standard of perfection and the best that had been expressed in the world.³¹ As T. C. Guy notes, this idea was dominant until the 1960s, when a new definition emerged that emphasized “the totality of socially transmitted behavior patterns, arts, beliefs, institutions, and all other products of creativity.”³²

According to Hooper-Greenhill, cultural literacy from the traditional perspective is problematic:

From a traditional point of view, ‘learning’ is understood as synonymous with ‘scholarship’ or ‘knowledge’. From this perspective, ‘learning’ is a result or product rather than a process. It is something to be achieved, rather than a series of interlinked and continuous activities. This view suggests a meaning for ‘learning’ limited to ‘the acquisition of facts and knowledge’, which is achieved through exposure to high-quality reliable information and to experts who have already attained a high level of learning. Knowledge that is to be attained is understood as an objective and truthful body of material, based on specific subject areas or disciplines (history, science), and able to be transmitted from those who possess it to those who do not. This is a narrow and tightly prescribed view of learning.³³

However, others, such as professor James Murphy of Dartmouth College, argue that human knowledge, in the West but also in all other cultures, has an objective structure,

²⁸ Kosmoski, Georgia J., Geneva Gay, and Edward L. Vockell. "Cultural Literacy and Academic Achievement," *Journal of Experimental Education*, vol. 58, no. 4, 1990: 265-272.

²⁹ Budin, Gerhard. "Theory and History of Culture," in *Encyclopedia of Social Sciences and Humanities: Culture, Civilization and Human Society in Encyclopedia of Life Support Systems (EOLSS)*, ed. Arlt, Herbert and Donald G. Daviau. Oxford, U.K.: Developed under the Auspices of the UNESCO, EOLSS Publishers, 2004, accessed June 2005; available from http://www.eolss.net/eolss_samplechapters_C04.aspx, p. 3.

³⁰ Guy, Talmadge C. "Culture as Context for Adult Education: The Need for Culturally Relevant Adult Education," *New Directions for Adult and Continuing Education*, vol. 82, no. Summer, 1999: 5-18.

³¹ Eagleton, Terry. *The Idea of Culture*, Oxford, U.K.: Blackwell Publishers, 2000.

³² Guy. "Culture as Context for Adult Education: The Need for Culturally Relevant Adult Education." p. 7.

³³ Hooper-Greenhill, Eilean. "Measuring Learning Outcomes in Museums, Archives and Libraries: The Learning Impact Research Project (LIRP)," *International Journal of Heritage Studies*, vol. 10, no. 2, 2004: 151-174. p. 155.

and that understanding the core elements of this structure gives access to the frontiers of knowledge. Murphy notes that all knowledge is connected through networks that have nodes leading to other knowledges, and that the primary nodes of knowing are the academic disciplines, which are the limbs of the tree of knowledge. Murphy defines core knowledge as “that body of concepts, facts, and texts presupposed by all advanced study in the various disciplines.”³⁴

Murphy argues that core knowledge can also be “defined not as what is most worthy but as what is most necessary for access to disciplined knowledge, rationality, and a reflective life.”³⁵ Murphy discusses various reasons why the study of core knowledge is important, including the notion that gaps in basic knowledge impede lifelong learning. In his view, basic, or core knowledge, is the foundation that is necessary as a basis for continued learning. Knowledge builds on knowledge, and new knowledge is discovered by means of older knowledge. Murphy notes:

Cognitive psychologists talk about schemas and other modes of representation by which human beings make sense of new experience by assimilating it to what we already know. Empirical studies of expert knowledge show that in any situation, the person who will learn the most is the person who already knows the most. A chess expert learns much more from watching a chess game than does a chess novice. The more we know the more we can learn and remember from experience, from reading, or from calculating. [...] The logic of learning in some ways mirrors the structure of knowledge. Some knowledge is a strict logical prerequisite for other knowledge: addition is a prerequisite for multiplication and algebra is a prerequisite for calculus; spelling is a prerequisite for grammar, and grammar a prerequisite for rhetoric. [...] Basic literacy, then, presupposes mastery of the strategic nodes of human knowing.³⁶

Murphy notes that no branch of genuine knowledge is more valuable than any other branch, but “some kinds of knowledge are better suited to enhancing the whole of one’s life than other kinds of knowledge.”³⁷ For example:

All kinds of knowledge are intrinsically valuable and rewarding, but some kinds of knowledge are also instrumentally valuable for shaping our decisions about how to pursue aesthetic, moral, and intellectual goods. The subjects known as the humanities are especially valuable because they take as their subject matter the very question of the value of the range of human goods. The question of whether a life devoted to natural science is a good life is not a scientific question but a humanistic one. [...] Art, literature, history, religion, and philosophy are the primary modes of critical reflection upon the permanent themes of the human

³⁴ Murphy, James Bernard. *Why a Core?*, Princeton, New Jersey, National Association of Scholars, 2004; accessed February 2007; available from http://www.nas.org/conferences/misc_2006/why_a_core_murphy.pdf, p. 1.

³⁵ Ibid., accessed. p. 2.

³⁶ Ibid., accessed. p. 6.

³⁷ Ibid., accessed. p. 8.

condition and of human nature. But the drama of human life also cannot be understood apart from the natural world that is its stage and setting. Today, rapid and disorienting technological change makes it imperative that all citizens have a basic understanding of the physical, chemical, and especially the biological sciences. [...] Without a basic knowledge of government, economics, and statistics, a person cannot even hope to understand a newspaper, let alone aspire to be an informed citizen. The ideal of an education for life will shape [...] which disciplines belong to the core of the curriculum.³⁸

In 1987, two books calling for greater cultural literacy in the U.S. became influential best sellers and spurred a growing movement for prescriptive cultural literacy and standards in general. These books were Allan Bloom's *The Closing of the American Mind*,³⁹ and E.D. Hirsch, Jr.'s *Cultural Literacy: What Every American Needs to Know*.⁴⁰ The call for greater prescriptive cultural literacy led the U.S. Department of Education to recommend that cultural literacy should inform the content of the American educational system.⁴¹ Although both books discuss the U.S. explicitly, they have international content, and Hirsch's book is now available in German, Dutch, and Swedish versions, each in its own language and with content reflecting its own relevant national cultural knowledge.⁴²

Both Bloom and Hirsch are interested in the "shared goals or vision of the public good," to use Bloom's words.⁴³ Bloom's book is a call to reinstate the importance of the liberal arts and Western classical literature in university curricula:

Men may live more truly and fully in reading Plato and Shakespeare than at any other time, because then they are participating in essential being and are forgetting their accidental lives. The fact that this kind of humanity exists or existed, and that we can somehow still touch it with the tips of our outstretched fingers, makes our imperfect humanity, which we can no longer bear, tolerable. The books in their objective beauty are still there, and we must help protect and cultivate the delicate tendrils reaching out toward them through the unfriendly soil of students' souls. Human nature, it seems, remains the same in our very altered circumstances because we still face the same problems, if in different guises, and have the distinctively human need to solve them, even though our awareness and forces have become enfeebled.⁴⁴

³⁸ Ibid., accessed. pp. 8–9.

³⁹ Bloom, Allan. *The Closing of the American Mind*, New York: Simon & Schuster, 1987.

⁴⁰ Hirsch, E. D. Jr. *Cultural Literacy: What Every American Needs to Know*, Boston: Houghton Mifflin, 1987.

⁴¹ Kosmoski, Gay, and Vockell. "Cultural Literacy and Academic Achievement."

⁴² Hirsch, E. D. Jr., Joseph F. Kett, and James Trefil. *The New Dictionary of Cultural Literacy: Third Edition*, Boston: Houghton Mifflin, 2002.

⁴³ Bloom. *The Closing of the American Mind*. p. 27.

⁴⁴ Ibid. p. 380.

16.3.2 E.D. Hirsh, Jr. and core knowledge

Hirsch defines core knowledge, or cultural literacy, “as a body of knowledge that is shared by the literate and educated individuals within a society.”⁴⁵ He is concerned with the relationship between cultural literacy—a concept he coined but which has taken on broader meanings and is now often referred to as “core knowledge” to indicate its more narrow meaning—and communication. According to Hirsch, reading and writing skills require a diversity of prior knowledge to understand both literal and implied meanings. He views cultural literacy as a store of specific shared knowledge of a culture, or a background knowledge of the current mainstream culture that is taken for granted but is necessary for communication, reading newspapers and magazines, communicating with elected representatives, or following debates about public issues.⁴⁶ Furthermore, Hirsch suggests that this “broad, shallow knowledge is the best route to deep knowledge.”⁴⁷

Hirsch and his colleagues created a list or dictionary of cultural literacy terms that “identifies and defines the names, phrases, events, and other items that are familiar to most literate Americans.”⁴⁸ They warn that the list should not be taught as just a list of words to be memorized, but as a “vivid system of shared associations.”⁴⁹ The first edition of the dictionary identified 5,000 items, listed alphabetically, while the third revised edition now has almost 7,000 entries.⁵⁰ To determine what to include on the list, Hirsch, et al. eliminated expert knowledge that was specialized and therefore not common knowledge as well as information that was too basic such as the names of colours and animals.⁵¹ They reviewed a wide range of national periodicals for common items and reasoned that “if a major daily newspaper refers to an event, person, or thing without defining it, we can assume that the majority of the readers of that periodical will know what that item is.”⁵² Another important criterion was that items must have lasting significance, and the group arbitrarily chose a memory span of 15 years during which the item has been widely recognized, or will likely to be recognized in the next 15 years. The criterion for choosing science entries was different, since they found little broad knowledge of science among the populace. For this they used their “best judgment” to select items considered essential in order to grasp the major scientific issues.

⁴⁵ Kosmoski, Gay, and Vockell. “Cultural Literacy and Academic Achievement.” p. 265.

⁴⁶ Laugksch, Richard. “Scientific Literacy: A Conceptual Overview,” *Science Education*, vol. 84, 2000: 71-94.

⁴⁷ Hirsch, Kett, and Trefil. *The New Dictionary of Cultural Literacy: Third Edition*. p. 1.

⁴⁸ Hirsch, E. D. Jr., J. F. Kett, and J. Trefil. *The Dictionary of Cultural Literacy*, Boston: Houghton Mifflin, 1988. p. 1. Topics include: The Bible; Mythology and Folklore; Proverbs; Idioms; World Literature, Philosophy and Religion; Literature in English; Conventions of Written English; Fine Arts; World History to 1550; World History since 1550; American History to 1865; American History since 1865; World Politics; American Politics; World Geography; American Geography; Anthropology, Psychology, and Sociology; Business and Economics; Physical Sciences and Mathematics; Earth Sciences; Life Sciences; Medicine and Health; and Technology

⁴⁹ Hirsch. *Cultural Literacy: What Every American Needs to Know*. p. 127.

⁵⁰ Hirsch, Kett, and Trefil. *The New Dictionary of Cultural Literacy: Third Edition*.

⁵¹ Hirsch, Kett, and Trefil. *The Dictionary of Cultural Literacy*.

⁵² Ibid. p. 1.

The cultural literacy list produced by Hirsch and colleagues has sparked heated criticism among educators, in part between the teaching-for-content schools and the teaching-for-skills view of Rousseau and Dewey.⁵³ The major objection in the literature to Hirsch's view, beyond what should be included in such a list—a huge debate in itself—is that Hirsch's list is elitist since it implicitly considers knowledge from the Western cultural tradition to be better and more important than knowledge from other traditions. Donna Amstutz notes that this tradition itself mainly comes from a "white, male, western European perspective," and gives inadequate recognition to key sub-cultures.⁵⁴ According to Schank and Cleary, the facts on Hirsch's list tend to be known to those in power.⁵⁵ Hirsch counters that it is also important to level the playing field so that visible minorities learn this body of cultural information as a beginning of their freedom rather than an end of their individuality.⁵⁶ By learning the dominant cultural references, these minorities will presumably be able to fit into that society in ways that will increase their wellbeing.

In a critical article on the need for culturally relevant adult education, Guy argues:

Despite the theoretical movement toward a more democratic or popular conception of culture, the Arnoldian version of high culture remains influential. It is fashionable nowadays for political and educational leaders to bemoan the decline in culture that they say is characteristic of contemporary American society. From E. D. Hirsch's *Cultural Literacy: What Every American Needs to Know* and Allan Bloom's *The Closing of the American Mind* to conservative politicians like Pat Buchanan and Dan Quayle, the criticism of a popular culture gone berserk at the expense of traditional cultural values is the sounding alarm for a political and religious backlash against non-Anglo, non-Western cultural perspectives. The control for the production and validation of culture remains an important issue that drives much public discussion and debate about the future of American society.⁵⁷

Psychologist Roger Schank, director of the Institute for Learning Sciences at Northwestern University, and his student, Chip Cleary, are also critical of Hirsch's approach, but, taking another angle, argue that there is far too much diverse information available today to insist upon core knowledge:

Hirsch's idea that in order to be intelligent we should strive to know everything that makes up the "core" of our culture is an impossible and useless goal. When

⁵³ Pattison, Robert. "On the Finn Syndrome and the Shakespeare Paradox," *The Nation*, vol. May, 1987: 710-720.; Kaufman, Jay S. "Whad'ya Know? Another View on Cultural Literacy," *Epidemiology*, vol. 13, no. 5, 2002: 500-503.

⁵⁴ Amstutz, Donna D. "Adult Learning: Moving toward More Inclusive Theories and Practices," *New Directions for Adult and Continuing Education*, vol. 82, no. Summer, 1999.

⁵⁵ Schank, Roger, and Chip Cleary. *Engines for Education: The Cultural Literacy Movement: Distorted Facts*, The Institute for the Learning Sciences, 2002; accessed September 2005; available from <http://www.engines4ed.org/hyperbook/index.html>.

⁵⁶ Pattison. "On the Finn Syndrome and the Shakespeare Paradox."

⁵⁷ Guy. "Culture as Context for Adult Education: The Need for Culturally Relevant Adult Education." p. 7.

culture was younger and more tightly defined, it might not have been unreasonable to ask that an educated person be able to recognize all the cultural icons. But, the depth and breadth of today's culture makes that a ridiculous requirement.⁵⁸

Schank and Cleary also argue that many common "facts" taught in school are actually wrong, and that even these erroneous facts teach little about the issues the facts imply. An example they provide is "Columbus discovered America in 1492." The fact itself is controversial today, but as Schank and Cleary suggest:

What really matters are the concepts of invasion, religious toleration, warring empires, subjugation of weak peoples by strong people, and the establishment of colonies in the early years of U.S. history. [...] What matters is how [events] intertwine with the events that led up to them, and the consequences they have had for our lives. [...] Ideas matter more than facts. The meat of history lies in understanding the motives and behavior of human beings, what they have done, the effects of their actions, and the consequences for the future.⁵⁹

David Kaufer of Carnegie Mellon University also suggests that Hirsch's view is too narrow and that true cultural literacy should be based on contributions to the understanding of common issues:⁶⁰

The common coin of literacy is not cultural facts and associations but, rather cultural conversations. Students achieve membership by becoming aware that a culture is composed of ongoing conversations, many of which are essential to its continuing freedom and survival. Before students can function as contributors in their own right, they must learn to identify some of these conversations, on either traditional or nontraditional interpretations of culture. On more traditional interpretations, issues of democracy, freedom, paternalism, censorship, animal rights, and war and peace would seem classic places to start. On nontraditional interpretations, issues of gender, child rearing, evolution, capitalism, and bilingualism are also probably ripe. Long before students are ready to tackle the sources that have most influenced them, they should know that such issues, such cultural conversations, exist.⁶¹

Hirsch's "erasure of 'local' cultures," in the words of Ramona Fernandez, has led critics to produce alternate lists of terms that take the reality of multicultures into account.⁶² Fernandez notes that soon after the publication of Hirsch's book, Simonson and Walker published *Multicultural Literacy: Opening the American Mind*, which is a collection of

⁵⁸ Schank, and Cleary. *Engines for Education: The Cultural Literacy Movement: Distorted Facts*, accessed.

⁵⁹ Ibid., accessed.

⁶⁰ Kaufer, David S. "Cultural Literacy: A Critique of Hirsch and an Alternative Theory." *ADE Bulletin*, Modern Language Association, Association of Departments of English, Winter, 1989, 23-28.

⁶¹ Ibid. p. 25.

⁶² Fernandez, Ramona. *Imagining Literacy: Rhizomes of Knowledge in American Culture and Literature*, Austin: University of Texas Press; excerpt accessed October 2005, excerpt available from <http://www.rhizomes.net/issue3/fernandezhtml/encyclo.htm>, 2001.

essays on the multicultural character of society.⁶³ The appendix of that book lists items not included in Hirsch's list that the authors consider highly relevant for political and social thinking and planning. It begins with the 100,000 Songs of Milarepa and ends with Zulu.⁶⁴ A similar book, *The Dictionary of Global Culture*, was published in 1997 and presents Western culture as only one strand in a complex world of diversity.⁶⁵ Fernandez hopes that the central focus of the book is "global literacy resting on common knowledge among the literate citizens of the world,"⁶⁶ and notes further:

The attempt to codify one local knowledge, European American cultural tradition, ignores the partiality of that vision and structurally produces a bias. There is nothing intrinsically negative about local knowledges; it is just that they are rooted in a perspective. It is their presentation as unique and global that produces the problem. Instead they should be presented as tentative visions from a particular perspective.⁶⁷

In 1990, Hirsch developed a 115-item Cultural Literacy Test (CLT) drawn from his original 5,000-item list, which has been used mainly in research studies.⁶⁸ The test asks factual questions in five areas: Names and Places, Economics, English, Social Science, and Classics. Pentony, et al. give examples of some of the questions:

- *Names and Places*: "Where is the U.S. Naval Academy?" and "What is the term for a device in an electric circuit that stores a charge?"
- *Economics*: "What is the term for the manufacturing of goods in large quantities and assembly lines?"
- *English*: "Which of the following expressions means quickly?"
- *Social Science*: "In the Rorschach psychological test, what is a person asked to look at and describe?"
- *Classics*: "What is the source of the proverb 'Blessed are the meek, for they shall inherit the Earth'?"⁶⁹

Researchers have found high scores on the CLT to correlate with a high grade point average and with high grades in first-semester remedial and regular English, history, government, and other courses that require reading in university.⁷⁰

In Canada, one recent study funded by the Social Sciences and Humanities Research

⁶³ Simonson, Rick, and Scott Walker, eds. *Multicultural Literacy: Opening the American Mind*. Minneapolis, MN., Graywolf Press, 1988.

⁶⁴ Cited in: Fernandez. *Imagining Literacy: Rhizomes of Knowledge in American Culture and Literature*.

⁶⁵ Appiah, Kwame Anthony, Henry Louis Gates Jr., and Michael Colin Vazquez, eds. *The Dictionary of Global Culture*. New York, Knopf, 1997., cited in Fernandez. *Imagining Literacy: Rhizomes of Knowledge in American Culture and Literature*.

⁶⁶ Fernandez. *Imagining Literacy: Rhizomes of Knowledge in American Culture and Literature*.

⁶⁷ Ibid. 34.

⁶⁸ Hirsch, E. D. Jr. *Cultural Literacy Test: Manual for Administration and Interpretation*, Chicago: Riverside, 1990.

⁶⁹ Pentony, Joseph F., Paul Swank, and Carole G. Pentony. "The Cultural Literacy Test: A Validation and Factor Analysis," *Community College Journal of Research and Practice*, vol. 25, 2001: 87-96. p. 92.

⁷⁰ Ibid.

Council and reported at the 12th International Conference on Learning in July 2005, used Hirsh's concept of cultural literacy in a large-scale survey. The authors report: "We are adopting the concept of 'cultural literacy' from the book of the same name by E.D. Hirsch, but transforming it into an inclusive, rather than exclusive concept and project." The survey measured the current "multicultural literacy" levels, or the "understanding of the intellectual, social and cultural contributions of the world's diverse cultures," of a broad sample of high school students.⁷¹ The study was based on the following hypothesis:

... that the values and fears which structure the cultural and historical fabric of racism are undergirded by the legacy of Eurocentrism in school curricula and in cultural and political institutions (mass media, the arts, governments, community organizations, etc.).⁷²

Since only the abstract of this study was available at this time, we were not able to discover either the methodology, design of the survey, or findings. However, we have contacted the researchers, and plan to report the results in the final indicator report.

⁷¹ Taylor, Lisa, and Michael Hoechsmann. "Multicultural Literacy in Canada." Paper presented at the 12th International Conference on Learning, Granada, July 11-14, 2005; accessed June 2005; available from http://105.cgpublisher.com/proposals/953/index_html - author-1.

⁷² Ibid.

16.4 Functional knowledge deficit

The extent to which the public understands issues concerning the environment, food, health, science, economy, and politics can be a measure of societal knowledge and the extent to which life-long learning has become important within society.⁷³ Lack of basic knowledge necessary to function in society in a way that increases environmental and social wellbeing has been termed a “functional knowledge deficit.”⁷⁴

We discuss the public “functional knowledge deficit” throughout various “need-to-know” literacy sections of this literature review, e.g., scientific literacy, civic literacy, and so forth. In other words, we ask what the public needs to know (at a minimum) to be considered literate in various fields, and what is the gap between the public’s actual knowledge and this minimum standard.

The “deficit model” has been widely criticized, as Wright and Nerlich note, for basically explaining public behaviour “solely by pointing out a deficiency in knowledge,” and for asserting that with more knowledge, or communication, the behaviour will change.⁷⁵ Critics claim that this model ignores contextual elements, local knowledge, and public intelligence, and puts the locus for change solely on the individual, rather than on prevailing socioeconomic environments, for example. As well, critics argue that the media helps to reinforce the deficit model with reductionist headlines proclaiming public ignorance. Nick Wright and Brigitte Nerlich cite a U.K. Royal Society statement, relating to the public understanding of science, as summarizing some of these main criticisms:

The public understanding of science approach has been questioned as a deficit model of understanding. The implied relationship that support for science can be achieved through better communication overlooks the fact that different groups may frame scientific issues differently. The approach [does] not adequately conceptualise how publics’ views and attitudes towards science [are] embedded within wider social, political and institutional understandings, and risks discounting the role of local knowledge and different public values in science debates.⁷⁶

However, Wright and Nerlich remark that meaning is created through using the deficit model, and that it provokes discussion, but that care should be taken to not avoid contextual complexities and fall into the trap of merely conceiving the problem as one of communicating results to an ignorant public that has to be taught by experts. Again, relating the argument to science, Wright and Nerlich note:

⁷³ Delanty, Gerard. "Ideologies of the Knowledge Society and the Cultural Contradictions of Higher Education," *Policy Futures in Education*, vol. 1, no. 1, 2003.

⁷⁴ Ungar, Sheldon. "Stumped by Headlines: Investigating a Functional Knowledge Deficit," *The Canadian Journal of Higher Education*, vol. XXXII, no. 3, 2002: 29-48.

⁷⁵ Wright, Nick, and Brigitte Nerlich. "Use of the Deficit Model in a Shared Culture of Argumentation: The Case of Foot and Mouth Science," *Public Understanding of Science*, vol. 15, no. 3, 2006: 331 - 342. p. 332.

⁷⁶ Royal Society. *Science in Society Report*, London, England: The Royal Society, 2004. p. 11, cited in Wright, and Nerlich. "Use of the Deficit Model in a Shared Culture of Argumentation: The Case of Foot and Mouth Science." p. 332.

[I]t is tempting to discuss the use of the deficit model as an archaic model, long replaced in the march of progress that characterizes the social study of ‘making sense of science.’ However, the outright rejection of the deficit model in favor of ‘alternative explanations of the public understanding of science overlooks the importance of the deficit model as a shared cultural resource used to discuss science.’⁷⁷

Although we do discuss the functional knowledge deficit in this review, we are also cognizant of the need to keep this deficit within its broader socioeconomic contexts. In addition, we also discuss the importance of local knowledges specifically within Chapter 19 of this literature review.

Research reveals a significant “functional knowledge deficit” among the public in North America about a wide range of social, economic, health, and environmental issues ranging from mutual fund risks, to women’s heart disease, medical instruction, and risks of sexually transmitted diseases, to the connection between ozone depletion and air conditioning and refrigeration. Studies in the U.S., for example, show public lack of knowledge about climate change, policies concerning global warming, and even the concept of energy efficiency.⁷⁸ Sheldon Ungar of the University of Toronto at Scarborough notes:

These informational deficits amount to more than asserting that my version of cultural literacy trumps yours. Rather, ignorance in these realms suggests that people lack the facts and / or analytic tools to deal with important social, citizenship, and personal or practical issues.⁷⁹

This lack of knowledge is one factor that is often manifested in action, again demonstrating the crucial nexus between learning outcomes and social outcomes, as emphasized both in the new Composite Learning Index and in the Canadian Index of Wellbeing. Thus, statistics illustrate that rates are increasing for amount of driving, amount of gasoline use, and use of large vehicles with low mileage per gallon of gas consumed—illustrating a lack of knowledge or an ignoring of the consequences of global warming, of the impact of human energy use on climate change, and of the value of energy conservation. However, there is some indication that, since hurricanes Katrina and Rita and the rising price of gasoline, this ignoring and its consequent actions may be changing.

Claims about youth ignorance also abound, particularly in academic circles. According to Ungar, professors complain that the only information they have in common with their

⁷⁷ Wright, and Nerlich. "Use of the Deficit Model in a Shared Culture of Argumentation: The Case of Foot and Mouth Science." p. 332.

⁷⁸ Kingwell, Mark. *Dreams of Millennium: Report from a Culture on the Brink*, Toronto: Viking, 1996. p. 304.

⁷⁹ Ungar. "Stumped by Headlines: Investigating a Functional Knowledge Deficit." p. 37.

students comes from television.⁸⁰ On the other hand, Ungar points to other arguments that claim what youth don't know about facts they make up with knowledge of analytical skills, and that youth today may just know different things. Popular culture, however, appears to devalue intellectual pursuit and knowledge, and to value speed and quick results over reflection and process. As a recent op-ed article in the *New York Times* notes: "If you can't say it in 30 seconds, you have to move on. [...] Ignorance is in."⁸¹

Ungar argues that there are several reasons for the knowledge deficit in the public. For example, various institutionalized forces such as a "long-standing anti-intellectualism, resentment of the educated elite, a generalized distrust of politicians and the media, and cutbacks to knowledge-bearing organizations," such as libraries, museums, art galleries, the arts, public broadcasting, and universities have helped to discredit the idea of being knowledgeable.⁸² To this list, Ungar adds the pervasiveness and influence of the "attention economy" that values visual images, "infotainment," and celebrity facts, and that provides a ready, non-threatening resource for conversation. He also finds that people do not have the motivation, or "payoff," needed to become scientifically informed, unless they have a personal "need-to-know" reason, such as those suffering a heart attack might have to understand and improve their condition.

Ungar also reflects on the inability of the media to keep the public informed. More than 25 years of media research has found that public awareness of issues can be correlated with the amount of media coverage on an issue, and that the extent of this coverage is therefore a major determinant of which issues are regarded as important.⁸³ In other words, the mass media and its communication mechanisms must be acknowledged as key social learning mechanisms. Because the media are likely more powerful in terms of influencing the type and extent of public knowledge and awareness of issues than what is formally taught in schools, this media influence should be reflected in indicators of an educated populace. Ungar argues:

[W]hile it is easy to recommend that the media educate the audience, limitations in their resources to convey information (from time constraints through accessible and lucid experts) coupled with limited audience forbearance render the advice simplistic. To be understood and retain an audience, the media must either avoid many topics or treat them in a superficial way.⁸⁴

For example, in 2000, Kris Wilson surveyed 249 environmental journalists with a high level of education and extensive reporting experience, in an effort to measure cognitive

⁸⁰ Ibid.

⁸¹ Herbert, Bob. "The Public Thinker." *The New York Times*, New York, Op-Ed, February 14, 2005, Op-Ed.

⁸² Ungar, Sheldon. "Knowledge, Ignorance and the Popular Culture: Climate Change Versus the Ozone Hole," *Public Understanding of Science*, vol. 9, 2000: 297-312.

⁸³ McCombs, M., and D. Shaw. "The Evolution of Agenda-Setting Research: Twenty-Five Years in the Marketplace of Ideas," *Journal of Communication*, vol. 43, 1993: 58-67., cited in Ungar. "Knowledge, Ignorance and the Popular Culture: Climate Change Versus the Ozone Hole." p. 304.

⁸⁴ Ungar. "Knowledge, Ignorance and the Popular Culture: Climate Change Versus the Ozone Hole." p. 299.

knowledge about climate change.⁸⁵ The study found that the few full-time environmental reporters were very well informed, but that the majority of reporters were confused about the basic science of climate change, and were ignorant about the fact that most scientists in the field accept the theory of climate change. Wilson notes: “Many reporters created dissent in areas in which science agrees,” and “by creating an ersatz ‘balance’ to the climate change story, the scientific debate has been accentuated.”⁸⁶

Wilson also found that newspapers were the source of information 37% of the time for most of the journalists, while interviews with scientists and use of science journals, the second and third highest ratings, were employed 20% and 15% of the time, respectively. In a related study, Wilson surveyed 217 local television weathercasters who were assumed to have knowledge about atmospheric science. Cognitive knowledge about climate change was measured using 76 multiple-choice questions. In both surveys, respondents were requested to use the “I don’t know” response, rather than guess an unknown answer. The results of this survey among supposed specialists in atmospheric science also showed “widespread ignorance of and misinformation about basic climate change science.”⁸⁷

Ungar finds that efforts to investigate the possible declines in general knowledge among the public reflect a number of problems. Researchers tend to focus on “aristocracies of knowledge” such as science or history, rather than popular culture; and surveys stipulate in advance what people should know without justifying the choices. Ungar argues that the cultural literacy work done by Hirsch, which we review below, is “the one systematic attempt to identify and define knowledge assumed in public discourse.” However, he also notes that this work has been highly criticized as elitist and prescriptive.⁸⁸

In order to study functional knowledge, in 2001 Ungar examined Canadian student recognition of a wide-range of common terms or expressions used without definitions in headlines of newspaper articles from the *Toronto Star*, the *Toronto Sun*, and *Whitby this Week*, a suburban community newspaper.⁸⁹ The terms have multiple associations and are seen to be part of the operating stock of common knowledge, but are not “facts” per se. A small sample of 147 first-year students in the second week of a university Introduction to Sociology course completed Ungar’s questionnaire, which was designed to measure what students knew in leaving high school. Students were asked to write a relevant phrase or two about what each of 66 terms meant or how they were used.

Students correctly identified an average of 20.5 terms, or 31% of the terms. Terms with economic associations, such as “brain drain,” were recognized by less than 20% of the students. Less than 50% of the students correctly identified “politically correct,”

⁸⁵ Wilson, Kris M. "Drought, Debate, and Uncertainty: Measuring Reporters' Knowledge and Ignorance About Climate Change," *Public Understanding of Science*, vol. 9, 2000: 1-13.

⁸⁶ Ibid. p. 11.

⁸⁷ Wilson, Kris M. "Forecasting the Future: How Television Weathercasters' Attitudes and Beliefs About Climate Change Affect Their Cognitive Knowledge on the Science," *Science Communication*, vol. 24, no. 2, 2002: 246-268. p. 266.

⁸⁸ Ungar. "Stumped by Headlines: Investigating a Functional Knowledge Deficit." p. 36.

⁸⁹ Ibid.

“affirmative action,” “Chernobyl,” and “Challenger.” The recognition of terms derived from computers and popular culture varied: “RAM” and “Woodstock” were well known, but “Silicon Valley” and “Rohypnol or Rophies,” the drug associated with date rape, were not. Ninety per cent of the students knew “clone,” but only 50% had heard of “antibiotic resistance.” None of the respondents identified “zero sum,” “MAD,” or “Munich.” Males correctly identified 24.4% of the terms compared with 18.4% of the terms correctly identified by women. However, the terms more readily identified by males were those associated with military metaphors, computers, and economics.

Ungar also has investigated why the public has more knowledge of and resonance with the ozone hole rather than with climate change, given the almost identical levels of media coverage.⁹⁰ He finds that “bridging metaphors” and “cognitive templates” are much stronger in the case of the ozone hole. For example, the “penetration” metaphor of a hole leading to the increased bombardment of the earth by lethal rays is succinct and easy to understand, and is associated with images from the popular media such as the shields on the Starship Enterprise and in Star Wars. On the other hand, global warming, the greenhouse effect, or climate change sound natural and complex, as opposed to the hole that shouldn’t be there, and there are no ready-made metaphors in popular culture to illustrate the situation.

In addition, Ungar notes that reports of the ozone hole created a personal “hot crisis” among the public. Hot crises inspire personal dread and threats, and are startling and menacing. Emerging diseases such as “bird flu,” or SARS, for example, inspire a hot crisis response, since we are just “a plane ride away” from a “chain of lethal transmission.”⁹¹ The ozone hole brought the threat of skin cancer, while issues of climate change are too future-oriented to create a hot crisis. In addition, the ozone hole hot crisis spurred a commercialization frenzy that saw the proliferation of new types of sunscreens, lipgloss, sunglasses, UV-safe hats, clothing, umbrellas, awnings, and other items that represented a need for constant vigilance, typified also by the inclusion of the UV index in daily weather reports. The public perceived that it had a need to know about the ozone hole. In the case of climate change, Ungar notes:

Specifically, concern about the future is discounted in institutional thinking and in virtually every public arena. So stable and recurrent is this effect that economists routinely devalue the future in their econometric models. Efforts, of course, have been made to reverse this future orientation and to claim that “strange weather” and the attendant increases in insurance losses are signs that climate change is already occurring. While extreme weather events serve as the principal public ‘sign’ of climate change, they do not make good candidates for attention-commanding beacons. For the most part, human beings lack the anchoring concepts required to follow and comprehend the scientific logic underlying extreme weather impacts. Scientific predictions that the average temperature may rise two to three degrees Celsius over the course of the next 50 years do not

⁹⁰ Ungar. “Knowledge, Ignorance and the Popular Culture: Climate Change Versus the Ozone Hole.”

⁹¹ Ibid.

appear overly threatening to North Americans who often experience far larger swings in temperature over the course of a single day.⁹²

Ungar also notes public confusion about predictions for winters—the public does not understand that climate change may involve both hotter summers and colder winters. Thus, the public thinks that colder winters belie predictions about global warming. Ungar finds that cartoons routinely use extreme cold spells to mock scientists' claims about global warming. In a study of U.S. network news, Ungar found no mention of correlations between extreme climate events such as hurricanes, heat waves, droughts, fires, and floods on the one hand and climate change on the other.⁹³

Ungar's example is important because it illustrates not only widespread public ignorance about what the Governments of Canada, the U.K. and others have called the greatest challenge of the twenty-first century, but also the failure of conventional learning structures to transmit knowledge of key contemporary issues and to produce essential learning outcomes. That knowledge and learning failure in turn helps explain the lack of concerted social action and desired social outcomes, as typified by the fact that greenhouse gas emissions in Canada and globally have continued to rise despite international legal obligations and professed commitments to the Kyoto Accord. Ungar's analysis demonstrates that conventional learning mechanisms and assessment tools, including measures of science literacy, do not adequately address deeper underlying causes of ignorance and of the functional knowledge deficit.

16.4.1 National Association of Scholars (NAS) general cultural knowledge survey

The U.S. National Association of Scholars (NAS) compared responses to a battery of 12 general cultural knowledge questions given to U. S. adults by the Gallup Organization in 1955, with responses to an identical battery of questions given to a random sample of 401 U.S. university seniors by Zogby International in 2002.⁹⁴ Topics covered were literature, music, science, geography, and history. Results showed that university seniors scored on average little or no higher than high school graduates a half-century ago, and much worse compared with 1955 university graduates. Although this is a U.S. survey, it might serve as an example for the design of a similar general cultural knowledge survey for Canada. In fact, the CIW is recommending that a more extensive Canadian Knowledge Survey be administered to adults in Canada.

Acknowledging that the importance of factual knowledge is considered less important today in universities than the development of “thinking skills,” the NAS noted:

⁹² Ibid. p. 307.

⁹³ Ibid. p. 308.

⁹⁴ National Association of Scholars (NAS). *Today's College Students and Yesteryear's High School Grads: A Comparison of General Cultural Knowledge*, Princeton, New Jersey, NAS, 2002; accessed February 2007; available from http://www.nas.org/reports/senior_poll/senior_poll_report.pdf.

[I]t seems to us that learning ‘how to think’ about matters pertaining to culture and society has at least as much to do with having a fund of reliable information ‘to think about’ as it does to possessing special thinking skills (other than common sense) or some body of abstruse theoretical understandings.⁹⁵

The questions used in 2002 were the same as questions used in 1955, with a few modifications to remove dated allusions. However, NAS offers the caveat that the study was constrained by the lack of suitable survey data available from earlier periods, and that the limited number of questions used in the survey reflects this constraint. It also remarked: “A more numerous set of benchmark questions would have provided [...] deeper and more systematic answer[s].”⁹⁶

The NAS report did not release the overall number of respondents in 1955, although it did note that the 1955 Gallop general knowledge survey was considerably larger than the 2002 survey. This made it possible to break the 1955 results into large subsets based on age and level of schooling. In order to control for the information acquisition effects of aging, the comparisons included only those 1955 respondents who were between 25 and 36 at the time of the survey. Level of schooling categories included “attended elementary school,” “graduated from high school,” and “graduated from college.”⁹⁷ It should be noted that the term “college” in the U.S. is synonymous with the term “university” as it is used in Canada, where the term “college” more often indicates a vocational school. Therefore, in the following discussion, “college” and “university” are used interchangeably.

The Gallop disaggregation allowed for the comparison with contemporary university seniors. The number of college graduates in the 1955 sample was small, numbering only 45. However, NAS notes:

This, perforce, reduces one’s confidence in the comparisons between yesteryear’s college graduates and today’s seniors. Still, the consistency of the knowledge superiority displayed from question to question by yesteryear’s college graduates makes us believe that their superiority is real.⁹⁸

The subset of high school graduates in 1955 was 164, which NAS notes, “means a margin of statistical error of about +/- 7.7%.”⁹⁹ The 2002 data, based on a sample of 401, has a margin of error of +/- 5%. “The most reliable and meaningful comparisons are thus between these earlier high school cohorts and today’s college seniors.”¹⁰⁰

⁹⁵ Ibid., accessed. p. 6.

⁹⁶ Ibid., accessed. p. 5.

⁹⁷ Ibid., accessed. p. 1.

⁹⁸ Ibid., accessed. p. 5.

⁹⁹ Ibid., accessed. p. 5.

¹⁰⁰ Ibid., accessed. p. 5.

The general knowledge questions used in the surveys, answers to the questions, and the percentage of correct answers for 2002 university seniors, 1955 high school graduates (ages 25 to 36), and 1955 university graduates (ages 25 to 36) are listed in Table 1 below.

Table 1. Percentage of correct responses on U.S. general knowledge survey questions, by education level, 1955 and 2002

General knowledge questions (and answers)	1955 high school graduates	1955 university graduates	2002 university seniors
1. Which is the largest lake in North America? (Lake Superior)	27	47	38
2. What is the national language of Brazil? (Portugese)	13	58	55
3. In what country was the Battle of Waterloo fought? (Belgium)	44	64	3
4. Who made the first non-stop transatlantic solo flight? (Lindbergh)*	79	96	49
5. What professions do you associate with Florence Nightingale? (nursing and / or medicine)	87	96	53
6. What is the capital city of Spain? (Madrid)	61	89	63
7. What composer wrote <i>The Messiah</i> ? (Handel)	20	56	35
8. Who wrote a play entitled <i>A Midsummer Night's Dream</i> ? (Shakespeare)	37	73	78
9. Which planet is nearest the sun? (Mercury)	6	20	59
10. What is the name of the decoration given to those in the armed forces who are wounded in action against an enemy? (Purple Heart)	90	91	78
11-What great scientist do you associate with the Theory of Relativity? (Einstein)†	83	98	72

General knowledge questions (and answers)	1955 high school graduates	1955 university graduates	2002 university seniors
12-Which of the following states border on Canada?			
12.a - Montana	56	69	60
12.b - Michigan	86	91	57
12.c - Minnesota	61	71	53
12.d - Maine	67	80	50
All (correct)	-not given	-not given	10
Not sure	-not given	-not given	1

Note: The adults surveyed in 1955 were between the ages of 25 and 36

* “The 1955 respondents were, of course, more than a generation closer to Lindbergh’s 1927 flight than the respondents in 2002,” NAS, p. 3.

† “The earlier survey was conducted in June of 1955, two months after Einstein’s death. It began ‘What great scientist, *who died recently*....’ The 1955 respondents thus had an additional clue,” NAS, p. 2.

Sources: Adapted from Malin, Patricia J., and Joseph Zogby. *Survey of College Seniors*, Utica, N.Y., Zogby International and National Association of Scholars, 2002; accessed February 2007; available from http://www.nas.org/reports/senior_poll/survey_raw.pdf, and National Association of Scholars (NAS). *Today’s College Students and Yesteryear’s High School Grads: A Comparison of General Cultural Knowledge*, Princeton, New Jersey, NAS, 2002; accessed February 2007; available from http://www.nas.org/reports/senior_poll/senior_poll_report.pdf.

The results showed that overall correct responses for the entire general knowledge survey was 53.5% for 2002 university seniors, 54.5% for 1955 high school graduates, and 73.3% for 1955 university graduates.¹⁰¹ NAS counted question 12 as 4 questions: Which of the following states border on Canada? 1. Montana, 2. Michigan, 3. Minnesota, 4. Maine. The 2002 university seniors did better than 1955 high school graduates on 7 questions, and worse on 8 questions—they did better on questions concerning literature, music, and science; about the same on questions about geography, and worse on questions about history. Compared with the 1955 university graduates, the 2002 university seniors only did better on 2 questions (numbers 8—literature, and 9—geography) and worse on the remaining 13 questions.

While the 2002 university seniors scored about the same overall level as 1955 high school seniors, they scored far below 1955 university graduates on almost every measure. In conclusion, the NAS remarked: “Thus, the failure—suggested by our comparisons—of additional years of education to enlarge the stock of general cultural knowledge, seems to us indicative of a serious shortcoming in the design of contemporary education.”¹⁰²

¹⁰¹ Ibid., accessed. p. 6.

¹⁰² Ibid., accessed. p. 6.

16.4.2 University of Arizona test of general knowledge and reasoning

In 2001, the University of Arizona gave a test of general knowledge and reasoning to 167 senior students selected randomly at three universities—the University of Arizona, Arizona State University, and Northern Arizona University—in order to discover if they have “received a well-rounded, liberal education.”¹⁰³ Block, Franciosi, and Geiger, the principle investigators for the study note that, while the test is far from comprehensive, it is designed to sample student knowledge and “to assess whether a student has enough factual knowledge to facilitate further study.”¹⁰⁴ The students were each paid \$5 in cash to take the test, as well as an additional \$.50 for each correct answer. Block, et al. explain that: “Economists, psychologists and others have found monetary rewards for student subjects induces more thoughtful and calculated action and reduces the variance of responses.”¹⁰⁵

The general subject fields to cover in the test were taken from Harvard University’s core curriculum, which “has one of the most traditional liberal education requirements of the elite American universities.”¹⁰⁶ The test included 40 multiple-choice questions taken from the following sources:

- The *Elite College History Survey*, conducted in 2000 for the American Council of Trustees and Alumni
- The National Assessment for Educational Progress
- Study guides for the College-Level Examination Program (CLEP) and the Foreign Service Written Examination and Assessment Procedure
- The Cultural Literacy Test created by the Core Knowledge Foundation, founded by E.D. Hirsh, Jr.
- *The Dartmouth Review*’s regular polls of the general knowledge of Dartmouth College undergraduates
- Mindfun.com
- the authors of the test report.¹⁰⁷

The test questions, sources, and results are included in Appendix 30 of this literature review.

The vast majority of the students failed the test in general, and passed in only four of eleven subject areas. The average number of correct answers was 21, or 53% of the questions asked. Less than 60% correct answers indicates a failing grade. Only three students achieved the highest score, with 34 questions correct, or 85% of the questions

¹⁰³ Block, Michael K., Robert J. Franciosi, and Melissa Geiger. *What Do College Graduates Know? A Survey of Arizona Universities*, University of Arizona, 2002; accessed February 2007; available from http://www.nas.org/affiliates/arizona/az_survey_revised.pdf, p. 2.

¹⁰⁴ Ibid., accessed. p. 14.

¹⁰⁵ Ibid., accessed. p. 6.

¹⁰⁶ Ibid., accessed. p. 5.

¹⁰⁷ Ibid., accessed. p. 5.

asked. Five students had the lowest score, with 8 correct answers, or 30% of the questions asked.

The question that 93% of the students answered correctly, which was the highest score on any question, was concerned with a pop culture rap singer: “Identify Snoop Doggy Dogg,” choosing from the following four choices: a rap singer, cartoon by Charles Schulz, a mystery series, and a jazz pianist. The question with the second highest score asked what the scarlet “A” stood for on Hester Prynne’s dress, which 86% of the students answered correctly. Fewer than half of the students answered 17 of the questions correctly—four of these were in American history, and seven were in science and math. Table 2 below gives the average scores for each of the eleven topic areas.

Table 2. Percentage of correct answers by subject on a U.S. test of general knowledge and reasoning, 2002

Subject	Average correct answers (percent)	Test question number (see Appendix 30)
Pop culture	92.0	7
Civics	69.3	25, 31, 40
Computer literacy	67.5	16, 32
Literature	63.3	9, 13, 20, 39
World history	58.0	30, 36
Social sciences	52.5	21, 24, 37, 38
Science	47.7	5, 12, 18, 22, 27, 33
Music and art	46.0	11, 15, 29, 34
Geography	46.0	2, 6
Quantitative analysis	45.8	3, 10, 17, 26, 35
American history	40.1	1, 4, 8, 14, 19, 23, 28

Note: Average correct answers above 60% are considered to be a passing grade.

Source: Block, Michael K., Robert J. Franciosi, and Melissa Geiger. *What Do College Graduates Know? A Survey of Arizona Universities*, University of Arizona, 2002; accessed February 2007; available from http://www.nas.org/affiliates/arizona/az_survey_revised.pdf. p. 13.

Table 2 shows a very wide gap between the one pop culture question (about Snoop Doggy Dogg), on which students would receive an A (above 90%) if the results were translated into letter grades, and the rest of the questions. In general, students passed civics, computer literacy, and literature with a grade of D (between 69% and 60%), and failed the rest (below 60%). However, as Block, et al. note, if the question of the meaning of the scarlet letter “A” was removed, the average for literature falls to 55%, which is not a passing grade.

Block, et al. were particularly disturbed by the fact that American history received the lowest scores: “If publicly supported education is to create better citizens, one thing those

citizens should have is a shared memory of how our nation has come to where it is today.”¹⁰⁸ They also note:

Critics might counter that knowing how to reason is more important than recalling mere facts, and dismiss most of the survey as an exercise in trivia. Although the merits of this argument are not obvious, this cannot be said about the quantitative analysis category, which ranks as the second lowest in average scores.¹⁰⁹

One of the categorical variables obtained was the student’s self-described grade point average (GPA). According to Block, et al., almost two-thirds of the sample had a GPA above 3.0—what used to be the threshold for graduating with honours, and nearly a third of the sample was scheduled to graduate *cum laude*.¹¹⁰ In general, Block, et al. note that students with higher GPAs tended to score higher than average, but this does not make up for the disconnection between students’ GPA and their general results on the test. GPA, which had a positive effect in art, literature, and quantitative analysis, was the only factor that had a consistently significant effect across subject areas. Also, the authors note that a student’s discipline had no effect on his / her score, except that business students tended to score lower on the survey. Males did significantly better in science and geography than did females.

Block, et al. conclude that the failure shown in this test is one of breadth, rather than depth or an inability to learn. The fault lies, they argue, with the lack of breadth in the university requirements:

[T]here is no requirement that graduates obtain a well-rounded education. Even at the undergraduate level, our universities are glorified professional schools where each student leaves knowing the lingo of his or her chosen field, but having little shared culture with educated society as a whole.¹¹¹

Unfortunately, we were unable to find similar tests of general knowledge given to Canadian students. However, the results of the above two surveys are not indicative of students obtaining a broad liberal arts education in U.S. universities. Given the similarities in trends between the two countries, it is likely that results of a similar test given to Canadian students would give similar results.

As noted, the CIW recommends that a general knowledge survey be given to the Canadian adult populace, including young adults of university age, to test their general knowledge of issues related to the literacies reported in this review.

¹⁰⁸ Ibid., accessed. p. 13.

¹⁰⁹ Ibid., accessed. p. 14.

¹¹⁰ Ibid., accessed. p. 7.

¹¹¹ Ibid., accessed. p. 18.

16.5 Public opinion polls in Canada

Public opinion polls are an important method of gauging the concerns of the public, and for tracking changes in the dissemination and circulation of ideas and public knowledge over time. Since the 1940s, public opinion polling has been one of the most significant ways the Canadian government has assessed popular attitudes and opinions.¹¹² Public opinion analyst Daniel Yankelovich observes, as we discuss further below, that understanding complex issues involves a definite learning process, which attitudes and opinions reflect.¹¹³

Benjamin Levin, Ontario's Deputy Minister of Education, suggests that public opinion research can play an important role in helping societies learn about and address important social issues, although there is no direct path from learning to actual use of knowledge.¹¹⁴ Levin notes that public opinion is vital for the political process, and that in politics, "perception is reality."¹¹⁵

Levin argues that beliefs and public opinion drive political action more than research evidence; that what people believe to be true is more important than facts; and that people respond more to individual stories than to statistical evidence.¹¹⁶ He quotes former McGill University President, Bernard Shapiro, as observing: "All policy decisions are made by leaping over the data." Levin also reports personal discussions with policy makers who all noted that, while the evidence for a policy might be correct, it "was not what people wanted or what they would accept."¹¹⁷ As examples, he comments that despite very strong evidence to the contrary, people continue to believe that capital punishment deters crime, that welfare cheating is a bigger problem than tax evasion, and that retaining students in a grade will improve their achievement. In addition, he observes:

In much the same way as stories circulate, so do ill-defined ideas about public policy. Such truisms as 'the virtues of the private sector,' 'the importance of competition,' 'brain drain,' 'the need for accountability' are all deeply rooted in public thinking without necessarily having much depth to them or much clarity as to their implications.¹¹⁸

¹¹² Emery, Claude. *Public Opinion Polling in Canada*, Parliamentary Research Branch, Library of Parliament, 1994; accessed October 2005; available from <http://www.parl.gc.ca/information/library/PRBpubs/bp371-e.htm>.

¹¹³ Yankelovich, Daniel. *The Seven Stages of Public Opinion*, Public Agenda, 2005; accessed October 2005; available from http://www.publicagenda.org/polling/polling_stages.cfm.

¹¹⁴ Levin, Benjamin. "Knowledge and Action in Educational Policy and Politics," in *Towards Evidence-Based Policy for Canadian Education*, ed. Broucker, Patrice de and Arthur Sweetman, 15-33. Montreal & Kingston: McGill-Queen's University Press, 2002.

¹¹⁵ Ibid. p. 31.

¹¹⁶ Ibid.

¹¹⁷ Ibid. p. 23.

¹¹⁸ Ibid. p. 28.

Levin also notes that public beliefs are not always consistent over time or across issues. For example, the public demands more governmental services while also demanding lower taxes.

In response to Levin's article, Giddings cites additional examples where "empirical evidence and commonly held beliefs are in conflict."¹¹⁹ For example, many people believe there are severe and widespread skill shortages, and that there is a declining quality of basic skills among high school students, while at the same time it is getting increasingly difficult for university graduates to find work. Giddings adds that it is very important to explore these "apparent anomalies."¹²⁰

In order to begin to close the gap between public opinion and evidence, Levin recommends that researchers in this area start with awareness of which issues are on the political agenda at the time, and of which concerns are emerging in the population. With that knowledge, deliberate efforts can then be made gradually to develop popular interest in crucial topics, mainly through dissemination of information in the media.¹²¹

16.5.1 Stages of public opinion

Public opinion analyst Daniel Yankelovich, observing that public opinion is never static, describes an evolutionary learning process of seven stages that the public goes through in first paying attention to and then attempting to understand complex issues.¹²² A description of this "issue-attention" cycle first appeared in 1972 in an issue of *The Public Interest*.¹²³ Writing more than 30 years later, Yankelovich expounds on this thesis and stresses that when the public accepts the consequences of its views, public opinion can change from "poorly formed reactions to more thoughtful conclusions, from changeable public opinion to settled public judgment."¹²⁴ Understanding what stage public opinion has reached on the issue in question and whether opinions are stable or volatile can make public opinion surveys more reliable and useful, and can make their interpretation more meaningful.

Yankelovich identifies the following stages of public opinion that might be usefully applied to the evolution of public opinion over time on issues like global warming:

- *Stage 1: Dawning awareness.* People first approach an issue they have just become aware of, most likely through the media, with little understanding of the

¹¹⁹ Giddings, Doug. "Knowledge and Action in Educational Policy and Politics: Comment," in *Towards Evidence-Based Policy for Canadian Education*, ed. Broucker, Patrice de and Arthur Sweetman, 34-38. Montreal & Kingston: McGill-Queen's University Press, 2002. p. 38.

¹²⁰ Ibid. p. 38.

¹²¹ Levin. "Knowledge and Action in Educational Policy and Politics."

¹²² Yankelovich. *The Seven Stages of Public Opinion*, accessed.

¹²³ Downs, Anthony. *Up and Down with Ecology: The "Issue-Attention Cycle"*, Disinformation, 1998; accessed December 2005; available from <http://www.disinfo.com/site/displayarticle4847.html>.

¹²⁴ Yankelovich. *The Seven Stages of Public Opinion*, accessed. p. 1.

issue or of the consequences of their opinions; however, they often have strong emotional reactions to the issue.

- *Stage 2: Greater urgency.* This stage is often the result of an external event, which brings the issue into the forefront and results in public demands ‘to do something.’
- *Stage 3: Reaching for solutions.* This stage often results in a ‘period of stunningly false endorsement,’ when people do not understand the consequences of choices and initially support a proposal but then back down when costs and trade-offs are clarified.
- *Stage 4: Wishful thinking.* On difficult issues that require significant change or sacrifice, the public generally resists the trade-off, feeling it can ‘have it all’ or arguing that technology can fix the problem without a change in public behaviour. In this case, this attitude presents obstacles to realistic solutions.
- *Stage 5: Weighing the choices.* At this stage, the public begins to understand the problem in greater depth and to weigh the pros and cons of various solutions and alternatives in terms of values and practical consequences. [...] Stage 5 is hard work, as people come to understand that easy, cost-free solutions are unlikely to work, and that seemingly simple solutions may have down-sides. When the public has given a lot of thought to an issue and the proposals for addressing it, they begin to hold firmly to their opinions even when presented with unpleasant consequences.
- *Stage 6: Taking a stand intellectually.* At this point, people have a good understanding of the issue and begin to accept change intellectually. Their basic attitudes change, but their behaviour may not. [...] The intellectual resolution of stage 6 requires people to clarify fuzzy thinking, reconcile inconsistencies, consider relevant facts and new realities, and grasp the full consequences of choices. At this stage, people accept the necessity for change in their minds.
- *Stage 7: Making a responsible moral and emotional judgment.* The full recognition and resolution of an issue may take ten or more years. The emotional resolution of stage 7 requires people to accommodate themselves to different situations, change their own thinking and behavior, and confront their own ambivalent feelings. At this point, people accept trade-offs, sacrifices, and change in their hearts and minds, and are willing to change their behaviour.¹²⁵

The development of the health care system in Canada and attitudes toward pay equity are examples of issues where public opinion has evolved and changed. Yankelovich argues that it is important for leaders to know where people are coming from, where they stand in their thinking, and where they are headed, before effective strategies can be applied.¹²⁶

¹²⁵ Ibid., accessed.

¹²⁶ Ibid., accessed.

Abbott and Ryan use Yankelovich's seven-stage framework to look at where people involved with school reform and transformation are in this continuum.¹²⁷ Abbott and Ryan are concerned with transforming schooling into community-based models of learning. In particular, they are critical of the "one-size fits all," mechanistic view of education that places children into the input-process-output structure, which ignores the way children learn at individual rates by making connections meaningful to themselves. Abbott and Ryan apply this example by using Yankelovich's seven stages to identify where their ideas are on the continuum, and at what stage their ideas might become relevant to the general public and to policy makers.

Stage 1: Dawning of awareness. Abbott and Ryan identify this first stage by noting how often major journals such as *Newsweek*, *Time*, *The New Yorker*, *The Economist*, *New Statesman*, *Prospect*, *The Guardian*, *Harper's*, and *The Atlantic Monthly* focus on a new topic related to education and learning. For example, in the 1990s, these journals included many stories on early childhood learning and brain research, which resulted in a "swell of concern" that these issues needed to be addressed. At this initial stage solutions are mainly sought within the present institutional structure, although a few writers begin to suggest alternatives such as stressing learning and community rather than instruction and schooling.

Stage 2: Greater urgency. At this stage, with the public call to "do something," major efforts are put into raising standards for defined learning outcomes and into improving accountability. "Working harder" rather than doing things differently is emphasized.

Stage 3: Reaching for solutions. Free-floating concern is transformed into more specific proposals for action. "School effectiveness" becomes the key concept, which asks if the investment in schooling is giving maximum payback. Achievement on standardized tests becomes the central measure to assess school effectiveness. Education Reform Agendas combine the "work harder" agenda with a range of initiatives, such as calls for charter schools, computer-assisted learning, additional vocational and civics courses, homework contracts, and other school-based reforms. Some teachers and administrators, however, start to question whether schools are failing to develop creativity and adaptability in the students.

Stage 4: Wishful thinking. Managerial responsibility, and the effective administration of an institution according to highly defined rules, further replaces leadership and the ability of leaders to make meaningful choices. Students start to do better on standardized tests; however, complaints start to arise in other sectors. For example, business leaders call for higher life skills such as critical thinking, creativity, adaptability, and the ability to work collaboratively in teams; others call for more civic literacy and concern for social responsibility. These calls add more stress to the already overloaded system, and teachers

¹²⁷ Abbott, John, and Terry Ryan. *The Unfinished Revolution: Ignorance, Interests, Ideology and What We Can Do About It*, London: Network Educational Press, 2000. John Abbott is President of the 21st Century Learning Initiative and Director of the British Education 2000 Trust. He has been a keynote speaker for the Canadian Education Association.

leave the profession in ever larger numbers. Solutions are bounded by the perceived need to strengthen the system rather than transform it. There is general resistance to the perception by more progressive leaders that difficult choices must be made. At this point, note Abbott and Ryan, people need to ask what is essential for learning.

Stage 5: Weighing the choices. Abbott and Ryan observe that this is our present stage in terms of educational reform. Difficult choices between educating mainly for the economy and educating for quality of life are beginning to be articulated. Agendas for change are beginning to be discussed more often, moving the discussion away from systemic issues confined to formal schooling and school politics toward the learning and developmental needs of children and adults. The direction of this discussion is in expanding the boundaries of learning beyond the school and in bringing difficult ideas, evidence, and choices to the attention of both policy makers and the public.

Stage 6: Taking a stand intellectually. At this stage people basically change their values and intellectually accept a course of action. Abbott and Ryan predict that this stage:

... will be characterized by the way in which communities learn to work together to implement profound changes that will touch all parts of their corporate and individual lives. This will not be easy. For years communities will have to work a double agenda (the operational and the strategic)—doing the best they can for the current generation of young people, according to learning arrangements currently provided. At the same time these innovative community leaders will need to help individuals and groups not currently involved in formal education systems develop and implement new partnerships and programs. The transition will require a tremendous amount of trust, collaboration and leadership. However, as these new opportunities become better understood, so the significance of the emphasis on developing learning skills will start to regenerate the community and reinvigorate people who previously have ‘opted out’ of any community involvement.¹²⁸

Stage 7: Making a responsible moral and emotional judgment. This stage reflects a growing commitment to change and an emotional acceptance of new ideas as people come to understand intellectually why change is needed. In relation to community-based models of learning, Abbott and Ryan conclude:

Once communities gain the power of ‘full, pure, gut emotional acceptance’, they will eventually break out of the old constraints and show just what a community of really determined, knowledgeable, dedicated, and caring people can actually do. When such communities become confident of flexing their muscles then, but only then, does the unfinished revolution come to a conclusion worthy of a just and free society.¹²⁹

¹²⁸ Ibid. p. 19.

¹²⁹ Ibid. pp. 13–19.

Other analysts of public opinion have shown that peoples' views can change, sometimes dramatically, after they have studied an issue and discussed it with others who have different opinions and expertise.¹³⁰ Patrick Sturgis observes, for example, that James S. Fishkin of Stanford University has seen an increase in *informed* public opinion in his work with "deliberative polling."¹³¹ The deliberative polling process involves a population sample with diverse views on a topic engaging with a number of experts representing "balanced" views during a weekend conference. Efforts are made to ensure a lack of bias in the presentation of the briefing materials and expert testimonies. Fishkin argues that the process produces opinions that are representative of what a broader representation of the public would think if they were better informed about the issue.¹³²

Such a deliberative polling process, if skillfully conducted as a true learning tool, may help close the gap between public opinion and evidence noted by Levin and Giddings above, and may even speed up the transition between the earlier, relatively uninformed phases of Yankelovich's seven stages of public opinion and the later stages of more genuine intellectual understanding and moral judgement.

In a research approach focussing on the outcome of the process rather than the process itself, Sturgis found modest but relevant opinion change with an increase in knowledge.¹³³ He also found that between a quarter to a fifth of respondents switched sides on the issue when their knowledge increased, which translated "into sizable shifts in the distribution of collective preferences."¹³⁴

According to Fishkin, as of mid-2005, only one official Deliberative Poll had been held in Canada—which took place in Nova Scotia—although in 2003 Fishkin held a workshop on the subject with the Public Policy Forum in Ottawa.¹³⁵ In 2004, Nova Scotia Power hosted a Deliberative Poll in Halifax involving 135 Nova Scotians and a 15-person Advisory Group with diverse viewpoints in a discussion about energy issues facing the region.¹³⁶ The main topic "centered on customer values and preferences concerning options to meet the need for future generations in a context of increasingly strict emission requirements."¹³⁷ Participants were surveyed before and after the process. Prior to the

¹³⁰ Sturgis, Patrick. "Knowledge and Collective Preferences: A Comparison of Two Approaches to Estimating the Opinions of a Better Informed Public," *Sociological Methods & Research*, vol. 31, no. 4, 2003: 453-485.

¹³¹ Fishkin, James S. *The Voice of the People: Public Opinion and Democracy*, 2nd ed. New Haven, CT: Yale University Press, 1997. cited in Sturgis. "Knowledge and Collective Preferences: A Comparison of Two Approaches to Estimating the Opinions of a Better Informed Public."

¹³² Sturgis. "Knowledge and Collective Preferences: A Comparison of Two Approaches to Estimating the Opinions of a Better Informed Public."

¹³³ Ibid.

¹³⁴ Ibid. p. 474.

¹³⁵ Fishkin, James, Department of Communication Chair; Director, Institute for Communication Research; and Director, Center for Deliberative Democracy; Stanford University, personal communication with Karen Hayward, email correspondence, July 28, 2005.

¹³⁶ The Public Decision Partnership. *Customer Energy Forum: Summary of Results*, Nova Scotia Power, 2004; accessed July 2005; available from <http://www.nspower.ca/CustomerEnergyForum/2004Forum.shtml>.

¹³⁷ Ibid., accessed. p. 6.

conference, economic factors such as stable electric costs and lowest reasonable price were considered the most important topics by the participants. After the conference, concern for economic factors dropped by half and environmental factors took prominence. Nova Scotia Power plans to use the final opinions from the Deliberative Poll as a basic element in its planning process.

A similar intensive learning process, called “consensus conferences,” originated in Denmark in 1987, also in an effort to bridge the gap between the public, experts, and politicians.¹³⁸ The process has been reproduced in many countries including Canada, where the first consensus conference was held in Calgary in 1999 on the issue of food biotechnology.¹³⁹

The Danish Board of Technology, which works to ensure that technology is in harmony with an ecologically and socially sustainable society, conducts these conferences over a four-day period 6 or 7 times a year. The public process involves from 12 to 15 lay citizens studying current, socially relevant, and often controversial technological policy issues. After discussions with experts, who provide high-quality information, the group of citizens identifies options for solutions and makes recommendations, which are seriously considered by the Danish Parliament. In addition, the Danish Board of Technology widely disseminates the results of the conferences to the general public. Einsiedel, et al., compared consensus conferences in Denmark, Canada, and Australia, and found that “the consensus conference model is one that ‘travels well’ and is easily adapted to contexts outside of Europe.”¹⁴⁰ As in the cases of both Denmark and Australia, increased media coverage as well as increased public knowledge were results of the Canadian conference.¹⁴¹

16.5.2 Public opinion research in the Government of Canada

The following is a brief overview of general public opinion survey research conducted by or for the Government of Canada. We do not analyze these surveys here, but list them as possible interim sources of data for particular cultural literacy areas in the CIW educated populace domain. In the report, “Public Opinion Research in the Government of Canada: Annual Report 2003–2004,” former Public Works and Government Services Minister, Scott Brison, identifies public opinion research as a “vital resource in developing government policy, programs and communications centred on the expectations of citizens.”¹⁴²

¹³⁸ The Danish Board of Technology. *Consensus Conference*, 2005; accessed November 2005; available from <http://www.tekno.dk/subpage.php3?article=468&toppic=kategori12&language=uk>.

¹³⁹ Einsiedel, Edna F., Erling Jelsoe, and Thomas Breck. “Publics at the Technology Table: The Consensus Conference in Denmark, Canada, and Australia,” *Public Understanding of Science*, vol. 10, 2001: 83-98.

¹⁴⁰ Ibid. p. 94.

¹⁴¹ Ibid.

¹⁴² Public Works and Government Services Canada. *Public Opinion Research in the Government of Canada: Annual Report 2003*, Government Information Services Branch, Public Works and Government Services Canada, 2004; accessed October 2005; available from http://www.communication.gc.ca/reports_rapports/por_rop/2003-2004/03-04_toc.html, p. 1.

Every year Public Works and Government Services Canada coordinates a multitude of survey projects. The following examples, except where noted, took place in the 2003/2004 fiscal year and were reported in the annual report:¹⁴³

- It coordinated 593 projects with a value of more than \$25.4 million and in the previous year it coordinated 576 projects with a value of \$23.7 million.¹⁴⁴ In 2003/2004, Health Canada and Human Resources and Skills Development Canada (HRSDC) undertook slightly more than a third of these projects.¹⁴⁵
- Health Canada tracks opinions on emerging public health threats, healthy eating and obesity, physical activity, chronic disease issues, drug and tobacco control strategies, and health attitudes of on-reserve First Nations people.¹⁴⁶ HRSDC commissions surveys relating to human resources including, in 2003/2004, opinions concerning access to postsecondary education that covered issues relating to the quality, accessibility, and funding of the education system. HRSDC also developed surveys on issues relating to skills and learning, especially related to the workplace.¹⁴⁷
- Canadian Heritage, Foreign Affairs Canada, and International Trade Canada¹⁴⁸ conducted a survey of 2,662 Canadian adults concerning their opinions, experiences, and expectations on arts and culture and about major international issues. According to the survey, Canadians identified war, the environment, world hunger, and terrorism as their top international concerns, and they approved of Canada's handling of issues such as the Iraq crisis.¹⁴⁹
- Industry Canada conducted its first annual survey, which focused on research and development, commercialization, trade, and investment. Industry Canada also uses survey tools to study the impact of the Internet on Canadians, consumer protection, and issues such as biotechnology.¹⁵⁰
- Agriculture and Agri-Food Canada conducted perception and attitude surveys on issues such as food safety and "functional foods and nutraceuticals" intended to support market development activities.¹⁵¹

¹⁴³ Ibid., accessed.

¹⁴⁴ Ibid., accessed.

¹⁴⁵ The name of HRSDC has now been changed from Human Resources and Skills Development Canada to Human Resources and Social Development Canada after a merger with Social Development Canada.

¹⁴⁶ Public Works and Government Services Canada. *Public Opinion Research in the Government of Canada: Annual Report 2003*, accessed.

¹⁴⁷ Ibid., accessed.

¹⁴⁸ Formerly called Foreign Affairs and International Trade Canada.

¹⁴⁹ Public Works and Government Services Canada. *Public Opinion Research in the Government of Canada: Annual Report 2003*, accessed.

¹⁵⁰ Ibid., accessed.

¹⁵¹ Ibid., accessed.

- Natural Resources Canada tracked awareness and understanding of issues such as climate change and the Kyoto Agreement, ethanol-blended gasoline, and corporate social responsibility. It also has conducted three baseline surveys in 1993, 1997, and 2002 to track public opinion on key energy and resource issues.¹⁵²
- Environment Canada, as part of the One Tonne Challenge (OTC) initiative, studied social engagement issues among Canadian youth in order to develop baseline data to assess the effectiveness of the OTC. It also surveyed public opinion on issues concerning water, toxins, nature, and climate change. It plans to explore views on the Canadian Environmental Protection Act, contaminated sites, the Species at Risk Act, natural area management, and Canada's international role in environmental management.¹⁵³
- The Treasury Board of Canada Secretariat collects Strategic Outcome Information for all government departments. For example, it notes that the strategic outcome mandate of Statistics Canada is to "inform Canada's citizens, governments, and businesses on various aspects of Canada's evolving economy and society, with objective and impartial statistics [...] which contribute to [...] keeping Canadians informed on, and of, current and emerging economic and social issues affecting their lives and well-being."¹⁵⁴ The Treasury Board Secretariat is also working toward developing on-line survey formats. The first two on-line surveys were answered by 6,727 individuals and 4,141 individuals, respectively. Topics focused on the Government On-Line Internet Research Panel, and on issues such as functionality and navigation of the Government of Canada Web sites.¹⁵⁵

Public opinion research by the government in Canada includes both custom and syndicated studies, which have different policies for data availability. Custom studies are commissioned from private firms to address the specific research needs of a department and are available to the public. In 2003, Public Works and Government Services Canada developed an on-line database that, in part, offers access to information on current research projects and past project results. To date, the final reports of more than 3,300 public opinion research studies conducted since 1994 by the government of Canada are listed in the searchable database.¹⁵⁶ The reports are also available at the National Library of Canada and the Library of Parliament. In 2003–2004, the Canadian government used

¹⁵² Natural Resources Canada (NRC). *Tracking Report of Canadian Attitudes Towards Natural Resource Issues, 1997*, NRC, 1997; accessed July 2005; available from http://www.nrcan.gc.ca:80/inter/cb97rep_e.html.

¹⁵³ Public Works and Government Services Canada. *Public Opinion Research in the Government of Canada: Annual Report 2003*, accessed.

¹⁵⁴ Treasury Board of Canada Secretariat. *Strategic Outcome Information*, 2005; accessed October 2005; available from http://www.tbs-sct.gc.ca/rma/krc/common/map-carte_e.asp.

¹⁵⁵ Public Works and Government Services Canada. *Public Opinion Research in the Government of Canada: Annual Report 2003*, accessed. pp. 21–27

¹⁵⁶ CommNET. *Public Opinion Research (POR) Database*, Government of Canada, 2005; accessed November 2005; available from http://commnet.gc.ca/por_rop/report/findreports_e.php.

the services of 87 research firms, including EKOS Research Associates, Environics Research Group (now GlobeScan), and Ipsos-Reid.

Syndicated research, which often contains trend information, is owned by the research firm that collects the data, and the data are only available to subscribers who share the costs. In 2003–2004, the Canadian government purchased \$2.9 million worth of syndicated studies, down from \$3.1 million in 2002–2003 and \$4 million in 2001–2002. National Public Opinion Overview surveys in 2003–2004 that used syndicated research included the following (with the firm conducting the survey listed in parentheses after each survey description):

- *3SC Socio-Cultural surveys*: These surveys monitor social values and have been conducted in Canada since 1983 to map the changing values, attitudes, and behaviour of consumers. The surveys correlate socio-cultural trends with specific questions that the client requesting a survey may have. (CROP: *Centre de recherche sur l'opinion publique*.)
- *Citizens First*: This series of surveys, from 1998, 2000, and 2003, provides comprehensive information on how citizens and clients of the Canadian public sector perceive the services they receive from governments at the municipal, provincial / territorial, and federal levels. (Institute of Public Administration of Canada.)
- *Communications Canada*: From 2001 to 2003 Communications Canada conducted the Listening to Canadians poll three times a year to assess public views on public policy priorities. It closed its operations in March 2004.¹⁵⁷ A January 2002 survey by Communications Canada focused on young adults.
- *Environmental Monitor*: This is the first tracking study to focus exclusively on environmental and natural resource issues. It is an in-depth study conducted annually since 1987, and is supplemented by quarterly samples of attitudes and opinions of 1,500 Canadians (Environics International / GlobeScan);
- *Focus Canada*: This is a comprehensive quarterly survey of about 2,000 Canadians dating from 1976 that focusses on political, economic, and social trends (Environics Research Group).
- *Perspectives Canada*: This is a quarterly assessment of political and other opinion issues that focusses on government and business (Perspectives Canada).
- *Rethinking Government*: This is a comprehensive survey to chart trends and issues on themes such as trust, values, globalization, “democratic deficit,” public priorities, and the role of government, conducted since 1994 (EKOS Research Associates).
- *The Ipsos Trend Report Canada*: This survey, which is available to subscribers, identifies and monitors shifts in Canadians’ values, behaviors and perceptions about marketplace, social, economic and political issues. (Ipsos-Reid).

Examples of surveys on international issues are: *Corporate Social Responsibility Monitor* (Environics International / GlobeScan); *Food Issues Monitor* (Environics International /

¹⁵⁷ Public Works and Government Services Canada (PWGSC). *Listening to Canadians*, PWGSC, 2005; accessed October 2005; available from http://www.communication.gc.ca/survey_sondage/index_e.html.

GlobeScan); *Gallup Poll Tuesday Briefing, ePublication* (The Gallup Organization); *Global Issues Monitor* (EnviroNics International / GlobeScan); *International Environmental Monitor* (EnviroNics International / GlobeScan); *Rethinking Work: Understanding the New North American Workforce and Workplace* (EKOS Research Associates); and *Survey of International Students in Canada* (Canadian Bureau of International Education).¹⁵⁸

16.5.3 General non-governmental surveys

Other organizations in Canada collect public opinion surveys and produce results within searchable databases available to the public for non-commercial uses. These include the Canadian Opinion Research Archive (CORA) at Queen's University, which contains surveys dating from the 1970s, and the Centre for Research and Information on Canada (CRIC), which tracks and analyzes Canadian public opinion, and publishes a weekly newsletter called "Opinion Canada." Every year since 1997, CRIC has conducted its Portraits of Canada survey on key issues that affect the future of Canada.¹⁵⁹ CORA also collects searchable data in its Public Opinion Trends Series.¹⁶⁰ The Canadian Gallup Polls (formerly Canadian Institute of Public Opinion) has surveys dating from 1945.

An interesting collaborative survey was designed by CRIC, CORA, and the *Globe and Mail* to provide an authoritative picture of the way the attitudes and values of Canadians have evolved since the 1960s.¹⁶¹ The CRIC-Globe and Mail Survey on "The New Canada" was conducted in April and May of 2003 by Ipsos-Reid, and sampled 1,000 respondents between the ages of 18 and 30, and 1,000 respondents 31 years and older. Results and an analysis of the survey are available in a 2004 book, *The New Canada*.¹⁶² This study was highly publicized for its finding that Americans and Canadians hold very different values and attitudes, and are becoming more different as time proceeds, especially in respect to their basic value systems and levels of tolerance.

The survey also found that young Canadians in their 20s are the most highly educated generation ever produced in Canada. The proportion of Canadians in their 20s with a university degree has more than doubled from 8% in 1971 to 18% in 2001. Interestingly, the survey showed that what drives young people today is the goal of having a balanced life, rather than corporate success or material gain, and that they prefer a good quality of

¹⁵⁸ Public Works and Government Services Canada. *Public Opinion Research in the Government of Canada: Annual Report 2003*, accessed. p. 39.

¹⁵⁹ Centre for Research and Information on Canada (CRIC). *Portraits of Canada, 2004*. Vol. 2005 CRIC, 2005.

¹⁶⁰ Canadian Opinion Research Archive (CORA). *Website*, Kingston, ON, CORA, Queens University, accessed April 2005; available from <http://www.queensu.ca/cora>.

¹⁶¹ Centre for Research and Information on Canada (CRIC), Globe and Mail, and Canadian Opinion Research Archive (CORA). *The CRIC-Globe and Mail Survey on "The New Canada"*, Canadian Opinion Research Archive, Queen's University, 2003; accessed November 2005; available from <http://jeff-lab.queensu.ca/poadata/info/cric/cricgmnc03.shtml>.

¹⁶² Anderssen, Erin, and Michael Valpy. *The New Canada: A Globe and Mail Report on the Next Generation*, Toronto: McClelland & Stewart Ltd, 2004.

life over a high standard of living. They also have significant ecological and social justice concerns.¹⁶³

The Institute for Social Research (ISR) at York University, which has nearly 40 years of experience in social science, public opinion, and policy research, houses the largest university-based survey research unit in Canada.¹⁶⁴ It has conducted two waves of a national longitudinal study, the Social Change and Well-being Survey, the first in 2000-2001 and the second in 2003. The study surveyed approximately 5,100 adults in the first wave, and reinterviewed them in the second wave in order to explore “the economic, social and political factors that shape public policy, and how these policies determine societal values, attitudes and well-being among individuals and communities.”¹⁶⁵ The study was commissioned by a group of university researchers led by Richard Johnston of the University of British Columbia and was funded by SSHRC. ISR also administers the Ontario Student Drug Use Survey, which has been conducted bi-annually since 1977, for the Centre for Addiction and Mental Health, to study student awareness and use of alcohol, tobacco and other drugs. The survey is administered to 7,000 students from grades 7–12.¹⁶⁶

The Ontario Institute for Studies in Education (OISE) at the University of Toronto has conducted two key surveys, which are discussed in detail elsewhere in this literature review: the National Study of Work and Learning and the National Survey of Informal Learning Practices. The National Study of Work and Learning is a 2004 national survey of 10,000 Canadians to “identify gaps in workplace training and education and to explore current issues and trends related to work and learning.” This study was led by David Livingstone of the University of Toronto on behalf of a network of researchers from seven universities and more than 10 community groups and professional institutions across Canada. The National Survey of Informal Learning Practices was conducted in 2000 for a study also led by David Livingstone.

Finally, OISE also conducts the Provincial Public Attitudes Toward Education Survey, which is the longest-running public opinion survey on education in Canada. It has surveyed approximately 1,000 adults in the province bi-annually since 1978 about their attitudes toward the education system. The survey examines “educational policy issues including public satisfaction with schools, funding priorities and control, governance and reorganization, testing, teachers’ rights, equity issues and lifelong learning.”¹⁶⁷

The Calgary Faculty and Student Alliance (CalFASA) conducts an interesting and unusual survey during provincial elections to clarify the views of the major political parties on postsecondary education issues, and to hold the government accountable for its

¹⁶³ Ibid.

¹⁶⁴ Institute for Social Research. *Website*, York University, accessed October 2005; available from <http://www.isr.yorku.ca/home.html>.

¹⁶⁵ Ibid., accessed.

¹⁶⁶ Ibid., accessed.

¹⁶⁷ University of Toronto. "Public Support for Education Funding Remains at Historic High: OISE / UT Survey." *University of Toronto News*, February 8, 2005, accessed October 2005; available from http://www.oise.utoronto.ca/OISE-Survey/2004/survey04_release.pdf.

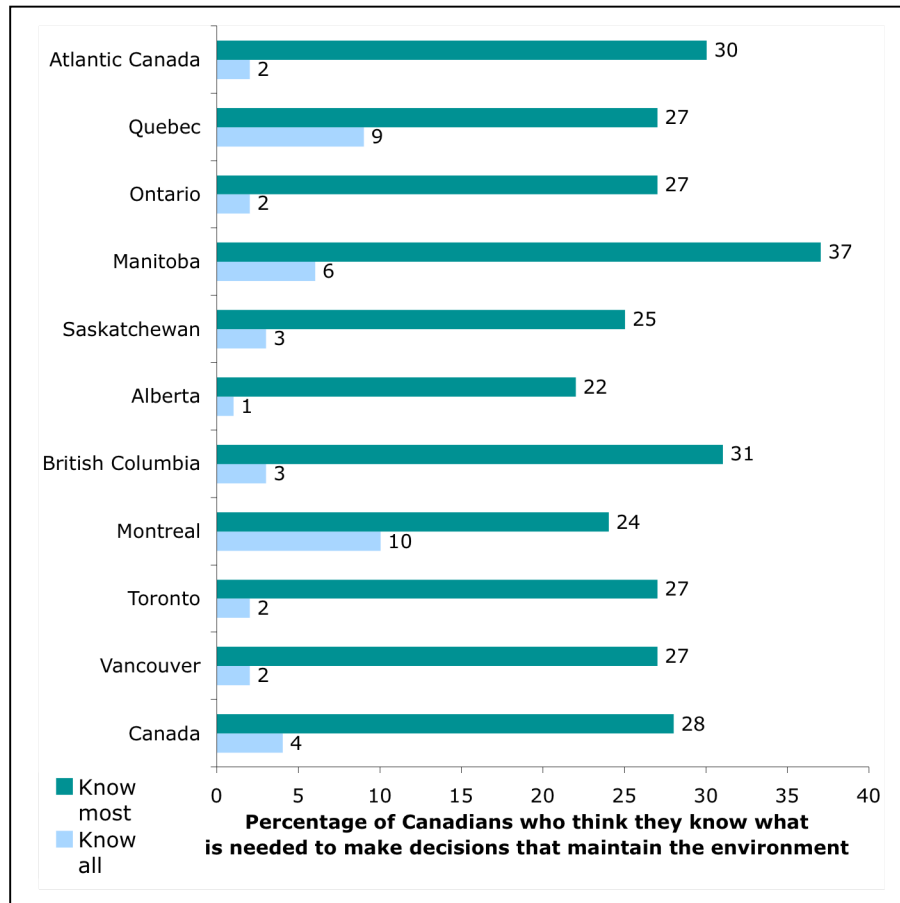
own postsecondary education policies and views.¹⁶⁸ The survey is sent to those sitting members in the provincial legislature who are responsible for postsecondary education (minister or critic) regarding his or her views on a range of postsecondary education issues. The survey has six questions and a final space for comments. For each question, the survey provides a paragraph of background information. The survey questions and background paragraphs are reproduced in Appendix 27.

16.5.4 Public opinion on environmental education: an example

In May-June 2002, Environics International conducted a survey of 1,502 Canadian adults for the Sustainability Network. Two of the 15 questions concerned environmental education. The first question asked respondents to what extent they feel they know enough about the environment to make decisions in their day-to-day lives that would help maintain a healthy environment. Figure 1 below illustrates the results.

¹⁶⁸ Calgary Faculty and Student Alliance (CalFASA). *2004 Election Special Report: Post-Secondary Education Survey*, CalFASA, 2004; accessed October 2005; available from http://www.calfasa.org/publicationsCalFASA_Election_Survey_Responses_2004.pdf.

Figure 1. Percentage of Canadians who think they know all or most of what is needed about the environment to make decisions that maintain a healthy environment, by region, 2002



Note: based on a survey of 1,502 adult Canadians

Source: Adapted from Environics International. *Public Opinion on Environmental Education, Urban Sprawl, and Water Issues*. Sustainability Network, 2002.

Fifty six percent of respondents said they knew some, and 12% of respondents said they knew very little, which implies that they believe they need to know more to make informed decisions about the environment. Only 4% of Canadian adults feel they know all that's needed, and only 28% feel they know most of what is needed.¹⁶⁹ Environics notes:

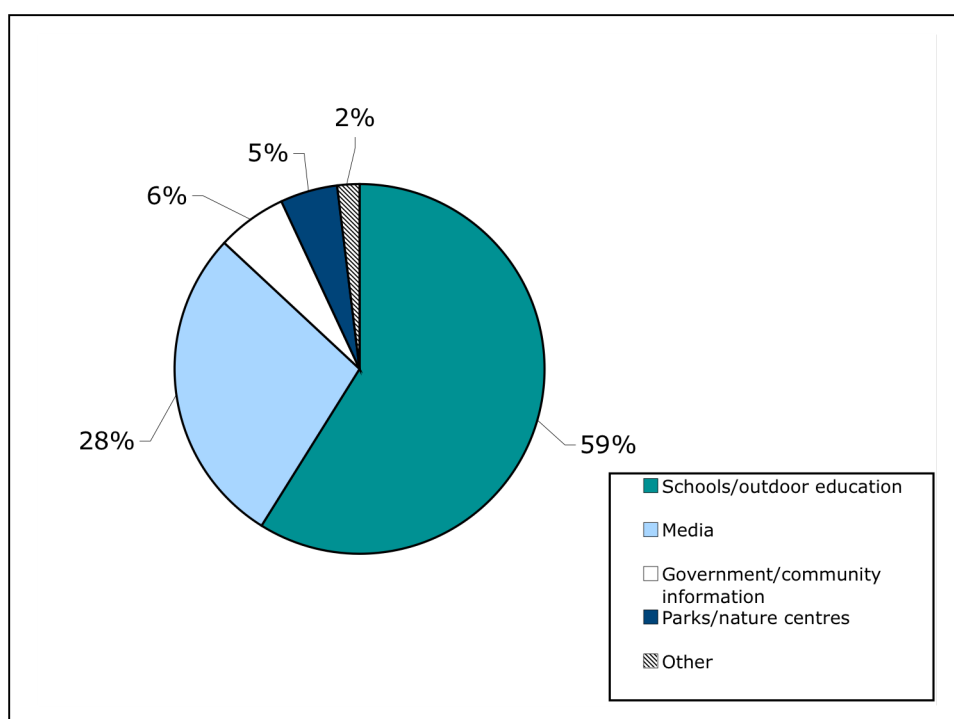
While there is likely a gap between willingness to take action and ability to make decisions that maintain a healthy environment, further research will be required to

¹⁶⁹ Environics International. *Public Opinion on Environmental Education, Urban Sprawl, and Water Issues*, Sustainability Network, 2002; accessed July 2005; available from <http://sustain.web.ca/cbt/research - July 2002.pdf>.

predict what effect increased environmental knowledge will have on environmental behaviour.¹⁷⁰

The second question asked respondents to choose from among four sources of information, the one that could best help young people make day-to-day decisions that would help maintain a healthy environment. Results are shown in Figure 2, and Figure 3 shows the results analyzed by age.

Figure 2. Percentage of Canadians that consider specific sources of information the most important to help young people make decisions that will help maintain a healthy environment, 2002



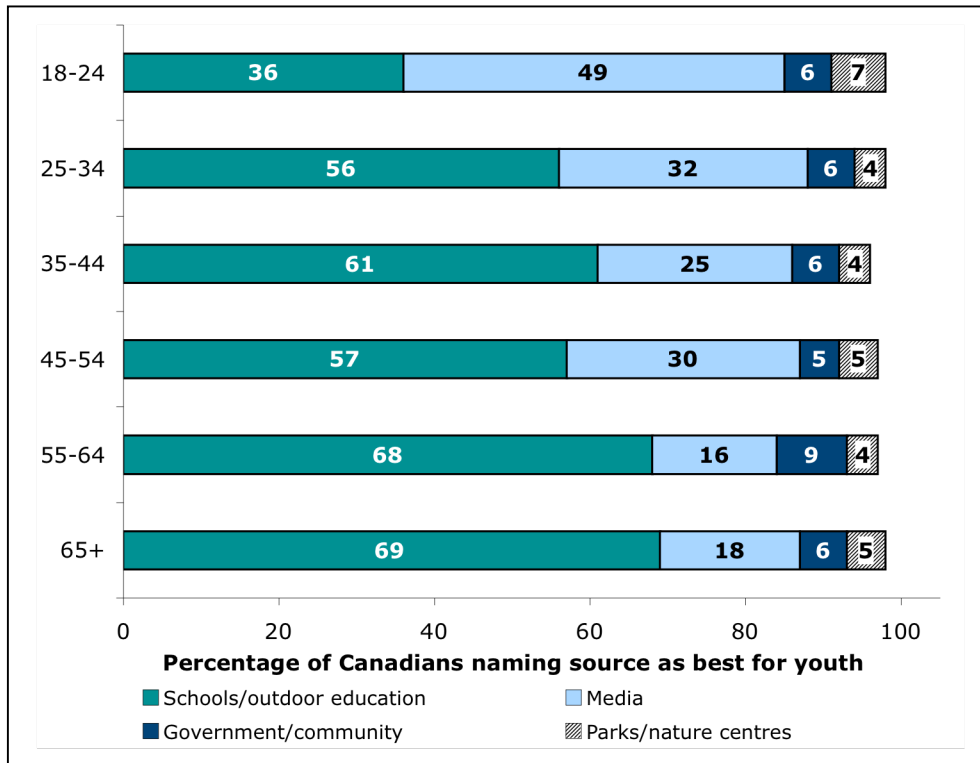
Note: based on a survey of 1,502 adult Canadians

Source: Adapted from Environics International. *Public Opinion on Environmental Education, Urban Sprawl, and Water Issues*. Sustainability Network, 2002.

Schools, including outdoor education, were considered the best source of information by 59% of respondents; media was considered the best source for 28% of respondents; government and community information was the best source for 6% of respondents; and parks and nature centres was the best source for 5% of respondents.

¹⁷⁰ Ibid., accessed. p. 6.

Figure 3. Percentage of Canadians that consider specific sources of information the most important to help young people make decisions that will help maintain a healthy environment, by age group, 2002



Note: based on a survey of 1,502 adult Canadians

Source: Adapted from Environics International. Public Opinion on Environmental Education, Urban Sprawl, and Water Issues. Sustainability Network, 2002

When results are analysed by age, 69% of respondents over the age of 65 chose schools as the most important information source, compared to 36% of respondents aged 18–24. This is very significant because it indicates that those who have most recently experienced schooling have considerably less faith in the ability of the school system to provide needed environmental information than those most removed from schooling—who may harbour illusions about the knowledge they think schools are imparting. While only 18% of respondents over 65 years of age chose media as the best source of information to help maintain a healthy environment, 49% of respondents aged 18–24 chose media as the most important information source—considerably more than chose schools. The figure highlights the differences of opinion among age groups. These results indicate that respondents over the age of 65 may have a very different idea of what young people need to know and how they can best acquire that knowledge than young people themselves.

17. Basic Adult Literacy

Basic literacy is generally associated with the ability to read, write, speak, and count. But the term *literacy* has also been used more broadly to include other areas that measure what the population needs to know to function in society. These skills and knowledge include more than what is learned in school. Individuals build on this knowledge throughout their lives in various contexts. The knowledge includes that needed for health literacy, civic literacy, ecological literacy, science literacy, media literacy, and cultural literacy, among others.¹⁷¹ We will look at some of these types of literacy in separate sections of this literature review. However, this section focusses on basic literacy—the ability to read, write, speak, and count.

The level of literacy in a population is widely considered a key social and economic indicator. Quantitative literacy generally is related to the effects of schooling, while the other basic literacy skills are more strongly affected by family background.¹⁷² Literacy skills are associated with educational attainment, health, income, citizenship abilities, as well as the ability to function in society. One study looking at economic growth (based on the GDP) found that the average literacy score in a population is a better indicator and predictor of economic growth than a score based only on high-level skills.¹⁷³ This finding indicates that, even from a strictly economic perspective that does not include considerations of equity and social justice, it may be a better investment for governments to expand basic literacy skills throughout the population than to focus more exclusively on high-end research and innovation at the tertiary level—which is often touted as the key to embracing the knowledge economy.

Over the last decade the concept of literacy has changed from one that defines literacy according to an arbitrary standard of reading performance that then labels people as literate or illiterate to one that defines literacy proficiency levels along a continuum that assesses how well adults use information to function in society. The current official OECD definition is:

Literacy is defined as a particular capacity and mode of behaviour: the ability to understand and employ printed information in daily activities, at home, at work and in the community—to achieve one's goals, and to develop one's knowledge and potential.¹⁷⁴

¹⁷¹ Joint Centre of Excellence for Research on Immigration and Settlement (CERIS). *Meanings of Literacy*, Toronto, CERIS, 2005; accessed February 2005; available from <http://ceris.metropolis.net>.

¹⁷² Willms, J. Douglas. *Three Hypotheses About Community Effects*, OECD and Canadian Research Institute for Social Policy (CRISP), 1999; accessed February 2005; available from <http://www.oecd.org/dataoecd/25/4/1825818.pdf>.

¹⁷³ Coulombe, Serge, Jean-Francois Tremblay, and Sylvie Marchand. *Literacy Scores, Human Capital and Growth across Fourteen OECD Countries*, Ottawa: Statistics Canada, catalogue number 89-552-MIE200411, 2004.

¹⁷⁴ Organisation for Economic Co-operation and Development (OECD). *Literacy in the Information Age: Final Report of the International Adult Literacy Survey*, OECD and Statistics Canada, 2000; accessed

In addition to the benefits that accrue to literate individuals, such as the ability to manage ones household and participate more fully in society, there is also an assertion that increased levels of literacy translate into increased levels of productivity and economic development.

It is widely believed that individuals with greater knowledge, skills and desirable personal attributes have a higher likelihood of experiencing labour market success than those with less. The knowledge and skills of workers are known to be a major factor in productivity, innovation and technological change. Furthermore, a workforce involved in continuous learning is an advantage in a global economy characterized by rapid change. A strong foundation in literacy and numeracy is the basis for the acquisition of further knowledge.¹⁷⁵

However, some scholars in the field of literacy have challenged the assertion that higher levels of literacy stimulate economic development. According to Graff:

Contrary to popular and scholarly wisdom, major steps forward in trade, commerce, and even industry took place in some periods and places with remarkably low levels of literacy; conversely, higher levels of literacy have not proved to be stimulants for ‘modern’ economic development. More important than high rates or ‘threshold levels’ of literacy have been the educational levels and power relations of key persons, rather than of the many; the roles of capital accumulation, ‘cultural capital,’ technological innovations, and the ability to put them into practice; or the consumer demands and distribution-marketing-transportation-communication linkages.¹⁷⁶

Graff argues that by the nineteenth century literacy became “vital to the process of training and being trained” for factory capitalism.¹⁷⁷ It should be noted here that the historical role of literacy in society is well beyond the scope of this literature review. However, a question that needs to be raised is what role does literacy play in the processes of class mobility in contemporary society? In other words, is it the case that anyone who becomes literate is better off economically and more able to find good employment?

According to the 2003 International Adult Literacy and Skills Survey (IALSS) there is a clear relationship between literacy proficiency and employability. That is, the average scores of those employed are higher than those who are either unemployed or not in the

January 2005; available from

http://www.oecd.org/LongAbstract/0,2546,en_2649_34509_1897266_119699_1_1_1,00.html.

¹⁷⁵ Statistics Canada. *Building on Our Competencies: Canadian Results of the International Adult Literacy and Skills Survey 2003*, Statistics Canada, Catalogue no. 89-617-XIE , and Human Resources and Social Development Canada, 2005; accessed January 2006; available from <http://www.statcan.ca/cgi-bin/downpub/listpub.cgi?catno=89-617-XIE2005001>. p. 73.

¹⁷⁶ Graff, Harvey J. *The Legacies of Literacy. Continuities and Contradictions in Western Culture and Society*, Indianapolis: Indiana University Press, 1987. p. 11.

¹⁷⁷ Ibid. p. 11.

labour force. The employment rates are also higher for those with higher proficiency scores. Higher literacy scores are also associated with higher earnings, particularly for women.¹⁷⁸ Since comparable data only exist starting in 1994, it is difficult to assess a historical trend, but there are international studies, which indicate that the influence of education on social mobility may be on the decline.

One British study found that when data on persistent poverty were examined from a historical perspective, children born in the UK in the 1950s were more socially mobile than those born in the 1970s. The report, published in 2006, found that in the 1970s the chances of a teenager living in poverty as an adult doubled if they lived in poverty in childhood. By the 1980s, that was nearly four times as likely to happen.¹⁷⁹

Another British study, cited in *The Economist*, on the impact of education on social mobility found that employers are becoming less interested in educational qualifications and that there is some question about whether higher levels of education necessarily translate into more social mobility.

Part of the job of higher education is to send a signal to employers at that someone has learnt to think, to persevere, to absorb information and to present ideas. As the supply of graduates grows, and the quality of teaching in Britain's shabby, crowded universities declines, this signal is fading. At the same time, services have been growing at the expense of manufacturing, and, increasingly, the qualities that employers in the service sector want are those the middle class acquire at home: articulacy, confidence, and smartness.¹⁸⁰

According to Statistics Canada:

The problem of poor literacy skills is not simply an issue of education, nor is it only a private, individual matter. It is also an indicator of deeper social and economic inequalities that characterize contemporary society. Because the improvement of literacy skills alone will not solve systemic inequalities, policies designed to address literacy concerns will have limited effect unless they also include a serious attack on economic insecurity and other inequalities.¹⁸¹

¹⁷⁸ Statistics Canada. *Building on Our Competencies: Canadian Results of the International Adult Literacy and Skills Survey 2003*, accessed. pp. 73–88.

¹⁷⁹ Dean, Malcolm. "Social Mobility Is Still an Unequal Struggle." *The Guardian*, London, May 3, 2006; available from <http://www.guardian.co.uk/socialexclusion/story/0,1765826,00.html> old. The report, *The Persistence of Poverty Across Generations*, was written by Jo Blanden and Steve Gibbons of the Centre for Economic Performance at the London School of Economics and Political Science and published by the Joseph Rowntree Foundation.

¹⁸⁰ The Economist. "Social Mobility. What's It Worth?" *The Economist*, January 15, 2004, accessed May 2006; available from http://www.economist.com/world/europe/displayStory.cfm?story_id=2352932. The study cited was "Education, Employers and Class Mobility," by Michelle Jackson, John Goldthorpe and Colin Mills of Oxford University. The report was published in *Research in Social Stratification and Mobility*.

¹⁸¹ Shalla, Vivian, and Grant Schellenberg. *The Value of Words: Literacy and Economic Security in Canada*, Catalogue no. 89-552-MPE3, Ottawa: Statistics Canada and HRSDC, 1998. p. 46.

17.1 Measuring adult literacy

In the main, literacy assessments in Canada use data from two OECD surveys, which Canada helped to develop: the Programme for International Student Assessment (PISA)¹⁸² and the International Adult Literacy and Skills Survey (IALSS), which is the Canadian component of the Adult Literacy and Life Skills Program (ALL). PISA will be discussed later in this review, as it deals with youth literacy. Both surveys were conducted in Canada with co-operation from Statistics Canada and HRSDC through the National Literacy Secretariat (NLS).¹⁸³

17.1.1 International Adult Literacy and Skills Survey (IALSS)

The first round of the International Adult Literacy Survey (IALS) was fielded between 1994 and 1998 in 22 countries. Data for Canada were collected in 1994 and results were reported by the OECD, Statistics Canada, and HRSDC. The second round was conducted in 2003 and the survey was renamed the International Adult Literacy and Skills Survey (IALSS). The IALSS is the Canadian component of the Adult Literacy and Life Skills program (ALL), which is a “large-scale co-operative effort undertaken by governments, national statistical agencies, research institutions and multi-lateral agencies that provides internationally comparable measures.”¹⁸⁴

The four domains of literacy skills measured in the 2003 IALSS are prose literacy, document literacy, numeracy, and problem solving. Prose literacy is defined as the knowledge and skills needed to understand and use information from texts such as news stories, instruction manuals, poems, and fiction. Document literacy measures the knowledge and skills needed to locate and use information in formats such as job applications, maps, transportation schedules, tables, and charts. Numeracy measures the mathematical knowledge and skills needed for ordinary procedures such as balancing a chequebook, figuring out tips, completing order forms, and determining interest on a loan. Problem solving measures the ability to think with goals in mind and to act in situations where no set solutions exist.¹⁸⁵

The Educational Testing Service (ETS) gives colloquial examples of the first three types of skills in terms of what people need to know in their daily lives:

¹⁸² Organisation for Economic Co-operation and Development (OECD). *The PISA [Programme for International Student Assessment] 2003 Assessment Framework - Mathematics, Reading, Science and Problem Solving, Knowledge and Skills*, OECD, 2003; accessed September 2006; available from <http://www.pisa.oecd.org/dataoecd/46/14/33694881.pdf>.

¹⁸³ Human Resources and Skills Development Canada (HRSDC). *Literacy: Research and Statistics*, Ottawa, 2005; accessed February 2005; available from <http://www.hrsdc.gc.ca/en/gateways/topics/lxa-rsr.shtml>.

¹⁸⁴ Statistics Canada. *Building on Our Competencies: Canadian Results of the International Adult Literacy and Skills Survey 2003*, accessed. p. 12

¹⁸⁵ Ibid., accessed. p. 16

Prose literacy:

- Learn about quitting smoking from a brochure at your health clinic
- Read a story or poem with your child
- Join in the readings at a wedding, or other ceremonies or events
- Give your child medication as directed on the package
- Read a newspaper or magazine to keep up on local and national events.

Document literacy:

- Fill out a job application form or complete a credit card application
- Use a bus or train schedule to retrieve specific information
- Find out today's weather using a weather map
- Use the TV guide to find the time that your favorite TV show starts
- Sign a form giving permission for your child to go on a school field trip
- Compare items in the warehouse to those listed on the inventory sheet
- Retrieve information from a graph or chart

Quantitative literacy or numeracy:

- Figure out how much commission you earned last month in your sales job
- Add up how much you save when you use coupons to buy two items at a store
- Calculate a 15% tip at a restaurant
- Figure out the monthly cost of the milk program at your child's school
- Keep score for your bowling team
- Follow the instructions on a can of paint to calculate how many cans you need to paint a room¹⁸⁶

The 2003 IALSS divides these literacy skills into five levels of difficulty, from the lowest proficiency at level 1 to the highest proficiency at level 5. People at level 1, for example, would have a hard time understanding how to follow directions in a cookbook, follow maps, or understanding directions on a prescription. Those at level 2 would be able to read simple texts but would have difficulty with job applications or bank deposit slips and would have trouble learning new job skills. Level 3 is the “desired threshold” or the “minimum for persons to understand and use information contained in the increasingly difficult texts that characterize the emerging knowledge society and information economy.”¹⁸⁷

According to Statistics Canada:

Level 3 performance is generally chosen as a benchmark because in developed countries, performance above level 2 is generally associated with a number of positive outcomes. These include increased civic participation, increased

¹⁸⁶ Educational Testing Service (ETS). *Types of Literacy*, ETS, 2005; accessed February 2005; available from <http://www.ets.org/etsliteracy/types.html>.

¹⁸⁷ Statistics Canada. *Building on Our Competencies: Canadian Results of the International Adult Literacy and Skills Survey 2003*, accessed. p. 26

economic success and independence, and enhanced opportunities for lifelong learning and personal literacy.¹⁸⁸

In fact, OECD analysis of the 1994 IALS data yielded consistent evidence that the performance difference between levels 2 and 3 “is substantive and corresponds to a significant difference in measurable benefits accruing to citizens of OECD countries.”¹⁸⁹ However, a “desirable threshold” for the problem solving domain has yet to be set.¹⁹⁰

Individuals with a proficiency at level 4/5 in prose and document literacies are able to make complex and high-level inferences, and use specialized and complex information. In numeracy, these levels reflect an ability to understand a broad range of mathematical information of a more abstract nature, and to undertake mathematical tasks that involve multiple steps or “draw inferences” or “generate mathematical justifications for answers.”¹⁹¹

Table 3 summarizes the results of the 2003 IALSS for each proficiency level, each province and territory in Canada, and each category of literacy.

Table 3. Percentage of Canadians aged 16 and older at each proficiency level, by region, 2003

Subsection by region	Proficiency level			
	Level 1	Level 2	Level 3	Level 4/5
Prose				
Canada	20	28	35	17
NFLD and Labrador	24	31	33	12
Prince Edward Island	20	30	34	17
Nova Scotia	17	28	38	17
New Brunswick	23	33	32	12
Quebec	22	32	33	13
Ontario	21	27	35	17
Manitoba	18	28	37	17
Saskatchewan	14	27	39	21
Alberta	14	26	40	21

¹⁸⁸ Ibid., accessed. p. 14

¹⁸⁹ Organisation for Economic Co-operation and Development (OECD). *The PISA [Programme for International Student Assessment] 2003 Assessment Framework - Mathematics, Reading, Science and Problem Solving, Knowledge and Skills*, accessed.

¹⁹⁰ Statistics Canada. *Building on Our Competencies: Canadian Results of the International Adult Literacy and Skills Survey 2003*, accessed. p. 15

¹⁹¹ Ibid., accessed. p. 16

Subsection by region	Proficiency level			
	Level 1	Level 2	Level 3	Level 4/5
British Columbia	17	23	37	23
Yukon	11	23	40	27
Northwest Territories	19	26	35	20
Nunavut	47	26	20	8
Document				
Canada	22	27	34	18
NFLD and Labrador	27	31	29	13
Prince Edward Island	22	29	34	16
Nova Scotia	20	28	35	18
New Brunswick	26	32	30	12
Quebec	25	32	30	13
Ontario	23	26	34	18
Manitoba	19	28	37	16
Saskatchewan	15	26	39	21
Alberta	15	25	37	23
British Columbia	17	23	35	24
Yukon	11	25	40	25
Northwest Territories	20	26	34	20
Nunavut	47	27	19	8
Numeracy				
Canada	26	30	30	15
NFLD and Labrador	32	33	26	9
Prince Edward Island	26	34	28	12
Nova Scotia	26	31	31	13
New Brunswick	30	35	26	9
Quebec	28	31	29	13
Ontario	27	29	29	15
Manitoba	25	32	31	12
Saskatchewan	20	29	34	17
Alberta	20	29	33	19
British Columbia	21	27	33	18
Yukon	16	28	38	19
Northwest Territories	25	28	32	15
Nunavut	56	22	15	7
Problem solving				
Canada	36	36	23	5
NFLD and Labrador	44	37	17	2*
Prince Edward Island	38	39	20	2*
Nova Scotia	35	38	22	4

Subsection by region	Proficiency level			
	Level 1	Level 2	Level 3	Level 4/5
New Brunswick	43	38	16	3*
Quebec	40	36	20	4
Ontario	37	35	23	5
Manitoba	35	37	24	4
Saskatchewan	29	40	26	5
Alberta	29	38	27	6
British Columbia	30	35	29	6
Yukon	24	39	31	7
Northwest Territories	36	36	24	4
Nunavut	64	24	10	1*

Notes: numbers have been rounded and may not add up to 100. * use with caution

Source: Statistics Canada. *Building on Our Competencies: Canadian Results of the International Adult Literacy and Skills Survey 2003*, Statistics Canada, Catalogue no. 89-617-XIE , and Human Resources and Social Development Canada, 2005; accessed January 2006; available from <http://www.statcan.ca/cgi-bin/downpub/listpub.cgi?catno=89-617-XIE2005001>. Table 1.2. pp. 112-113.

The IALSS data indicate that about 12 million or 48% of Canadian adults over 16 years of age scored below level 3 in prose literacy, 35% scored at level 3, and 17% scored at level 4/5. For document literacy, 49% of Canadians overall scored below level 3 and 51% at level 3 and above. Overall, 55% of Canadians scored below level 3 in numeracy, while 45% scored at level 3 and above. According to the 2003 IALSS results for problem solving skills, 36% of Canadians scored at level 1, 36% scored at level 2, 23% scored at level 3, and only 5% of Canadians scored at level 4/5. As previously noted, no threshold has yet been set in the problem-solving domain.¹⁹²

Overall for the four domains—prose, literacy, numeracy, and problem solving—the Western provinces score above the Canadian average, central Canada as well as Nova Scotia and Prince Edward Island at the average, and the other eastern provinces (except Nova Scotia and Prince Edward Island) below the average. This pattern was also observed in both the 1989 survey of Literacy Skills Used in Daily Activities and the 1994 IALS.¹⁹³ This east to west pattern also holds for the territories. Overall, the Yukon has the highest average proficiency scores in all four domains.¹⁹⁴

¹⁹² Ibid., accessed. pp. 112–113

¹⁹³ Results of the first major Canadian study on literacy were published in 1991. This study was based on Statistics Canada's 1989 survey *Literacy Skills Used in Daily Activities* (LSUDA). The definition of literacy used at that time was "the information processing skills necessary to use the printed material commonly encountered at work, at home, and in the community." The survey assessed reading, writing, and numeracy skills and scores were slotted into four levels, instead of five. In the IALS, the lowest level, level 1, is analytically equivalent to LSUDA levels 1 and 2. This change was based on analysis of the

As previously noted, the 2003 IALSS was the Canadian component of the Adult Literacy and Life Skills Survey (ALL). When the Canadian data are compared with the international results, the literacy performance of 16 to 65 year-olds in the Yukon, Saskatchewan, Alberta and British Columbia compares favourably with Bermuda and Norway, the best performing OECD countries. ALL results also indicate that the average literacy performance of the adult populations in most Canadian provinces and territories is significantly higher than that of the adult population of the United States.¹⁹⁵

According to Statistics Canada there has been little significant change between the 1994 and 2003 literacy survey results.¹⁹⁶ In this regard, Canada was not unique. Little change in literacy scores was observed over this time period in any of the countries that participated in both international surveys.

In terms of distributions of proficiency, or the spread of proficiency scores between 1994 and 2003, there was also little change. However, the data indicate that there are fewer Canadians at the highest and lowest literacy levels in 2003 than in 1994 and more at level 2 and 3. According to Statistics Canada, few of the changes are statistically significant and therefore “the cautious conclusion is that there has been little change in the literacy profiles of Canadians between 1994 and 2003.”¹⁹⁷

Both the 1994 IALS and the 2003 IALSS data can be accessed through an interactive data retrieval system at Statistics Canada that allows users to retrieve the prose, document and quantitative (numeracy) literary data as well as corresponding data on a wide range of intermediate variables covering adult education, community activities, demographics, educational experience, household information, labour force experience, language background, mathematics, parental information, reading at home or at work, self-reported skills, and training and writing at home or at work.¹⁹⁸ These variables are associated with performance on the literacy tasks, account for between 79% and 89% of the variance in task difficulty, and are generalizable across pools of tasks.¹⁹⁹

A scan of this Statistics Canada database for knowledge-related questions found questions about public library use; time spent watching television or videos; attendance at

LSUDA data and similar data from the United States, which suggested that there was little need to distinguish between the two lowest LSUDA levels. The same analysis suggested a need to provide more levels at the higher end of each literacy scale. Thus, the IALS replaced the highest LSUDA level, level 4, with three new levels—3, 4 and 5. Statistics Canada. *Reading the Future: A Portrait of Literacy in Canada*, Catalogue no. 89-551-XPE, Ottawa: Minister of Industry, 1996. p. 19.

¹⁹⁴ Statistics Canada. *Building on Our Competencies: Canadian Results of the International Adult Literacy and Skills Survey 2003*, accessed. p. 22

¹⁹⁵ Ibid., accessed. p. 30

¹⁹⁶ In 1994 Canada participated in the International Adult Literacy Survey (IALS). In 2003 the survey was renamed the International Adult Literacy and Life Skills Survey (IALSS).

¹⁹⁷ Statistics Canada. *Building on Our Competencies: Canadian Results of the International Adult Literacy and Skills Survey 2003*, accessed. p. 34

¹⁹⁸ Ibid., accessed.

¹⁹⁹ Kirsch, Irwin. *The International Adult Literacy Survey (IALS): Understanding What Was Measured*, Princeton, N.J.: Educational Testing Service (ETS), 2001.

movies, plays, or concerts; and whether books, magazines, or newspapers were read regularly. A question was asked about which parts of the newspaper were regularly read: comics, editorial, finance, advice columns, horoscope, movie / concert lists, classified ads, national / international news, and other. Also, the survey asked whether the household had an encyclopedia, a dictionary, or more than 25 books.

The 1994 survey is not without its detractors. Thomas Sticht, for example, criticizes the survey's validity from a number of perspectives.²⁰⁰ For example, he feels that the survey, since it uses both standardized performance tests and self-assessments, and does not measure knowledge of vocabulary of a cultural nature, particularly underestimates the abilities of older adults. Another criticism is that performance test results were lower than perceived literary abilities in the self-assessment segments, which Sticht hypothesizes might be the arbitrary way the IALS defines proficiency at a given level.

The number of adults thought to be at risk for various factors—such as low employment, dependency upon welfare, poor health care, lack of civic participation, and so forth—due to low literacy in each nation was much higher when the performance scales were used than when the self-assessment scale was used [...]. Using the data for Canada as an example, the document scale performance assessment methodology assigned some 3.3 million adults into literacy Level 1 as poorly literate. However, only 22% of the adults assigned to Level 1 actually considered themselves as poor readers and over 60% to 70% thought they were moderate, good, or excellent at meeting the reading requirements for their daily lives and work.

In this case then, the performance task methodology was not very accurate in predicting the self-assessment results. It produced millions of false negatives—that is, people who were declared to be poorly literate whose self-ratings said they were actually moderately to excellently literate [...]. Even given that many adults may have over-estimated their reading skill levels on the self-assessments, creating numerous false positives (i.e., adults who said they could read well who actually did not perform above Level 1 on the IALS), this analysis lends support to the interpretive inference (construct validity) that the self-assessment scale provides a valid measure of literacy ability.²⁰¹

However, according to Statistics Canada, research has shown that very often those with low literacy levels are reluctant to reveal their abilities and many develop strategies and coping mechanisms to conceal their problem, or have learned to avoid situations that require reading.²⁰²

²⁰⁰ Sticht, Thomas G. "The International Adult Literacy Survey: How Well Does It Represent the Literacy Abilities of Adults?," *The Canadian Journal for the Study of Adult Education*, vol. 15, no. 2, 2001: 19-29.

²⁰¹ Ibid.

²⁰² Statistics Canada. *Adult Literacy in Canada: Results of a National Study*, Catalogue no. 89-525E, Ottawa: Minister of Industry, 1991. pp. 42–44. Statistics Canada's 1989 survey *Literacy Skills Used in Daily Activities (LSUDA)* was conducted on behalf of the National Literacy Secretariat of Multiculturalism, and Citizenship Canada.

17.1.2 Other Canadian literacy initiatives

In 1998, a five-year Strategic Joint Initiative of the National Literacy Secretariat (NLS) and the Social Sciences and Humanities Research Council (SSHRC) was announced called *Valuing Literacy in Canada*. According to the Canadian Education Association (CEA):

[T]his initiative fosters collaborative, multidisciplinary, policy-oriented and applied research on a broad range of issues that affect adult learners' ability to participate in Canadian society. The objectives of the program are to develop research capacity in Canada in the field of adult literacy, and to encourage and assist co-operation between researchers and adult literacy practitioners.²⁰³

²⁰³ Canadian Education Association (CEA). *Focus on Literacy: Policy Landscape*, CEA, 2005; accessed February 2005; available from <http://www.cea-ace.ca/foo.cfm?subsection=lit&page=pol&subpage=lan&subsubpage=can>.

18. Ecological Literacy

Our society is suffering from the loss of vital contact and of the sense of transcendence that nature provides. We have lost the best part of ourselves and we don't know it.

Peter Quince ²⁰⁴

18.1 Environmental learning and education for sustainability: The United Nations Decade of Education for Sustainable Development (DESD)

The United Nations General Assembly adopted a resolution in December 2002 to create the Decade of Education for Sustainable Development (DESD) that would run from 2005 to 2014, with the United Nations Educational, Scientific and Cultural Organization (UNESCO) at its helm.²⁰⁵ The initiative joins and overlaps with three other U.N. educational initiatives—Education for All (EFA), the Millennium Development Goals (MDG), and the United Nations Literacy Decade (UNLD). These initiatives propose to extend basic education to all children and adults, to reduce poverty and inequities, and to focus on literacy in particular as a key instrument and goal of learning.

The DESD was created as “a way of signaling that education and learning lie at the heart of approaches to sustainable development,” and is more concerned than the other three initiatives with the content and purpose of education.²⁰⁶ The DESD takes a broad view of education as learning within formal, nonformal, and informal settings throughout the life course. Education for Sustainable Development (ESD) encompasses environmental education but also includes the broader context of socio-cultural and socio-political issues. The UN therefore notes that education for sustainable development must be integrated into all disciplines and not taught as a separate subject. ESD considers sustainable development as basic to what is needed for the health of the planet and for the social and economic wellbeing of communities and individuals. Sustainable development, the UN argues, will not be achieved by maintaining the status quo. Rather, for sustainable development to become a reality, we need a change of thinking and values.

²⁰⁴ Quince, Peter. "Compost or Computers? Gardening Should Be as Important a Part of Education as English, Maths, and Science." *Resurgence*, January-February, 2000.

²⁰⁵ United Nations Educational, Scientific, and Cultural Organization (UNESCO). *UN Decade of Education for Sustainable Development 2005-2014. International Implementation Scheme (Draft)*, Paris, UNESCO, 2005; accessed April 2005; available from http://portal.unesco.org/education/admin/ev.php?URL_ID=36026&URL_DO=DO_TOPIC&URL_SECTION=201&reload=1099410445.

²⁰⁶ Ibid., accessed.

UNESCO bases education for sustainability on development of particular values, with respect for others as a central coordinating theme: “Learning is most likely to foster the values which underpin sustainable development, since it is more a matter of confidently adopting a vision rather than assimilating a particular body of knowledge.”²⁰⁷ Respect includes that for present and future generations, the environment, and the practices that value and sustain biodiversity and life-supporting ecological processes. UNESCO sees that “alongside positive spiritual motivations, education is our best chance of promoting and rooting the values and behaviours which sustainable development implies.”²⁰⁸

Incorporated in the vision of DESD are fifteen strategic and interconnected perspectives or trends that need to inform education and learning for sustainable development. Sociocultural perspectives include those of human rights; peace and human security; gender equality; cultural diversity and intercultural understanding; health; HIV/AIDS; and governance at local, national, and international levels. The environmental perspectives include those of natural resources (water, energy, agriculture, biodiversity); climate change; rural development; sustainable urbanization; and disaster prevention and mitigation. The economic perspectives include those of poverty reduction; corporate responsibility and accountability; and the global market economy, which the DESD observes “as it currently exists does not protect the environment and does not benefit roughly half of the world’s people.”²⁰⁹ The DESD is also explicit in identifying over-consumption and over-development as key factors in environmental unsustainability, and it warns that the rich “have much higher levels of unsustainable production and consumption” than do the poor, adding, “[w]hile the rich are able to adopt patterns of sustainable development, they frequently are reluctant to do so—the poor have few if any options but to make use of their immediate environment.”²¹⁰

UNESCO has developed an “implementation scheme” for the DESD, which was formally approved by the Executive Board of UNESCO in 2005, in order to provide multi-level guidance and a broad framework for the contribution of all partners—governmental, civil society and NGOs, private business, and media, at local, regional, sub-national (provincial), national, and international levels. The draft of this scheme outlines the kind of education that leading academics and experts in the field, as well the hundreds of government and NGO stakeholders consulted, consider essential in order to lead action to meet the global challenge for sustainable development.

The implementation scheme includes strategies that can be applied at all levels within all contexts—social, environmental, and economic. The seven strategic areas are: advocacy and vision building; consultation (and participation in policy and initiative planning) and ownership (of the vision); partnership and networks; capacity building and training; research and innovation; use of information and communication technologies (ICTs); and monitoring and evaluation of the changes and impact of the DESD. UNESCO suggests the “effectiveness of the Decade will ultimately be judged by the degree of change in

²⁰⁷ Ibid., accessed. p. 17.

²⁰⁸ Ibid., accessed. p. 16.

²⁰⁹ Ibid., accessed. p. 22.

²¹⁰ Ibid., accessed. p. 10.

attitude and behaviour in the lives of communities and individuals at the local level.”²¹¹ However, UNESCO recognizes that this will only be accomplished through activities and understanding at all levels.

The DESD framework for monitoring and evaluation is based on five objectives and 11 outcomes that have potential indicators and suggested data sources. Both qualitative and quantitative indicators are recommended and interested groups will decide for themselves which specific indicators to use and the kinds of data needed for these indicators. This framework includes indicators assessing the DESD initiative itself. However, these indicators represent the social and economic systems necessary for sustainable development and are broader than the objective of “educational attainment” of the individual alone. For the Canadian Index of Wellbeing, we are interested in this broader sociocultural approach as well, since it represents the collective, holistic knowledge that society holds and acts upon in order to enhance societal wellbeing. Therefore, the DESD framework and potential indicators can be examined as a basis for the broader education—or learning—indicators under development for the CIW. In Appendix 2, we list all of the objectives, expected outcomes, potential indicators, and possible generic data sources proposed for the DESD, although not all of these may be useful for our CIW purposes.

The DESD approach encourages longitudinal studies and qualitative analysis based on ethnographic approaches to indicate the changed behaviour, awareness of values of sustainable development, and the adoption of sustainable development practices within communities. UNESCO will identify places for longitudinal studies in the early phases of the Decade, will establish a database of indicators and means of verification, and will work with countries to increase their capacity for monitoring and evaluation.

Further research will clearly be needed in the coming years, in collaboration with the DESD, to identify which of these indicators are most appropriate for the CIW, and which comparable data sources are available in Canada for potential use in the CIW.

²¹¹ Ibid., accessed. p. 33.

18.2 Encyclopedia of Life Support Systems (EOLSS)

In the event of a world catastrophe, future generations will need a book of knowledge to guide them in rebuilding civilization.

James Lovelock²¹²

The foundation of any civilization is knowledge. A sustainable society cannot be realized without detailed and thorough knowledge of all the different disciplines involved in sustainable development, and a wise and judicious development, implementation and sharing of this knowledge.

UNESCO-EOLSS²¹³

UNESCO has produced a “living encyclopedia” knowledge resource for sustainable development, “the world’s largest online publication,” that offers “integrated knowledge and worldviews related to the state of Earth’s natural, social, institutional, economic and financial resources.”²¹⁴ The *Encyclopedia of Life Support Systems* (EOLSS) was released online in 2002, after almost a decade in development, with information that is equivalent to 40 printed volumes. It is updated and augmented approximately every two weeks. Sample chapters are available online to the general public, however, the entire EOLSS must be accessed online through university libraries or through subscriptions. A special additional publication in three printed volumes of about 1,000 pages each, called *Knowledge for Sustainable Development—An Insight into the Encyclopedia of Life Support Systems* has also been released. The EOLSS defines *life support system* as:

... any natural or human engineered (constructed) system that furthers the life of the biosphere in a sustainable fashion. The fundamental attribute of life support systems is that together they provide all of the sustainable needs required for continuance of life.²¹⁵

The vision of the EOLSS is one of knowledge serving humanity in a way that contributes to providing a “better quality of life and a sustainable and healthy environment for present and future generations.” The key focus is the relationship between humans and nature:

To date, education and the media have only succeeded in fostering a culture characterized by narrow vested interests, intolerance and violence. There must be a fundamental change in education, creating the desire for proactive

²¹² Lovelock, James. "A Modest Inheritance." *Resurgence*, March, 1997.

²¹³ United Nations Educational, Scientific, and Cultural Organization (UNESCO). *Encyclopedia of Life Support Systems (EOLSS)*, Oxford, U.K., EOLSS Publishers, 2004; accessed June 2005; available from <http://www.eolss.net/>.

²¹⁴ Ibid., accessed.

²¹⁵ Ibid., accessed.

environmental protection and respect for human dignity and rights, as the two are mutually empowering.²¹⁶

The EOLSS comprehensively examines all of the systems that support life on earth including natural and social systems, and it therefore includes a diverse range of social issues such as human rights, poverty, peace, biodiversity, ecotechnology,²¹⁷ environmental economics, and the unity of knowledge (in transdisciplinary research for sustainability). The aim of the EOLSS is to serve as an expert advisor, rather than merely to provide raw information. It was created to reach a wide audience from university students to professors, scientists, researchers, educators, and policy and decision makers as a professional guide, rather than “a casual reference to satisfy occasional curiosity.”

The EOLSS contains a selection of articles covering the knowledge base for “every aspect of sustainable development.” The body of knowledge contained in the EOLSS is arranged thematically (rather than alphabetically) and covers 16 subject domains—each comprising an interrelated sub-encyclopedia with about 200 subject themes, each of which contains about 30 chapters. The EOLSS provides different levels of specialization and was written with contributions from more than 7000 scholars in over 100 countries, including many Nobel Laureate scholars. It presents a wide perspective and a holistic understanding of principles, paradigms, methodologies, examples, knowledge practices, case studies, and future perspectives related to sustainable development.

The EOLSS is especially concerned with the higher education sector since UNESCO has noted that this is where society should produce leaders capable of addressing sustainability needs.

If universities are to be the nursery of tomorrow’s leaders and to educate most of the people who develop and manage society’s institutions, then the sector bears ‘profound responsibilities to increase the awareness, knowledge, technologies, and tools to create a sustainable future’, as stated in the *Talloires Declaration* which was signed in 1990 by many of the world’s university leaders [including Canadians]. This clearly implies that graduates of *every* discipline will need a sound working knowledge about sustainability.²¹⁸

In a personal email correspondence with a co-author of this literature review, Vladislav Kotchetkov of the UNESCO-EOLSS Joint Committee Secretariat suggested that, when the EOLSS attains full maturity (which is expected soon), the EOLSS will be “regarded as a model of human knowledge.”²¹⁹ It includes, however, only established knowledge and suggests that new knowledge is the domain of refereed research journals. The

²¹⁶ Ibid., accessed.

²¹⁷ Ecotechnology is defined by the EOLSS as “involving appropriate blends of traditional technologies and the ecological prudence of the past with frontier technologies such as biotechnology, information technology, space technology, new materials, renewable energy technology, and management technology.” Ibid., accessed.

²¹⁸ Ibid., accessed.

²¹⁹ Kotchetkov, Vladislav, UNESCO-EOLSS Joint Committee Secretariat, personal communication with Karen Hayward, email correspondence, July, 2005.

Secretariat is concerned in the future to capture the component of “indigenous knowledge from the various communities in the world transferred to the generations by culture and tradition.” The Secretariat is also concerned that it cannot “take into account in any way” the research and developmental knowledge developed in the corporate sector by their commercially sponsored activities as these remain “as unpublished, classified, confidential, and proprietary.”²²⁰

In answer to questions concerning data tracking and indicators of knowledge change, Mr Kotchetkov of the UNSECO-EOLSS Secretariat notes that in the future the Secretariat does plan to develop indicators to monitor knowledge changes relative to the “actual body of knowledge in the world taken as a whole.” Such indicator work will be of direct interest and relevance to the educated populace domain of the Canadian Index of Wellbeing.

²²⁰ Ibid., personal communication.

18.3 Environmental learning and education for sustainability in Canada

Canada has made considerable progress in developing education for sustainability, which is termed “Environmental Learning and Sustainability” (ELS) by Environment Canada (EC). ELS includes nonformal and informal education as well as education in the formal system. What follows is a brief overview of some of the many activities and organizations dedicated to sustainability education in Canada. It is difficult to evaluate their impact, however, since most of the relevant websites do not include assessment information. Thomson and Hoffman suggest that environmental educational professionals, in particular, do not understand methods of evaluation, which are often expensive to undertake. They also found that measurement techniques were lacking in outcomes such as values shift, behaviour change, and benefits to the environment.²²¹ As the Canadian report to the World Summit on Sustainable Development in 2002 observes:

By definition, educational efforts take time to bear fruit. While Canadians are more environmentally aware than ever before, polling research also reveals that many do not make the link between their lifestyle choices and environmental effects. This has led to inconsistent behaviours, such as high rates of household recycling co-existing with a continued demand for large gas-guzzling vehicles.²²²

Environmental educators have provided leadership in developing concepts, curricula, teacher education, and educational programs since at least the 1960s. In 1992, The United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, helped systematize the educational process for sustainable development through its declaration, “Agenda 21.” Chapter 36 of Agenda 21 provides recommendations for “Promoting Education, Public Awareness and Training.”²²³ It specifically recommends that:

Governments should strive to update or prepare strategies aimed at integrating environment and development as a cross-cutting issue into education at all levels within the next three years. This should be done in cooperation with all sectors of society. The strategies should set out policies and activities, and identify needs, cost, means and schedules for the implementation, evaluation and review. A thorough review of curricula should be undertaken to ensure a multidisciplinary approach, with environment and development issues and their socio-cultural and demographic aspects and linkages. Due respect should be given to community-

²²¹ Thomson, Gareth, and Jenn Hoffman. *Measuring the Success of Environmental Education Programs*, Canadian Parks and Wilderness Society, Sierra Club of Canada-B.C. Chapter, Global, Environmental, and Outdoor Education Council of Alberta, 2003; accessed April 2005; available from http://www.sierraclub.ca/bc/programs/education/educators/resources/Measure_Success_of_EE_Final.pdf.

²²² Earth Summit 2002 Canadian Secretariat. *Sustainable Development: A Canadian Perspective*, Government of Canada, 2002; accessed March 2005; available from http://www.wssd-smdd.gc.ca/canada_at_wssd/canadian_perspective_e.cfm.

²²³ Environment Canada. *A Framework for Environmental Learning and Sustainability in Canada*, Government of Canada, 2002; accessed July 2004; available from http://www.ec.gc.ca/education/framework/framework_overview_e.htm.

defined needs and diverse knowledge systems, including science, cultural and social sensitivities. [...]

The objective is to promote broad public awareness as an essential part of a global education effort to strengthen attitudes, values and actions which are compatible with sustainable development. It is important to stress the principle of devolving authority, accountability and resources to the most appropriate level with preference given to local responsibility and control over awareness-building activities.²²⁴

According to Environment Canada, “many Canadians are fully engaged in implementing the recommendations.”²²⁵

In October 1992, Toronto hosted over 4,000 environmental educators from 90 countries at the World Congress for Education and Communication on Environment and Development (ECO-ED). As a response to this meeting, the Canadian Network for Environmental Education and Communication (EECOM) was formed with a mission “to engage Canadians in learning about their environment by enabling teachers, educators, and communicators to work together to nurture environmentally-informed and responsible individuals, organizations and communities.”²²⁶

The National Round Table on the Environment and the Economy (NRTEE) held a meeting in 1993 of heads of post-secondary institutes and centres for sustainable development research. The Canadian Consortium for Sustainable Development Research (CCSDR), coordinated by the Sustainable Development Research Initiative (SDRI), developed from this meeting.²²⁷ Its mandate is to promote collaboration among post-secondary sustainable development institutes and university and research centres, and to act in an advisory capacity to the federal government for policy development and research initiatives. According to its website, the CCSDR “offers a one-stop shopping window into the sustainable development research community across Canada.”²²⁸ In addition, it publishes a multi-discipline sustainable development book series that reports on ecological, political, social, and economic progress in SD. This series was not available to our CIW research team and, in fact, may be out of date. This lack of availability may indicate that the initiative currently has limited reach. However, the CCSDR might be a useful resource for future development of appropriate indicators in this field.

²²⁴ United Nations Department of Economic and Social Affairs. Division for Sustainable Development (DESA). *Promoting Education, Public Awareness and Training*, Chapter 36, UN-DESA, 2002; accessed May 2005; available from <http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21chapter36.htm>.

²²⁵ Environment Canada. *A Framework for Environmental Learning and Sustainability in Canada*, accessed.

²²⁶ Earth Summit 2002 Canadian Secretariat. *Sustainable Development: A Canadian Perspective*, accessed.

²²⁷ Canadian Consortium for Sustainable Development Research (CCSDR). *Website*, accessed April 2005; available from <http://www.royalroads.net/ccsdr/index-hp.htm>.

²²⁸ Ibid., accessed.

There are many environmental education initiatives focused on the formal education system. For example, the Nova Scotia Museum of Natural History phenology project, Thousand Eyes, which is based on an observation initiative started over 100 years ago, involves students in observing, recording, and studying natural history events to help understand climate change and other phenomena.²²⁹ The Canadian Environmental Literacy Project (CELP) at Dalhousie University in Halifax, was formed in 2004 with private foundation funding and has a three-year mandate to develop new open-access environmental studies teaching materials.²³⁰ It should be possible in the future to develop indicators to assess the effectiveness and reach of this environmental research program.

The Learning for a Sustainable Future (LSF) initiative, created by the NRTEE, works to support sustainable development concepts and principles within school curricula and communities.²³¹ LSF has developed a curriculum framework that it has circulated to approximately 800 educators, business leaders, and government and non-governmental organizations. The framework lists knowledge, skills, and values that are needed for the sustainability and wellbeing of the environment, health, the economy, and society.²³² A sample of these needs includes:

Knowledge needed:

- The planet earth as a finite system and the elements that constitute the planetary environment.
- The resources of the earth, particularly soil, water, minerals, etc., and their distribution and role in supporting living organisms.
- The nature of ecosystems and biomes, their health, and their interdependence within the biosphere.
- The dependence of humans on the environmental resources for life and sustenance.
- The sustainable relationship of native societies to the environment.
- The implications of resource distribution in determining the nature of societies and the rate and character of economic development.
- The interconnectedness of present world political, economic, environmental, and social issues
- The implications for the global community of the political, economic, and socio-cultural changes needed for a more sustainable future.
- Processes of planning, policy-making, and action for sustainability by governments, businesses, non-governmental organizations, and the general public.

²²⁹ Earth Summit 2002 Canadian Secretariat. *Sustainable Development: A Canadian Perspective*, accessed.

²³⁰ Canadian Environmental Literacy Project (CELP). *Website*, Halifax, Nova Scotia, CELP, Department of Biology, Dalhousie University, accessed April 2005; available from <http://celp.ucis.dal.ca/index.php>.

²³¹ Learning for a Sustainable Future (LSF). *Website*, LSF, York University, accessed April 2005; available from <http://www.lsf-lst.ca/en/home/>.

²³² Manitoba Education, Training and Youth (Sustainable Development Initiative). *Educating for Sustainability. The Status of Sustainable Development in Canada*, Toronto, Council of Ministers of Education Canada (CMEC), 1999; accessed December 2004; available from <http://www.cmec.ca/else/environment.en.pdf>.

Skills needed:

- Frame appropriate questions to guide relevant study and research.
- Define such fundamental concepts as environment, community, development, and technology, and apply definitions to local, national and global experience.
- Use a range of resources and technologies in addressing questions.
- Assess the nature of bias and evaluate different points of view.
- Develop hypotheses based on balanced information, critical analysis, and careful synthesis, and test them against new information and personal experience and beliefs.
- Communicate information and viewpoints effectively.
- Work towards negotiated consensus and cooperative resolution of conflict.
- Develop cooperative strategies for appropriate action to change present relationships between ecological preservation and economic development.

Values needed:

- An appreciation of the resilience, fragility and beauty of nature and the interdependence and equal importance of all life forms.
- An appreciation of the dependence of human life on the resources of a finite planet.
- A sense of self-worth and rootedness in one's own culture and community.
- A respect for other cultures and a recognition of the interdependence of the human community.
- A global perspective and loyalty to the world community.
- A concern for disparities and injustices, a commitment to human rights and to the peaceful resolution of conflict.
- An appreciation of the challenges faced by the human community in defining the processes needed for sustainability and in implementing the changes needed.
- Personal acceptance of a sustainable lifestyle and a commitment to participation in change.
- A realistic appreciation of the urgency of the challenges facing the global community and the complexities that demand long-term planning for building a sustainable future²³³

In 1997, the Council of Ministers of Education Canada (CMEC) produced the *Common Framework of Science Learning Outcomes, K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum*,²³⁴ which has many elements of education for sustainability. We will look at this framework in detail in the next section of this review, on scientific literacy.

²³³ Ibid., accessed. pp. 97–98.

²³⁴ Council of Ministers of Education Canada (CMEC). *Common Framework of Science Learning Outcomes, K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum*, Council of Ministers of Education, Canada, 1997; accessed December 2004; available from <http://www.cmec.ca/science/framework>.

In 1999, Manitoba Education, Training and Youth, as part of its Sustainable Development Initiative, produced a document for the CMEC, *Educating for Sustainability: The Status of Sustainable Development in Canada*. This report develops a rationale for educating for sustainability and presents a comprehensive review of policies, guidelines, curricula, teacher training, learning resources, and actions taken in Canadian provinces and territories, and recommendations for future action.

Between 1999 and 2002 over 5,500 Canadians participated in the National Consultation on Environmental Education and Sustainability led by Environment Canada. This process resulted in designing a framework for Environmental Learning and Sustainability (ELS) that was presented at the World Summit on Sustainable Development in Johannesburg in August 2002.²³⁵ The framework has resulted in an ELS website through Environment Canada as well as action plans from 236 organizations. These organizations include 19 plans from all levels of government, 4 from universities and research centres, 6 from museums, 105 schools and colleges, 3 from school boards, 26 from NGOs, and 45 from Environmental learning NGOs, among others. Transport Canada, Natural Resources Canada, and Environment Canada all have developed action plans. The specific plans for each of the 236 initiatives are available on the ELS website.²³⁶ Many Canadian initiatives, however, are not included on the ELS website, such as the new Research Chair of Canada in Environmental Education at the Université du Québec à Montréal. This Chair will develop research in community action as a context for environmental education, teacher development, and the integration of environmental education within curricula of formal education.²³⁷

Environment Canada (EC) is now acting as a facilitator and network contact for Canadian ELS stakeholders who wish to develop action plans, and the department intends to issue regular reports on these efforts. EC notes that the long-term success of the ELS framework can be:

²³⁵ Environment Canada. *A Framework for Environmental Learning and Sustainability in Canada*, accessed.

²³⁶ http://www.ec.gc.ca/education/ee_introduction_e.htm

The Government of Canada initiatives listed on the website include those from the following departments and agencies: Transport Canada, Natural Resources Canada, Environment Canada, Canadian Museum of Nature / Canadian Centre for Biodiversity, Climate Change Action Fund—Public Education and Outreach component, Environment Canada Biosphere—Environmental Observation Centre and Showcase for Information on Water. Among other national initiatives are those from: Association for Canadian Educational Resources, Inc. (A.C.E.R. Inc); BIOCAP Canada Foundation—Queen's University; Canadian Biodiversity Institute—Great Canadian BioBlitz.; Canadian Ecology Centre; Canadian Forestry Association; Canadian Institute for Environmental Law and Policy (CIELAP); Canadian Journal of Environmental Education; Canadian Network for Environmental Education and Communication (EECOM); Centre for Indigenous Environmental Resources; Labour Environmental Alliance Society (LEAS); Learning for a Sustainable Future.; Society, Environment and Energy Development Studies (SEEDS) Foundation; Working Group on Museums and Sustainable Communities; and Youth Round Table on the Environment.

²³⁷ Environment Canada. *A Framework for Environmental Learning and Sustainability in Canada*, accessed.

measured by the continual development of an active, competent citizenry, whose lifestyles increasingly reflect informed choices about the environment and a commitment to sustainable living. More specifically, it will be clear that implementation of the Framework is on the right track if:

- The number, variety, geographic scope, and sophistication of front-line environmental learning and sustainability initiatives continue to increase.
- The individuals, groups, corporations, and agencies that took part in the consultation declare their support for environmental learning and sustainability, and develop their own action plans in response, to make their skills and successes transferable to others.
- Action plans are leading to practical results, while generating new insights and best practices that can be shared among practitioners and learners, across the country and around the world.
- Wider dissemination of environmental knowledge and learning leads to broader adoption of sustainable practices, at all levels and in all sectors.
- More resources are devoted to environmental education programs at all levels of formal education, leading to an increase in the number and breadth of K-12 courses and course modules, post-secondary courses and degree programs, and post- graduate programs with environmental education specialties.
- An increase in public discussion and media coverage indicates broader interest in environmental education, and in wider environmental and sustainability issues.²³⁸

²³⁸ Ibid., accessed.

18.4 Measurements of ecological literacy

Godfrey Nolan of the Geological Survey of Canada makes an important point that is relevant to knowledge of sustainability issues and its indication.²³⁹ He suggests that people in industrial countries do not make a connection between their lives and the current level of civilization and the earth resources necessary to maintain this level. The simplistic questions on the basic surveys such as whether the centre of the earth is hot or whether humans lived at the time of dinosaurs, he suggests, do not measure the most important things that the public needs to know to possess essential life skills and to make critical decisions. There is presently a disconnect, he suggests, between people's knowledge of ordinary things, such as glass in windows, wallboard, and the plastic, steel, and copper wiring in computers, for example, and the knowledge that these all come from natural resources. What is not measured in surveys, Nolan suggests is:

... their understanding of the complex relationships between extraction of resources, their use and value, and their effect upon the general environment. Many also harbour misconceptions about natural hazards that may affect their lives from time to time. Furthermore, they commonly fail to understand much about their actual interface with the surface of the Earth on which they live. Think of the importance to humans of earthquakes, soil degradation, landslides, metals, plastics, energy resources and ask yourself what the general public knows about these.²⁴⁰

David Orr cites a test of bioregional knowledge that was proposed by *Co-Evolution Quarterly*. Speculating that few people would do well on the quiz, Orr sees it as an indicator of "a widening gap between the growing power of our society over nature and the general ignorance about it among individuals."²⁴¹

This test includes the following questions:

1. What soil series are you standing on?
2. When was the last time a fire burned in your area?
3. Name five native edible plants in your region and their seasons of availability.
4. From what direction do winter storms generally come in your region?
5. Where does your garbage go?
6. How long is the growing season where you live?
7. Name five grasses in your area. Are any of them native?
8. Name five resident and five migratory birds in your area.
9. What primary geological event or processes influenced the land where you live?
10. What species have become extinct in your area?

²³⁹ Nowlan, Godfrey S. *The Earth and Its People: Repairing Broken Connections*, Calgary, Alberta, Geological Survey of Canada, 2001; accessed December 2004; available from <http://cgen.bio.ns.ca/Nowlan.pdf>.

²⁴⁰ Ibid., accessed.

²⁴¹ Orr, David. W. *Ecological Literacy. Education and the Transition to a Postmodern World*, Albany: State University of New York Press, 1992. p. 137.

11. What are the major plant associations in your region?²⁴²

18.4.1 The New Environmental Paradigm (NEP) scale

The New Environmental Paradigm (NEP) scale has been widely used internationally to test basic attitudes toward the environment since Dunlap and van Liere first developed the scale in 1978.²⁴³ According to Cordano, et al.: “The impact of the original NEP is difficult to overestimate given the continuing stream of studies using the scale.”²⁴⁴

Primary researcher, Riley E. Dunlap, was Boeing Distinguished Professor of Environmental Sociology at Washington State University until 2002, when he moved to Finland to become Donner Professor at Abo Akademi University. He was also Past President of the International Sociological Association’s Research Committee on Environment and Society.

The 12-item NEP scale focusses on three aspects of a new social paradigm or worldview: humanity’s ability to upset the balance of nature; limits of growth for human societies; and concerns over humanity’s right to rule over the rest of nature.²⁴⁵ A high score on this scale indicates an endorsement of environmental conservation, which challenges dominant views about human relationships to nature that see nature mostly as something to be exploited for human use. Thus, a high score can be interpreted as a negative relationship to the dominant social paradigm (DSP), which holds a basically anti-environmental attitude. A research consensus has emerged that a high score on the NEP should lead to pro-environmental attitudes on a wide-range of specific issues, although other barriers and opportunities may also influence pro-environmental behaviour.

The NEP has undergone a great deal of testing during the past two decades and has been found to have considerable validity. As a response to questions concerning contemporary reliability of the scale, however, Dunlap, et al. suggested that new instruments were needed to measure people’s belief systems and “ecological consciousness” to replace the measures of “environmental concern,” which are more specific and less systemic than an ecological approach.²⁴⁶ Dunlap and van Liere consequently revised the NEP scale in the 1990s to include a wider range of facets of an ecological worldview, a more balanced set of pro and anti-NEP items, and a revision of outmoded terms.²⁴⁷

The new scale, now titled the New Ecological Paradigm scale, contains 15 items, an addition of three items over the original NEP scale. The new scale uses 6 of the items from the old scale and includes two new dimensions as well as the original three

²⁴² Ibid.

²⁴³ Cordano, Mark, Stephanie A Welcomer, and Robert F Scherer. "An Analysis of the Predictive Validity of the New Ecological Paradigm Scale," *The Journal of Environmental Education*, vol. 34, no. 3, 2003: 22-28.

²⁴⁴ Ibid. p. 23.

²⁴⁵ Dunlap, Riley E., K.D. van Liere, A.G. Mertig, and R.E. Jones. "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale," *Journal of Social Issues*, vol. 56, no. 3, 2000: 425-442.

²⁴⁶ Ibid. p. 425.

²⁴⁷ Ibid.

dimensions noted above from the original scale. The two new dimensions are the attitudes of exemptionalism, and concern about the possibility of an eco-crisis. The authors view the idea of “human exemptionalism,” prominent in the DSP, to mean that humans, unlike other animals, are exempt from the constraints of nature. Specific items used in the NEP scale to tap the eco-crisis dimension, or the perceived seriousness of major world ecological problems, refer to the increasing environmental destruction patterns shown in climate change, ozone depletion, and global environmental change caused by humans. Tests of the new scale have shown a reliable internal consistency, which allows the scale to be treated as a single construct to measure a coherent worldview.

Cordano, Welcomer, and Scherer note that the need for environmental concern measures is increasing as more researchers in a variety of disciplines are incorporating environmental issues into their research.²⁴⁸ They conducted studies to compare the predictive validity of the original and revised NEP scales and found that both scales provide useful tools, as does Dunlap’s earlier modified regulation attitudes scale, which provides more content-specific measures of environmental attitudes toward regulations and intended pro-environmental behaviour. In the latter scale, intended behaviour includes signing petitions, protesting against harmful companies and in general against adverse environmental conditions, participating in events organized by environmental groups, distributing information, and writing letters to public officials to increase their support for environmental protection. In conclusion, Cordano, et al. encourage researchers to use scales appropriate to their investigative needs, and they also encourage them to use the full work of Dunlap, et al. and others who have been researching environmental concern for more than 25 years.

Both NEP scales have been used in large population surveys in the U.S.²⁴⁹ Consistent results show that people have more support for pro-environmental beliefs than they do for the idea that there are limits to growth. Pro-environmental attitudes are also more prominent in young, well-educated, and politically liberal adults. Dunlap, et al. suggest that new research should include comparisons of NEP beliefs across different populations and should assess the degree that belief systems or worldviews influence environmental attitudes, beliefs, and behaviors.²⁵⁰ They propose that the new NEP scale should be useful in tracking changes in ecological worldviews, the effects of specific problematic environmental experiences, and responses to information from government, scientists, environmentalists, and the media that may generate changes in this worldview.

Table 4 shows items used on the new NEP scale, and Table 5 shows items used in its abbreviated form, which Cordano, et al. suggest can be used by researchers who want to use the NEP but have limited space on their own surveys. The new scale uses a 5-point response scale ranging from 1 = strongly disagree to 5 = strongly agree. It adds a new

²⁴⁸ Cordano, Welcomer, and Scherer. "An Analysis of the Predictive Validity of the New Ecological Paradigm Scale."

²⁴⁹ Dunlap, Liere, Mertig, and Jones. "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale."

²⁵⁰ Ibid.

response, “unsure,” to eliminate the “don’t know” response in the original scale. (Note that the questions listed below are organized, for clarity, according to the dimension they are measuring. In the NEP scale itself, however, these items are not placed under an identifying banner and are organized in a different order, the number of which is shown in parentheses as the end of the question.)

Table 4: The revised New Ecological Paradigm (NEP) scale

Balance of nature

- When humans interfere with nature, it often produces disastrous consequences. (3)
- The balance of nature is very delicate and easily upset. (13)
- The balance of nature is strong enough to cope with the impacts of modern industrial nations. (8)

Eco-crisis

- Humans are severely abusing the environment. (5)
- The so-called ‘ecological crisis’ facing humankind has been greatly exaggerated. (10)
- If things continue on their present course, we will soon experience a major ecological catastrophe. (15)

Antiexemptionalism

- Human ingenuity will insure that we do NOT make the earth unlivable. (4)
- Despite our special abilities, humans are still subject to the laws of nature. (9)
- Humans will eventually learn enough about how nature works to be able to control it. (14)

Limits to growth

- The earth is like a spaceship with very limited room and resources. (11)
- We are approaching the limit of the number of people the earth can support. (1)
- The earth has plenty of natural resources if we just learn how to develop them. (6)

Anti-anthropocentrism (Human domination)

- Plants and animals have as much right as humans to exist. (7)
- Humans have the right to modify the natural environment to suit their needs. (2)
- Humans were meant to rule over the rest of nature. (12)

Note: numbers in parentheses at the end of the questions represent the order of the questions in the actual survey instrument. Instructions are for the respondents to indicate agreement or disagreement or unsure on a 5-point scale

Source: Adapted from Dunlap, Riley E., K. D. van Liere, A.G. Mertig, and R.E. Jones. "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." *Journal of Social Issues*, 56, no. 3 (2000): 425-42., and Cordano, Mark, Stephanie A Welcomer, and Robert F Scherer. "An Analysis of the Predictive Validity of the New Ecological Paradigm Scale." *The Journal of Environmental Education*, 34, no. 3 (2003 Spring): 22–28.

Table 5: Abbreviated NEP-based scales

Balance

- The balance of nature is very delicate and easily upset.
- When humans interfere with nature it often produces disastrous consequences.
- Humans are severely abusing the environment.
- The so-called 'ecological crisis' facing humankind has been greatly exaggerated.
- If things continue on their present course, we will soon experience a major ecological catastrophe.

Human domination

- Humans have the right to modify the natural environment to suit their needs.
 - Humans were meant to rule over the rest of nature.
 - Plants and animals exist primarily to be used by humans.
-

Source: Cordano, Mark, Stephanie A Welcomer, and Robert F Scherer. "An Analysis of the Predictive Validity of the New Ecological Paradigm Scale." *The Journal of Environmental Education*, 34, no. 3 (2003 Spring): 22–28.

19. Indigenous Knowledge Literacy

Any assessment of the role of Indigenous knowledge (IK) today must occur within the larger context of the long history of genocide and abuse suffered by First Nations peoples in the Americas at the hands of Euro-Americans. The destruction was not only physical, but extended to the body of knowledge, learning, and culture of First Nations peoples. As Fain, et al. argue, Europeans treated Aboriginal culture as unscientific, primitive, and merely superstitious, and deliberately sought to destroy Indigenous languages and traditional knowledge.²⁵¹

Despite this sad legacy, new understanding of and respect for the rich legacy of IK has recently emerged in the West. Canada, in particular, has officially recognized the importance of diversity and multiculturalism to society; and First Nations peoples themselves have begun to rediscover their own heritage in an effort both to prevent its total extinction and to reconnect with their own dignity. George Sefa Dei notes that in Canada, Aboriginal communities are rewriting their histories, including naming historical periods from their own perspectives, in an effort to reclaim their past, which has been largely excluded from the official history of the “colonial” nation.²⁵²

Much of IK, language, and wisdom has already been lost, although as Brockman points out, there is still a great deal of IK that remains, and the extent of loss can be overestimated.²⁵³ The knowledge of Indigenous languages is particularly vulnerable, however. Aboriginal languages are a vital means of transferring oral knowledge between generations. They express concepts that are not captured in other languages, as Eli Taylor of Manitoba reported to the House of Commons Standing Committee on Aboriginal Affairs:

Our Native language embodies a value system about how we ought to live and relate to each other [...] it gives a name to relations among kin, to roles and responsibilities among family members, to ties with the broader clan group. There are no English words for these relationships because your social and family life is different from ours. Now if you destroy our language, you not only break down these relationships, but you also destroy other aspects of our Indian way of

²⁵¹ Fain, Stephen M., Martha Barantovick, and Raquel Martin. "The Aims of Education in an Age of Stasis and Change," in *Encyclopedia of Social Sciences and Humanities: Education for Sustainability in Encyclopedia of Life Support Systems (EOLSS)*, ed. Farrell, Robert V. and George Papagiannis. Oxford, U.K.: Developed under the Auspices of the UNESCO, EOLSS Publishers, 2004, accessed June 2005; available from http://www.eolss.net/eolss_samplechapters_C04.aspx.

²⁵² Dei, George J. Sefa. *Rethinking the Role of Indigenous Knowledge in the Academy*, The Research Network on New Approaches to Lifelong Learning, Ontario Institute for Studies in Education/University of Toronto, NALL Working Paper 58, 2002; accessed November 2005; available from <http://www.nall.ca/res/index.htm>.

²⁵³ Brockman, Aggie. *When All Peoples Have the Same Story, Humans Will Cease to Exist: Protecting and Conserving Traditional Knowledge: A Report for the Biodiversity Convention Office*, Dene Cultural Institute, 1997; accessed December 2005; available from http://www.nativemaps.org/abstracts/all_peoples.pdf.

life and culture, especially those that describe man's connection with nature, the Great Spirit, and the order of things. Without our language, we will cease to exist as a separate people.²⁵⁴

Indian and Northern Affairs Canada lists more than 630 Aboriginal nations speaking more than 50 languages in Canada.²⁵⁵ The Canada Council for the Arts gives details of current trends in Aboriginal language use based on Statistics Canada census data:

- Of the 800,000 Canadians who claimed an Aboriginal identity in 1996, only 26% claimed an Aboriginal language as their mother tongue, and even fewer spoke an Aboriginal language at home.
- Over the past 100 years, approximately ten of fifty Canadian Aboriginal languages have become extinct, while an additional twelve languages are on the brink of extinction.
- Only one-quarter (26%) of Aboriginal youth aged 15 to 24 reported an ability to converse in an Aboriginal language, compared with one-third of Aboriginal adults aged 25 to 34, and one-half of Aboriginal adults aged 55 and over.
- Inuktitut, Cree, and Ojibway are the only three out of a total of fifty Aboriginal languages that currently have a sufficient base of speakers to be considered secure from the threat of extinction.²⁵⁶

The importance of preserving and strengthening the remaining Aboriginal languages has only recently been officially acknowledged and supported. For example, the Native Social and Cultural Development Program of the Department of Canadian Heritage is designed to increase, promote and strengthen the individual opportunities of Aboriginal peoples to develop their full potential and talents in the socio-cultural domain. The program's current focus is particularly the promotion and retention of Aboriginal languages. The annual budget of \$1 million supports approximately 90 projects annually.

National and international organizations have recognized the need to protect IK, which, in Canadian law, is protected as part of Aboriginal and treaty rights, although the degree of true protection for Aboriginal and treaty rights is disputed. In Canada, the Royal Commission on Aboriginal Peoples has affirmed and acknowledged the importance of IK as an essential policy goal,²⁵⁷ and internationally, the United Nation's *Principles and Guidelines for the Protection of the Heritage of Indigenous Peoples* has also

²⁵⁴ Ibid., accessed. cited in Hunter, Anna. *Traditional and Western Systems of Knowledge*, Prince George, University of Saskatchewan, 2002; accessed January 2006; available from <http://uarctic.org/bcs/BCS100/index.htm>. p. 6.

²⁵⁵ Indian and Northern Affairs Canada (INAC). *First Nation Profiles Database*, 2007; accessed March 2007; available from http://sdiprod2.inac.gc.ca/fnprofiles/FNProfiles_Search.asp?Search=FN.

²⁵⁶ Canada Council for the Arts. *Overview of Key Demographic Trends - Possible Impact on Canadian Arts Attendance*, The Canada Council for the Arts, 2002; accessed August 2005; available from <http://www.canadacouncil.ca/NR/rdonlyres/7ABE4A9B-798B-4262-8AFF-FD45E9A5089A/0/demographse.pdf>. p. 21.

²⁵⁷ Royal Commission on Aboriginal Peoples. *Report of the Royal Commission of Aboriginal Peoples*. 5 vols., Ottawa: Canada Communication Group, 1996.

acknowledged the scientific and logical validity of IK.²⁵⁸ These *Principles and Guidelines* define IK as comprising all knowledge pertaining to a particular people and its territory that has been handed down from generation to generation, that is not static but is further refined by each generation, and that includes “all kinds of scientific, agricultural, technical and ecological knowledge, including cultigens, medicines and the rational use of flora and fauna.”²⁵⁹ We will look more closely at the issue of IK protection below.

²⁵⁸ Daes, Erica-Irene. *Principles and Guidelines for the Protection of the Heritage of Indigenous Peoples*, United Nations Sub-Commission on Prevention of Discrimination and Protection of Minorities, Commission on Human Rights, United Nations Economic and Social Council, E/CN.4/Sub, 1995., cited in Battiste, Marie. *Indigenous Knowledge and Pedagogy in First Nations Education: A Literature Review with Recommendations*, National Working Group on Education and the Minister of Indian Affairs, Indian and Northern Affairs Canada (INAC), 2002; accessed January 2006; available from http://www.ainc-inac.gc.ca/pr/pub/kw/ikp_e.html.

²⁵⁹ Daes. *Principles and Guidelines for the Protection of the Heritage of Indigenous Peoples*. p. 6, cited in Battiste. *Indigenous Knowledge and Pedagogy in First Nations Education: A Literature Review with Recommendations*, accessed.

19.1 Traditional ecological knowledge (TEK) literacy

[I]n Canada, we have this strange mixture of the Anglophone and the Francophone, but tied to the Aboriginal. We still have over a million Aboriginal Canadians who have an unbroken link to the animist. And, thank god for Canada, this part of the population is becoming stronger every day. We're seeing the return of Aboriginals to a central role in Canada, a central role which they were guaranteed at the beginning, and that return may be the thing that will actually—if I could be dramatic—save Canada as a civilization. I think it's actually the key to Canada's future.²⁶⁰

John Ralston Saul

[A]s a western scientist, a planet biologist, I believe that Indigenous peoples are the guardians of our species; the part of humanity that alone holds the wisdom to insure our healthy survival.²⁶¹

Elisabet Sahtouris, *The Survival Path*

There is a growing consensus that the information and knowledge used by Indigenous and non-Indigenous populations around the world to survive and to live “in harmony” with nature for millennia is not only a crucial part of their own cultural identities, but is also very valuable for Western science as a source of ecological information. While this is a commonly believed generalization, and one that often holds true, please see section 5.6.2 of the literature review for a discussion on the problems of false dichotomies between “Indigenous” and “Western” and romanticizing of Indigenous communities.

According to Martha Johnson in a publication of the International Development Research Centre: “[A] growing body of literature attests not only to the presence of a vast reservoir of information regarding plant and animal behaviour but also to the existence of effective Indigenous strategies for ensuring the sustainable use of local natural resources.”²⁶² Stephen Augustine of Environment Canada's Biodiversity Convention Office notes that it is through “precise observation over a long period of time” that Indigenous peoples have accumulated this kind of knowledge, often by watching the behaviour of animals:

Because most life forms have a natural sense of survival—and even their own natural forms of medicine—much can be learned by watching them. Moose, for

²⁶⁰ Saul, John Ralston. "Good Governance as the Key to Gross National Happiness." Paper presented at the Second International Conference on Gross National Happiness: Rethinking Development: Local Pathways to Global Wellbeing, Antigonish, Nova Scotia, June 20- 24, 2005; accessed December 2005; available from <http://gpiatlantic.org/conference/proceedings/saul.htm>. p. 19

²⁶¹ Sahtouris, Elisabet. *The Survival Path: Cooperation between Indigenous and Industrial Humanity (Abridged)*, Santiago, Chile, Proceedings of the UN Policy Meeting on Indigenous Peoples, 1992; accessed January 26 2006; available from http://twm.co.nz/saht_survival.html.

²⁶² Johnson, Martha. "Introduction: Research on Traditional Environmental Knowledge: Its Development and Its Role," in *Lore. Capturing Traditional Environmental Knowledge*, ed. Johnson, Martha. Ottawa: The International Development Research Centre, 1992.

example, eat calamus root, beech leaves and cedar buds when they are sick, and lie on dry leaves or roll in mud to stop bleeding when they are wounded.²⁶³

This kind of knowledge has been labelled in a variety of ways: folk ecology, local knowledge, ethnoecology, ethnoscience, traditional environmental or ecological knowledge, Indigenous ecological knowledge, or Aboriginal traditional knowledge. In some of the literature it is also referred to as traditional ecological knowledge and wisdom.²⁶⁴ The most commonly used term in the literature reviewed is *traditional environmental* or *ecological knowledge*. However, it has been noted by some that the word “traditional” can be problematic:

In the dictionary sense, ‘traditional’ usually refers to cultural continuity transmitted in the form of societal attitudes, beliefs, principles and conventions of behaviour and practice derived from historical experience. However, societies change through time, constantly adopting new practices and technologies, making it difficult to define just how much and what kind of change would affect the labeling of a practice as ‘traditional’.²⁶⁵

Due to this ambiguity, the term “Indigenous ecological knowledge” is often used in the literature. However, this term may also be limiting as it excludes the possibility of similar knowledge existing among the non-Indigenous population, such as local fishers or farmers, for example.²⁶⁶ Johnson notes that these non-Indigenous groups have also acquired their knowledge and skills through hands-on experience living in close contact with their environment.²⁶⁷ Therefore, for the purposes of this literature review, we will adopt the term “traditional ecological knowledge” (TEK), keeping in mind the points raised above, since it includes both Indigenous and non-Indigenous knowledge. There is no one agreed upon definition of TEK. However, most scholars in the field agree that it has the following characteristics:

- TEK is a body of knowledge built up by a group of people through generations of living in close contact with nature.²⁶⁸
- It includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use. TEK has a specialized vocabulary.^{269, 270}

²⁶³ Augustine, Stephen J. *Traditional Aboriginal Knowledge and Science Versus Occidental Science*, Ottawa: Biodiversity Convention Office of Environment Canada, 1997.

²⁶⁴ Turner, Nancy J., Marianne Boelscher Ignace, and Ronald Ignace. "Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia," *Ecological Applications*, vol. 10, no. 5, 2000: 1275-1287.

²⁶⁵ Johnson. "Introduction: Research on Traditional Environmental Knowledge: Its Development and Its Role."

²⁶⁶ Non-Indigenous populations include peasants, fishers, forest dwellers, nomadic shepherds as well as other societies with historical continuity.

²⁶⁷ Johnson. "Introduction: Research on Traditional Environmental Knowledge: Its Development and Its Role."

²⁶⁸ Ibid.

²⁶⁹ Ibid.

- The quantity and quality of TEK varies among community members depending on age, gender, social status, intellectual capability, and profession (hunter, spiritual leader, healer, etc.). Knowledge is not homogeneous within societies.^{271, 272}
- TEK is cumulative and dynamic, building upon the experience of earlier generations and adapting to the technological and socio-economic changes of the present.^{273, 274}
- TEK involves the evolution, development, and use of appropriate technologies for hunting, fishing, and trapping.²⁷⁵
- TEK involves the understanding of and intimate relationship with the natural world as a whole. This holistic view is embodied in all aspects of the community—language, culture, spirituality, mythology, customs, and social organization. Indigenous knowledge, in particular, cannot be separated from other aspects of daily existence, namely ethics and spirituality.^{276, 277} Thus traditional science is “moral” as opposed to “value-free” and humans are not regarded as more important than nature.²⁷⁸
- TEK is usually passed from one generation to the next through oral traditions. It resembles a “social memory of landscape dynamics” and the stories recount peoples’ “histories upon the land.”²⁷⁹ IK, in particular, is based on observation, direct experience, testing, teaching, and recording in the collective memory through oral tradition, storytelling, ceremonies, and songs.²⁸⁰ “It is both remembered sensory information that is usually transmitted orally in descriptive names and in stories where abstract principles are encapsulated in metaphor.”²⁸¹

²⁷⁰ Environment Canada. *The State of Canada's Environment*, Environment Canada, 1996; accessed January 24 2006; available from <http://www.ec.gc.ca/soer-ree/English/SOER/1996report/Doc/1-6-9-5-6-1.cfm>.

²⁷¹ Johnson. "Introduction: Research on Traditional Environmental Knowledge: Its Development and Its Role."

²⁷² Turner, Ignace, and Ignace. "Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia."

²⁷³ Johnson. "Introduction: Research on Traditional Environmental Knowledge: Its Development and Its Role."

²⁷⁴ Canadian Environmental Assessment Agency. *Considering Aboriginal Traditional Knowledge in Environmental Assessments Conducted under the Canadian Environmental Assessment Act - Interim Principles*, Canadian Environmental Assessment Agency, 2004; accessed January 23 2006; available from <http://www.ceaa-acee.gc.ca/012/atke.htm>.

²⁷⁵ Environment Canada. *The State of Canada's Environment*, accessed.

²⁷⁶ Ibid., accessed.

²⁷⁷ Higgins, Charlene. "Indigenous Knowledge and Occidental Science: How Both Forms of Knowledge Can Contribute to an Understanding of Sustainability," in *Proceedings, from Science to Management and Back: A Science Forum for Southern Interior Ecosystems of British Columbia.*, ed. Hollstedt, C., K. Sutherland and T. Innes, 147-151. Kamloops: Southern Interior Forest Extension and Research Partnership, 2000.

²⁷⁸ Snively, Gloria, and John Corsiglia. *Discovering Indigenous Science: Implications for Education*, Toronto: John Wiley and Sons, Inc., 2000. p. 12

²⁷⁹ Folke, Carl. "Traditional Knowledge in Social-Ecological Systems," *Ecology and Society*, vol. 9, no. 3, 2004.

²⁸⁰ Augustine. *Traditional Aboriginal Knowledge and Science Versus Occidental Science*.

²⁸¹ Snively, and Corsiglia. *Discovering Indigenous Science: Implications for Education*. p. 10

- TEK tends to belong to or be held collectively by the community as well as by individuals.²⁸²
- By and large, TEK is an attribute of non-industrial or less technologically advanced societies.²⁸³
- The term TEK tends to be used in juxtaposition with Western or modern science.²⁸⁴ Some of the contrasts between the two were highlighted in Chapter 5.

Sahtouris argues that traditional ecological knowledge, while intrinsically valuable in and of itself, has become increasingly valuable to Western science largely due to the ecological devastation being wreaked on the planet. She notes that industrial resource extraction has degraded or depleted most of the world's ecosystems, threatening the biodiversity of plant and animal species, and necessitating a different worldview to reverse these trends:

At present, human existence is dominated by a technological society founded on the mechanical worldview of Western science with its materialistic values—a worldview, value system and way of life that for all its benefits has brought us to the brink of disaster. It stands in sharp contrast to the worldviews, value systems and lifestyles of Indigenous and traditional peoples, which are only now beginning to be recognized as valid in their own right and possibly critical for our very survival as a species.²⁸⁵

Furthermore, Sahtouris argues that loss of species diversity is also threatening the viability of Indigenous populations worldwide, and that these peoples are under as much threat as the ecosystems in which they live:

Monoculture is as destructive and dangerous in human social systems as in human agriculture; the failure to respect and protect indigenous and traditional cultures in the attempt to industrialize all humanity according to one model actually hastens human extinction.²⁸⁶

Analysts have noted that some of the key answers to the ecological dilemmas we face, including land degradation and loss of biodiversity, can be found in TEK. In particular, according to Turner, et al., Indigenous ecological knowledge holds important information about species and the interconnectedness of ecosystems, since much of this knowledge is based on detailed observations over a very long period of time.²⁸⁷ In addition, Higgins

²⁸² Canadian Environmental Assessment Agency. *Considering Aboriginal Traditional Knowledge in Environmental Assessments Conducted under the Canadian Environmental Assessment Act - Interim Principles*, accessed.

²⁸³ Snively, and Corsiglia. *Discovering Indigenous Science: Implications for Education*. p. 16

²⁸⁴ Reid, Alan, Kelly Teamey, and Justin Dillon. "Traditional Ecological Knowledge for Learning with Sustainability in Mind," *The Trumpeter*, vol. 18, no. 1, 2002.

²⁸⁵ Sahtouris. *The Survival Path: Cooperation between Indigenous and Industrial Humanity (Abridged)*, accessed.

²⁸⁶ *Ibid.*, accessed.

²⁸⁷ Turner, Ignace, and Ignace. "Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia."

has noted that traditional (Indigenous and non-Indigenous) societies have tended to have a low impact on the biological diversity in their own environs because their resource use has been based on “self-regulation, [...] built on consensus, and enforced through social sanctions according to customary law, cultural tradition, and local knowledge.”²⁸⁸ For these reasons, and because it offers a practical guide to action in Western societies, TEK is crucial to our current understanding of sustainability.

Parajuli notes that it is the character and quality of the human interaction with nature in Indigenous societies that teaches and fosters sustainability:

Ecological ethnicities have become distinct today because they maintain the rhythm of circularity and regenerative cycles of nature’s economy by cultivating appropriate cosmovisions, observing related rituals, and practicing prudence in the ways they care about nature, harvest from nature, nurture nature, and in turn are nurtured. There is nothing romantic or exceptional about their worldviews or practices. What might seem exceptional in our eyes is that among them, nature cannot be distinguished from everyday production and consumption, livelihoods and survival, rituals and festivities, inhabitation, or a sense of place. What is in nature is directly experienced and lived through plants, crops, and other sources of sustenance, an interaction mediated through rituals associated with production, collection, preparation, and distribution of food. In the most primal sense, it is through the search for food, nutrition, and medicine that ecological ethnicities communicate with nature.²⁸⁹

Again, it is noteworthy that conventional educational systems and indicators give insufficient attention to this kind of learning, which is based on direct experience and the practices of “everyday production and consumption.” Just as previous sections have noted that the media and advertising can function as learning mechanisms that are at least as if not more powerful than what is taught in schools, so this present section recognizes that the characteristics of daily life, including the methods of production and consumption, likely have a greater impact on understanding of the natural world than formal education structures. This again indicates the necessity for indicators of learning to account for far more than standardized tests, school enrolment, class sizes, and graduation rates in accounting for key determinants of an educated populace.

Some analysts have described the knowledge that focuses on “balancing human needs with environmental requirements” as wisdom. Thus, Corsiglia and Snively write:

All life forms must be respected as conscious, intrinsically invaluable, and interdependent. Respecting an animal’s body means honoring its spirit and using every part of an animal’s body. In practical terms, traditional wisdom extends the

²⁸⁸ Higgins. "Indigenous Knowledge and Occidental Science: How Both Forms of Knowledge Can Contribute to an Understanding of Sustainability." p. 148–149

²⁸⁹ Parajuli, Pramod. "Learning from Ecological Ethnicities: Toward a Plural Political Ecology of Knowledge," in *Indigenous Traditions and Ecology. The Interbeing of Cosmology and Community*, ed. Grim, John A., 559-589. Cambridge: Harvard University Press, 2001. p. 560

caring relationships associated with family life to communities and even to the environment. We are all relations, it is wrong to exploit other life forms or take more than one's share. The deep interest our children feel in animals, plants, water, and earth should be trusted and encouraged. All creatures can be our teachers and while humans may readily affect other life forms, we need not see ourselves as superior.²⁹⁰

For instance, a fundamental belief of Inuit culture is that humans and other species are equals and all have souls or spirits. As a result, the Inuit have developed many rules that govern hunting and fishing so that species are conserved. For example, there are rules prohibiting the hunting of animals when they are breeding.^{291, 292}

In their book, *Wisdom of the Elders*, Peter Knudtston and David Suzuki point out that if we cannot predict the consequences of technologies and alterations we impose on nature, then it is doubtful that we can control or manage them properly.²⁹³ According to Sahtouris, seed that has been developed by Indigenous populations and peasants over thousands of years is given no value in our dominant worldview or in our conventional accounting systems until it is brought into a laboratory, genetically altered, and patented.²⁹⁴ However, analysts note that we have little or no idea what consequences these alterations will have on the environment, or on the Indigenous and peasant populations who are seeing their traditional varieties replaced by genetically altered seeds that are promoted as faster growing and disease-resistant.

In many cases, this shift is involuntary. A case in point is genetically modified (GM) corn, which is also referred to as genetically engineered (GE) corn. In 2001, scientists found GM corn in 15 places in Oaxaca, Mexico, the "heartland of corn diversity in the world," with corn strains that have been developed over 5,500 years of Indigenous corn cultivation. Since Mexico has outlawed the commercial use of GM crops altogether, it is unknown how the illegal corn got to the remote region. However, scientists are now worried that the aggressive forms of GM corn may "drive the native species to extinction, causing the loss of irreplaceable cultivars."²⁹⁵

Furthermore, because transnational corporations patent all GM varieties of corn, the only legitimate way for anyone, including Indigenous and peasant populations, to acquire

²⁹⁰ Corsiglia, J., and G. Snively. "Global Lessons from the Traditional Science of Long-Resident Peoples," in *Thinking Globally About Mathematics and Science Education*, ed. Snively, G. and A. MacKinnon, 25-51. Vancouver: University of British Columbia, Research and Development Group, 1995. cited in Snively, and Corsiglia. *Discovering Indigenous Science: Implications for Education*. p. 14

²⁹¹ Environment Canada. *The State of Canada's Environment*, accessed.

²⁹² The holistic worldview embodied in Indigenous cultures and in TEK can also be found in the contemporary ecological movement, including deep ecology, ecofeminism, bioregionalism, Lovelock's "Gaia hypothesis," and in some cases the concept of sustainable development.

²⁹³ Knudtston, Peter, and David Suzuki. *Wisdom of the Elders*, Toronto: Stoddart Publishing, 1992.

²⁹⁴ Sahtouris. *The Survival Path: Cooperation between Indigenous and Industrial Humanity (Abridged)*, accessed.

²⁹⁵ Montague, Peter. *New Threat to Indigenous People*, New Brunswick, N.J., Environmental Research Foundation, 2002; accessed January 27 2006; available from <http://www.rachel.org/bulletin/index.cfm?St=2>. p. 1

these varieties is to purchase them. Warning of a “new threat to indigenous people,” Peter Montague comments:

The purpose of patenting seeds is to prevent seed saving—the ancient Indigenous practice of keeping seeds from this year’s crop to grow next year’s crop. Farmers who purchase GE seeds sign contracts requiring—under penalty of law—that they not save seed from one crop to the next. Thus farmers who employ GE seeds must purchase new seed year after year, making them dependent upon whatever transnational corporation owns the patent. Farmers who can’t afford to buy seed each year will simply not be allowed to grow a crop.²⁹⁶

To prevent the illegal saving of GM seeds, GM corporations have developed “terminator genes,” which essentially render the seeds sterile unless applied with a special chemical. Montague notes: “As terminator technology spreads around the world, it will end Indigenous agriculture, and much biodiversity as well. An estimated 1.4 billion Indigenous peoples currently grow their own crops for subsistence”²⁹⁷ Presently there is a United Nations moratorium on use of sterile seed technology, which governments attending the March, 2006 UN 8th biennial meeting of the Convention on Biological Diversity in Brazil upheld, despite the efforts of Canada, Australia, and New Zealand (with support from the United States) to undermine the moratorium.²⁹⁸ However, there is still a possibility that terminator seeds will be commercialized if governments do not ban its use, as only Brazil and India have done to date.²⁹⁹

Knudtston and Suzuki argue that nature is being altered and new technologies are being developed with little consideration about the long-term environmental or human consequences. In fact, many critics of GM crops believe that very little is actually known about their effects and that corporations are conducting an uncontrolled experiment on an unsuspecting world.

Because this example graphically illustrates the current threat to Indigenous knowledge and the fact that millennia of transmitted knowledge and practice can literally be lost overnight, we discuss GM crops in more detail later in this review. Here, it is sufficient to note that the potential value and utility of Indigenous knowledge and practices for sustainability and wellbeing cannot be taken for granted and must be actively nurtured and promoted if this treasury of knowledge is not to become extinct. From the perspective of indicators of an educated populace, it can be argued that the store of social knowledge may quickly become depleted and impoverished—i.e., that intellectual capital may markedly depreciate—if strenuous efforts are not made to protect and preserve this knowledge and to incorporate it into mainstream education and information systems, and social practices. Effective indicators of an educated populace that acknowledge and

²⁹⁶ Ibid., accessed. p. 2

²⁹⁷ Ibid., accessed. p. 2

²⁹⁸ Ban Terminator Campaign. *News Release: UN Upholds Moratorium on Terminator Seed Technology: Worldwide Movement of Farmers, Indigenous Peoples and Civil Society Organizations Calls for Ban*, 2006, March 31; accessed July 2006; available from http://www.etcgroup.org/documents/pressreleaseCOP8_March3106.pdf.

²⁹⁹ Ibid., accessed.

include the value and contribution of Indigenous knowledge can play an important role in this process.

Knudtston and Suzuki point to the importance of this effort to protect Indigenous knowledge, and suggest that the solution to the current environmental “crisis” actually lies in the ways the Indigenous populations of the world relate to nature:

[O]ur problem is inherent in the way we perceive our relationship with the rest of Nature and our role in the grand scheme of things. [...] Science alone is not enough to solve the planetary environmental crisis and we must recreate for ourselves a sense of place within the biosphere that is steeped in humility and reverence for all other life.³⁰⁰

In addition, Knudtston and Suzuki argue that part of the problem with modern scientific expertise is that it is “so narrowly focused and specialized that it can barely comprehend the dimensions and the interconnectedness of life.”³⁰¹ They note that modern scientists are knowledgeable about their field of expertise, but may know little or nothing about another field, however closely it may be related in practice.

The importance of TEK was recognized at the Earth Summit in 1992 in the Rio Declaration, which suggested that Indigenous peoples have a crucial role to play in terms of environmental sustainability. The Convention on Biological Diversity, which was opened for signature at the Earth Summit, referred to the important relationship between protecting Indigenous knowledge and protecting biodiversity. Article 8 (j) of the Convention proposed the need to:

... respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biodiversity, the need to promote the wider application with the approval and involvement of the holders of such knowledge, and to encourage the equitable sharing of benefits arising from the utilization of such knowledge, innovations and practices.³⁰²

There are countless examples of TEK in practice that well illustrate the intimate relationship between learning outcomes and social outcomes that is central to the CIW framework. However, for the purposes of this literature review, just a few examples are provided below to illustrate the concept of TEK, its range, and its significance—including the fact that Indigenous knowledge of the natural world has frequently proven more accurate than Western science.

³⁰⁰ Knudtston, and Suzuki. *Wisdom of the Elders*. p. xxiv

³⁰¹ Ibid. p. xxix

³⁰² Convention on Biological Diversity, Article 8 (j), cited in Higgins. "Indigenous Knowledge and Occidental Science: How Both Forms of Knowledge Can Contribute to an Understanding of Sustainability." p. 1

- The South Ellesmere Island caribou population was nearly decimated due to the system put in place by scientists to manage the hunt. Scientists instituted a quota system and a plan that advocated the selective hunting of large males with a prohibition on hunting females and immature animals. The Inuit, however, believed that the survival of the caribou herd depended on the social structure of the small herds in the winter, and they argued for the “non-selective hunting of all animals encountered opportunistically.” The TEK view “holds that only hunting the large males would quickly result in the accelerated death of the remaining population.” Monitoring of the caribou population proved the Inuit were correct.³⁰³
- In 1977, scientific surveys of the Beaufort Sea population of Bowhead whales indicated that there were only 800 whales left. Local Inuit hunters believed there were more than 7,000 whales. In addition the Inuit disagreed with some of the assumptions held by the scientists regarding feeding patterns and swimming patterns of the whales. Based on this, the scientists developed survey techniques, which incorporated Inuit knowledge, and in 1991 the Bowhead whale population was conservatively estimated to be more than 8,000 whales—confirming the earlier Inuit observations.³⁰⁴
- The Menominee Indian Tribe in Wisconsin was recognized by the United Nations in 1995 for its expertise in sustainable forest management, and the tribe was given the first ever U.S. Presidential award for Sustainable Development in 1996. Today, it is the only Native American tribe to have its forests certified by two Forest Stewardship Council approved certifiers. The Menominee’s 89,000 ha forest has been sustainably logged for 147 years and there is more wood there today than there was when the reservation was first established in 1854. Even from outer space one can tell where the forest starts and stops. A satellite photo of the state of Wisconsin shows a clearly delineated forest area located about 60 km northwest of Green Bay. In the photo, a dark line surrounds a deep green oasis separating the Menominee lands from the surrounding snow-covered farm fields.

The Menominee forest land, which boasts remarkable age and species diversity, is an outstanding example of indigenous knowledge of ecology viably and sustainably applied to a modern business enterprise—yielding employment opportunities and income for the Menominee tribe while protecting a valuable natural resource. The model demonstrates that timber harvesting and economic opportunity can be fully consistent with the protection of other forest values and environmental preservation, and that indigenous knowledge can be effectively applied as a viable alternative to industrial methods like clearcutting that have devastated and depleted large tracts of forests worldwide. In short, indigenous knowledge can produce effective learning outcomes that translate into economic

³⁰³ Freeman, Milton M.R. "The Nature and Utility of Traditional Ecological Knowledge," *Northern Perspectives*, vol. 20, no. 1, 1992; accessed January 2006; available from <http://www.carc.org/pubs/v20no1/utility.htm>.

³⁰⁴ Ibid.

outcomes that may be significantly more sustainable and successful than those produced by university-based forestry schools.³⁰⁵

³⁰⁵ Pannozzo, Linda, and Minga O'Brien. *The Nova Scotia Genuine Forest Index Forest Accounts. Volume 2. A Way Forward: Case Studies in Sustainable Forestry*, Genuine Progress Index Atlantic (GPI Atlantic), 2001; accessed March 2005; available from <http://www.gpiatlantic.org>.

19.2 How is TEK being used?

In her report for the International Development Research Centre, Johnson argues that TEK is important for the rest of the world for “the ethical imperative” of preserving cultural diversity, as well as for the following reasons:

- New biological and ecological insight
- Resource management
- Protected areas and conservation education
- Development planning
- Environmental assessment³⁰⁶

According to Snively and Corsiglia, TEK can be used practically in the following ways:

- Local knowledge can be used for map-making and surveying, and may make it possible to do so in a few days, rather than in what would usually take months if local knowledge was not used
- TEK can help to locate rare and endangered species for identifying sensitive areas
- TEK can be used to locate areas that should be protected
- TEK can be used to determine true costs and benefits of development³⁰⁷

Scholars recognize the importance of TEK for conducting environmental assessments, because its in-depth insights help to identify and inform the social and environmental impacts of proposed projects. Freeman notes:

[A] large quantity of information now exists in the published scientific literature to suggest that traditional ecological knowledge and its application to enlightened environmental assessment and management should be taken seriously.³⁰⁸

IK is currently recognized in the amended Canadian Environmental Assessment Act (CEAA) as an important source of information that may be considered when an environmental assessment is being conducted.³⁰⁹ Currently, the consideration of traditional knowledge in environmental assessments is voluntary in the CEAA, but the interim principles will be replaced in the future with “more detailed guidance” developed by the Aboriginal Advisory Committee.

The CEAA, which uses the term “Aboriginal traditional knowledge” or ATK, provides general principles that are voluntary and intended to provide general guidance when considering traditional knowledge:

³⁰⁶ Johnson. "Introduction: Research on Traditional Environmental Knowledge: Its Development and Its Role."

³⁰⁷ Snively, and Corsiglia. *Discovering Indigenous Science: Implications for Education*. p. 17–18

³⁰⁸ Freeman. "The Nature and Utility of Traditional Ecological Knowledge."

³⁰⁹ Canadian Environmental Assessment Agency. *Considering Aboriginal Traditional Knowledge in Environmental Assessments Conducted under the Canadian Environmental Assessment Act - Interim Principles*, accessed.

- ATK research should be planned and conducted in conjunction with the ATK holders: work with the community.
- Only Aboriginal communities can decide whether and to what extent they are willing to provide access to their ATK.
- Access to ATK is a privilege and must be respected.
- Intellectual property held by Aboriginal communities includes inventions, literary and artistic works, symbols, names, images, and designs.
- All ATK research must respect the privacy, dignity, cultures, and traditions of Aboriginal peoples.
- ATK and Western knowledge can complement one another effectively.³¹⁰

Higgins stresses the point that Indigenous knowledge belongs to Indigenous communities, which should control how it is going to be used:

This will minimize the chance of assimilation, misappropriation, and exploitation, and bring forth a greater desire by Indigenous communities to share this knowledge and participate in co-management of the land and resources. Indigenous knowledge holders must be respected as experts.³¹¹

Reid, et al. argue that TEK can be used to develop a frame of mind, which could bring about sustainability in our society, illustrating again the intimate connection between learning outcomes and potential social outcomes that is central to the Canadian Index of Wellbeing, and which acknowledges education as a core determinant of wellbeing:

Mobilizing traditional knowledge systems for environmental, economic, and ecological gain, or for creating the conditions for rediversification of traditional languages and cultures in the face of the growing standardization of education and language, represent just some of the ways in which TEK is being transformed for the purposes of pursuing sustainability (understood culturally and environmentally).³¹²

While TEK still remains on the margins of mainstream Western education systems, the authors argue that even UNESCO recognizes that TEK should be incorporated into formal, non-formal, and informal modes of teaching and learning. This again provides a concrete rationale for the inclusion of indicators of both traditional ecological knowledge and Indigenous knowledge in the educated populace domain of the Canadian Index of Wellbeing.

³¹⁰ Ibid., accessed.

³¹¹ Higgins. "Indigenous Knowledge and Occidental Science: How Both Forms of Knowledge Can Contribute to an Understanding of Sustainability." p. 149

³¹² Reid, Teamey, and Dillon. "Traditional Ecological Knowledge for Learning with Sustainability in Mind." p. 11

19.3 Grassroots indicators

Indigenous and local peoples have very specific ways of indicating and assessing change in the health of their ecosystems as well as their own wellbeing. According to Helen Hambly, there have been some initiatives internationally to develop grassroots indicators based on Indigenous knowledge that can be aggregated and scaled to levels where they can be included in regional data sets.³¹³ Although a literature search has found Hambly's claim that grassroots indicators can be aggregated repeated elsewhere, the search did not yield any actual examples of grassroots indicators in use at any aggregate level, including in the IDRC's Grassroots Indicators Network discussed below. Hambly defines grassroots indicators as:

... a term used to refer to measures or signals of environmental quality or change formulated by individuals, households, and communities and derived from local systems of observation, practice and indigenous knowledge.

They are based on accrued local knowledge of the environment and are used in local level decision making for the allocation of resources and land management procedures. Rarely do grassroots indicators exist independently. Instead, they are more typically used as sets of multiple indicators, which contribute to a pattern, or flow of activity representing a particular phenomenon and predicting and stimulating a specific decision or action. A common example is the combined observation of stars, air currents and cloud formation by farmers to predict or monitor rainfall. Such diagnosis may be further elaborated with indicators of animal behavior and the appearance of certain plants and birds generally reinforcing or contradicting the initial assessment.³¹⁴

Hambly also observes that since grassroots indicators span economic, social, cultural, and ecological boundaries and encompass all these dimensions, they "may be better gauges of well-being than traditional development indicators that are confined to sectors such as health, education or the economy."³¹⁵

Grassroots indicators include reports of pollution, invasive plant species, and changes in bird and animal migration patterns. They can use the presence or absence of species, such as earthworms in the soil or the activity of bee colonies, to assess ecosystem health. They can also include use of certain types of foods as poverty indicators, or increases in social violence as indicators of a breakdown in the economy.³¹⁶

³¹³ Hambly, Helen. "Grassroots Indicators: Measuring and Monitoring Environmental Change at the Local Level," *ILEIA Newsletter*, vol. 12, no. 3, 1996: 14-18, Centre for Information on Low External Input and Sustainable Agriculture; accessed September 2005; available from [http://www.leisa.info:80/index.php?url=show-blob-html.tpl&p\[o_id\]=12179&p\[a_id\]=211&p\[a_seq\]=0](http://www.leisa.info:80/index.php?url=show-blob-html.tpl&p[o_id]=12179&p[a_id]=211&p[a_seq]=0).

³¹⁴ Ibid. p. 18.

³¹⁵ Hambly, Helen. "Grassroots Indicators for Sustainable Development," *IDRC Reports*, vol. 23, no. 1, 1995: 24-26.

³¹⁶ Mehta, Pratibha. "Local Governance and Sustainability: Tools for Assessment and Decision-Making." Paper presented at the Training and Research Partners for Habitat Caucus, Habitat II NGO Forum, Istanbul,

Identifying, interpreting, validating, and using grassroots indicators are difficult—especially for a nationwide endeavour like the CIW—because of their cultural specificity and the challenge of aggregating and comparing data over space and time. Grassroots indicators cannot be identified through surveys but must come from direct observation and dialogue with Indigenous peoples. Indeed, their very appropriateness in assessments of Indigenous knowledge illustrates the difficulties of developing suitable indicators of Indigenous knowledge for an instrument like the CIW, since the conventional, generalized indicators suitable for the CIW are inadequate to assess the contribution and impact of localized, culture-specific, Indigenous knowledge.

Hambly points out that the real challenge is to integrate grassroots indicators into decision making by making them more acceptable within current decision-making processes and by making these processes more receptive to grassroots indicators.³¹⁷ One approach to “validating” grassroots indicators has been to compare and test Western scientific concepts against grassroots indicators to “add value” to local knowledge. For example, the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), an NGO in Ahmedabad, India, that is supported by Canada’s International Development Research Centre, studies the local ecological taxonomic classification basis of Indigenous knowledge systems on issues like cloud formation and soil type, and compares them to formal scientific taxonomies.³¹⁸ In another such example of validation, information from Northern Canadian trappers about their trap lines and the distributions of animals was supported by satellite data used in habitat mapping. Hambly writes further: “This means of aggregating semiquantitative and qualitative data is useful in geographic information systems (GIS) and was applied in the settlement of northern land claims.”³¹⁹

Efforts to incorporate Indigenous knowledge and to integrate grassroots indicators into scientific assessments, however, often face condescension and lack of respect toward IK by the conventional scientists involved. Jucker illustrates this issue with a story told by Angayuqaaq Oscar Kawagley and Ray Barnhardt:

Some scientists of the State Department of Fish and Game and the Department of Natural Resources wanted to do research in the Minto Flats, Alaska. They met with elders of the native people living there and basically regarded all this as a one-way process. These scientists assumed that only they knew how to acquire knowledge and that they would have to impart this knowledge to the ignorant natives. There were five scientists with different specializations, all going about their ways with different methods, and ignorant of each other’s approaches. They were then completely dumb-struck when they were confronted by one elder of the natives, Peter John, who could provide them more or less offhand with most of

June 10, 1996, International Council for Local Environmental Initiatives (ICLEI), Toronto; accessed January 2006; available from <http://idrinfor.idrc.ca/Archive/Corpdocs/110019/tools.html>.

³¹⁷ Hambly. “Grassroots Indicators for Sustainable Development.”

³¹⁸ Ibid.

³¹⁹ Ibid.

the information they wanted to find out in the first place, and could indicate where and why they would run into trouble with the proposed methodology and their elaborate technical equipment; all this on the basis of accumulated knowledge over generations and an intimate knowledge of the area through long-term, first-hand experience.

In the end, it turned out that the ignorance was somewhere else than anticipated. While the scientists with their specialized knowledge and elaborate tools were well intentioned, the gulf between their compartmentalized, limited-time-frame view of the world and the holistic, multigenerational perspective of Peter John appeared insurmountable. The fish and game people couldn't see beyond their constituent areas of expertise to connect with what the elders were trying to tell them, though the Minto people had a quite sophisticated understanding of what the fish and game specialists were talking about.³²⁰

In Canada, the International Development Research Centre (IDRC) has directed the Grassroots Indicator Network (GRIN) since 1993. GRIN "encourages the view that local knowledge and capacity to monitor and measure change are a valid basis for development indicators."³²¹ IDRC has supported initiatives through GRIN which include:

- support for the selection and testing of tools and indicators for integrated policy planning
- integrated approaches, tools and indicators for measuring progress towards sustainability which incorporate community-based perspectives and local knowledge of conditions
- methods and indicators for participatory needs assessments or policy assessments by citizens and communities
- refinement of concepts, methods, tools and indicators of urban poverty and vulnerability
- support for the development of information systems for decentralised policy making³²²

Overlapping characteristics that GRIN uses to validate grassroots indicators include 1) specificity, 2) types of knowledge systems from which they are derived, 3) source and user, 4) scale, and 5) purpose.³²³

³²⁰ Kawagley, A. O., and R. Barnhardt. "Education Indigenous to Place: Western Science Meets Native Reality," in *Ecological Education in Action: On Weaving Education, Culture, and the Environment*, ed. Smith, G. A. and D. R. Williams. Albany, NY: State University of New York Press, 1999., p. 125, cited in Jucker, Rolf. "UNESCO's Teaching and Learning for a Sustainable Future: A Critical Evaluation of Underlying Unsustainable Progress Myths," *The Trumpeter*, vol. 19, no. 2, 2003: 83-107., p. 104.

³²¹ Mehta. "Local Governance and Sustainability: Tools for Assessment and Decision-Making."p. 3.

³²² Ibid.

³²³ Hambly, Helen, and Tobias Onweng Angura. "Appendix: Report of the Workshop on Grassroots Indicators for Sustainable and Equitable Development," in *Grassroots Indicators for Desertification: Experience and Perspectives from Eastern and Southern Africa*, ed. Hambly, Helen and Tobias Onweng Angura. Ottawa: IDRC, 1996.

Various initiatives are finding ways to include grassroots indicators from local groups, as well as from Indigenous peoples, into environmental reporting systems. For example, in the Netherlands people telephone a central Environmental Monitoring Centre “hotline” to report noise and air pollution based on what they smell, see, and hear. Regular tallies of these observations are given to public authorities, and data from the grassroots indicators of pollution are compared and synthesized with the national environmental services data. In Ontario, provincial authorities with community group participation operate telephone hotlines to monitor invading plant species and sightings of endangered birds and animals. As Hambly remarks: “Use of local observations means that decision makers have an additional source of data, including an increase in sample size due to a larger number of direct observations.”³²⁴

While the CIW in general, and the educated populace domain of the CIW in particular, do not currently have the means to include such grassroots indicators, that present omission by no means denigrates the importance either of local knowledge or of such grassroots indicators based on direct observation. Indeed, this section is intended to acknowledge and recognize that significance. It is a key goal and aspiration of the CIW working group to move towards increasing disaggregation of the CIW data, possibly using the Newfoundland and Labrador Community Accounts as a model for provision of community-level data. As the CIW moves in that direction in the coming years, grassroots indicators may become increasingly relevant and usable in the emerging CIW framework.

³²⁴ Hambly. "Grassroots Indicators for Sustainable Development."

19.4 Protection of Indigenous knowledge

Indigenous peoples have often in the past been willing to share their knowledge. However, this has frequently led to situations that have not been fair, equitable, or beneficial to local and Indigenous communities. As Simon Brascoupé, an Algonquin-Mohawk and Aboriginal consultant, and Endemann, an intellectual property rights (IP) consultant note, there is a growing interest, particularly in the business community, to seek out and use Indigenous knowledge to create new products for the global marketplace.³²⁵ This includes expropriating artwork, symbols, design, textiles, medicines, genetic products, and traditional ecological knowledge. IK is currently being used in Canada in areas such as genetic and medical research, resource management, monitoring development impacts, and managing forests, coastlines, waters, and Arctic ecosystems.³²⁶ Brascoupé and Mann point out many abuses in uses of IK, including:

... situations where IK has been gathered and used without contacting the source of the knowledge; for example, the use of traditional medicines as a basis for developing Western pharmaceutical products and herbal remedies, or the unauthorized use of Aboriginal designs on T-shirts and other commercial goods.³²⁷

Darrell Posey of Oxford University points to the “biopiracy” that is a common result of the globalization of trade:

Although international efforts to recognize indigenous, traditional and local communities are welcome and positive, they are pitted against enormous economic and market forces that propel globalization of trade. Critiques of globalization are numerous and point to at least two major short-comings: (i) value is imputed to information and resources only when they enter external markets; and (ii) expenditures do not reflect actual environmental and social costs. This means that existing values recognized by local communities are ignored, despite knowledge that local biodiversity provides essential elements for survival (food, shelter, medicine, etc.). It also means that the knowledge and managed resources of indigenous and traditional peoples are ascribed no value and assumed to be free for the taking. This has been called ‘intellectual terra nullius’ after the concept (empty land) that allowed colonial powers to expropriate ‘discovered’ land for their empires. Corporations and states still defend this morally vacuous concept because it facilitates the ‘biopiracy’ of local folk varieties of crops, traditional medicines, and useful species.

³²⁵ Brascoupé, Simon, and Karin Endemann. *Intellectual Property and Aboriginal People: A Working Paper*, Ottawa, Strategic Research and Analysis Directorate, Indian and Northern Affairs Canada, and Intellectual Policy Directorate, Industry Canada, 1999; accessed January 2006; available from http://www.ainc-inac.gc.ca/pr/ra/intpro/intpro_e.html.

³²⁶ Brascoupé, Simon, and Howard Mann. *A Community Guide to Protecting Indigenous Knowledge*, Research and Analysis Directorate, Indian and Northern Affairs Canada, 2001; accessed January 2006; available from http://www.ainc-inac.gc.ca/pr/ra/ind/gui_e.pdf.

³²⁷ Ibid., accessed. p. 6–7.

Even scientists have been accomplices to such raids by publishing data they know will be catapulted into the public domain and gleaned by ‘bioprospectors’ seeking new products. They have also perpetuated the ‘intellectual terra nullius’ concept by declaring useful local plants as ‘wild’ and entire ecosystems as ‘wildernesses,’ often despite knowing that these have been molded, managed, and protected by human populations for millennia. It is also common for scientists to declare areas and resources ‘wild’ through ignorance or negligence—without even basic investigations into archaeological or historical records, or to actual human management practices. The result is to declare the biodiversity of a site as ‘natural’, thereby transferring it to the public domain. Once public, communities are stripped of all rights to their traditional resources.³²⁸

Such frequent abuses point to the need that Indigenous peoples have to control the access of their knowledge in order to prevent its inappropriate use. Again, it would be appropriate to include an indicator of the degree of abuse and exploitation of IK, and conversely of the effectiveness of efforts to protect that knowledge, in the educated populace domain of the CIW. While lack of data do not presently allow for such an indicator, this short section at least points to the need to develop it in the future.

Some information is at least available at the input level in terms of legislative action and negotiations designed to protect IK, if not yet at the outcome level in terms of assessing whether exploitation and misuse or effective protection are increasing or not. Canada is currently working both domestically and internationally to help identify effective means to protect IK from unauthorized appropriation and commercialization.³²⁹ Work is taking place to assess how the existing intellectual property rights mechanisms can address the issue of IK, although few legal mechanisms presently exist for such protection, and knowledge that is considered to be “in the public domain” does not qualify for IP protection.³³⁰ The Canadian government is also committed to contributing \$172.5 million over 11 years, from 2002–2013, to preserve and promote Aboriginal languages and cultures.³³¹ As well, the Canadian Council on Learning is in the process of creating a new Aboriginal Learning Centre, which may deal with these issues.³³²

Indigenous peoples are also working within their own communities to address jurisdiction of their knowledge and to develop guidelines and protocols governing access

³²⁸ Posey, Darrell Addison. *The 'Balance Sheet' and the 'Sacred Balance': Valuing the Knowledge of Indigenous and Traditional Peoples*, Oxford, U.K., Oxford Centre for the Environment, Ethics & Society, University of Oxford, 1999; accessed January 2006; available from <http://www.ubcic.bc.ca/Resources/conferences/kit.htm>. p. 9.

³²⁹ Department of Foreign Affairs and International Trade (Canada). *Traditional Indigenous Knowledge and Intellectual Property Rights*, 2005; accessed January 2006; available from <http://www.dfait-maeci.gc.ca/aboriginalplanet/750/resource/global/rewipo-en.asp>.

³³⁰ Indian and Northern Affairs Canada (INAC). *Statement by the Observer Delegation of Canada on the Agenda Item 4 (B): "Indigenous Peoples and the International and Domestic Protection of Traditional Knowledge"*, INAC, 2005; accessed January 2006; available from http://www.ainc-inac.gc.ca/nr/spch/unp/05/pop/int_e.html.

³³¹ Ibid., accessed.

³³² Canadian Council on Learning (CCL). *Website*, CCL, accessed March 2006; available from <http://www.ccl-cca.ca/>.

to and use of TEK. For example, the new government of Nunavut has passed legislation to preserve, promote, and protect Inuit traditional knowledge. According to Indian and Northern Affairs Canada, part of the protection process is for Aboriginal communities to identify the scope and nature of knowledge within their communities and to prioritize which knowledge is most important to the community. This includes identifying what knowledge is sacred and what may be shared with others or used commercially. Issues also include identifying what is being lost and why. For example, Brascoupé and Endemann ask:

Is traditional knowledge being lost because elders have been unable to pass their wisdom to the next generation? Is knowledge being lost because Aboriginal people are being displaced from their traditional environment or because they are influenced by outside media and culture? Has traditional knowledge been allowed into the public domain or been misappropriated by commercial or scientific interests from outside the Aboriginal community?³³³

The need to protect traditional ecological knowledge in order to preserve it and prevent its inappropriate use has been discussed in international fora since the Rio Conference in 1992. The main organizations and frameworks leading this work include: the World Intellectual Property Organization (WIPO), the Convention on Biological Diversity, the Council for the Agreement on Trade-Related Aspects of Intellectual Property (TRIPS), the World Health Organization, United Nations Conference on Trade and Development (UNCTAD), UNESCO, and the World Trade Organization (WTO).³³⁴ Both government officials and Indigenous representatives from Canada have participated in these international fora. Departments which share responsibility for working with these international fora and therefore engaging in discussions on protection of Indigenous knowledge are the departments of Foreign Affairs and International Trade, Industry Canada, Indian and Northern Affairs Canada, Environment Canada, and Canadian Heritage, and Justice.³³⁵

As we have seen, Indigenous knowledge has a different basis and source than does Western scientific knowledge. For example, Indigenous knowledge is generally considered to belong to Indigenous communities or peoples rather than to one or more specific individuals. According to British Columbia lawyer David Robbins, international treaties such as TRIPS and those connected with the WTO reflect the vulnerability of traditional knowledge and highlight the differences between Western and Aboriginal legal systems:

As part of the TRIPS regime, the copyright protections express the values of capitalism: individual liberty, property, private enterprise, capital accumulation,

³³³ Brascoupé, and Endemann. *Intellectual Property and Aboriginal People: A Working Paper*, accessed. p. 4.

³³⁴ Indian and Northern Affairs Canada (INAC). *Statement by the Observer Delegation of Canada on the Agenda Item 4 (B): "Indigenous Peoples and the International and Domestic Protection of Traditional Knowledge"*, accessed.

³³⁵ Department of Foreign Affairs and International Trade (Canada). *Traditional Indigenous Knowledge and Intellectual Property Rights*, accessed.

rapid consumption, etc. Thus, by imposing these standards on all member states, global trade mechanisms impinge on the ability of a traditional society, as a constituent of a member state, 'to observe and preserve the underlying values of its society as expressed through law. The state has conflicting obligations to these societies and to the international community under the TRIPS agreement.' In short, TRIPS is a form of 'passive coercion' insofar as it ignores and threatens the cultures of indigenous peoples present within member states.³³⁶

Brascoupé and Endemann also point out differences between Aboriginal and Western goals:

The laws relating to intellectual property provide exclusive market rights for an innovation or artistic work for a period of time, in order to increase economic returns for the inventor or creator. The purpose of these laws is to encourage individuals and corporations to create artistic works and to invest in new innovations. In the case of traditional knowledge, the primary goal of Aboriginal people is usually preservation rather than innovation. Indigenous knowledge frequently has intangible and spiritual manifestations that relate to a community or nation rather than to an individual.³³⁷

In addition, IP laws do not protect ideas themselves; they protect "only their expression or their embodiment in a process, an artistic creation or a manufactured product."³³⁸ For all these reasons, Indigenous and traditional knowledge often lacks adequate legal protection and is vulnerable to protection and misuse.

The World Intellectual Property Organization (WIPO) is the specialized United Nations agency responsible for the worldwide promotion of intellectual property rights. In 2000 it established an Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC) to explore intellectual property issues including the IP system and its impact on Indigenous knowledge.³³⁹ The mandate of the IGC specifically is to develop policy objectives and principles for the protection of traditional knowledge with an aim of developing international agreement on a general direction. The IGC has met eight times since 2001 and has prepared two draft documents, which were discussed at a recent meeting in Geneva in June 2005. At that meeting the IGC failed to find an agreement on the major issues, including proposals that could form the basis for an international protection mechanism. In particular, it was reported that "developed countries such as the U.S. and Canada were unwilling to continue work on

³³⁶ Robbins, David. *Aboriginal Custom, Copyright & the Canadian Constitution*, Union of B.C. Indian Chiefs (UBCIC), 1999; accessed January 2006; available from <http://www.ubcic.bc.ca/files/PDF/Robbins.pdf>, p. 9.

³³⁷ Brascoupé, and Endemann. *Intellectual Property and Aboriginal People: A Working Paper*, accessed. p. 2.

³³⁸ Ibid., accessed. p. 8.

³³⁹ Department of Foreign Affairs and International Trade (Canada). *Traditional Indigenous Knowledge and Intellectual Property Rights*, accessed.

drafting substantive provisions for a possible international treaty,” with genetic resources being the subject of much of the disagreement.³⁴⁰

These are very complex issues, and as Reid, et al. note:

[T]he collective and collaborative forms of producing knowledge found within some TEK systems may mean that IPR [Intellectual Property Rights] regimes are not necessarily amenable, affordable, or desirable for groups that reject ‘individualization’ of knowledge, ‘commoditization’ of ‘knowledge products,’ or the ‘monetarization’ of local communities.³⁴¹

In the meantime, the issue is simply flagged here for its potential relevance to the development of learning and education indicators for the CIW. Just as creation of protected areas is an important indicator of protection of forest health and biodiversity (see GPI Atlantic Forest Accounts at <http://www.gpiatlantic.org>), so protection of Indigenous knowledge is an important indicator of the health and wellbeing of Indigenous peoples and their knowledge.

³⁴⁰ International Centre for Trade and Sustainable Development (ICTSD). "WIPO Committee Fails to Move on Traditional Knowledge Treaty," *BRIDGES Weekly Trade News Digest*, vol. 9, no. 21, 2005.

³⁴¹ Reid, Teamey, and Dillon. "Traditional Ecological Knowledge for Learning with Sustainability in Mind." p. 8.

20. Scientific Literacy: public understanding of science³⁴²

It is an obvious and understated observation that science and technology (S&T) have an enormous impact on our lives and the state of the world. They hold the most prominent place in the curriculum of our schools and are at the top of political agendas concerned with economic growth and competitiveness. Yet the culture that forms the context for the study and application of science and technology today is not well understood.³⁴³ One researcher suggests: "Science education represents a massive institutional effort on a society-wide scale. It does not just affect individual learners; it also has important economic, military, political, and cultural effects."³⁴⁴

Terms such as *scientific literacy*, *public scientific awareness*, *public understanding of science*, and *citizen science* are used frequently in the literature to describe the outcome expected from teaching science.³⁴⁵ Quebec professors Benoit Godin and Yves Gingras contend there is a broad agreement that the term includes both the public knowledge of *methods* of science and a general knowledge of some specific content.³⁴⁶

Reaching a more specific definition is difficult, however, since various interest groups emphasize different areas of importance: the economic sector focuses on the importance of science understanding for economic development and innovation; social sector interests are concerned that people have the knowledge to understand scientifically-based social issues such as biotechnology; and the environmental sector is concerned, in part, that people understand what is happening to the state of the natural world and the sustainability of the planet. In addition, there is no agreement among researchers about many measurement issues.

Godin and Gingras point out the distinctions between the definitions of *science* and *technology*:

Science is here understood as being characterized by two aspects: (1) as a *corpus* of conceptual and experimental methods that allow the investigation of objects pertaining to the natural or social worlds; and (2) as the *body of knowledge* derived from these investigations. Technology in turn is defined as the set of tools

³⁴² Many jokes have been made in the literature concerning the acronym of public understanding of science (PUS), therefore we have chosen not to use it.

³⁴³ Bak, H-J. "Education and Public Attitudes toward Science: Implications for the 'Deficit' Model of Education and Support for Science and Technology," *Social Science Quarterly*, vol. 82, no. 4, 2001: 779-795.

³⁴⁴ Lemke, J. L. "Articulating Communities: Sociocultural Perspectives on Science Education," *Journal of Research in Science Teaching*, vol. 38, no. 3, 2001: 296-316.

³⁴⁵ Godin, Benoit, and Yves Gingras. "What Is Scientific and Technological Culture and How Is It Measured? A Multidimensional Model," *Public Understanding of Science*, vol. 9, 2000: 43-58.

³⁴⁶ Ibid.

and machinery, in short the artefacts, as well as the knowledge pertaining to their functioning and use.³⁴⁷

R.C. Laugksch, writing in 1997, reviewed the literature of the history, concepts, and measurements of scientific literacy.³⁴⁸ The term, *scientific literacy*, was first used in 1958 by Paul Hurd in his publication *Science Literacy: Its Meaning for American Schools*.³⁴⁹ Since that time, the literature has become extensive. Laugksch explains that the term has become an internationally well-recognized educational and contemporary educational goal. He notes that the term “scientific literacy” refers to what the general public ought to know about science, and implies an understanding of the nature, aims, and general limitations of science, as well as some understanding of the more important scientific ideas.³⁵⁰

One difficulty, according to Laugksch, is reaching a consensus on what the public ought to know about science. He describes various systems that conceptualize scientific literacy according to expert levels, competent levels, and minimal functionality levels.³⁵¹ The expert level refers to that of professional scientists and specialists, and the competent level refers to specialized knowledge needed to solve practical problems and the ability to think critically and logically about the issues. A competent level describes someone who needs specialized scientific information in his or her job, but who is not considered a “scientist.” The minimum level concerns the knowledge that members of the public use generally in their daily lives. This requires less knowledge than the competent level. This last (“minimal functionality”) category is the one usually used to describe scientific literacy in most measurement systems. It is quite broad and includes social issues such as nutrition, health, energy usage, and respect for nature and the environment.

Shamos suggests describing scientific literacy through a continuum that is comprised of three overlapping levels.³⁵² The most basic is “cultural” scientific literacy, which is knowledge of basic terms commonly used in the media to communicate scientific matters. “Functional” scientific literacy adds the ability to use the terms in non-technical but meaningful contexts in reading, writing, and conversing about the issues. This level also requires that the person has knowledge of simple everyday facts of nature, such as some knowledge of the solar system. The third level, “true scientific literacy,” adds a need for understanding key concepts or theories that form the foundation of science and the basic processes involved in scientific research. Examples of knowledge needed in the third level include:

³⁴⁷ Ibid.

³⁴⁸ Laugksch. "Scientific Literacy: A Conceptual Overview."

³⁴⁹ Hurd, Paul D. "Science Literacy: Its Meaning for American Schools," *Educational Leadership*, vol. 16, 1958: 13-16.

³⁵⁰ Laugksch. "Scientific Literacy: A Conceptual Overview."

³⁵¹ Ibid.

³⁵² Shamos, M. H. *The Myth of Scientific Literacy*, New Brunswick, N.J.: Rutgers University Press, 1995., Cited in Gal, Iddo. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities," *International Statistical Review*, vol. 70, no. 1, 2002: 1-25. p. 2.

Appreciation of the relativity of ‘fact’ and ‘theory,’ awareness of how knowledge accumulates and is verified, the role of experiments and mathematics in science, the ability to make sense of public communications about scientific matters, and the ability to understand and discuss how science and technology impinge on public life.³⁵³

Some researchers focus on the content of scientific knowledge,³⁵⁴ while others are more concerned with the social uses of science and the contexts in which scientific knowledge is applied.³⁵⁵ In the 1970s and early 1980s, the importance of social context to knowledge and scientific literacy became an important issue, and has remained so today.³⁵⁶ The Science-Technology-Society movement, or STS as it has come to be called in both formal education and in public scientific literacy, developed from that time. The foundation of Canadian formal science education in K-12 is based on a modification of the STS view—an STSE or Science-Technology-Society-Environment framework.³⁵⁷ STS arose from educators’ concerns with understanding science as a social and cultural force that has relevance to the ordinary lives of students and the public. This marked a major shift from the content orientation of science as “pure” knowledge, which has not lost its importance as the “backbone” of science curriculum, to the importance of reflecting on the moral, social, and economic impacts of science on society.³⁵⁸

The National Academy of Sciences in the United States produced the *National Science Education Standards* in 1995 as part of the new standards reform. This offers a definition of scientific literacy that, as DeBoer notes, “includes virtually all of the objectives of science education that have been identified over the years.”³⁵⁹ It also forms the basis for the public understanding of science internationally.

Scientific literacy is the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity. It also includes specific types of abilities [...]. Scientific literacy means that a person can ask, find, or determine answers to questions derived from curiosity about everyday experiences. It means

³⁵³ Shamos. *The Myth of Scientific Literacy*.

³⁵⁴ Brennan, R. P. *Dictionary of Scientific Literacy*, New York: Wiley, 1992.

, Hazen, R. M., and J. Trefil. *Science Matters. Achieving Scientific Literacy*, New York: Anchor Books Doubleday, 1991.

, Hirsch, Kett, and Trefil. *The Dictionary of Cultural Literacy*.

³⁵⁵ Wynne, B. "Knowledges in Context," *Science, Technology, & Human Values*, vol. 16, no. 1, 1991: 111–121.

, Ziman, J. "Public Understanding of Science," *Science, Technology, & Human Values*, vol. 16, no. 1, 1991: 99–105.

³⁵⁶ DeBoer, George E. "Scientific Literacy: Another Look at Its Historical and Contemporary Meanings and Its Relationship to Science Education Reform," *Journal of Research in Science Teaching*, vol. 37, no. 6, 2000: 582–601.

³⁵⁷ Council of Ministers of Education Canada (CMEC). *Common Framework of Science Learning Outcomes, K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum*, accessed.

³⁵⁸ DeBoer. "Scientific Literacy: Another Look at Its Historical and Contemporary Meanings and Its Relationship to Science Education Reform."

³⁵⁹ Ibid.

that a person has the ability to describe, explain, and predict natural phenomena. Scientific literacy entails being able to read with understanding articles about science in the popular press and to engage in social conversation about the validity of the conclusions. Scientific literacy implies that a person can identify scientific issues underlying national and local decisions and express positions that are scientifically and technologically informed. A literate citizen should be able to evaluate the quality of scientific information on the basis of its source and the methods used to generate it. Scientific literacy also implies the capacity to pose and evaluate arguments based on evidence and to apply conclusions from such arguments appropriately.³⁶⁰

It is interesting to compare this definition with the one produced in Canada to describe a framework for science education, which puts more emphasis on society, the environment, and “maintaining a sense of wonder about the world.”³⁶¹ This framework defines the function of science education in terms of a “vision for scientific literacy”:

The framework is guided by the vision that all Canadian students, regardless of gender or cultural background, will have an opportunity to develop scientific literacy. Scientific literacy is an evolving combination of the science-related attitudes, skills, and knowledge students need to develop inquiry, problem-solving, and decision-making abilities, to become lifelong learners, and to maintain a sense of wonder about the world around them. Diverse learning experiences based on the framework will provide students with many opportunities to explore, analyse, evaluate, synthesize, appreciate, and understand the interrelationships among science, technology, society, and the environment that will affect their personal lives, their careers, and their future.³⁶²

³⁶⁰ National Research Council (U.S.), and National Committee on Science Education Standards' Assessment. *National Science Education Standards*, Washington, DC, National Academies Press, 1996; accessed January 2005; available from <http://www.nap.edu/readingroom/books/nses/html/>.

³⁶¹ Council of Ministers of Education Canada (CMEC). *Common Framework of Science Learning Outcomes, K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum*, accessed.

³⁶² *Ibid.*, accessed.

20.1 Measurement of scientific literacy: three models

Laugksch identifies three types of measurements of scientific literacy produced by three different interest groups: public opinion researchers, sociologists, and education researchers.³⁶³ Each of these models has its particular approach and criticism of the other models. However, as Laugksch argues, the essential point is that the approach used needs to be appropriate to the aims and objectives of the study. We will use a related typology to look at the various measurement methodologies. In the literature, these models are generally referred to as the knowledge content or “deficit model,” the “contextual model,” and the “science-technology-society” (STS) model. There are major overlaps in all of these models, however. The STS model, for instance, incorporates science knowledge, opinions, and contextual frameworks. After a brief conceptual review of each model, which is important in order to understand the implications for measurement, we will look more closely at specific measurement instruments that use each of these frameworks.

20.1.1 Public survey approach: science knowledge content-deficit model

The public survey approach is widely referred to in the literature (somewhat pejoratively by sociologists) as the “deficit model,” since some say it measures what people do not know.³⁶⁴ This model measures scientific literacy mainly through large public surveys that collect data on the knowledge of specific facts as well as opinions and attitudes. Godin and Gingras criticize this approach on the basis that knowing a lot of facts does not necessarily make one scientifically literate, since knowledge of facts does not indicate skill, understanding, or the ability to deal with everyday life situations requiring use of technology.³⁶⁵ Knowledge of facts constitutes collecting information, whereas the understanding and use of facts is more indicative of knowledge in the sense in which we are using the term. Godin and Gingras also criticize the deficit model for its focus on individual performance rather than on society as a whole, although an understanding of social issues is among the main reasons for public surveys. Egil Kallerud and Inge Ramberg from Norway summarize recent criticism of public survey methodology:

The limitations of large-scale survey methodology for undertaking studies of public understanding of science have been the topic of much controversy. In strong versions of constructivist criticism of the survey approach, the problem with such surveys is that they produce simplified, coarse-grained, and in that sense empirically inadequate, representations of what are complex and context-dependent social phenomena. More seriously, it is argued that they distort the very nature of public understanding of science. Standardized questionnaires of

³⁶³ Laugksch. "Scientific Literacy: A Conceptual Overview."

³⁶⁴ Ibid.

³⁶⁵ Godin, and Gingras. "What Is Scientific and Technological Culture and How Is It Measured? A Multidimensional Model."

large-scale surveys provide no means to capture the essentially local and contextual processes by which lay people relate to science and technology.³⁶⁶

Laugksch and Spargo, on the other hand, feel that the science knowledge content approach is necessary in order to survey large samples, and that knowledge of basic facts is essential to understanding and acting on more contextual knowledge and public policy alternatives.³⁶⁷

The knowledge content or deficit model is the model that large government surveys use with large-scale samples and standardized questions to obtain data.³⁶⁸ In fact, as Laugksch points out, this model “has formed the basis of almost all national and cross-national studies of the scientific literacy of adults conducted in the last decade or so.”³⁶⁹ Jon Miller is one of the pioneers of scientific literacy measurement who was instrumental in developing the basic science knowledge survey most commonly used in the United States. In 1983, Miller defined scientific literacy as having three dimensions that involve understanding: the nature of science consisting of its norms and methods; the content of knowledge, or key scientific terms and concepts; and the awareness of the impact of science and technology on society.³⁷⁰

This three-dimensional model now forms the basis of the U.S. National Science Foundation *Science & Engineering Indicators* series, the Public Attitudes toward Science and Technology (PATSAT) survey, which is conducted in the U.S. every two years. This model also forms the basis of the multi-national Eurobarometer survey, conducted in the European Union countries.³⁷¹ These surveys use a combination of open-ended and closed-ended questions to ask about a core set of knowledge items that are designed to be relatively durable, while reflecting changing themes over time. For example, early PATSAT surveys included questions about radioactive fallout, polio vaccine, and fluoride in drinking water, whereas the current survey uses constructs such as atomic structure and DNA. The PATSAT has accumulated data since 1979, but the surveys that include the core set of questions about public attitudes toward science began in 1988.³⁷²

This review of the literature on education indicators uncovered only one national Canadian survey on scientific literacy, despite a rather exhaustive review of government and nongovernmental websites and relevant databases. This was a 1989 study supported by grants from the Social Sciences and Humanities Research Council and Industry,

³⁶⁶ Kallerud, Egil, and Inge Ramberg. "The Order of Discourse in Surveys of Public Understanding of Science," *Public Understanding of Science*, vol. 11, 2002: 213-224.

³⁶⁷ Laugksch, R. C., and P. E. Spargo. "Construction of a Paper-and-Pencil Test of Basic Scientific Literacy Based on Selected Literacy Goals Recommended by the American Association for the Advancement of Science," *Public Understanding of Science*, vol. 5, no. 4, 1996: 331-359.

³⁶⁸ Laugksch. "Scientific Literacy: A Conceptual Overview."

³⁶⁹ Ibid.

³⁷⁰ Miller, J. D. "Scientific Literacy: A Conceptual and Empirical Review," *Daedalus: Proceedings of the American Academy of Arts and Sciences*, vol. 112, no. 2, 1983: 29-48.

³⁷¹ Miller, Jon D. "The Measurement of Civic Scientific Literacy," *Public Understanding of Science*, vol. 7, 1998: 203-223.

³⁷² Bak. "Education and Public Attitudes toward Science: Implications for the 'Deficit' Model of Education and Support for Science and Technology."

Science and Technology Canada. Canadian researcher Edna Einsiedel conducted a telephone survey of 2,000 Canadian adults, which included a battery of 127 questions related to basic scientific knowledge, technological literacy, knowledge of scientific processes, and attitudes toward science. The 1994 article based on these data recorded that some of the questions “replicated questions in the 1988 British and American surveys [Eurobarometer survey and PATSAT] on the public understanding of science.”³⁷³ The 27 questions given by Einsiedel as examples of the survey are mostly identical to the U.S. survey questions. The U.S. survey will be discussed in detail below. Given the professed and frequently stated importance of science literacy for the economy, the dearth of recent and readily available evidence on the subject is puzzling and constitutes a serious data gap.

Public opinion surveys on biotechnology and related specific topics have been conducted in Canada.³⁷⁴ However, these studies were done by private polling consultants such as Decima, Optima Consultants, Environics, and Earncliffe research, and most of the surveys are not in the public domain, as they were privately commissioned by industry.³⁷⁵

In addition, the Canadian Science and Innovation Indicators Consortium (CSIIC), a coalition of researchers with expertise in econometrics, bibliometrics, technometrics, and surveys, among other fields, who are “interested in the quantitative aspects of science and innovation,” are working on a project to develop indicators of science and innovation that are mainly concerned with economic development.³⁷⁶ The indicators it uses for scientific and technological culture are: literacy, awareness and interest in S&T affairs, and coverage of S&T in the press.³⁷⁷

The OECD has a section on its website that reports the results of surveys of public understanding of science by country. However, Canada is not among the countries reviewed.³⁷⁸ Most of the international surveys of scientific literacy in OECD countries are similar to the U.S. surveys and have shown similar responses. The majority of adults, including those with higher education degrees, have a very limited knowledge of scientific facts, but remain interested in and positive toward science in general.³⁷⁹

³⁷³ Einsiedel, Edna F. "Mental Maps of Science: Knowledge and Attitudes among Canadian Adults," *International Journal of Public Opinion Research*, vol. 6, no. 1, 1994: 35-44.

³⁷⁴ Einsiedel, Edna F., Karen Finlay, and Jennifer Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, Canadian Biotechnology Advisory Committee (CBAC), 2000; accessed March 2005; available from <http://cbac-cccb.ca/epic/site/cbac-cccb.nsf/en/ah00513e.html>.

³⁷⁵ Ibid., accessed.

³⁷⁶ Canadian Science and Innovation Indicators Consortium (CSIIC). *Website*, CSIIC, accessed March 2005; available from <http://www.csiic.ca>.

³⁷⁷ Godin, Benoît. *Canadian Scoreboards on S&T and Its Further Developments*, Montreal, QU, Canadian Science and Innovation Indicators Consortium (CSIIC), 2004; accessed March 2005; available from <http://www.csiic.ca/Scoreboard.html>.

³⁷⁸ Organisation for Economic Co-operation and Development (OECD). *Public Understanding of Science and Technology: Results of Surveys on Recent Trends in Public Understanding of Science*, OECD, 2005; accessed January 2005; available from http://www.oecd.org/document/55/0,2340,en_2649_34269_1962039_1_1_1_1,00.html.

³⁷⁹ Ziman. "Public Understanding of Science."

In broad terms, approximately 17 percent of US adults qualified as being scientifically literate by the end of the twentieth century and this level is equal to the levels estimated for Britain, France, Denmark, and the Netherlands, and better than all other countries, including Japan and the other members of the European Union not cited above.³⁸⁰

Canada was not mentioned in this reference, likely due to lack of survey evidence.

An analysis of a large-scale British survey found that people with low general knowledge of science often have a more sophisticated understanding of specific science policy issues, especially if the issues are contentious, such as research on genetic engineering and nuclear power.³⁸¹ One analysis of British and U.S. surveys found the level of education to be a strong predictor on positive attitudes toward science in general, but a weak predictor of public attitudes toward controversial scientific research. It did not find lack of scientific knowledge or limited educational attainment to be a causal factor behind skepticism about scientific research on controversial issues like genetic engineering.³⁸² The surveys generally show marked gender differences, with males showing higher levels of knowledge and interest in science than females.³⁸³ Females, on the other hand, have a stronger grasp of contextual social issues. How these attitudes affect the process and outcome of scientific controversies, however, needs further research.³⁸⁴

United States National Science Foundation (NSF) surveys³⁸⁵

The NSF surveys were discussed in general above. Here we highlight more detailed information on these surveys, since they are the prototype surveys for most other national assessments. In a 2004 article, Jon Miller explained various rationales for choosing the questions for the NSF survey, which will not be detailed here. Generally, the questions were chosen on the basis of the level of concept vocabulary and process understanding required for the public to be able to read and understand the science section of the *New York Times* and popular science books, and to watch and understand episodes of the television program *Nova*.³⁸⁶

The NSF publishes science and technology indicators in the following areas: elementary

³⁸⁰ Miller, Jon D. "Public Understanding of, and Attitudes toward, Scientific Research: What We Know and What We Need to Know," *Public Understanding of Science*, vol. 13, no. 3, 2004: 273-294. p. 1.

³⁸¹ Ziman. "Public Understanding of Science."

³⁸² Bak. "Education and Public Attitudes toward Science: Implications for the 'Deficit' Model of Education and Support for Science and Technology."

³⁸³ Ziman. "Public Understanding of Science."

³⁸⁴ Bak. "Education and Public Attitudes toward Science: Implications for the 'Deficit' Model of Education and Support for Science and Technology."

³⁸⁵ National Science Foundation (NSF). *Science and Engineering Indicators: Chapter 7: Public Attitudes and Understanding*, Arlington, VA, NSF, 2004; accessed April 2005; available from <http://www.nsf.gov/statistics/pubseri.cfm?TopID=9&SubID=34&SerID=49>.

³⁸⁶ Miller. "Public Understanding of, and Attitudes toward, Scientific Research: What We Know and What We Need to Know."

and secondary education; higher education in science and engineering; science and engineering labour force; U.S. and international research and development: funds and technology linkages; academic research and development; industry, technology, and the global marketplace; science and technology: public attitudes and understanding; and state indicators. Each of these topics forms a chapter in the Science and Engineering Indicators report, which includes massive amounts of information. In this section we are concerned with the section on public attitudes and understanding. Data sets in the 2002 indicator document are compiled for 11 surveys from 1979–2001, providing a resource for the longitudinal study of U.S. knowledge and attitudes toward science and technology issues. The surveys were administered each year in telephone interviews to about 2,000 U.S. adults over the age of 18.³⁸⁷

The surveys assess attitudes toward and interest in science and technology; self assessed knowledge of the interest areas; understanding of scientific and environmental concepts; knowledge of specific scientific information; how scientific information was acquired, understanding of public policy issues, computer access and use; and the usual demographic questions. All of the surveys have basic questions in common, but each survey also has additional questions. Data are organized on the strongly agree / strongly disagree scale and can be disaggregated according to the following categories: all adults, male, female, less than high school graduate, high school graduate, baccalaureate and higher, and public that is attentive to science and technology. The NSF survey actually identifies three categories of public—attentive public, interested public, and residual public:

It is important to identify the audience for S&T issues so that the attitudes of this group can be compared with those of everyone else. Therefore, it is useful to classify the public into three groups:

- The attentive public consists of those who (1) express a high level of interest in a particular issue; (2) feel very well informed about the issue; and (3) read a newspaper on a daily basis, read a weekly or monthly news magazine, or read a magazine relevant to the issue.
- The interested public consists of those who claim to have a high level of interest in a particular issue but do not feel very well informed about it.
- The residual public consists of those who are neither interested in nor feel very well informed about a particular issue.³⁸⁸

Data categories for potential indicators

Data categories in the U.S. NSF *Science and Engineering Indicator* series that might be useful to consider for education indicators include the following, which were selected

³⁸⁷ National Science Foundation (NSF). *Science and Engineering Indicators: Chapter 7: Public Attitudes and Understanding*, accessed.

³⁸⁸ Ibid., accessed.

from a very long list. If Canada was compared to the U.S. in the NSF indicators, this is noted below:

- Patents granted to universities and organizations
- Average number of citations to scientific and technical articles per patent
- Output of scientific and technical papers
- Indices of public interest in and feeling well informed about public policy issues
- Indices of public interest in and feeling well informed about scientific and technological issues, by sex and level of education
- Public attentiveness to science and technology issues, by sex and level of education
- Public understanding of scientific terms and concepts
- Public understanding of nature of scientific inquiry
- Public assessment of scientific research
- Support for Federal governmental funding of basic scientific research, by level of general support for or reservations about science and technology
- Public assessment of genetic engineering
- Attitudes toward genetically modified food and crop biotechnologies in Canada, Europe, and the United States
- Attitudes toward genetic testing and medicine production in Canada, Europe, and the United States
- Public attitudes toward selected technologies in the United States, Europe, and Canada
- Public assessment of space exploration
- Public confidence in leadership of selected institutions
- Who does what—scientists, engineers, or technicians
- Public perception of scientists, engineers, and technicians
- Public viewing broadcast news versus online news
- Leading source of information
- Public reading a daily newspaper
- Public perception of whether astrology is scientific
- Belief in paranormal phenomena
- Public attentiveness to news stories
- Leading news stories for year
- International awards, e.g. Nobel Prize³⁸⁹

Demographic questions and computer use

In addition to the usual demographic questions, the NSF survey asks whether or not the respondent took math, biology, chemistry, or physics in high school and what the highest level was, and, if he or she attended university (called “college” in the U.S.), what was studied. It goes through a long list of possibilities. It asks specific questions about employment such as whether or not the organization the respondent works for conducts or sponsors any scientific or technological research, and it asks whether there are minor children living with the respondent.

³⁸⁹ Ibid., accessed.

The survey then asks very detailed questions about computer use in the home—including whether or not the respondent has one—and at work, and use of the Internet, email, and network services like Compuserve or America Online. It also asks the following three questions:

1. When you read or hear the term the Internet, do you have a clear understanding of what it means, a general sense of what it means, or little understanding of what it means?
2. In general, computers and factory automation will create more jobs than they will eliminate. Do you strongly agree, agree, disagree, or strongly disagree?
3. With the application of science and new technology, work will become more interesting. Do you strongly agree, agree, disagree, or strongly disagree?

Interest and self-assessed knowledge

The knowledge part of the survey begins with *interest* since whether or not an individual is interested in the subject represents a basis for understanding concepts and attitudes, as well as for constructing knowledge.³⁹⁰ Respondents were asked if they were very interested, moderately interested, or not at all interested in: new medical discoveries, local schools, environmental pollution, new scientific discoveries, economy and business conditions, new inventions and technologies, military and defense policy, agriculture and farming, international and foreign policy, and space exploration. The survey then asked how well informed the respondent was about each of the topics in the interest area. (Major discrepancies were found each year of the survey, since many people who were interested in science issues said they were not well informed about them.)

Understanding of scientific and environmental concepts

The following questions were asked as two-part questions. The respondent was first asked “When you read or hear the term *scientific study* do you have a clear understanding of what it means, a general sense of what it means, or little understanding of what it means?”³⁹¹ (Emphasis added.) If the answer was the first or second item, the respondent was then asked: “In your own words, could you tell me what it means to study something scientifically?”³⁹² This was followed by the two-part question:

When you hear the term DNA, do you have a clear understanding of what it means, a general sense of what it means, or little understanding of what it means? Please tell me, in your own words, what is DNA? [and] If you wanted to find DNA in the human body, where would you expect to find it?³⁹³

³⁹⁰ Durant, John R., Geoffrey A. Evans, and Geoffrey P. Thomas. "The Public Understanding of Science," *Nature*, vol. 340, no. 6, 1989: 11-14.

³⁹¹ Ibid.

³⁹² Ibid.

³⁹³ Ibid.

Other questions in this section have included those about theory (hunch or idea; established explanation; proven fact?), what scientists would do if a drug used to treat high blood pressure is not working well (get patient's opinion, use their medical knowledge to decide if the drug is good or not; give the drug to some patients but not to others and compare the results), and about probability (what does it mean if genetic make-up means that a couple has a one in four chance of having a child with an inherited illness?). These questions also indirectly measure tacit understanding. For example, people who did not mention "hypothesis testing" or "theory construction" when asked what it means to study something scientifically, nevertheless disagreed with a statement given in this section that all of today's scientific theories will be accepted in a hundred years.³⁹⁴

Knowledge of specific scientific information

This section starts with an introductory statement noting that the interviewer is going to ask "a few short quiz-type questions such as you might see on a television game show," and asks for a true or false answer. The questions measure basic and fundamental knowledge. One of the survey's authors notes that this general understanding scale is "measuring variability that is directly relevant to specific science-related public policy issues."³⁹⁵ Among the questions asked were the following:

- All radioactivity is man-made (False)
- Electrons are smaller than atoms (True)
- The continents on which we live have been moving their location for millions of years and will continue to move in the future (T)
- The earliest humans lived at the same time as the dinosaurs (F)
- The centre of the earth is very hot (T)
- All insects have eight legs (F)
- The oxygen we breathe comes from plants (T)
- It is the father's gene that decides whether the baby is a boy or girl (T)
- Lasers work by focusing sound waves (F)
- Antibiotics kill viruses as well as bacteria (F)
- The universe began with a huge explosion (T)
- Human beings, as we know them today, developed from an earlier species of animals (T)
- Cigarette smoking causes lung cancer (T)
- Radioactive milk can be made safe by boiling it (F)
- Sunlight can cause skin cancer (T)

A few short answer questions were also included such as:

- Which travels faster: light or sound?
- Does the earth go around the sun, or does the sun go around the earth?

³⁹⁴ Ibid.

³⁹⁵ Ibid.

- How long does it take for the earth to go around the sun: one day, one month, or one year?
- Of the following things, which is the largest, next largest, smallest: solar system, galaxy, earth, universe, sun?

There were also a few attitude questions, such as:

- Some of the unidentified flying objects that have been reported are really space vehicles from other civilizations [True or False?]
- Do you ever read a horoscope or your personal astrology report?
- [IF YES:] Do you read an astrology report every day, quite often, just occasionally, or almost never? Would you say that astrology is very scientific, sort of scientific, or not at all scientific?
- Do you strongly agree, agree, disagree, or strongly disagree with the following?
 - Some numbers are especially lucky for some people.
 - We depend too much on science and not enough on faith.
 - It is not important for me to know about science in my daily life.
 - Technological development creates an artificial and inhuman way of living
 - Science makes our way of life change too fast.
 - Technological discoveries will eventually destroy the earth.
 - People would do better by living a simpler life without so much technology.
 - Some people possess psychic powers or ESP [53% of all adults in 2001 agreed].
 - There are some good ways of treating sickness such as forms of alternative medicine that science does not recognize

Understanding of public policy issues

These questions are mostly attitude questions that were designed to reflect the relationship between public understanding of, and public support for, science. Some of the questions in this area, which are mostly agree / disagree types, include the following:

- Science and technology are making our lives healthier, easier, and more comfortable.
- New inventions will always be found to counteract any harmful consequences of technological development.
- Even if it brings no immediate benefits, scientific research, which advances the frontiers of knowledge, is necessary and should be supported by the federal government.

Next, a list of “problems” was given and the respondent was asked if the government was spending too much, too little, or the right amount. The categories were: exploring space, reducing pollution, improving health care, supporting scientific research, improving

education, helping older people, improving national defence, and helping low-income persons.

There are also specific policy questions concerning genetic engineering; biotechnology applications; space exploration; use of mice, dogs, and chimpanzees in scientific research; belief in global warming; and quality of science and mathematics education.

Questions are asked about confidence in the following institutions: medicine, scientific community, military, U.S. Supreme Court, banks and financial institutions, major companies, organized religion, education, executive branch of federal government, organized labour, congress, press, and television.

There are quite a few other questions concerning attitudes about scientists and where one's scientific information comes from: TV news magazine shows like "60 Minutes," "20/20," or "Dateline"; public television programs and specifically "NOVA," Discovery, and National Geographic specials; television news; daily newspaper; magazines; cable or satellite viewing; science or technology museums; zoos or aquariums; public libraries; art museums; radio; science fiction books or magazines; and science fiction television shows such as "Star Trek" and "X-Files."

Also, a group of questions asks about involvement in public activities, such as whether the respondent had written or spoken to any public official or legislator about any political issue or problem during the last year and what was the issue (a long list is provided); whether he or she voted; and a few questions about gender.

Results

These surveys have produced massive amounts of information of what people know about science in the sense of tacit knowledge, especially. The variables can all be correlated with education levels. Some of the results were surprising and some were expected. For example, when asked if they agreed or disagreed with the statement that the quality of science and mathematics education was inadequate, 49% of all adults over age 18 agreed in 1985 and 51% of adults agreed in 2001. When asked if people would do better by living a simpler life without so much technology, in 1985, 37% of adults agreed and 48% disagreed, and in 2001, 37% of adults also agreed and 48% disagreed—unchanged.

Data were reported for the correct answers to specific science literacy questions, but the data were not cumulative for all questions, so no composite data were produced on overall scores. As might be expected, the higher the education level, the more correct answers were given. The strongest predictor of scientific literacy was the number of college-level (university-level in Canada) science courses taken. Also, the use of informal science education resources was related positively to scientific literacy. These resources

included use of science magazines, news magazines, science books, science museums, home computer, science websites, and the public library.³⁹⁶

Various questions about belief in paranormal phenomena show a progressive strengthening of positive beliefs in these phenomena from 1990–2001. The NSF survey questions were about psychic or spiritual healing, or the power of the human mind to heal the body; extrasensory perception; haunted houses; ghosts or spirits of dead people; extraterrestrial beings having visited the earth; clairvoyance; and astrology. The NSF commentary calls paranormal information “pseudoscience,” partially blames the growing belief in these phenomena on misinformation from the media, and is concerned that this trend demonstrates a growing anti-science attitude while the government professes an interest in promoting science and technology.³⁹⁷

20.1.2 Contextual model: cultural science

The sociological approach to understanding scientific literacy is widely known as the “contextual model.”³⁹⁸ While the “knowledge content” approach to scientific literacy described above assumes an objectivity to science, the contextual model takes a far more relativistic approach. Researchers are interested in people’s understanding of issues within a social and cultural context. Weinstein describes a “cultural commonsense notion of science” that evolves within a network of communities such as health systems, political systems, media, industry, and environmental groups. He elaborates that each of these communities interacts with communities of scientists to create cultural science:

The meaning making that we call science happens in a way that is distributed over the society spatially and temporally. It happens through science fiction, it happens through laboratory work, [...] it happens in hospitals, it happens in advertising, and it happens in schools. To emphasize this, I explicitly refer to *science-as-culture* rather than to just *science*. I do this as a reminder to the reader that I am concerned with science in all parts of the network and not just the laboratory, field station, and research institute.³⁹⁹

Roth sees “context” not as a container filled with people or as a particular space, but as an “order of behaviour” of which individuals are a part.⁴⁰⁰ He sees contexts as activity systems that are multi-dimensional “entities composed of many, often dissimilar and contradictory elements, lives, experiences, and voices and discontinuous, fractured and

³⁹⁶ Miller. “Public Understanding of, and Attitudes toward, Scientific Research: What We Know and What We Need to Know.”

³⁹⁷ National Science Foundation (NSF). *Science and Engineering Indicators: Chapter 7: Public Attitudes and Understanding*, accessed.

³⁹⁸ Wynne. “Knowledges in Context.”

³⁹⁹ Weinstein, M. “Playing the Paramecium: Science Education from the Stance of the Cultural Studies of Science,” *Educational Policy*, vol. 12, 1998: 484-506.

⁴⁰⁰ Roth, Wolff-Michael. “Scientific Literacy as an Emergent Feature of Collective Human Praxis,” *Journal of Curriculum Studies (reprint)*, 2003; available from <http://www.educ.uvic.ca/faculty/mroth/PREPRINTS/OPED200.pdf>.

non-linear relationships between these elements, lives, experiences, and voices.”⁴⁰¹ This context, he argues, is the source of scientific literacy. He offers the following example:

Such scientific literacy may, for example, emerge when ordinary citizens question a scientist about the methodology he used, which turns out to fall short considering the problem at hand. Recognising this falling short as a collective achievement is the kind of scientific literacy that I am advocating here. This scientific literacy, then, emerges when scientists, science-related professionals, and people from other walks of life and with different backgrounds engage each other over contentious and personally relevant issues. Thus, everyone (speakers, listeners, moderator) and everything (reports, spatial arrangements, historical context) in the public meeting was part of the appearance of scientific literacy.⁴⁰²

Glen Aikenhead notes that science is embedded in society through particular roles such as “setting standards, regulating commerce, providing legal evidence, announcing medical breakthroughs, creating novel ethical dilemmas, and requiring financial support for research and development.”⁴⁰³ Steven Yearley emphasizes the importance of public trust in scientific expertise as an important factor in how people utilize scientific knowledge in individual contextual circumstances.⁴⁰⁴ And Wynne observes that people often do not have an extensive knowledge of “science” in general, however, when they see a practical use for specific information, for example about disease when they are ill, they often “show a remarkable capability to learn and to find relevant sources of scientific knowledge. This is true of medical self-help organizations [...] but also of bird-watchers, amateur astronomers, and many other groups.”⁴⁰⁵ Making the point that it is important to indicate specific contextual knowledge, Wynne describes the effort needed for informal learning:

An important discovery from our research has been the enormous amount of sheer *effort* needed for members of the public to monitor sources of scientific information, judge between them, keep up with shifting scientific understandings, distinguish consensus from isolated scientific opinion, and decide how expert knowledge needs qualifying for use in *their* particular situation. They must also judge what level of knowledge is *good enough* for them. This is not necessarily the same level as scientists have assumed; the threshold may be looser, or tighter.⁴⁰⁶

⁴⁰¹ Ibid.

⁴⁰² Ibid.

⁴⁰³ Aikenhead, Glen S. "Review of Research on Humanistic Perspectives in Science Curricula." Paper presented at the European Science Education Research Association (ESERA) 2003 Conference, Noordwijkerhout, The Netherlands, August 19-23, 2003, University of Saskatchewan; accessed January 2006; available from http://www.usask.ca/education/people/aikenhead/ESERA_2.pdf.

⁴⁰⁴ Yearley, S. "What Does Science Mean in the 'Public Understanding of Science'," in *Between Understanding and Trust: The Public, Science and Technology*, ed. Dierkes, Meinolf and Claudia von Grote, 217-236. Amsterdam: Harwood, 2000.

⁴⁰⁵ Wynne. "Knowledges in Context."

⁴⁰⁶ Ibid.

Although some researchers, such as Wynne, are strongly critical of the knowledge content or deficit model,⁴⁰⁷ others, such as Einsteidel and Sturgis and Allum, see a possibility that the frameworks might be complementary, and that contextual issues could more effectively be integrated within the survey framework.⁴⁰⁸ While the knowledge content model relies largely on quantitative data, research in the contextual, sociological area uses mainly qualitative case studies, structured in-depth interviews, and questionnaires on specific issues.⁴⁰⁹ There have been suggestions as to how conceptual issues can be included in large surveys, and we will look at a few of them below.

The conceptual approach often is more interested in focussing on society as a whole, which can be seen as more or less literate, rather than concentrating on the individual level and on the sum of individual responses to science literacy questionnaires. As Godin and Gingras remark:

Societies and social institutions can also learn, for example, to control science and technology or to intervene to diminish the perverse effects of technologies. This dimension of S&T culture—the social dimension—is not measured with existing indicators.⁴¹⁰

Roth and Lee, in a report of their three-year ethnographic study of science in a First Nation community in British Columbia, also see scientific literacy “as a property of collective activity rather than individual minds.”⁴¹¹ They continue:

We think of knowing and learning science as situated in and distributed across social and material aspects of a setting. [The community they are researching features] different types of citizens who walk a creek, interact during an environment-oriented open-house event, discuss water problems, collect data, and have different conceptions of human-environment relations. The case studies show that collectively, much more advanced forms of scientific literacy are produced than any individual (including scientists) could produce. Creating opportunities for scientific literacy to emerge from collective activity, irrespective of whether one or more participants know some basic scientific facts, presents challenges to science educators very different from teaching basic facts and skills to individuals.⁴¹²

In their study, Roth and Lee saw science as related to a variety of contexts “ranging from personal matters (e.g., accessibility to safe drinking water), livelihood (e.g., best farming practices), leisure (e.g., gardening in sustainable, organic ways), spiritual values of water

⁴⁰⁷ Ibid.

⁴⁰⁸ Sturgis, Patrick, and Nick Allum. "Science in Society: Re-Evaluating the Deficit Model of Public Attitudes," *Public Understanding of Science*, vol. 13, 2004: 55-74.

⁴⁰⁹ Wynne. "Knowledges in Context."

⁴¹⁰ Godin, and Gingras. "What Is Scientific and Technological Culture and How Is It Measured? A Multidimensional Model."

⁴¹¹ Roth, Wolff-Michael, and Stuart Lee. "Scientific Literacy as Collective Praxis," *Public Understanding of Science*, vol. 11, 2002: 33-56.

⁴¹² Ibid.

as cleansing, to activism and organized protest.”⁴¹³ Thus, knowledge is situated in its use in the “changing processes of human activity,” and individual scientific literacy and learning are correspondingly seen as reflections of the knowing and learning within society as a whole. Roth, in a separate article, believes that “we treat scientific literacy as a recognisable and analysable feature that emerges from the (improvised) choreography of human interaction, which is always a collectively achieved, indeterminate process.”⁴¹⁴

According to Roth and Lee, in order to measure the scientific literacy of society, one would need to indicate “changing participation in changing social practices”⁴¹⁵ such as the society’s engagement with the environment. They argue that it is not important that individuals all know specific information, such as how genetic modification is achieved, since this knowledge lies within a collective body. Too much specialized knowledge exists for one person to know all the relevant facts. What is important is that “as collectives we produce the substantive knowledges relevant to the problem at hand.”⁴¹⁶ What is also important, according to Roth and Lee, is to facilitate democratic conversations in policy-making, in public hearings or “study circles,” for example, where this knowledge is shared for the public good. Indicators might measure the extent and content of this type of activity, the extent to which adults are engaged in these activities, and the social consciousness about issues like climate change that threaten the planet. They argue that this consciousness needs to challenge scientists to account for their actions, for example, in producing potentially harmful substances such as drugs to make children—who are labelled as having “ADHD” (Attention Deficit Hyperactivity Disorder)—compliant, genetically altered infertile seeds, or “smart bombs” that function as land mines.⁴¹⁷

Some researchers have started the process of contextualizing scientific knowledge by looking for broad principles that affect the way people receive and use this knowledge. For example, Zinman points to evidence that shows that people receive their scientific understanding in incoherent ways—from the media, from friends and colleagues, and in other aspects of life—not simply from school. The important point is “what they pick up is not simply a filtered version of formal scientific knowledge: its meaning is actively constructed by the processes and circumstances under which it is communicated and received.”⁴¹⁸ As well, the knowledge that people construct and use is directly related to what they need at the moment, and they “select, or construct the scientific elements according to their own interests, involvement, personal and social histories, and other circumstances.”⁴¹⁹ Therefore, in this model, scientific knowledge is socially negotiated, and this “local knowledge” should not be considered less important than that held by experts, who may or may not see their work—or the consequences of their work—in a social context.

⁴¹³ Ibid.

⁴¹⁴ Roth. “Scientific Literacy as an Emergent Feature of Collective Human Praxis.”

⁴¹⁵ Roth, and Lee. “Scientific Literacy as Collective Praxis.”

⁴¹⁶ Roth. “Scientific Literacy as an Emergent Feature of Collective Human Praxis.”

⁴¹⁷ Ibid.

⁴¹⁸ Ziman. “Public Understanding of Science.”

⁴¹⁹ Ibid.

Kallerud and Ramberg call for surveys to be redesigned. They see the potential for large-scale surveys to broaden social policy considerations, if the survey is “framed as a methodology for mapping the social pervasiveness of ideologies about the science–society relationship.”⁴²⁰ They suggest that it is important to highlight how scientists themselves understand and interpret science. Citing Aant Elzinga and Andrew Jamison, they see science policy as an area in which four main social perspectives are embedded within the social context. Each of these areas has its own culture, mode of public assessment, core concerns, and means of application.⁴²¹ These cultures comprise the academic, industrial, bureaucratic, and civic cultures. This framework is reproduced below in Table 6.

Table 6: The cultures of science policy

Culture	Mode of public assessment	Core concern	Pragmatic implication
The academic culture	Appreciation	Cultural achievement	Scientific autonomy
The industrial culture	Acceptance	Technological opportunity	Competitive advantage
The bureaucratic culture	Trust	Epistemological authority	Effective political action
The civic culture	Responsibility	Social consequences	Accountability

Source: Kallerud, Egil, and Inge Ramberg. "The Order of Discourse in Surveys of Public Understanding of Science." *Public Understanding of Science*, 11 (2002): 213–24, p. 217.

The first three cultures have been fairly well treated in the surveys, according to Kallerud and Ramberg. They especially see the need for surveys to incorporate the civic culture perspective on core issues, which they term as the “socio-political embeddedness of science”:

In order to do so within the science policy culture framework, issues concerning social responsibility and responsiveness would have to be focused in ways that also address, for example, the links between science and power, the role of socio-

⁴²⁰ Kallerud, and Ramberg. "The Order of Discourse in Surveys of Public Understanding of Science."

⁴²¹ Elzinga, Aant, and Andrew Jamison. "Changing Policy Agendas in Science and Technology," in *Handbook of Science and Technology Studies*, ed. Jasanoff, S., et al., 572-597. Thousand Oaks, CA: Sage, 1995.

political alliances that underpin the funding and practice of science, its susceptibility to ‘outside’ influences, and so on.⁴²²

Specifically, issues that need to be addressed, according to Kallerud and Ramberg, include:

- the precautionary principle
- the connection between researchers and their sponsors, and the independence of researchers
- the role of scientific knowledge in the political process⁴²³

Response choices need to be broader than “for or against,” for example, when asking about science and technology. To illustrate the type of contextual questions that could (and should) be included in future science literacy surveys, Kallerud and Ramberg give as examples alternative questions that were in the first Norwegian survey of public understanding of science conducted in 1999. These questions were designed to measure the three issues above in order to indicate a correlation between knowledge and the socio-political embeddedness of science. The questions are reproduced in Table 7.

Table 7: Three items on the socio-political embeddedness of science

1. The trustworthiness of science (A) “Nowadays it seems that anyone who has the money required, may purchase research on nearly any topic with the conclusion they want” (B) “I am confident that researchers and other experts do not allow the results of their research to be influenced by outsiders”
2. The precautionary principle (A) “It is wrong to put strong restrictions on the use of new technology as long as it is not scientifically proved that it will cause extensive damage to humans and the environment” (B) “If it is uncertain what consequences the use of new, unknown technologies will have for humans and the environment, one should be restrictive in permitting their use”
3. Science in politics (A) “Science is the best basis for policy” (B) “In politics, values and attitudes are at least as important as science”

Source: Kallerud, Egil, and Inge Ramberg. “The Order of Discourse in Surveys of Public Understanding of Science.” *Public Understanding of Science*, 11 (2002): 213–24, p 220.

Sturgis and Allum are interested in integrating the contextual perspective into survey-based quantitative analysis.⁴²⁴ They are particularly concerned with “how different

⁴²² Kallerud, and Ramberg. “The Order of Discourse in Surveys of Public Understanding of Science.”

⁴²³ Ibid.

domains of *knowledge* impact on attitudes toward science.”⁴²⁵ For their analysis of the connections between the knowledge of the formal contents of scientific knowledge, the nature or methods of science, and the institutional embedding and control of science, they constructed a simple quiz. The content of knowledge and the methods of science sections are based on items often used in surveys, and are comprised of 7 and 4 questions, respectively. The authors suggest that the items selected for their analysis should be seen as diagnostic indicators, rather than as representative of the full scope of actual scientific knowledge needed to form attitudes. Sturgis and Allum find it likely that a high score on their quiz will indicate that a person also has a fairly wide range of understanding of scientific knowledge.

Their treatment of the knowledge and understanding of contextual effects on science are, however, unusual. They chose “institutional knowledge of science,” which they define as “denoting an understanding of the ways in which science is embedded within wider political, economic, and regulatory settings,”⁴²⁶ to represent the context of scientific knowledge—although they realize it is only one factor. In order to measure institutional knowledge, they use the proxy of questions about political knowledge.

People who are knowledgeable about political parties and the issues they endorse, are also more likely to be familiar with existing forms of scientific regulation, government committee structures, and the nature of links between science, industry, and government and so forth.⁴²⁷

This observation is based on studies that show people to be “generalists”—their level of knowledge in one domain will predict their level of knowledge in another.⁴²⁸ Also, studies have shown that a person’s level of political knowledge has a major impact on “political preferences, likelihood of voting, and a whole host of other important behaviours, attitudes, and beliefs.”⁴²⁹

The Table 8 shows the questions and coding used in the Sturgis and Allum political knowledge scale. (Note that it was composed for British respondents.)

⁴²⁴ Sturgis, and Allum. "Science in Society: Re-Evaluating the Deficit Model of Public Attitudes." p. 60.

⁴²⁵ Ibid.

⁴²⁶ Ibid.

⁴²⁷ Ibid.

⁴²⁸ Bauer, Martin W., Kristina Petkova, and Pepka Boyadjieva. "Public Knowledge of and Attitudes to Science: Alternative Measures That May End the 'Science War'," *Science, Technology and Human Values*, vol. 25, no. 1, 2000: 30-51.

⁴²⁹ Converse, Philip E. "Assessing the Capacity of Mass Electorates," *Annual Review of Political Science*, vol. 3, 2000: 331-353.
, Delli-Carpini, Michael X., and S. Keeter. *What Americans Know About Politics and Why It Matters*, New Haven, CT: Yale University Press, 1996.

Table 8. Wordings and coding of items in political knowledge scale

The political knowledge measure is a summed scale of the following six items: (parenthetical answers give the knowledge scale codes)
These next questions are about things that different parties are in favor of. If you feel you don't know, just tell me and we'll go to the next question. Firstly which party would you say is ...
Most in favor of changing the voting system to a form of proportional representation? (Liberal Democrats = correct (1), all other answers = incorrect (0).)
Most in favor of reducing government spending in order to cut taxes? (Tories [Conservatives] = correct (1), all other answers = incorrect (0).)
Most in favour of schools being under local authority control? (Labour = correct (1), all other answers = incorrect (0).)
Most in favor of independence for Scotland? (SNP = correct (1), all other answers = incorrect (0).)
Most in favor of letting private industry run the railways? (Tories = correct (1), all other answers = incorrect (0).)
Most in favor of setting a minimum wage level, below which no one can be paid? (Labour = correct (1), all other answers = incorrect (0).)

Source: Sturgis, Patrick, and Nick Allum. "Science in Society: Re-Evaluating the Deficit Model of Public Attitudes." *Public Understanding of Science*, 13 (2004): 55–74.

VNOS—Views of Nature of Science

The VNOS—Views of Nature of Science tool places science and technology within the context of the larger society. It was designed by Norm Lederman, et al. in the U.S. to test views of the nature of science (NOS), which have direct relevance to understanding science and our world in general.⁴³⁰ The instrument is intended to be used for the purpose of teaching and learning NOS, and includes open-ended questions and follow-up interviews, which make it unlikely to be useful for large-scale surveys. Indeed, Lederman, et al. are highly critical of instruments designed for “mass administration to large samples.”⁴³¹ It is included here since the questions that were developed for this tool might inform the CIW indicator development.

A brief review of the VNOS conceptual basis is important in order to understand the significance of NOS. Lederman, et al. conceptualize NOS as referring to “the epistemology and sociology of science, science as a way of knowing, or the values and beliefs inherent to scientific knowledge and its development.”⁴³² For the VNOS instrument, the authors chose aspects of NOS that were general enough not to be

⁴³⁰ Bonnett, Michael. "Education for Sustainability as a Frame of Mind," *Environmental Education Research*, vol. 8, no. 1, 2002: 9-20. 497–591.

⁴³¹ Lederman, Norm G., Fouad Abd-El-Khalick, Randy L. Bell, and Renée S. Schwartz. "Views of Nature of Science Questionnaire: Toward Valid and Meaningful Assessment of Learners' Conceptions of Nature of Science," *Journal of Research in Science Teaching*, vol. 39, no. 6, 2002: 497-521. p. 497.

⁴³² Ibid. p. 498.

controversial and that had relevance to daily life. They defined these fundamental aspects of scientific knowledge as follows: “Scientific knowledge is tentative; empirical; theory-laden; partly the product of human inference, imagination, and creativity; and socially and culturally embedded.”⁴³³ Three additional important aspects of the scientific method were also included: “the distinction between observation and inference, the lack of a universal recipelike method for doing science, and the functions of and relationships between scientific theories and laws.”⁴³⁴

NOS is concerned with the values and assumptions underlying the scientific processes of collecting and interpreting data and the derivation of conclusions. It involves understanding that perceptual apparatus and instruments such as microscopes and telescopes restrict and filter the observations. Lederman, et al. feel that knowing the difference between direct observation and inferences about phenomena that are not directly observable with the senses is basic to understanding “inferential and theoretical entities and terms,” such as “atoms, molecular orbitals, species, genes, photons, magnetic fields, and gravitational forces,” which are “functional models rather than faithful copies of reality.”⁴³⁵

This understanding also relates to the differences between scientific theories and laws. Theories are inferred explanations that cannot be directly tested by observation, that are based on assumptions that have consensus, and that are used to explain phenomena. Laws describe relationships among phenomena that can be observed. They are different, equally valid, ways of knowing and have no hierarchical relationship, i.e., theories do not become laws with more evidence. Facts, theories, and laws are all subject to change.

The work of scientists is also necessarily coupled with their beliefs, prior knowledge, experiences, professional commitments, and the beliefs and power structures of their society. These underlying assumptions affect what and how scientists conduct investigations, what they do or do not observe, and how they interpret their findings. In other words, scientific findings are not neutral and value-free. According to Lederman, et al., this is necessary for people to understand in order to make decisions about the trustworthiness of evidence.

The VNOS has mainly been administered to high school and university students, graduates, and secondary science teachers in countries across four continents, including Canada, and has been demonstrated to have a high validity rate. There are three versions of the VNOS, which all use an open-ended questionnaire. Ideally, the questionnaire would be used with a follow-up interview of 15–20% of the participants, which could clarify ambiguous responses. In fact, Lederman, et al. stress the importance of the follow-up interview and argue that it is the principle source of validity evidence for the questionnaire. Analysis of the questionnaires and interviews must be conducted by trained researchers and interrater agreement must be established. It is not intended to

⁴³³ Ibid. p. 499.

⁴³⁴ Ibid.

⁴³⁵ Ibid. p. 501.

label “learners’ views as adequate or inadequate or sum their NOS understandings into numerical scores.”⁴³⁶ Furthermore:

The analysis of responses to VNOS items does not assume a restrictive one-to-one correspondence between an item on the questionnaire and a target NOS aspect [...]. This approach to the analysis has two major advantages. First, it is consistent with our belief that NOS understandings should not be construed in the narrow sense of specific desired responses to cues set by specific questions. Rather, participants could demonstrate their NOS understandings in several contexts. Second, this approach allows one to check for deep understanding of an NOS aspect versus superficial reiteration of key terms by examining the consistency, or lack thereof, in respondents’ answers across VNOS items.⁴³⁷

The different versions of the survey have gone through various validation and reliability tests, and have been examined by an expert panel of scientists and science educators. VNOS-B has been modified to create the latest version, VNOS Form-C. VNOS-C has 10 questions that are each printed on a separate page to allow ample space for answers. The entire questionnaire can be found in Appendix 3.

20.1.3 Science-Technology-Society (STS) model: science education in Canada

Although formal education systems are the responsibilities of the provincial governments in Canada, the Council of Ministers of Education, Canada (CMEC) provides direction in the form of curriculum policy documents in an effort to avoid duplication and disparity among the provinces. However, the provinces remain independent, and choose their own specific curriculum. In 1997, the CMEC, in consultation with many stakeholders and partially based on the U.S. models, *Benchmarks for Science Literacy*⁴³⁸ and *National Science Education Standards*⁴³⁹ produced the *Common Framework of Science Learning Outcomes*, which was the first Canadian national framework for science education.⁴⁴⁰ Although this is not an adult scientific literacy document per se, it does create “a vision and foundational statements for scientific literacy in Canada” within a lifelong learning process.⁴⁴¹ It establishes a science–technology–society–environment (STSE) approach to scientific literacy in Canada.⁴⁴² The framework also outlines both general and specific learning outcomes for grades K-12.

⁴³⁶ Ibid. p. 517.

⁴³⁷ Ibid. p. 512.

⁴³⁸ American Association for the Advancement of Science (AAAS). *Benchmarks for Science Literacy (Project 2061)*, Oxford University Press, 1993; accessed March 2005; available from <http://www.project2061.org/tools/benchol/bolintro.htm>.

⁴³⁹ National Research Council (U.S.), and National Committee on Science Education Standards' Assessment. *National Science Education Standards*, accessed.

⁴⁴⁰ Council of Ministers of Education Canada (CMEC). *Common Framework of Science Learning Outcomes, K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum*, accessed.

⁴⁴¹ Ibid., accessed.

⁴⁴² Aikenhead, Glen S. "STS Science in Canada: From Policy to Student Evaluation," in *Science, Technology, & Society: A Source Book on Research and Practice*, ed. Kumar, David and Daryl Chubin, 49-89, Kluwer Academic Press, 2000.

Glen Aikenhead, of the University of Saskatchewan, has been involved with the development of the STSE system in Canada. He reviews its pros and cons along with the controversies surrounding STSE in a report, *STS Science in Canada: From Policy to Student Evaluation*.⁴⁴³ He says that STSE science is “expected to fill a critical void in the traditional curriculum—the social responsibility in collective decision making on issues related to science and technology.”⁴⁴⁴ Quoting Kranzberg, Aikenhead says making complex decisions involves “the application of scientific knowledge, technological expertise, social understanding, and humane compassion.”⁴⁴⁵ The CMEC framework establishes the social context of knowledge in a discussion of the considerations that were taken into account in the framework development:

Student learning is affected by personal and cultural preconceptions and prior knowledge. Students learn most effectively when their study of science is rooted in concrete learning experiences, related to a particular context or situation, and applied to their world where appropriate. Science activities, therefore, occur within a socio-cultural context, are interpreted within that context, and are designed to extend and challenge existing views.⁴⁴⁶

The CMEC framework sets out four foundation statements, the first being STSE as the “driving force.” The framework document advises that many of the learning outcomes presented come either directly or indirectly from the STSE domain. The first foundation notes that “Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.”⁴⁴⁷

The second, third, and fourth foundation statements concern skills, knowledge, and attitudes respectively. Skills to be developed include those needed for scientific and technological inquiry, problem solving, communicating scientific ideas, working collaboratively, and for informed decision-making. The framework takes a constructionist view of knowledge stating that students will construct knowledge and understandings of concepts in the sciences and be able to apply these understandings to “interpret, integrate, and extend their knowledge.”⁴⁴⁸

The final foundation, *attitudes*, emphasizes developing attitudes that support responsible “application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.”⁴⁴⁹ It names six attitude indicators that guide the learning outcomes:

⁴⁴³ Ibid.

⁴⁴⁴ Ibid.

⁴⁴⁵ Kranzberg, M. “Science-Technology-Society: It’s as Simple as XYZ,” *Theory in Practice*, vol. 30, 1991: 234-241.}

⁴⁴⁶ Council of Ministers of Education Canada (CMEC). *Common Framework of Science Learning Outcomes, K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum*, accessed.

⁴⁴⁷ Ibid., accessed.

⁴⁴⁸ Ibid., accessed.

⁴⁴⁹ Ibid., accessed.

- appreciation of science and awareness of its role, contributions to society, impacts, and limits
- interest in science
- active scientific inquiry
- collaboration to develop ‘interpersonal responsibilities,’ ‘openness to diversity,’ and respect for others
- stewardship and responsible action toward living things, the environment, and issues related to sustainability
- safety or the ability to ‘assess and manage potential dangers and apply safety procedures.’⁴⁵⁰

The attitude indicators are not meant to be formally assessed. The detailed list provides examples of behaviours to be encouraged and that “when observed regularly, indicate a desire to act in certain ways.”⁴⁵¹

The framework also undercuts myths that are prevalent in the general society. For example, it takes science out of the strictly positivist, rationalist realm to include intuitive processes of creating knowledge: “Science is also a way of learning about the universe based on curiosity, creativity, imagination, intuition, exploration, observation, replication of experiments, interpretation of evidence, and debate over the evidence and its interpretations.” It also moves away from a common misconception of the “scientific method”:

Science is a human and social activity with unique characteristics and a long history that has involved many men and women from many societies [...]. Many historians, sociologists, and philosophers of science argue that there is no set procedure for conducting a scientific investigation. Rather, they see science as driven by a combination of theories, knowledge, experimentation, and processes anchored in the physical world. Theories of science are continually being tested, modified, and improved as new knowledge and theories supersede existing ones. Scientific debate on new observations and hypotheses that challenge accepted knowledge involves many participants with diverse backgrounds. This highly complex interplay, which has occurred throughout history, is fuelled by theoretical discussions, experimentation, social, cultural, economic, and political influences, personal biases, and the need for peer recognition and acceptance.⁴⁵²

Educators in Canada, for the most part, believe that contextualizing science within the STSE framework, which also includes scientific content standards, will benefit both students who will go on to study science professionally, as well as the general public.⁴⁵³ The framework document records that the knowledge outcomes are meant to provide curricula with direction. However:

⁴⁵⁰ Ibid., accessed.

⁴⁵¹ Ibid., accessed.

⁴⁵² Ibid., accessed.

⁴⁵³ Aikenhead. "STS Science in Canada: From Policy to Student Evaluation."

[T]he knowledge foundation is intended to reduce the volume of material traditionally covered in science curricula, and to ensure that students are not learning isolated bits of information, but rather are developing a greater understanding of science through the appropriate contexts.⁴⁵⁴

⁴⁵⁴ Council of Ministers of Education Canada (CMEC). *Common Framework of Science Learning Outcomes, K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum*, accessed.

20.2 Science learning outcomes expected in Canadian secondary schools

In Appendix 4, we list outcome statements from the Council of Ministers of Education, Canada's *Common Framework of Science Learning Outcomes* for grade 12.⁴⁵⁵ These statements give examples of what students are expected to know and be able to do by the end of secondary schooling. We also show general learning outcomes for life science, and a more elaborate, though partial, list of expected grade 12 outcomes for earth and space science.

We have included only general outcomes anticipated for the STSE framework, and examples of specific knowledge outcomes in one particular sub-discipline of science, as specified in the STSE framework. The specific knowledge contents listed in the STSE are extremely detailed and discipline-specific, and are therefore probably not useful for designing general scientific literacy indicators. Based on results from U.S. and European surveys discussed above, which all reported similar results, it is most likely that the majority of the general population, even the highly educated, would not do very well on a test constructed from the specific knowledge outcomes listed in Appendix 4. Nevertheless, according to the CMEC, the list of specific knowledge outcomes in the STSE, as illustrated in Appendix 4, does represent what the populace who have graduated from high school is "expected" to know to be scientifically literate. As we have seen, the questions asked on national literacy exams, particularly in the U.S., are far more basic. A quick glance at the CMEC framework indicates that the learning outcomes expected from grade six, or even grade three, students, might be the equivalent of the level of basic science literacy assessed in national surveys in the U.S.

In general, the teacher conducts student assessments and evaluations of learning outcomes. The knowledge content of science, however, is most often evaluated by national standardized tests such as PISA (Programme for International Student Assessment) and SAIP (School Achievement Indicators Program). Aikenhead suggests that student assessments—defined as the act of observing or collecting student work—and evaluations—defined as the judgment of or interpretation of the work—should be a collaborative endeavour between students and teachers and should be used in a "formative" way to help students progress.⁴⁵⁶

20.2.1 Models of STS (Science–Technology–Society) assessments

VOSTS: Views of Science–Technology–Society

The CMEC framework has influenced tests and surveys that measure portions of adult scientific literacy, specifically concerning attitudes toward the nature of science (NOS) and the impact of science and technology on society.⁴⁵⁷ Aikenhead and Ryan created an

⁴⁵⁵ Ibid., accessed.

⁴⁵⁶ Aikenhead. "STS Science in Canada: From Policy to Student Evaluation."

⁴⁵⁷ Laugksch. "Scientific Literacy: A Conceptual Overview."

alternative assessment instrument to measure STSE content specifically for an Anglo-Canadian setting. This instrument has been used internationally (with cultural modifications), and has been tested for reliability and validity. The authors found that people were able to express their beliefs better on the questionnaire than they could by writing a paragraph. The VOSTS—Views of Science–Technology–Society instrument can be used to formulate a bank of items for public scientific literacy surveys.⁴⁵⁸ The entire 114-item instrument can be found online at <http://www.usask.ca/education/people/aikenhead/vosts.pdf>.⁴⁵⁹

Aikenhead and Ryan reviewed contemporary literature and formulated statements, from the humanistic content they found, into 114 multiple-choice items. These items are then used to select 10–20 items for use on different versions of the questionnaire. On the questionnaire, a statement is made and there are about 10 responses from which to choose. The choices give responses or positions that range from one extreme to the other. The respondent is asked to choose the one that is closest to her or his personal view or belief. The response format is designed to reflect the respondent's opinion, rather than a correct answer. The evaluation is straightforward, although there have been some advances in scaling procedures.⁴⁶⁰ This is a very interesting tool that assesses presumptions and attitudes that underlie much of behaviour. The VOSTS is unique in that it includes viewpoints from Canadian 11 and 12 grade students—over a six year period—to help formulate the multiple choices, rather than only using expert judgment.

The VOSTS asks for viewpoints on particular statements that are about:

- what science and technology are
- how society influences science and technology
- how science and technology influence society
- how science as taught in school influences society
- what characterizes scientists
- how scientific knowledge comes about
- the nature of scientific knowledge⁴⁶¹

Table 9 illustrates the conceptual framework of VOSTS. A few sample questions and response choices are shown in Appendix 5.

⁴⁵⁸ Organisation for Economic Co-operation and Development (OECD). *The PISA [Programme for International Student Assessment] 2003 Assessment Framework - Mathematics, Reading, Science and Problem Solving, Knowledge and Skills*, accessed.

⁴⁵⁹ Aikenhead, Glen S., Alan G. Ryan, and Reg W. Fleming. *Views on Science-Technology-Society: Form CDN.Mc.5*. Vol. 2005 University of Saskatchewan, 1989.

⁴⁶⁰ V. "Response and Scoring Models for the 'Views on Science–Technology–Society' Instrument," *International Journal of Science Education*, vol. 21, no. 3, 1999: 231–247.; Tedman, Debra K., and John P. Keeves. "The Development of Scales to Measure Students' Teachers' and Scientists' Views on STS," *International Education Journal*, vol. 2, no. 1, 2001: 20–48.

⁴⁶¹ FLAG Fellows. *Field-Tested Learning Assessment Guide (FLAG)*, National Institute for Science Education, University of Wisconsin-Madison, 2005; accessed January 2005; available from http://www.flaguide.org/tools/attitude/views_science_tech.php.

Table 9: VOSTS (Views on Science–Technology–Society) Conceptual Framework

<i>Definitions</i>
1. Science and Technology
01. Defining science (e.g., instrumentalism, curiosity satisfaction, social enterprise).
02. Defining technology (e.g., social and human purposes, hardware, socioeconomic & cultural components).
03. Defining research & development (R&D).
04. Interdependence of science & technology (e.g., rejection that technology is simply applied science).
<i>External Sociology of Science</i>
2. Influence of Society on Science / Technology
01. Government (e.g., control over funding, policy & science activities, influence of politics).
02. Industry (e.g., corporate control dictated by profits).
03. Military (e.g., utilization of scientific human resources).
04. Ethics (e.g., influence on research program).
05. Education institutions (e.g., mandatory science education).
06. Special interest groups (e.g., health societies, nongovernmental & non-industrial groups).
07. Public influence on scientists (e.g., upbringing, social interactions).
3. (Future category) [The literature does not make clear what this refers to.]
4. Influence of Science / Technology on Society
01. Social responsibility of scientists / technologists (e.g., communicating with public)
02. Contribution to social decisions (e.g., technocratic vs. democratic decision making, moral & legal decisions, expert testimony, lobbying for funds).
03. Creation of social problems (e.g., trade-offs between positive & negative consequences, competition for funds).
04. Resolution of social & practical problems (e.g., technological fix, everyday type of problems).
05. Contribution to economic wellbeing (e.g., wealth & jobs).
06. Contribution to military power.
07. Contribution to social thinking (e.g., lexicon, metaphors)
5. Influence of School Science on Society
01. Bridging C.P. Snow's two cultures.
02. Social empowerment (e.g., consumer decisions).
03. School characterization of science.
<i>Internal Sociology of Science</i>
6. Characteristics of Scientists
01. Personal motivation of scientists.
02. Standards / values that guide scientists at work and home (e.g., open-mindedness, logicity, honesty, objectivity, skepticism, suspension of belief; as well as the opposite values: closed-mindedness, subjectivity, etc.).

03. Ideologies of scientists (e.g, religious views).
04. Abilities needed to do science (e.g., commitment, patience).
05. Gender effect on the process & product of science.
06. Under-representation of females.
7. Social Construction of Scientific Knowledge
01. Collectivization of science (e.g., loyalties to research team & employer).
02. Scientific decisions (e.g., disagreements among scientists, consensus making).
03. Professional communication among scientists (e.g., peer review, journals, press conferences).
04. Professional interaction in the face of competition (e.g., politics, secrecy, plagiarism).
05. Social interactions.
06. Individual's influence on scientific knowledge.
07. National influence on scientific knowledge & technique.
08. Private vs. public science.
8. Social Construction of Technology
01. Technological decisions.
02. Autonomous technology (e.g., technological imperative).
Epistemology
9. Nature of Scientific Knowledge
01. Nature of observations (e.g., theory laden, perception bound).
02. Nature of scientific models.
03. Nature of classification schemes.
04. Tentativeness of scientific knowledge.
05. Hypotheses, theories & laws (e.g., definition, role of assumptions, criteria for belief).
06. Scientific approach to investigations (e.g., nonlinearity, rejection of a stepwise procedure, "the scientific method" as a writing style).
07. Precision & uncertainty in scientific/technological knowledge (e.g., probabilistic reasoning).
08. Logical reasoning (e.g., cause/effect problems, epidemiology & etiology).
09. Fundamental assumptions for all science (e.g., uniformitarianism).
10. Epistemological status of scientific knowledge (e.g., ontology as an assumption, questioning logical positivism).
11. Paradigms vs. coherence of concepts across disciplines.

Source: Aikenhead, Glen S., and Alan G. Ryan. "The Development of a New Instrument: "Views on Science–Technology–Society"." *Science Education*, 76, no. 5 (1992): 477–91.

Composite model: Test of Basic Scientific Literacy (TBSL)⁴⁶²

In his recent overview of scientific literacy, Laugksch mentions that there have been very few *composite* measures that use all three of the above models.⁴⁶³ Laugksch and Spargo in the United States constructed a 110-item Test of Basic Scientific Literacy (TBSL), which was designed for students entering university, based on 472 items developed from scientific literacy goals found in the U.S. foundation document, *Science for All Americans*.⁴⁶⁴ It was especially developed for large-scale surveys to monitor progress towards local, regional, national, or international goals, it does not employ interviews, and it is easy to administer. It mainly tests basic aspects of scientific literacy rather than applications for science or for decision-making or problem-solving abilities. According to Laugksch and Spargo, the TBSL can be used for specific target groups such as consumers, teachers, scientists, decision-makers, or the general public.

The tool has been validated and found internally consistent and reliable. The TBSL has three subsets, each of which is based on Jon Miller's multi-dimensional framework of scientific literacy: science content knowledge has 72 items; nature of science (NOS) has 22 items; and the impact of science and technology on society has 16 items. The TBSL tests factual knowledge, comprehension of key concepts in science, and attitudes toward science at the level of baseline knowledge and outcome studies. It is based on a simple true / false system that also uses a "don't know" response to minimize guessing.

Examples of the test from each of the subsets can be found in Appendix 6.

⁴⁶² Laugksch, and Spargo. "Construction of a Paper-and-Pencil Test of Basic Scientific Literacy Based on Selected Literacy Goals Recommended by the American Association for the Advancement of Science."

⁴⁶³ Laugksch. "Scientific Literacy: A Conceptual Overview."

⁴⁶⁴ Laugksch, and Spargo. "Construction of a Paper-and-Pencil Test of Basic Scientific Literacy Based on Selected Literacy Goals Recommended by the American Association for the Advancement of Science."

21. Scientific Literacy: public knowledge and understanding of biotechnology

21.1 Importance of biotechnology

Biotechnology is one of the most important, and highly contentious, issues transforming society today. The Canada government suggests that biotechnology is “expanding the frontiers of knowledge” and “changing the basis for innovation and productivity” in a diversity of fields including agriculture, energy, health care, aquaculture, forestry, mining, the environment, and the development of natural resources.⁴⁶⁵ It is also an issue that draws heated public debate, which requires that the public have the knowledge and understanding needed for engagement with the biotechnology issues directly affecting their lives. Because of its wide-ranging impact on almost every area of social outcomes, biotechnology may also be one of the most important issues to track in terms of public knowledge and learning, knowledge creation and control, public understanding, trust in the governmental regulatory process, and acceptance or rejection of ethical values underlying its development. The issues involved are complex but, as Alan McHughen, senior research scientist at the University of Saskatchewan, notes, not beyond the abilities of lay people to understand.⁴⁶⁶

Social ecologist Chaia Heller does not view biotechnology as an isolated technology, but fits it into the wider economic and political trends that are currently dictating the way knowledge, culture, and society are produced.⁴⁶⁷ She argues that biotechnology is the “systematic conversion of biological nature into informational capital” representing a new way of producing and ordering society and nature:

While some claim that [biotechnology] is ‘nothing really new’, that its transgenic creations represent a continuity with such previous biotechnologies as plant and animal breeding, they deny the underlying issue: transgenic biotechnology emerges out of a different *world* than plant breeding or beer making. It emerges out of a different set of economic, political, and social demands and commitments. Biotechnology is a new form of production that emerged as capital hit the limits of industrial production and began to enter what may be called its *organic* phase: a phase in which capital targets the reproductive dimensions of

⁴⁶⁵ Government of Canada. *Report on Biotechnology (1998-2003): Biotechnology Transforming Society: Creating an Innovative Economy and a Higher Quality of Life*, 2003; accessed November 2005; available from <http://www.biostrategy.gc.ca/english/view.asp?x=540>.

⁴⁶⁶ McHughen, Alan. *Pandora's Picnic Basket: The Potential and Hazards of Genetically Modified Foods*, Don Mills, Ontario: Oxford University Press, 2000.

⁴⁶⁷ Heller, Chaia. "McDonald's, MTV, and Monsanto: Resisting Biotechnology in the Age of Informational Capital," in *Redesigning Life? The Worldwide Challenge to Genetic Engineering*, ed. Tokar, Brian. London: Zed Books, 2001.

cultural and biological life as loci for intensified production and commodification.⁴⁶⁸

The pace of biotechnology is accelerating at an exponential rate. Monsanto, one of the leading “life sciences” companies, estimates that the genomic technologies will continue to double in capability every 12 to 24 months.⁴⁶⁹ A 2003 Canadian government report on biotechnology and its impact on the economy and quality of life notes: “Its impact on this century is predicted to be more dramatic and far-reaching than that of telecommunications and computers in the last, because it deals with life and living things which permeate all aspects of our own lives.”⁴⁷⁰ Edna Einsiedel, of the University of Calgary, suggests that biotechnology and its relative, nanotechnology, are “revolutionary technologies,” with the capacity to change a wide range of sectors.⁴⁷¹

The Canadian Biotechnology Secretariat uses a definition of biotechnology taken from the Organisation for Economic Co-operation and Development (OECD):

In general, biotechnology can be defined as the application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.⁴⁷²

Nanotechnology, the “relative” of biotechnology that is expected to become “the next big technology,” has been defined in the following way:

Nanotechnology involves the application of science and engineering at the atomic scale. It involves the construction of tiny structures and devices by manipulating individual molecules and atoms, which have unique and powerful properties. These structures can be used in medicine and biotechnology, in energy and the environment, and in telecommunications. Some examples of nanotechnology include the use of molecules to enable the production of drinking water by extracting salt from seawater, the use of implantable surgical dives that can measure things like blood pressure on a continuous basis, or the use of special nano-molecules in fabrics, like wrinkle resistant pants.⁴⁷³

⁴⁶⁸ Ibid.

⁴⁶⁹ Ibid. p. 15.

⁴⁷⁰ Government of Canada. *Report on Biotechnology (1998-2003): Biotechnology Transforming Society: Creating an Innovative Economy and a Higher Quality of Life*, accessed. p. 2.

⁴⁷¹ Einsiedel, Edna F. "Introduction: Making Sense of Emerging Technologies," in *First Impressions: Understanding Public Views on Emerging Technologies*, 2-5, Canadian Biotechnology Secretariat, Genome Prairie; accessed November 2005; available from <http://www.biostrategy.gc.ca/english/View.asp?x=524,2005http://www.biostrategy.gc.ca/english/View.asp?x=524>.

⁴⁷² Organisation for Economic Co-operation and Development (OECD). *A Framework for Biotechnology Statistics*, Paris: OECD, 2005. p. 8, cited in: Government of Canada. *Canadian Trends in Biotechnology. 2nd Edition*, Canadian Biotechnology Secretariat and Statistics Canada, 2005; accessed November 2005; available from http://www.whybc.com/bnetdocs/CDN_Biotech_Trends_Sep_2005.pdf.

⁴⁷³ Einsiedel, Edna F. "In the Public Eye: The Early Landscape of Nanotechnology among Canadian and U.S. Publics," in *First Impressions: Understanding Public Views on Emerging Technologies*, 99-117, Canadian Biotechnology Secretariat, Genome Prairie; accessed November 2005; available from

Einsiedel explains that biotechnology and nanotechnology can effect:

... what we eat and how our food is produced, how we view and treat disease, how we clean up the environment, even how we carry out justice in our judicial systems with DNA evidence [...]. Nanotechnology, still in its technological infancy, is similarly expected to have impacts on the types of materials we use and how they are applied, how we diagnose and treat disease, how we produce energy, and how we communicate.⁴⁷⁴

Peter Montague warns that biotechnology, and nanotechnology in particular, have tremendous potential to be dangerous for humanity.⁴⁷⁵ For example, the machines and substances created by nanotechnology must be able to self-replicate in order to be functional. Montague notes that if a software problem (inadvertent or otherwise) fails to stop self-replication, new classes of accidents and abuses can result. Furthermore, the potential for individuals or groups to cause large-scale destruction and harm is heightened because it would only require knowledge, whereas in the past it required large facilities or rare raw materials.⁴⁷⁶

For these reasons, and others discussed below, the CIW recommends including public knowledge, understanding, and engagement with biotechnology and nanotechnology issues in the development of indicators for the educated populace domain.

<http://www.biostrategy.gc.ca/english/View.asp?x=524>.
[2005http://www.biostrategy.gc.ca/english/View.asp?x=524](http://www.biostrategy.gc.ca/english/View.asp?x=524). p. 102.

⁴⁷⁴ Einsiedel. "Introduction: Making Sense of Emerging Technologies." p. 3.

⁴⁷⁵ Montague, Peter. *The Revolution, Part 2*, Rachel's Environment & Health News #773, 2003; accessed November 2005; available from http://www.rachel.org/bulletin/bulletin.cfm?Issue_ID=2363&bulletin_ID=48.

⁴⁷⁶ Ibid., accessed.

21.2 Debate about biotechnology

Since news and information about biotechnology entered the public sphere more than two decades ago, it has been the subject of much controversy. Issues involving the domination and control over human and non-human nature, and the commodification of basic needs are at the heart of the biotechnology debate. Drew Kershen, Professor of Law at the University of Oklahoma, reports:

In 1980, we first heard of in vitro tissue, cell culture, monoclonal antibodies, and recombinant deoxyribonucleic acid (rDNA) techniques. The pharmaceutical industry used these techniques to develop, among others, self-administered pregnancy tests for women (monoclonal antibodies) and human insulin analog (rDNA). At the same time, agricultural companies developed biotechnological products, among others, the Flavr-SavrTM tomato and Posilac® (recombinant bovine somatotropin (rBST)). Both agricultural products used rDNA technology.

While the pharmaceutical use of biotechnology has had some debate, agricultural biotechnology has been met with unceasing, acrimonious controversy from the start. An often quoted phrase is that ninety percent of the commercialized biotechnology has been in pharmaceuticals but 90 percent of the controversy has been about agriculture.⁴⁷⁷

However, the Ottawa-based Action Group on Erosion, Technology, and Concentration (ETC Group) is concerned with the relative absence of public debate. The ETC Group notes:

By allowing nanotech products to come to market in the absence of public debate and regulatory oversight, governments, agribusiness and scientific institutions have already jeopardised the potential benefits of nano-scale technologies. First and foremost, society—including farmers, civil society organisations and social movements—must engage in a wide debate about nanotechnology and its multiple economic, health and environmental implications[...]. Any efforts by governments or industry to confine discussions to meetings of experts or to focus debate solely on the health and safety aspects of nano-scale technologies will be a mistake. The broader social and ethical issues must also be addressed.⁴⁷⁸

In a recent newspaper column, Janet Lambert, President of BIOTECCanada, an organization representing the biotechnology industry, called for a responsible debate between industry, activists, government, and Canadians on biotechnology.⁴⁷⁹ She

⁴⁷⁷ Kershen, Drew L. "Biotechnology: An Essay on the Academy, Cultural Attitudes and Public Policy," *AgBioForum*, vol. 2, no. 2, 1999: 137-146.

⁴⁷⁸ ETC Group: Action Group on Erosion, Technology, and Concentration. *Down on the Farm: The Impact of Nano-Scale Technologies on Food and Agriculture*, ETC Group, 2004; accessed November 2005; available from <http://www.etcgroup.org/article.asp?newsid=485>, pp. 1-2.

⁴⁷⁹ Lambert, Janet. "Oped / Guest Column: Canada Needs Robust Public Dialogue on Biotechnology: Government Has a Duty to Set a Public Policy Framework to Foster Meaningful Dialogue." *The Hill Times*, Ottawa, November 21, 2004 14.

attributes a lack of meaningful discussion, “sprinkled with fruitless polemics,”⁴⁸⁰ to a lack of responsible leadership within the interested groups, including the biotechnology industry itself. She argues that the industry has not let public opinion affect its behaviour, despite the fact that “we know that society’s acceptance of the relative risks and benefits of biotech products are an essential part of the business environment that we require for long-term value and prosperity.”^{481,482}

One of Lambert’s complaints is that people hear more about perceived risks than about benefits and that the industry needs to show them that “these benefits are worth the possible risks, risks we are responsibly mitigating.”⁴⁸³ In terms of government responsibility to foster meaningful dialogue, Lambert complains that public consultations are not that meaningful since they usually happen “after the research and marketing has been done and after economic actors and institutions have staked claims.”⁴⁸⁴ In addition, she repudiates government for “unreflectively adding layers of smothering bureaucracy” to its regulatory policies. She also calls on Canadians to demand more investment in education to “create a science-literate populace.”⁴⁸⁵

Einsiedel reports that the nanotechnology industry would like to see public debate take place in the development stages of the technology, rather than in the commercialization stage. She explains:

The emergence of new technologies in the public arena is occurring much earlier in the innovation trajectory; many becoming a fixture in the public landscape even as early as the stage of ‘technology design.’ In some ways, this may be occurring from the benefit of hindsight. That is, when we look back to the experience of ‘older’ technologies—nuclear power, GM food are particular examples—we see that discussions of these technologies occurred at the commercialization stage when it was ‘too late’. Those engaged in nanotechnology design see this as a key lesson to be learned.⁴⁸⁶

Generally, the debate about biotechnology can be categorized into three interrelated areas: philosophical considerations and values; human, animal, and environmental health risks; and socio-economic-political issues, which are all important for the public to understand.⁴⁸⁷ Appendix 29 includes a detailed discussion of the importance of, and the

⁴⁸⁰ Ibid.

⁴⁸¹ Ibid.

⁴⁸² BIOTECCanada. *About BIOTECCanada*, Website, 2005; accessed November 2005; available from <http://www.biotech.ca/EN/aboutus.html>.

⁴⁸³ Lambert. "Oped / Guest Column: Canada Needs Robust Public Dialogue on Biotechnology: Government Has a Duty to Set a Public Policy Framework to Foster Meaningful Dialogue."

⁴⁸⁴ Ibid.

⁴⁸⁵ Lambert. "Oped / Guest Column: Canada Needs Robust Public Dialogue on Biotechnology: Government Has a Duty to Set a Public Policy Framework to Foster Meaningful Dialogue."

⁴⁸⁶ Einsiedel. "Introduction: Making Sense of Emerging Technologies." p. 4.

⁴⁸⁷ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, Health Canada, Canadian Food Inspection Agency, and Environment Canada, 2001; accessed November 2005; available from http://www.rsc.ca/index.php?lang_id=1&page_id=119.

issues involved in, each each of these areas. Here we briefly introduce these areas in order to stress the importance of biotechnology to the public, as well as to put the issues into context.

21.2.1 Philosophical considerations and values

The first area deals with ethical and philosophical agreements and disagreements about the process of biotechnology, rather than on its impacts alone. Kershen reasons that the acceptance or rejection of biotechnology ultimately will be based on “ideological beliefs and the cultural values adopted by individual human beings who, in turn, will shape societal beliefs and values.”⁴⁸⁸ The issue that has received the most media coverage, and has been central to much of the public debate surrounding biotechnology, is the genetic engineering (GE) of food, or “genetically modified organisms” (GM or GMOs). Genetic engineering gives humans power over nature that some consider unethical, unnatural, and dangerous, requiring precaution in the face of uncertainty. Linked to this issue is the idea of “food sovereignty,” or the ability of people to have control over what food they produce and eat. In addition, the issue speaks to a deeper level, one that spans the fields of science, politics, and ethics:

[D]ue to its ability to manipulate life forms, biotechnology has generated controversy as well as excitement in many countries, including Canada. This transformative technology has sparked a society-wide debate about whether we should interfere with nature and potentially alter or create life. Some biotechnology innovations challenge the values and beliefs that underpin society, forcing Canadians to confront complex ethical questions never before faced.⁴⁸⁹

David Suzuki notes: “We aren’t dealing with an insignificant change to our diets here, we’re dealing with a revolutionary technology being used in our food supply—affecting us, future generations and the ecosystems on which we depend.”⁴⁹⁰ Suzuki also contends that the imposition of GM foods on the public, without consultation or labelling of the foods, is an unethical, massive experiment, conducted without informed consent from the participants.⁴⁹¹

21.2.2 Human, animal, and environmental health risks

The second area in the biotechnology debate involves debate about human, animal, and environmental health risks. Proponents of biotechnology argue the technology has a great deal of promise in the area of human health in terms of prevention, diagnosis, and

⁴⁸⁸ Kershen. “Biotechnology: An Essay on the Academy, Cultural Attitudes and Public Policy.” p. 7.

⁴⁸⁹ Government of Canada. *Report on Biotechnology (1998-2003): Biotechnology Transforming Society: Creating an Innovative Economy and a Higher Quality of Life*, accessed. p. 2.

⁴⁹⁰ Suzuki, David. *Genetically Modifying Our Food: Part 2*, Science Matters, David Suzuki Foundation, 1999; accessed November 2005; available from http://www.davidsuzuki.org/About_us/Dr_David_Suzuki/Article_Archives/weekly11039901.asp.

⁴⁹¹ Ibid., accessed.

treatment of disease and disability. It has the potential, for example, to be used in screening the population for disease susceptibility, in the development of vaccines, in the application of pharmacogenomics⁴⁹² to develop the preventive use of anti-microbials, in therapeutic drug development, in the use of stem cells to repopulate diseased organs with healthy cells, in the development of tissue engineering and xenotransplantation,⁴⁹³ in the use of gene therapy to correct primary genetic defects in humans, and in the use of new nanotechnology techniques.⁴⁹⁴

A major report on food biotechnology by the Royal Society of Canada (RSC) argues that the potential health risks are generally categorized in three ways: as the possible creation of novel toxicants, as the possible shifts in nutrient content, and as the creation of novel allergens.⁴⁹⁵ According to the RSC, the development of GM foods has not focused on nutritional content to date, although GM crops have been judged by Health Canada as being nutritionally equivalent to their non-GM counterparts. However, the RSC is unaware of public data to confirm this equivalency. Those concerned about health risks caused by genetically engineered foods argue that there are no long-term studies on the effects of genetically modified foods on human health.⁴⁹⁶ David Suzuki does not see immediate health risks other than potential allergic reactions, but he notes that the long-term effects are unknown since the tests have not been done.⁴⁹⁷ He also notes that most of the data on health effects have come from the biotechnology industry itself.

Margrit Eichler, of the University of Toronto, quotes a World Health Organization report that lists some of the problems and potential health risks associated with genetically modified foods:

- Bioengineered food may result in unpredictable allergies to proteins not usually found in food products, but which are now present as a result of inserted genes.

⁴⁹² Pharmacogenomics is a science that examines the inherited variations in genes that dictate drug response and explores the ways these variations can be used to predict whether a patient will have a good response to a drug, a bad response to a drug, or no response at all. National Center for Biotechnology Information. *One Size Does Not Fit All: The Promise of Pharmacogenomics*, 2006; accessed January 2007; available from <http://www.ncbi.nlm.nih.gov/About/primer/pharm.html>.

⁴⁹³ Xenotransplantation is the transplantation of organs from other species into humans. It is a procedure considered to be very risky because of the potential to spread viruses and infectious agents from animal to patient, and to the larger community. In 1999, a new breed of pig was developed by the Novartis-owned British company called Imutran. A human gene was introduced into the fertilized egg of the pig to create a transgenic pig with genetically modified organs. Pannozzo, Linda. "This Little Piggy's Going to Market." *THIS Magazine*, July/August, 1999, 34-39.

⁴⁹⁴ Canadian Biotechnology Advisory Committee. *Biotechnology and the Health of Canadians: A Report from the Canadian Biotechnology Advisory Committee on Biotechnology and Health Innovation: Opportunities, Challenges and Public Policy*, Government of Canada, 2004; accessed November 2005; available from <http://cbac-cccb.ca/epic/internet/incbac-cccb.nsf/en/ah00488e.html>.

⁴⁹⁵ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

⁴⁹⁶ CBC News. *Indepth: Genetic Modification: Genetically Modified Foods: A Primer*, CBC News Online, 2004; accessed November 2005; available from http://www.cbc.ca/news/background/genetics_modification/.

⁴⁹⁷ Suzuki. *Genetically Modifying Our Food: Part 2*, accessed.

- Many food products are being introduced stealthily. For example 60% of consumer food products (margarine, chocolate bars, baby food) contain soybean material, much of which is now sold, sometimes without labelling, as a mixture of unmodified and genetically modified soybeans.
- There are reports of lapses in observing guidelines / laws regarding agricultural release into the environment.
- There is the danger of potential conflict between nations in the future with respect to patents, 'bio-piracy' and the sharing of the fruits of research.⁴⁹⁸

She concludes that "it seems [...] there are enormous potential, perceived, and unquantifiable risks," and argues that the driving force behind biotechnology is profit rather than the creation of healthy foods for people.⁴⁹⁹ According to Eichler, major efforts are put into creating genetically engineered crops in order to make them "pesticide tolerant, [to] improve appearance, allow for longer shelf life, and allow for long distance transportation," all of which can be demonstrated to be unsustainable practices.⁵⁰⁰ She alleges that such practices actually create some of the problems bioengineered foods are proposed to solve.⁵⁰¹

Brian Tokar also argues that biotechnology industries, in choosing what to research, ignore root causes and design solutions to problems caused by the industry itself. For instance, monocropping and excessive pesticide use can compromise plant health and soil fertility, and industrial scale irrigation and global warming can threaten water supplies. The response by the industry is to engineer crops tolerant to pesticides, low soil fertility, and drought.⁵⁰²

Biotechnology is widely used in livestock production to make silage inoculants, amino acid supplements, feed enzymes, and pre- and pro-biotics.⁵⁰³ It is also used to modify the growth rates and composition of meat-producing animals and the composition of milk and eggs. Risks to animal health from biotechnology are unknown, although there is concern that GM fish that do escape into the wild will contaminate wild species. Those who are opposed to the use of biotechnology in animal production are also concerned with the ethical treatment of these animals, and with the often extreme suffering that is

⁴⁹⁸ Daar, A., and J.F. Mattei. *Medical Genetics and Biotechnology: Implications for Public Health*, Document WHO/EIP/GPE/00.1, World Health Organization, 1999. p. 94, cited in: Eichler, Margrit. *Environmental Sustainability and the Canadian Biotechnology Strategy*, Canadian Women's Health Network, National Strategic Workshop, York University, "The Canadian Biotechnology Strategy: Assessing its Effects on Women and Health", 2000; accessed November 2005; available from <http://www.cwhn.ca/groups/biotech/availdocs/tableofcontents.htm>. pp. 3–4.

⁴⁹⁹ Ibid.

⁵⁰⁰ Eichler. *Environmental Sustainability and the Canadian Biotechnology Strategy*, accessed.

⁵⁰¹ Ibid., accessed.

⁵⁰² Tokar, Brian, ed. *Redesigning Life? The Worldwide Challenge to Genetic Engineering* London, U.K., Zed Books, 2001. cited in: Dorsey, Michael K. "Who Will Control Agriculture and Knowledge?" *Synthesis / Regeneration: A Magazine of Green Social Thought*, Winter, 2004.

⁵⁰³ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

afflicted on them through the use of genetically engineered growth hormones to modify growth rates.^{504, 505}

The environmental health debate concerning biotechnology revolves around issues of sustainability, unintended external costs of industrialized agriculture—including the agricultural release of GM crops into the environment—loss of biodiversity, pesticide use, crop yields, superweeds and superpests, and specific nanotechnology issues. The ETC Group closely follows developments in nanotechnology and recently published the first comprehensive look at how nano-scale technologies can affect farmers, food, and agriculture.⁵⁰⁶ It reports a number of pesticides containing nano-scale materials are commercially available, and have been released into the environment.⁵⁰⁷

Eichler challenges the Canadian Biotechnology Strategy with respect to its claims to promote sustainable development.⁵⁰⁸ She argues that while the strategy provides a list of potential benefits such as “more healthful food with higher nutritional quality,” it ignores the substantial risks associated with biotechnology. Eichler argues that because of these risks, biotechnology cannot be defined as sustainable, or “within the bio-physical carrying capacity of the earth.”⁵⁰⁹

Concerns about human, animal, and environmental health and sustainability also involve value judgments, and are based on implications of scientific uncertainty. As the Royal Society of Canada (RSC) report notes, managing technological risks is not only a scientific endeavour, it also involves value judgments:

Risks to human, animal, and environment health are not purely questions of science. It is now generally recognized in the scholarly literature on the nature of risk analysis that many aspects of the task of assessing the magnitude of technological risks and managing them within the limits of safety involve judgments and decisions that are not themselves strictly scientific. They involve value judgments related to such issues as the appropriate way to handle uncertainties in scientific data and results, assignment of the burden of proof among stakeholders in risk issues, standards of proof, definition of the scope of the risk issue (e.g., should human error be considered part of the risk of the technology?), and, of course, the central issue of what levels of risk should be considered ‘acceptable.’ Such ‘extra-scientific’ judgments are inherent in any assessment of risk and in the judgments about the technological and social

⁵⁰⁴ ETC Group: Action Group on Erosion. *Down on the Farm: The Impact of Nano-Scale Technologies on Food and Agriculture*, accessed.

⁵⁰⁵ Schlosser, Eric. *Fast Food Nation: The Dark Side of the All-American Meal*, New York: HarperCollins, 2002.

⁵⁰⁶ ETC Group: Action Group on Erosion. *Down on the Farm: The Impact of Nano-Scale Technologies on Food and Agriculture*, accessed.

⁵⁰⁷ ETC Group: Action Group on Erosion, Technology, and Concentration. *Nanotech Meets the Environment Making a Mole Hill out of a Mountain?*, 2003; accessed November 2005; available from <http://www.etcgroup.org/>.

⁵⁰⁸ Eichler. *Environmental Sustainability and the Canadian Biotechnology Strategy*, accessed.

⁵⁰⁹ Ibid., accessed.

mechanisms for maintaining it within safe limits. Similar judgments are involved in any attempt to predict future scientific and technological developments, which are always at least partially dependent upon human choices and other undetermined variables.⁵¹⁰

21.2.3 Socio-economic–political issues

The third area of the biotechnology debate involves the social, economic, and political impacts of biotechnology. Analysts do not see a separation between biotechnology and its political and economic contexts. The health and ecological safety of GMOs is an important part of the debate, but so too are the social and economic consequences of powerful multinational corporations controlling food biodiversity and seeds. For example, what are the effects of biotechnology on the social, economic, and political areas as the biotech industry becomes concentrated in a small number of multinational corporations? What are the effects on food security and world hunger; on intellectual property and patents; on social justice in the distribution of risks, costs and benefits; on individual and community rights to participate in decision-making; and on regulation and transparency issues?

Government subsidies to the biotechnology industry are particular sources of contention, since governments contribute tax dollars to corporate research into biotechnology. Montague argues: “Government donates publicly-created knowledge and investment to corporate elites who then make profits.”⁵¹¹ He notes that, by law, corporations are required to put profits before public health.⁵¹² In Appendix 29 we discuss these issues in more detail.

21.2.4 Canadian biotechnology regulatory process

Appendix 29 also includes more detailed information on the regulatory process of biotechnology. In 2001, Health Canada, the Canadian Food Inspection Agency (CFIA), and Environment Canada commissioned the RSC to “provide advice on the regulatory system and the scientific capacity the federal government requires into the 21st century to ensure the safety of new food products being developed through biotechnology.”⁵¹³ The result was a 265-page report covering the history, regulation, and challenges of the future of food biotechnology entitled, *Elements of Precaution: Recommendations for the*

⁵¹⁰ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 8.

⁵¹¹ Montague. *The Revolution, Part 2*, accessed.

⁵¹² Montague, Peter. *The Revolution, Part 3: Ultrafines*, Rachel’s Environment & Health News #774, 2003; accessed November 2005; available from http://www.rachel.org/bulletin/bulletin.cfm?Issue_ID=2371&bulletin_ID=48.

⁵¹³ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 1.

*Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology.*⁵¹⁴

The RSC report notes that there are “multiple gaps in the assessment process.”⁵¹⁵ In particular, the RSC found that Health Canada has no formal criteria or decision-making framework with which to approve GM products, other than basic guidelines. The RSC also notes:

Decisions are largely made on a case-by-case, ad hoc basis [...]. [T]he applicant is responsible for supplying all of the data to be evaluated [and] no independent testing of the safety of a GM food by a governmental or other independent laboratory is required [...]. [T]he data on which the decision was based are not revealed.⁵¹⁶

The RSC also found that the focus of environmental assessment is specifically on the agroecosystems, and little effort has gone into assessing possible impacts on the biodiversity of natural ecosystems. Moreover, “the quantity and quality of research on the potential environmental impacts of GMOs is not sufficient to address many of the pressing questions that concern the environmental impacts of GMOs.”⁵¹⁷ It concluded:

[T]he lack of transparency in the current approval process, leading as it does to an inability to evaluate the scientific rigor of the assessment process, seriously compromises the confidence that society can place in the current regulatory framework used to assess potential risks to human, animal and environmental safety posed by GMOs.⁵¹⁸

In response to the RSC report, Health Canada, the Canadian Food Inspection Agency, Agriculture and Agri-Food Canada, Environment Canada, and Fisheries and Oceans Canada developed an “Action Plan” to review and update their policies, especially as they relate to the safety assessment of food biotechnology and agri-food products.⁵¹⁹ In the Action Plan, they make a commitment “to maintain our objective and neutral stance about the risks and benefits of biotechnology in public statements and interpretations of the regulatory process.”⁵²⁰ The plan concurs with many of the Panel’s recommendations including those on potential health impacts.

We agree with the need to further refine our tools and continuously improve our approach for the safety and nutritional assessment of GM-foods and feeds,

⁵¹⁴ Ibid., accessed.

⁵¹⁵ Ibid., accessed.

⁵¹⁶ Ibid., accessed. pp. 37–38.

⁵¹⁷ Ibid., accessed. p. 132.

⁵¹⁸ Ibid., accessed. p. 215.

⁵¹⁹ Government of Canada. *Action Plan of the Government of Canada in Response to the Royal Society of Canada Expert Panel Report Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada*, 2001; accessed November 2005; available from http://www.hc-sc.gc.ca/sr-sr/pubs/gmf-agm/intro_e.html.

⁵²⁰ Ibid., accessed. p. 5.

particularly for future, more complex products. We also agree that we need clear criteria in our guidelines related to toxicological testing, i.e., when and what types of studies are required. We agree that we need to further develop and strengthen our tools for the assessment of the allergenicity potential of novel foods and the nutritional assessment of future GM-foods and feeds with significant composition / nutritional changes [...]. We agree with the need for rigorous assessments of GM-animals, as well as transgenic fish and aquatic organisms, and of GM-feeds.⁵²¹

To date, the Canadian government has published eight progress reports toward this goal and expects to continue the review process for some time. One progress report notes: “As science progresses and more advanced methods become available, protocols will be refined.”⁵²²

⁵²¹ Ibid., accessed. pp. 6–7.

⁵²² Government of Canada. *Progress Report: Action Plan of the Government of Canada in Response to the Royal Society Expert Panel Report, Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada*, 2005; accessed November 2005; available from http://www.hc-sc.gc.ca/sr-sr/pubs/gmf-agm/prog-rep-rap_06_2005_e.html. p. 5.

21.3 Public opinion on biotechnology

21.3.1 Availability of information

It is difficult for the public to find balanced information on biotechnology. According to Einsiedel, et al., both government and industry have vested interests in giving “consumers a more positive outlook on the possibilities of biotechnology, as a response to the perceived sensational attention the topic had been receiving in the media.”⁵²³ The Canadian government has a significant stake in the biotechnology industry, and a vital interest in developing public confidence in and acceptance of the new products and processes.⁵²⁴ Biotechnology is considered by government and industry to be crucial to national strategies of achieving “international competitiveness” and “sustained economic growth.”⁵²⁵ In Canada, as in many countries, biotechnology is a billion dollar knowledge business. According to the BIOTECCanada website, as of 2005, Canadian biotechnology companies have quadrupled their revenues since 1997 and have annual revenues totaling more than \$3.8 billion.⁵²⁶ Also as of 2005, Canadian biotechnology companies have invested close to \$1.5 billion in research and development.⁵²⁷

At the same time, the opposition has focused primarily on the risks associated with biotechnology, rather than on providing balanced views. Both government / industry and critical non-governmental organizations are working toward “dispelling the myths” about biotechnology, and neither group considers its perspectives “biased.”⁵²⁸

At the federal level, seven ministries have responsibility for regulating biotechnology in Canada, including Health Canada, Agriculture and Agri-Foods Canada, Industry, Environment Canada, Natural Resources, Fisheries and Oceans, and International Trade.⁵²⁹ Einsiedel, et al. note that “all, to a greater or lesser extent, try to provide information on biotechnology.”⁵³⁰ The government is responsible for providing the public

⁵²³ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed. p. 29.

⁵²⁴ Canadian Biotechnology Strategy Secretariat. *The 1998 Canadian Biotechnology Strategy: An Ongoing Renewal Process*, Industry Canada, 1998; accessed November 2005; available from <http://biportal.gc.ca/english/View.asp?pmiid=520&x=535>.

⁵²⁵ Davison, Aidan, Ian Barns, and Renato Schibeci. "Problematic Publics: A Critical Review of Surveys of Public Attitudes to Biotechnology," *Science, Technology, & Human Values*, vol. 22, no. 3, 1997: 317-348.

⁵²⁶ BIOTECCanada. *About BIOTECCanada*, accessed.

⁵²⁷ BIOTECCanada. *Biotech Classroom - What Is Biotechnology? - Dispelling the Myths*, 2005; accessed November 2005; available from <http://www.biotech.ca/EN/myths.html>.

⁵²⁸ For example, see *Ibid.*, accessed. and Sierra Club of Canada. *Website: Biotechnology Campaign*, accessed July 2005; available from <http://www.sierraclub.ca/national/programs/health-environment/food-agriculture/campaign.shtml?x=320>.

⁵²⁹ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed.

⁵³⁰ *Ibid.*, accessed.

with information on biotechnology, the regulatory system, and the safety of their food.⁵³¹ In 2000, Health Canada and the Canadian Food Inspection Agency sent a 7-page brochure about food safety was sent to 12 million households across the country at a cost \$2.8 million. The information brochure, titled “Food Safety and You,” addressed six questions:

1. Why is Canada’s food supply one of the world’s safest?
2. What is the government of Canada’s role in food safety?
3. Why is accurate labelling important for food safety?
4. How are new food products approved?
5. What can you do as a consumer?
6. What is the government’s commitment?⁵³²

The Government of Canada BioPortal is a website that attempts to consolidate much of this material and provide online access to the latest government information on biotechnology.⁵³³ The website brings together information from all federal departments and agencies and includes “government policy and research activity, business support programs and market intelligence, a virtual library of educational resources, and regulations on biotechnology research and applications.”⁵³⁴

According to Einsiedel, et al., many initiatives are just starting at the provincial level, with the exception of Ag-West Biotech in Saskatchewan, which has been in operation since 1989. Ag-West is a non-profit organization, funded by the Saskatchewan government through the Canada-Saskatchewan Agri-Food Innovation Agreement, which has “the most extensive experience in information dissemination at the provincial level.”⁵³⁵ While the organization’s main objective is to provide development support to companies, it seeks to raise awareness and understanding of biotechnology and “to familiarize individuals with the benefits of biotechnology.”⁵³⁶

Biotechnology industry organizations, such as the Council for Biotechnology Information (CBI), work to provide people with “a more positive outlook on the possibilities of biotechnology.”⁵³⁷ CBI was formed by seven multinational firms in the biotechnology / life sciences: Aventis CropScience, BASF, Dow Chemical, DuPont, Monsanto, Novartis, and Zeneca Ag Products, Inc. The three areas it concentrates on are the enhanced nutrition of foods, improvement of the environment, and the ability of biotechnology to solve world problems (e.g., world hunger).

⁵³¹ Ibid., accessed. p. 27.

⁵³² Ibid., accessed. p. 27. The brochure also provided a 1-800 number and a general website address for more information.

⁵³³ Government of Canada. *BioPortal Website*, accessed November 2005; available from <http://www.biportal.gc.ca/>.

⁵³⁴ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed. p. 27.

⁵³⁵ Ibid., accessed.

⁵³⁶ Ibid., accessed. p. 28.

⁵³⁷ Ibid., accessed. p. 29.

BIOTECCanada, which now includes the Canadian Institute of Biotechnology, is another industry portal that is “dedicated to promoting a better understanding of biotechnology and the many ways it contributes to improving the quality of life of all Canadians.”⁵³⁸

Industry-provincial alliances, which promote the development of the biotechnology industry, are present in most regions of Canada, and provide promotional material especially geared toward promoting biotechnology among journalists, teachers, and high school and postsecondary students.⁵³⁹ They sponsor science-based competitions for students and provide educational resources such as teaching manuals. Prominent among these alliances are: the BC Biotechnology Alliance, BioAlberta, the Toronto Biotechnology Initiative, Ottawa Life Sciences Council, Quebec Bioindustries Association, BioNova, and BioAtlantech.

The Food Biotechnology Communications Network is a not-for-profit organization formed by the biotechnology industry as an information and referral centre for information on biotechnology issues. It has become a referral point for a number of the major food retailers in Canada.⁵⁴⁰

The Food Safety Network at the University of Guelph provides research, commentary, policy evaluation and public information on food safety issues. It offers “a unique multi-faceted resource for evidence-based information” and provides services that include “consumer and student outreach, information research, on-line resources, collaborative projects, evaluation and analysis, and a capacity to address current and emerging food safety concerns.”⁵⁴¹

Various non-governmental organizations express varying degrees of opposition to biotechnology. In general, they promote consumer “right to know” about these issues, raise ethical questions about biotechnology, support organic farming techniques, and call on governments to fund organic agriculture to the same degree that they currently subsidize the biotechnology industry.⁵⁴² The most prominent and influential non-governmental organizations in this category include Greenpeace,⁵⁴³ Friends of the Earth,⁵⁴⁴ The Council of Canadians,⁵⁴⁵ The Sierra Club of Canada,⁵⁴⁶ and The David Suzuki Foundation.⁵⁴⁷

⁵³⁸ BIOTECCanada. *About BIOTECCanada*, accessed.

⁵³⁹ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed. p. 31.

⁵⁴⁰ Ibid., accessed. p. 32.

⁵⁴¹ Food Safety Network. *Website*, accessed November 2005; available from <http://www.foodsafetynetwork.ca>.

⁵⁴² Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed. pp. 35–36.

⁵⁴³ Greenpeace Canada. *Website*, accessed November 2005; available from <http://www.greenpeace.ca/e/index.php>.

⁵⁴⁴ Friends of the Earth Canada. *Website*, accessed December 2005; available from <http://www.foecanada.org/>.

21.3.2 Public opinion surveys on biotechnology

Public opinion surveys are generally considered reliable, neutral, and objective instruments to measure the levels of awareness, knowledge, interest in, and acceptance of biotechnology issues.⁵⁴⁸ The Government of Canada, through the Canadian Biotechnology Secretariat (CBS), has maintained a large-scale tracking program of public opinion research since 1999. To date the CBS has completed 12 public opinion surveys on biotechnology: "In all, there are more than 18,000 data points available in what is North America's largest and most comprehensive investigation into attitudes about biotechnology and the public policy that surrounds it."⁵⁴⁹

The program produces two waves of research per year that covers issues such as genetic privacy, GM food, and stem cell research. In addition, the CBS has completed two cross-national studies about attitudes towards biotechnology in Canada and the United States. Generally, in the surveys, Canadians are asked about their awareness of emerging technologies, confidence in expert knowledge, personal need for more information, attitudes toward risks and benefits, opinions on the involvement of government in funding the research, confidence in the safety and regulatory approval systems, as well as whether or not the technologies are morally acceptable, and whether decisions on biotechnology should be based mainly on moral and ethical issues or on the scientific evidence of risks and benefits.⁵⁵⁰

A brief summary of public opinion research on biotechnology issues in Canada between 1999 and 2003 found that when survey results were compared they were "remarkably consistent."⁵⁵¹ For the most part, they mirror attitudes in the United States, but diverge strongly from opinions in Europe. The summary suggests that Canadians support biotechnology in a ratio of two to one, with only 7% of adults strongly opposed. Canadians weigh the benefits and risks personally and when they see a personal benefit, they are more acceptable of potential risks. However, Canadians are concerned with potential long-term risks to human health and the environment and with unknowable outcomes the technologies may produce. The summary also notes:

⁵⁴⁵ Council of Canadians. *Website*, accessed October 2005; available from <http://www.canadians.org>.

⁵⁴⁶ Sierra Club of Canada. *Website: Biotechnology Campaign*, accessed.

⁵⁴⁷ The David Suzuki Foundation. *Website*, accessed January 2005; available from <http://www.davidsuzuki.org/>.

⁵⁴⁸ Davison, Barns, and Schibeci. "Problematic Publics: A Critical Review of Surveys of Public Attitudes to Biotechnology."

⁵⁴⁹ Canadian Biotechnology Secretariat. *Biostrategy*, Government of Canada, 2005; accessed November 2005; available from <http://www.biostrategy.gc.ca/english/View.asp?pmiid=524&x=543>.

⁵⁵⁰ Einsiedel. "In the Public Eye: The Early Landscape of Nanotechnology among Canadian and U.S. Publics."

⁵⁵¹ Government of Canada. *Summary of Public Opinion Research into Biotechnology Issues in Canada*, 2005; accessed November 2005; available from <http://www.biostrategy.gc.ca/english/View.asp?pmiid=524&x=543>.

While most Canadians express concern about potential risk, they are both resigned to its inevitability and confident that somewhere, someone is in charge of trying to mitigate that risk. In a world replete with threats and risks, the risks of biotechnology seem to many to be less urgent and commanding of immediate attention.⁵⁵²

According to the summary report, Canadians have a high awareness of biotechnology, but have low levels of knowledge and engagement, with most finding the area too complex and technical to follow closely.⁵⁵³ There is “a widely held sense” that Canadians see the technology as linked to social and economic progress and the ability to improve people’s lives, especially in the fields of health and medicine. However, there are areas, particularly regarding genetically modified foods, where there “are strong reservations among significant pockets of the population” concerning potential risks.⁵⁵⁴

Most Canadians also see the acceptability and approval of biotechnology products and processes as a technical and scientific issue rather than a moral one. “[T]hough Canadians expect ethical considerations to guide the development of these technologies, they are loath to allow the ethical standards of one person or group to determine whether a product should be allowed for all.”⁵⁵⁵ For the most part, Canadians trust the government and scientific “experts” to make decisions about product safety, and assume, “even though they have virtually no detailed understanding or knowledge of the federal government’s regulatory practices and imperatives,” that if the product is in use, it is safe.⁵⁵⁶ In addition: “Once Canadians are provided with information about the government’s stewardship roles and systems, large majorities move towards supporting most applications,” and “most Canadians would like government to contribute to private sector venture capital funds earmarked for biotechnology research and development.”⁵⁵⁷

In a 2005 report for the Canadian Biotechnology Secretariat (CBS), Jeff Walker presents more data taken primarily from the most recent 2005 Pollara poll, of 2000 Canadian adults.⁵⁵⁸ According to Walker, the data show “a clear upward pattern” in support of biotechnology over the past five years. Between 2004 and 2005, support rose from 63% of the Canadian population to 67%. The highest support for biotechnology came from young adults and adults from the Prairie provinces—in 2005, 72% of youth aged 18–34

⁵⁵² Ibid., accessed. p. 5.

⁵⁵³ Level of “awareness” is the degree to which respondents are familiar with, have been exposed to, and have discussed the technology with anyone.

⁵⁵⁴ Government of Canada. *Summary of Public Opinion Research into Biotechnology Issues in Canada*, accessed.

⁵⁵⁵ Ibid., accessed. p. 3.

⁵⁵⁶ Ibid., accessed.

⁵⁵⁷ Ibid., accessed. p. 5.

⁵⁵⁸ Walker, Jeff. “Report on a Study of Emerging Technologies in Canada and the U.S.: Prevailing Views, Awareness and Familiarity,” in *First Impressions: Understanding Public Views on Emerging Technologies*, ed. Prairie, Genome, 6-19, Canadian Biotechnology Secretariat, 2005, accessed November 2005; available from http://www.biostrategy.gc.ca/CMFiles/CBS_Report_FINAL_ENGLISH249SFD-9222005-5696.pdf. The most recent polling result from Pollara Inc. available online is from March 2004, see: Pollara Inc. *Public Opinion Research Findings on Emerging Technologies*, Government of Canada, 2004; accessed November 2005; available from <http://www.biostrategy.gc.ca/english/View.asp?x=524>.

and 73% of adults living in the Prairie provinces supported biotechnology. Support in British Columbia was the lowest, with 54% of B.C. residents in support, 40% opposed, and 11% of those opposed being strongly opposed. Overall, Canadian women are more opposed to biotechnology than men, especially in terms of risks and ethical issues.

According to Walker, 44% of Canadian adults believe the rules and systems regulating biotechnology are strict and 43% feel they are lax. However, 60% of Canadians believe the government doesn't do enough to study and manage the risks associated with biotechnology, and 85% agree (39% of those strongly agree) that the government should lessen the use of biotechnology until more is known about the risks. However, if scientific evidence says that a particular application of biotechnology is deemed safe, then 83% of Canadians say it should be allowed. Einsiedel, in an analysis of the same poll but looking specifically at nanotechnology, found the most important predictor of whether or not respondents approved of the technology was their confidence in the regulatory system.⁵⁵⁹

[I]t is highly likely that respondents are extrapolating from extant perceptions of regulatory performance rather than from awareness and familiarity of standards that are in place or are being considered for nanotechnology [...]. The assessment of conditional approval contingent on stricter regulation could be a projection of a series of previous experiences with various technologies, including their oversight.⁵⁶⁰

According to Walker, the results of focus group discussions indicate that public concern over the regulation of biotechnology is increasing. Some worry that corporate influence can have undue influence on decisions made by regulatory bodies, and that privately funded research takes place without moral and ethical oversight. In addition, highly publicized cases such as the withdrawal from the market of the drugs such as Vioxx, the anti-inflammatory drug reputed to have contributed to heart disease, undermine public confidence in government regulations.⁵⁶¹

When asked about specific issues such as stem cell research, pharmacogenetics (defined as "personalized medicine"), GM trees (where genes are inserted or modified to obtain desired traits such as improved growth or disease tolerance), nanotechnology, gene banks, and genetic research, most Canadians felt that these technologies were beneficial. GM food is an area that 90% of Canadians said they are familiar with.⁵⁶² GM food stood out as having the least approval, with 55% of respondents having a negative reaction compared with 13% having a positive reaction. And 20% of all respondents believed that GM foods are of no benefit to society and pose a substantial risk.

⁵⁵⁹ Einsiedel. "In the Public Eye: The Early Landscape of Nanotechnology among Canadian and U.S. Publics."

⁵⁶⁰ Ibid. pp. 109, 111.

⁵⁶¹ Walker. "Report on a Study of Emerging Technologies in Canada and the U.S.: Prevailing Views, Awareness and Familiarity."

⁵⁶² Ibid.

In 2000, Einsiedel, et al. also studied trends in Canadian public perceptions and attitudes of biotechnology.⁵⁶³ They found that in 1994, although four in ten Canadians were supportive of biotechnology, most Canadians had little awareness or knowledge of biotechnology in general. However, when these same Canadians were asked about specific applications, there was a higher level of awareness. For example, in 1994, seven in ten had heard of genetically engineered tomatoes, which have a longer shelf life, and over eight in ten had heard that hormone supplements were given to cows to increase their milk yields.⁵⁶⁴ Einsiedel, et al. used 1997 as a baseline for their study and found that between 1997 and 2000 there had been a significant change in public attitude, especially toward GM food. They found that by 2000, the level of knowledge had increased but the level of support had decreased. Einsiedel, et al. provide the following as key indicators of changes in public perceptions:

Support:

- In 1997, 72% of respondents expected biotechnology to ‘improve our way of life in the next 20 years’; 63% felt the same way in 2000.
- In 1997, 70% supported at least four out of six different applications, compared to a little over half (56%) with the same support three years later.
- There was less enthusiasm for food and crop applications in 2000, in contrast to the preceding period: while 49% definitely agreed that ‘inserting genes from one plant species into a crop plant to make it more resistant to pests’ was useful in 1997, only 30% shared the same opinion three years later.

Awareness:

- When asked what came to mind when thinking about biotechnology, over three quarters of respondents in 2000 could come up with some response / notion about biotechnology compared with only a third in 1997.
- In 2000, two thirds could recall seeing or reading something on biotechnology in the last three months, compared to 54% who could recall seeing or reading something on biotechnology prior to the last three months. However, this did not translate to higher levels of discussion, suggesting that the issue had become more prominent but remained relatively low in importance.

Einsiedel, et al. analyzed reactions to specific applications of biotechnology, such as using it in the production of food and drinks or in the process of transferring genes from one organism to another, in order to understand the criteria people used to make judgments about the applications. They compared attitudes of focus group members towards the application’s utility, risk factors, and moral acceptability. Focus group members expressed a number of concerns with regard to environmental sustainability, animal testing in research, ethical research practices, and equitable distribution of risks and benefits. Einsiedel, et al. found that in 1997, an application’s utility was considered

⁵⁶³ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed.

⁵⁶⁴ Optima Consultants. *Understanding the Consumer Interest in the New Biotechnology*, Ottawa: Office of Consumer Affairs, 1994. cited in: Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed.

the most important factor for determining whether it should be encouraged, whereas in 2000, moral acceptability had greater weight. With regards to GM food, Einsiedel, et al. found that focus group members were mainly concerned about nature, the environment, and utility:

- ‘Nature’ concerns were typified by preferences for more traditional breeding methods and beliefs that genetic modification was ‘fundamentally against nature.’ Such phrases as ‘playing God’ or ‘tampering with nature’ typified top-of-mind responses to the term biotechnology.
- Environmental concerns focused primarily on those applications that involved genetic manipulation of crop plants to make them pest resistant.
- The third area of concern, which was the most significant, was utilitarian worries. These involve the adequacy of the regulatory system and questions about risks and benefits.⁵⁶⁵

Einsiedel, et al. correlated the increase in awareness of biotechnology with an increase in newspaper stories about biotechnology. The researchers conducted a keyword search of the *Globe and Mail* newspaper and found that in 1995, 200 stories on biotechnology appeared in the newspaper, and more than 500 stories appeared in 2000. In a review of the literature on media coverage of biotechnology, the researchers found:

[T]he media play a significant role in telling us what to think about or what to view as public problems. Their role is also significant in providing some of the information on which beliefs about issues are based. This input has been documented in such areas as food safety and nutrition.⁵⁶⁶

The researchers also suggested that biotechnology became prominent as an important issue in the media in the late 1990s, when farmers were faced with a rejection of their GM products in export markets such as Europe.

21.3.3 Public familiarity with nanotechnology

Considering the potential impact nanotechnology could have on the lives of Canadians, it is important that Canadians be provided with meaningful information on the subject. The 2005 government poll on biotechnology surveyed 2,000 adults and found that 35% of Canadians are somewhat or very familiar with nanotechnology; 38% have had exposure from reading, seeing, or hearing something about the subject; and 24% had discussed the subject with someone.⁵⁶⁷ Einsiedel suggests: “Given the limited awareness and

⁵⁶⁵ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed. p. 6.

⁵⁶⁶ Ibid., accessed. p. 7. Payson, S. *Using Historical Information to Identify Consumer Concerns About Food Safety*, Washington D.C.: Technical Bulletin No. 1835, USDA Economic Research Service, 1994.

⁵⁶⁷ Einsiedel. "In the Public Eye: The Early Landscape of Nanotechnology among Canadian and U.S. Publics."

familiarity, there are indicators that publics [...] are giving the technology the benefit of the doubt, with at least half suggesting they see moderate risks but substantial benefits.”⁵⁶⁸ According to Einsiedel, the survey results also showed that 51% of Canadian adults saw substantial benefits arising from nanotechnology and 36% saw moderate benefits; 16% of adults saw substantial risks and 51% saw moderate risks. On the question of moral acceptability, 46% of adults found nanotechnology morally acceptable and 42% found it morally questionable—an almost even divide.⁵⁶⁹ In terms of economic benefits, 36% of adults saw major economic benefits, 48% saw modest economic benefits, 10% saw no significant economic benefits, and 6% said they didn’t know.⁵⁷⁰

When asked how confident they were in the safety and regulatory approval systems governing nanotechnology, only 17% of adults said they were confident. However, when they were asked, “In terms of the scientists who are involved in research of these technologies [...] how confident would you say you are that nanotechnology is in safe hands?” 31% of respondents said that they were confident that the technology was in safe hands. In separate questions, 71% of adults agreed that decisions about nanotechnology should be based mainly on the view and advice of experts; 65% agreed that decisions on nanotechnology should be based mainly on the scientific evidence of risk and benefit; and 31% agreed that decisions should be based mainly on the moral and ethical issues involved. Since these percentages sum to more than 100%, it is unclear whether respondents also agreed that nanotechnology should be based mainly on more than one of the factors, if they didn’t understand the information, or if there is an alternative explanation. When asked if authorities should inform people about nanotechnology and let them decide for themselves whether they want to use products developed using these technologies, 92% of the respondents agreed and 9% disagreed. And when asked: “Until more is known about the risks of nanotechnology, government should slow the use of nanotechnology,” 73% agreed, 25% disagreed, and 2% didn’t know.⁵⁷¹

21.3.4 Predictors of public attitudes toward biotechnology

In most public opinion surveys on food biotechnology the degree of trust in the regulatory system is a major factor influencing the public’s acceptance or rejection of these technologies and their potential risks.⁵⁷² In other words, those with the least amount of trust in government and industry regulations have the greatest concern about possible risks. In fact, the research shows that trust has a greater influence on risk perception than

⁵⁶⁸ Ibid. p. 103.

⁵⁶⁹ The results given here are incomplete, although they include all of the data that Einsiedel presented. For example, the sets of numbers do not add up to 100 percent, as in the following statement “the survey results also showed that 51% of Canadian adults saw substantial benefits arising from nanotechnology and 36% saw moderate benefits.” What the other 13% thought is not given. The same is true for data indicating risk and moral acceptability. Ibid.

⁵⁷⁰ Ibid.

⁵⁷¹ Ibid.

⁵⁷² Kamaldeen, Sophia, and Douglas A. Powell. *Public Perceptions of Biotechnology*, Food Safety Network Technical Report #17, University of Guelph, 2000; accessed November 2005; available from <http://www.foodsafetynetwork.ca/en/article-details.php?a=3&c=9&sc=65&id=221>.

does the inherent safety of a particular product.⁵⁷³ For the most part, people trust the government and scientific “experts” to make decisions about product safety, and assume, as noted above, “even though they have virtually no detailed understanding or knowledge of the federal government’s regulatory practices and imperatives,” if the product is in use, it is safe.⁵⁷⁴

Drew Kershen finds the main predictor of public attitudes towards biotechnology to be values.⁵⁷⁵ He argues that three main public attitude-conflicts, based on particular values, underlie the biotechnology debate. Kershen hypothesizes that there is a correlation between these values and corresponding attitudes towards biotechnology. He identifies three statements on which to base the correlations. Whether the individual agrees or disagrees with these statements is an indication of whether the individual supports or opposes biotechnology:

1. It is not wise to trick Mother Nature.

We have a stronger identification with living things (plants, animals, and fellow human beings) than we do with inert matter, and, therefore, are more comfortable with the manipulation of inert matter through physics and chemistry than with the modification and creation of living matter.

2. Mankind is the destroyer of nature.

Science and technology in society are being challenged as indicators of ‘progress’ as more ecological destruction is identified. Preference for the natural, holistic, sustainable, and organic is rising.

3. The world is a world of limited resources; therefore, population growth is the most serious threat to the future of the world.

Population growth is seen as an engine of progress when the world is seen as having limitless resources for exploration and development. Societies that try to attract people through immigration, for example, see larger populations with improved education as necessary for production capacities and consumer markets. Those concerned about limited resources generally want to limit population growth.⁵⁷⁶

Kershen hypothesizes four correlations based on the above three statements:

⁵⁷³ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed.

⁵⁷⁴ Government of Canada. *Summary of Public Opinion Research into Biotechnology Issues in Canada*, accessed.

⁵⁷⁵ Kershen. "Biotechnology: An Essay on the Academy, Cultural Attitudes and Public Policy."

⁵⁷⁶ Ibid.

1. If the person surveyed *agreed, or tended to agree*, that the three statements mentioned above were factually true, the person would be inclined to oppose biotechnology.
2. The *more strongly the person agreed* with the three statements as being factually true, the more strongly the person would oppose biotechnology.
3. If the person surveyed *disagreed, or tended to disagree*, that the three statements were factually true, the person would be inclined to support biotechnology.
4. The *more strongly the person disagreed* with the factual validity of the three statements, the more strongly the person would support biotechnology.⁵⁷⁷

Furthermore, Kershen argues:

One can further hypothesize that *a person's attitude towards the three statements is a better predictor of a person's attitude towards biotechnology than class, education, ethnic heritage, gender, geography, nationality, occupation, religious affiliation, or religious beliefs*. Finally, one can predict that no correlation exists between being a supporter (opponent) of computer technology and being a supporter (opponent) of biotechnology. In the late twentieth century, computer technology and biotechnology have simply come to occupy distinct intellectual universes even though both technologies appear to have enormous, irreversible impacts on, and potential catastrophic risks for, human beings and human society.⁵⁷⁸ [emphasis added]

21.3.5 Criticism of surveys of public attitudes toward biotechnology

Davison, et al. of Murdoch University in Australia reviewed a number of surveys of public attitudes toward biotechnology conducted in Australia, United States, Canada, the European Community, New Zealand, Denmark, Ireland, the Netherlands, and Japan. They found similar structures, questions, and problems with the surveys, and identified four problematic areas in particular, including a consumerist orientation, assumption of a unitary “general public,” a “cognitive deficit” approach, and the presumption of a neutral understanding of science and technology.⁵⁷⁹ These will be discussed in greater detail below.

The authors' main criticism is that the surveys are oriented toward consumer rather than citizenship concerns, and they “construct public opinion in a way that legitimates the commercialization of biotechnology [...] so as to inhibit effective participatory and dialogical public debate.”⁵⁸⁰ The authors argue that the surveys focus narrowly on health concerns, and ignore extremely important issues underlying the research such as the

⁵⁷⁷ Ibid.

⁵⁷⁸ Ibid. p. 5.

⁵⁷⁹ Davison, Barns, and Schibeci. "Problematic Publics: A Critical Review of Surveys of Public Attitudes to Biotechnology."

⁵⁸⁰ Ibid. p. 318.

“entrenchment of global corporate power and the radical instrumentalization of life that the new biotechnology signifies.”⁵⁸¹ They note:

[A]s biotechnology moves closer to the marketplace, the public, initially understood as being composed of democratic citizens concerned with the directions of public policy ‘for the common good,’ becomes an aggregation of individual consumer preferences and concerns about the possible threats which gene technology products might pose to personal well-being [...]. A consumer discourse constructs social activity in terms of individual preferences and thus narrows the range of recognized and legitimate concerns of ‘the public’ to matters which directly affect their own immediate health and welfare. It assumes that society is a market with individual consumers pursuing their immediate self-interest, with little or no interest in wider civic questions. The discourse of citizenship, on the other hand, involves the conception of the citizen as a member of a political community, with the rights and responsibilities to participate in the development of common purposes.⁵⁸²

The second concern raised by Davison, et al. is that the surveys assume a unified “public” and thus the possibility of a unified “public opinion.” In other words, dissenting opinions from groups who are interested in and knowledgeable about the controversial issues, such as the rapid development of global agrobusiness, are marginalized, and the most controversial issues are, by and large, ignored in the surveys. The third concern is with the “cognitive deficit” problem, since the authors contend that the surveys assume a low level of public understanding of genetics and biotechnology, and lead the “publics” to dismiss their own intuitive knowledge and experience.

The fourth concern is that the surveys assume that science and technology are politically neutral, which is reflected in a narrow and technical conception of personal risk. This approach does not include larger conceptions of risk such as whether commercial profits and mega-corporations, “whose interests are not necessarily the same as those of the producers, consumers, and citizens of regional and local economies,” should drive biotechnology research and development.⁵⁸³ Deeper issues, such as the manipulation of nature and human genes and their effects on health and the environment are also moral issues that are not considered in the surveys. Davison, et al. claim that this debate is a moral and ethical one that should question issues such as the importance of who can patent, and thus control knowledge. Another ethical concern is whether only a few should benefit from the profits of these technologies, while the needs of the poor are ignored. The authors cite examples of where the technology is being used to create expensive “designer” foods, instead of addressing societal needs for such things as affordable drugs. They claim that what is needed is a meaningful dialogue about values: “What sort of society do we want to be, and what political and cultural meanings do our technologies embody?”⁵⁸⁴

⁵⁸¹ Ibid. p. 319.

⁵⁸² Ibid. p. 331.

⁵⁸³ Ibid. p. 334.

⁵⁸⁴ Ibid. p. 342.

Einsiedel notes in a 2005 paper for the Canadian Biotechnology Secretariat that the view of a unidimensional 'public' has changed from a "monolithic public, subject to the vagaries of information disseminated from 'the experts,'" to a view of:

... publics (plural emphasis) engaged or inattentive at various times, occupying different roles at different times—citizen, consumer, patient, environmentalist—being naïve or displaying expertise, becoming active or non-committal depending on context and circumstance.⁵⁸⁵

However, this change in view does not change the observations of Davison, et al. concerning the lack of diverse opinions reflected in large-scale public surveys.

Despite these difficulties, public opinion surveys produce the only reliable data available upon which to base indicators of public knowledge, understanding, and engagement on biotechnology issues.

⁵⁸⁵ Einsiedel. "Introduction: Making Sense of Emerging Technologies." p. 3.

22. Health Literacy

22.1 Definitions and importance of health literacy

Health literacy is concerned with the degree to which learning and education are actually reflected in knowledge of health issues and in healthier lives. Health literacy is defined basically as the “ability to read, understand, and act on health information.”⁵⁸⁶ Expanding this basic definition, the Canadian Health Network (CHN) notes:

[H]ealth literacy is a new concept that links our level of literacy with our ability to act upon health information and, ultimately, to take control of our health. It builds upon the idea that both health and literacy are critical resources for everyday living.⁵⁸⁷

The CHN also notes that low health literacy creates barriers to access to information, the ability to make informed decisions, and the ability to gain greater control over one’s own health and wellbeing. The CHN lists examples of the kind of difficulties that people with low basic literacy levels—who most often are those with low educational attainment, low income levels, and advanced age—face in their daily lives:

- Following instructions for a diabetic diet
- Giving the correct amount of medication to a feverish child
- Determining the amount of sodium or fat from the label of a packaged food
- Safely operating a kitchen appliance
- Completing a medical form
- Finding a dentist or other health care provider
- Understanding an informed consent form for medical treatment
- Asking for and getting a referral to a specialist⁵⁸⁸

According to Health Canada, the primary focus of the health literacy field is to improve knowledge and outcomes concerning medication use, medical compliance, healthy lifestyle practices, and home and workplace safety practices.⁵⁸⁹ Health Canada also notes that health literacy applications should generally target the lower-income population, since this population is more likely than the higher-income population to have low literacy skills.

According to Weiss, basic literacy skills predict health status more accurately than any

⁵⁸⁶ Andrus, Miranda R., and Mary T. Roth. "Health Literacy: A Review," *Pharmacotherapy*, vol. 22, no. 3, 2002: 282-302.

⁵⁸⁷ Canadian Health Network. *Beyond Words: The Health-Literacy Connection*, Public Health Agency of Canada, 2005; accessed March 2005; available from <http://www.canadian-health-network.ca>.

⁵⁸⁸ *Ibid.*, accessed.

⁵⁸⁹ Health Canada. *How Does Literacy Affect the Health of Canadians*, Health Canada, 2003; accessed March 2005; available from <http://www.hc-sc.gc.ca/hppb/literacy/literacy.html>.

socio-demographic variable including formal education, income, or ethnic background.⁵⁹⁰ In addition to poor health status, evidence indicates that lack of knowledge about medical care, medical information, disease prevention, and poor medical compliance can lead to increased hospitalizations and increased health care costs.⁵⁹¹ An educated populace, therefore, is one that—among other things—knows and understands what is needed to live a healthy life, to prevent disease, and to seek and act upon appropriate medical care when needed.

However, health literacy goes well beyond simple reading skills. Donald Nutbeam, former director of Public Health for the United Kingdom and now Pro-Vice-Chancellor and Head of the College of Health Sciences at the University of Sydney, Australia, identifies three levels of health literacy—functional, interactive, and critical health literacies that involve communicative, social, and cognitive skills respectively. Together, these literacies and skills allow a critical analysis of information, and the ability to use the information for both personal and community wellbeing. Nutbeam argues that critical health literacy provides the ability to understand and act on wider community health concerns.⁵⁹² Ilona Kickbusch, an independent global health consultant based in Switzerland and previously of the World Health Organization and Yale University, suggests that Nutbeam's three levels of health literacy be used as a framework for developing a health literacy index to identify measures that "reflect health literacy in terms of knowledge and in terms of the capabilities to act, solve problems and evaluate circumstances."⁵⁹³ Such a health literacy index, if and when developed, will be a highly useful component of the educated populace domain of the Canadian Index of Wellbeing.

22.1.1 Knowledge of the non-medical, social determinants of health

One important issue in the health area is whether or not the public understands the broad determinants of health—the social, economic, and environmental factors that affect health. Vingilis and Sarkella refer to a 1992 Canadian survey that found Canadians recognize that health care, personal behaviour, and, to some extent, the environment, are determinants of health.⁵⁹⁴ The public fails to realize, however, that socioeconomic factors such as income and education affect health more strongly than does the health care system, and that direct health care expenditures do not have a strong correlation to the health status of the population.⁵⁹⁵ They also quote a 1994 report by the Ontario Premier's Council on Health, Wellbeing, and Social Justice that had similar findings:

⁵⁹⁰ Weiss, Barry D. "Health Literacy: An Important Issue for Communicating Health Information to Patients," *Chinese Medical Journal*, vol. 64, no. 11, 2001: 603-608.

⁵⁹¹ Andrus, and Roth. "Health Literacy: A Review."

⁵⁹² Nutbeam, Donald. "Health Literacy as a Public Health Goal: A Challenge for Contemporary Health Education and Communication Strategies into the 21st Century," *Health Promotion International*, vol. 15, no. 3, 2000: 183-184.

⁵⁹³ Kickbusch, Ilona S. "Health Literacy: Addressing the Health and Education Divide," *Health Promotion International*, vol. 16, no. 3, 2001: 289-297.

⁵⁹⁴ Vingilis, Evelyn, and Jennifer Sarkella. "Determinants and Indicators of Health and Well-Being: Tools for Educating Society," *Social Indicators Research*, vol. 40, no. 1/2, 1997: 159-178.

⁵⁹⁵ Ibid.

[P]eople were not always willing to recognize or acknowledge that indirect factors such as education were as important to health as direct lifestyle behaviours such as being a non-smoker or staying active. Two contradictions were particularly obvious. Some people were unwilling to make the links between education and health and between racism and health; some others felt that behaviour changes were more important to health than income.⁵⁹⁶

Vingilis and Sarkella also point to a *Chatelaine* cover story in May 1995 that evaluates Canada's "healthiest cities" with a "checkup" that includes the number of active treatment beds and physicians per 1,000 population, but does not include poverty rates as a key determinant of health. They also show that a simple correlation of health care variables and poverty variables with outcome measures like premature mortality and low birthweight babies would have illuminated the error in the *Chatelaine* story. "This is not to say that the health care system is not important. However, this popular myth of equating health status with health care has hampered wider consideration of the meaning of health."⁵⁹⁷ Vingilis and Sarkella continue:

A challenge for researchers and practitioners alike is the education of society on the determinants of health and well-being and the linkages among them. Without the knowledge and understanding of these broad determinants and their interrelatedness; without the appreciation that factors such as housing, unemployment, poverty and lone-parent family status predict rates of smoking, teen pregnancy, crime, disease, hospitalization and premature mortality communities will be limited in the programs and policies they have in their arsenal to sustain or improve on current levels of health and well-being [...]. Indeed, knowledge is the crucial first step in planned approaches to enhancing community health [...]. As long as there are major discrepancies between a community's perceived health issues and the actual health issues, the sustainability and enhancement of well-being can be jeopardized.⁵⁹⁸

While all the determinants of health, including income, employment, early childhood, the physical environment, and education are relevant to health literacy, there is not currently any systematic and comprehensive measure of health literacy that incorporates all these elements. Hopefully new work on health literacy measures by Rootman, Frankish, and Kwan, which are discussed below, will soon provide such measures that will be suitable for incorporation in the educated populace of the Canadian Index of Wellbeing. In the meantime, we are confined to the provision of illustrative examples.

⁵⁹⁶ Premier's Council on Health, Well-Being and Social Justice. *Health for All Ontarians*, Toronto, Ontario: Queens Printer for Ontario, 1994. p. 5, cited in Vingilis, and Sarkella. "Determinants and Indicators of Health and Well-Being: Tools for Educating Society." p. 161.

⁵⁹⁷ Vingilis, and Sarkella. "Determinants and Indicators of Health and Well-Being: Tools for Educating Society."

⁵⁹⁸ Ibid. p. 163.

22.1.2 Health literacy affects the entire population

The second comprehensive report on the health of Canadians, titled *Towards a Healthy Future*, notes that literacy levels are usually, but not always, related to levels of formal education.⁵⁹⁹ Very few researchers look beyond the low-income and low-educated population when discussing health literacy, since people with a low level of educational attainment have the poorest literacy skills. Andrus cites several studies, however, that indicate individuals with high school and university educations still have trouble understanding basic medical language.⁶⁰⁰ Using REALM (Rapid Estimate of Adult Literacy in Medicine) scores, one study assessing the reading ability of patients with systemic lupus erythematosus, found that patients read at a 7th–8th grade level in a university clinic and at a 9th grade level in a private clinic. The mean education level for these patients was 12th grade.⁶⁰¹

In 2004, the U.S. Institute of Medicine (IOM) reported that nearly half of Americans have a health literacy problem.⁶⁰² At some point, most individuals, including those who are highly educated, will encounter health information that they cannot understand. The IOM observes that: “Health systems are becoming increasingly complex, involving new technologies, scientific jargon, and complicated medical procedures and forms. All of these aspects of the health system can be confusing to patients.”⁶⁰³ The IOM report notes:

Complex text is very common in health information, from insurance forms to advertising. Even people with strong literacy skills may have trouble obtaining, understanding, and using complex health information; a surgeon may have trouble helping a family member with Medicare forms; a science teacher may not understand information sent by a doctor about a brain function test; and an accountant may not know when to get a mammogram.⁶⁰⁴

The IOM report records that over 300 studies indicate that health-related materials cannot be understood by most of the people for whom they are intended. A commentary by William Smith on the U.S. Academy for Educational Development website notes this is a systems problem, not an individual problem.⁶⁰⁵ The academy calls the situation a “social marketing challenge.” Kickbusch also notes that health is “a societal system that has become increasingly complex in all its components and requires a wide range of

⁵⁹⁹ Health Canada. *Towards a Healthy Future: Second Report on the Health of Canadians*, Health Canada, 1999; accessed March 2005; available from http://www.health.gc.ca/hppb/phdd/report/text_versions/english/index.html.

⁶⁰⁰ Andrus, and Roth. "Health Literacy: A Review."

⁶⁰¹ Ibid.

⁶⁰² Smith, William. *Social Marketing and Behavior Change: Smith on Social Marketing*, Academy for Educational Development, 2004; accessed March 2005; available from <http://www.aed.org/SocialMarketingandBehaviorChange/smithblog-oct-2004.cfm>.

⁶⁰³ Institute of Medicine (IOM) of the National Academies, and Committee on Health Literacy. *Health Literacy: A Prescription to End Confusion*, Washington, D.C., The National Academies Press, 2004; accessed March 2005; available from <http://www.nap.edu/books/0309091179/html/>.

⁶⁰⁴ Ibid., accessed.

⁶⁰⁵ Smith. *Social Marketing and Behavior Change: Smith on Social Marketing*, accessed.

knowledge and skills” to sustain health.⁶⁰⁶ Clearly, the importance of health literacy affects the entire population.

22.1.3 Importance of valid information from multiple sources

Health literacy involves understanding information, and acquiring the knowledge to discriminate and act on this information. However, as noted above, much more is involved than simple compliance issues like how to take medicine in accordance with directions.⁶⁰⁷ Even the literate public that reads newspapers, watches television, and surfs the web, is confronted with conflicting and confusing information on health issues, and must develop the ability to process this information so that it is relevant to personal experience and need.⁶⁰⁸ People need to know the side effects of drugs, the alternative treatment options they have, the dangers and success rates of surgery, and whether the information they are getting in the mainstream media is reliable.

The degree to which the general public is aware of certain key health issues, while not a systematic measure of health literacy, does provide some evidence of the degree to which the populace is educated on health matters.

Vingilis and Sarkella observe that there are often significant discrepancies between what the public thinks is true and the actual situation.⁶⁰⁹ One U.S. study found that 6% of respondents identified heart attack / stroke as responsible for most of the deaths in their community, while the reality was that 29% of deaths were due to cardiovascular problems. Over half of respondents thought most deaths were caused by homicides or drugs, when, in fact, only 4% of deaths were homicide related and 1% of deaths were due to drug overdose.⁶¹⁰ In sum, Vingilis and Sarkella report a high level of public ignorance concerning the causes of health, disease, and mortality, as indicated by literature in the field.

The U.S. Institute of Medicine advises that all persons working within the health context must be able to provide accurate information. This health context includes “the media, the marketplace, and government agencies, as well as those individuals and materials a person interacts with regarding health.”⁶¹¹

Iлона Kickbusch addressed this broad issue at the *Second Canadian Conference on*

⁶⁰⁶ Kickbusch. "Health Literacy: Addressing the Health and Education Divide."

⁶⁰⁷ Ibid.

⁶⁰⁸ Neuberger, J. "The Educated Patient: New Challenges for the Medical Profession," *Journal of Internal Medicine*, vol. 247, 2000: 6-10.

⁶⁰⁹ Vingilis, and Sarkella. "Determinants and Indicators of Health and Well-Being: Tools for Educating Society."

⁶¹⁰ Ibid.

⁶¹¹ Institute of Medicine (IOM) of the National Academies, and Committee on Health Literacy. *Health Literacy: A Prescription to End Confusion*, accessed.

Literacy and Health.⁶¹² She pointed out that the increased quantity of information available to the public can result in information overload and difficulty in making choices. Health-related information is available from numerous sources: the news media, health institutions and organizations, peer-reviewed literature, self-help books, health associations, health care providers, governmental health organizations, popular media such as television and radio, friends and family, and the Internet. (Interestingly, Kickbusch does not mention schools in her list of information and knowledge sources.) Kickbusch suggested that health literacy could potentially function as a filter that can help provide relevant information to enhance consumer knowledge, decisions, and action.

A British study by Coulter, et al., cited in the *Journal of Internal Medicine*, found that “much of the information patients receive about health and health care is misleading, outdated or biased.”⁶¹³ The *Journal of Internal Medicine* review also notes that there is a growing understanding in the public that “the medical / scientific model of health is not the only one.” It continues:

Recognition is growing that patients’ conceptions of illness are as valid as doctors’ concepts of disease. Comparisons of Western and Chinese or Arabic systems of medicine show that the former does not hold every answer to every question about a person’s health. Instead, it is clear that Western medicine is as much a cultural product as any other—that the theories and methods of scientific research are not 100% reliable and objective after all.⁶¹⁴

In sum, the basis for health literacy and for educating the populace adequately on health issues is valid and accurate information. Formal school structures are only one (and probably a relatively minor) source of such health information. Although conventional education indicators still focus primarily on formal schooling, the evidence indicates the need to examine other sources of information and learning structures—including, in the realm of health, the media, advertising, health professionals, family and friends, and government.

22.1.4 Knowledge of other health-related issues

Aside from the examples above, many other topics are clearly important to a consideration of the degree to which health literacy affects the health of the population, whether or not they are recognized in the conventional literature. For example, while nutrition education is certainly acknowledged as a key component of health literacy and public health, knowledge of food production and toxicity in the environment are not

⁶¹² Kickbusch, Ilona. "Health Conscious Societies in the 21st Century--Implications for Health Literacy and Canada." Paper presented at the Second Canadian Conference on Literacy and Health, Ottawa, 2004, Canadian Public Health Association; accessed March 2005; available from <http://www.cpha.ca/literacyandhealth/speeches2.htm>.

⁶¹³ Coulter, A., V. Entwistle, and D. Gilbert. *Informing Patients: An Assessment of the Quality of Patient Information Materials*, London: King's Fund, 1998. cited in Neuberger. "The Educated Patient: New Challenges for the Medical Profession." p. 9.

⁶¹⁴ Neuberger. "The Educated Patient: New Challenges for the Medical Profession." p. 7.

explicitly recognized as issues in the health literacy literature, though they clearly affect public health. Such wide-ranging knowledge of the determinants of health is crucial for public health, and, more broadly, to empower Canadians to choose the kind of society they want.

On another health issue, Statistics Canada data confirm a trend toward increased use of complementary / alternative health care in Canada.⁶¹⁵ The fact that Canadians are increasingly using forms of alternative health care such as chiropractic, massage therapy, naturopathy, homeopathy, and acupuncture indicates a growing awareness and openness to new forms of treatment. Cycle 2.1 of the Canadian Community Health Survey (CCHS), which collected information in 2003 from 135,573 individuals aged 12 or older, included questions about consultations with various “alternative health care providers” and chiropractors in the 12 months before the survey interview. It found 20% of Canadians aged 12 or older—5.4 million people—reported using some type of alternative or complementary health care.⁶¹⁶ This compares with data from the 1994/95 National Population Health Survey which found that about 15% of Canadians aged 18 or older had used alternative care in the 12 months prior to the survey.⁶¹⁷

People most likely to use alternative health care were: women, adults ages 25–64, Canadians in the western provinces, those with higher education and income, and those with chronic conditions. In the West, between 13% and 18% of residents reported consultations with chiropractors, compared with less than 5% of residents in the Atlantic provinces, for example.

As Statistics Canada points out, since most provincial programs only partially cover alternative health care costs, it is not surprising that the use of such services rose with income. While 26% of individuals in the highest household income group had used alternative care in 2003, only 13% of those in the lowest income group had done so. Also, more than a quarter (26%) of postsecondary graduates used some kind of alternative or complementary health care in 2003, compared with 16% of people with less than secondary education. Of those people who reported having at least one diagnosed chronic condition, about 25% had consulted an alternative practitioner compared with 16% of those who did not have chronic conditions. Also, more than 30% of individuals with fibromyalgia, back problems, or multiple chemical sensitivities had used alternative care, and use was also relatively high among those with bowel disorders, migraines, chronic fatigue syndrome, thyroid disorders, asthma, ulcers, and arthritis or rheumatism.

While usage of alternative care is not a direct health literacy indicator, increased rates of use can be interpreted as growing awareness of new, non-conventional forms of treatment. The Statistics Canada data above, as well as Vingilis and Sarkella’s assessment of public knowledge of the causes of health, disease, and mortality, are provided here as

⁶¹⁵ Park, Jungwee. "Use of Alternative Health Care," *Health Reports*, vol. 16, no. 2, 2005: 39-42, Statistics Canada, Catalogue 82-003.

⁶¹⁶ Ibid.

⁶¹⁷ Millar, W.J. "Patterns of Use - Alternative Health Care Practitioners," *Health Reports*, vol. 13, no. 1, 2001: 9-21, Statistics Canada, Catalogue 82-003.

illustrative of the types of issues that are potentially relevant to an exploration of the degree and extent of public awareness of factors affecting public health.

We have given only a few examples above of the kinds of knowledge that might be included in the concept of health literacy. Other important topics that could also be considered in health literacy assessments include public knowledge of:

- the multiple effects on health of various elements of the physical environment (e.g., water, air, land, work site)
- indoor pollution (e.g., sick building syndrome, and the impacts of fluorescent lighting, asbestos and other substances)
- neurotoxic effects on children and attention deficit hyperactivity disorder (ADHD)
- toxins in other consumer products such as cosmetics
- occupational workplace health literacy
- mental health literacy including stress management
- depression management and use of prescription medications
- health benefits of physical activity
- health effects of smoking, alcohol, and drug use
- positive health benefits of adequate nutrition ⁶¹⁸

⁶¹⁸ Jorm, A.F. "Mental Health Literacy: Public Knowledge and Beliefs About Mental Disorders," *British Journal of Psychiatry*, vol. 177, no. 5, 2001: 396-401.

22.2 Health literacy research and measurement

22.2.1 Health literacy research

The literacy-health connection has been studied in Canada since the late 1980s. In fact, Canada is recognized internationally for its extensive research and work in this area.⁶¹⁹ As well, national surveys such as the National Population Health Survey carried out by Statistics Canada (1994 and 1997), and the new Canadian Community Health Survey have also linked literacy and health status, although these surveys do not collect data on health literacy per se.⁶²⁰ The Canadian National Adult Literacy Database (NALD) also links over 300 references to literacy and health.⁶²¹

The Canadian Public Health Association (CPHA) established the *National Literacy and Health Program* in 1994 with a long-term commitment to promote awareness of literacy among health professionals. This program has created a framework for literacy and health research that includes health literacy. The framework, shown below in Figure 4, includes:

- *Types of actions*, which can be used to address literacy and health issues such as health communication, health education capacity development, community development, organizational development, and policy development.
- *Determinants of literacy*, which include education, early child development, aging, personal capacity, living / working conditions, gender, and culture.
- *Literacy*, which includes general literacy, health literacy, and other literacies.
- *Effects of literacy*, which includes direct and indirect outcomes.⁶²²

Rootman and Ronson have documented this development of literacy and health research in Canada in some detail in their report, *Literacy and Health Research in Canada: Where Have We Been and Where Should We Go?*⁶²³

⁶¹⁹ Perrin, Burt. *How Does Literacy Affect the Health of Canadians?*, Health Canada, 1998; accessed March 2005; available from <http://www.phac-aspc.gc.ca/ph-sp/phdd/literacy/literacy.html>.

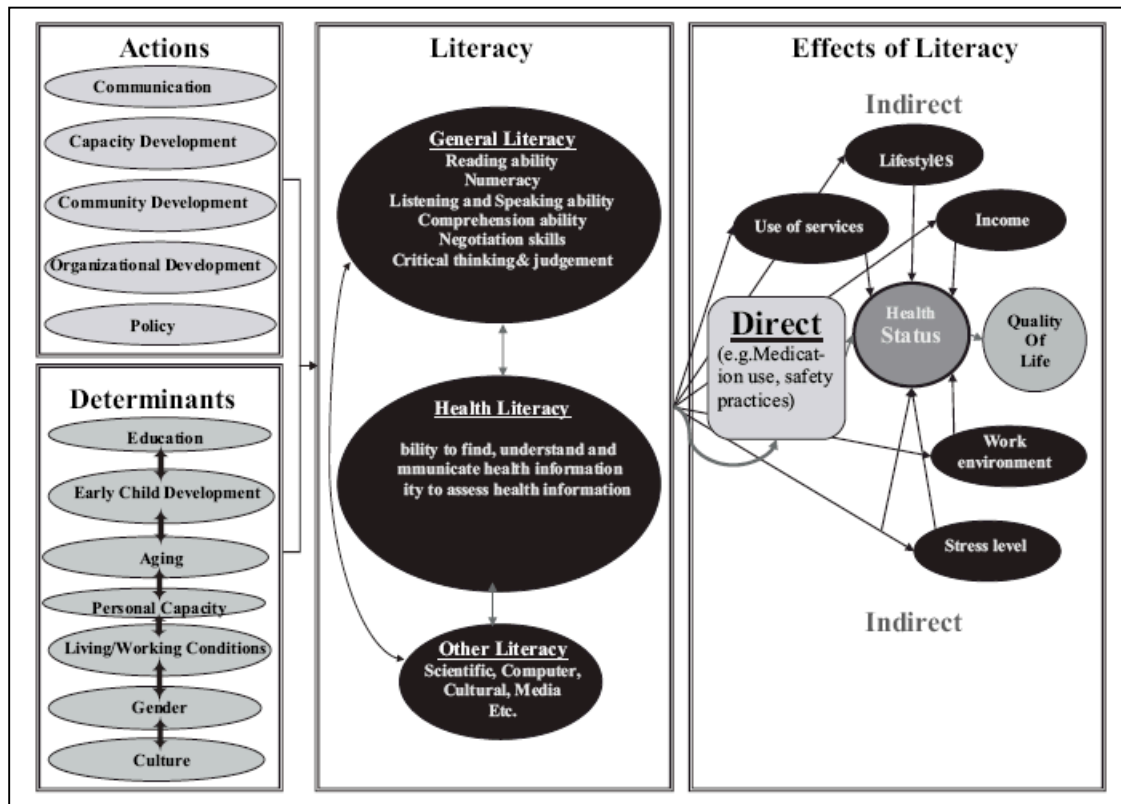
⁶²⁰ Federal, Provincial and Territorial Advisory Committee on Population Health. *Report on the Health of Canadians and Report on the Health of Canadians - Technical Appendix*, Ottawa: Health Canada, 1996.

⁶²¹ National Adult Literacy Database (NALD). *Website*, accessed March 2005; available from <http://www.nald.ca>.

⁶²² Rootman, Irving, and Barbara Ronson. "Literacy and Health Research in Canada: Where Have We Been and Where Should We Go?," *Canadian Journal of Public Health*, vol. 96, no. Supplement 2, 2005: S62-S77.

⁶²³ Ibid.

Figure 4. Conceptual framework for literacy and health research, 2005



Source: Rootman, Irving, and Barbara Ronson. "Literacy and Health Research in Canada: Where Have We Been and Where Should We Go?" *Canadian Journal of Public Health*, vol. 96, no. Supplement 2, 2005: S62-S77.

Studies on literacy and health are taking place at the local, provincial, and national levels. A major study located at St. Francis Xavier University, *Health Literacy in Rural Nova Scotia Research Project*, funded by the Social Sciences and Humanities Research Council (SSHRC), is exploring the links between literacy and health in a rural population.⁶²⁴ In 2002, SSHRC, with additional funding from the Canadian Institutes of Health Research (CIHR), also sponsored a three-year research program developed by the Canadian Public Health Association (CPHA) and the University of Toronto's Centre for Health Promotion, to encourage literacy and health research.⁶²⁵ This program, the *National Literacy and Health Research Program*, directed by Irving Rootman, has undertaken a number of projects, including establishing a national advisory committee on

⁶²⁴ Gillis, Doris, and Allan Quigley. *Taking Off the Blindfold: Seeing How Literacy Affects Health. A Report of the Health Literacy in Rural Nova Scotia Research Project*, Antigonish, N.S., St. Francis Xavier University, 2004; accessed March 2005; available from <http://www.nald.ca/healthliteracystfx>.

⁶²⁵ Canadian Public Health Association (CPHA), and University of Toronto's Centre for Health Promotion. *National Literacy and Health Research Program*, Canadian Public Health Association, 2005; accessed March 2005; available from http://www.nlhp.cpha.ca/clhrp/index_e.htm.

the subject, conducting a needs assessment and environmental scan of the literature,⁶²⁶ organizing a national workshop and a workshop on literacy and health held at the CPHA annual conference,⁶²⁷ and promoting co-operation between health researchers and health practitioners in this field.

In 2004, three major reports were released in the U.S., which, according to Rima Rudd of the Harvard School of Public Health, “has moved the topic of literacy and health onto the U.S. agenda in an unprecedented way.”⁶²⁸ These reports included *Literacy and Health Outcomes: A Systemic Review of the Literature*,⁶²⁹ *Health Literacy: A Prescription to End Confusion*,⁶³⁰ and *Literacy and Health in America*.⁶³¹ According to Rudd, the first report surveys over 700 articles and finds that low literacy, as measured by poor reading skills, is associated with poorer health. The studies reviewed measured outcomes such as health knowledge, use of health services, and preventive health practices.

The second report, from the U.S. Institute of Medicine, “expanded the scope of health literacy work, by moving it out of the context of medical institutions and into the home, workplace, and the community.”⁶³² The last report, which uses data from the International Adult Literacy Survey, “characterized the health-related literacy skills of American adults for the first time” and created a Health Activities Literacy Scale.⁶³³ In addition, in 2005, a fourth important report from the U.S., entitled *Understanding Health Literacy: Implications for Medicine and Public Health*, was published by the American Medical Association. Rootman noted that these reports “will very likely have a spillover value, raising the public and political profile of literacy and health in Canada as has already happened in the United States.”⁶³⁴

⁶²⁶ Rootman, and Ronson. "Literacy and Health Research in Canada: Where Have We Been and Where Should We Go?"

⁶²⁷ See also: Rootman, Irving, et.al. "Literacy and Health in Canada: Perspectives from the Second Canadian Conference on Literacy and Health," *Canadian Journal of Public Health*, vol. 97, no. Supplement 2, 2006: entire issue.

⁶²⁸ Canadian Public Health Association. *Second Canadian Conference on Literacy and Health. Final Report*, Ottawa, Ontario, October 17-19, 2004; accessed March 2005; available from <http://www.cpha.ca/alphabetisation/documents/RapportFinal.pdf>.

⁶²⁹ Berkman, N.D., D.A. DeWalt, M.P. Pignone, S.L. Sheridan, K.N. Lohr, L. Lux, S.F. Sutton, T. Swinson, and A.J. Bonito. *Literacy and Health Outcomes: A Systematic Review of the Literature*, Rockville, MD, Evidence Report/Technology Assessment No. 87. AHRQ [Agency for Healthcare Research and Quality] Publication No. 04-E007-2. Agency for Healthcare Research and Quality, 2004; accessed July 2005; available from <http://www.ahrq.gov/downloads/pub/evidence/pdf/literacy/literacy.pdf>.

⁶³⁰ Institute of Medicine (IOM) of the National Academies, and Committee on Health Literacy. *Health Literacy: A Prescription to End Confusion*, accessed.

⁶³¹ Rudd, Rima, Irwin Kirsch, and Kentaro Yamamoto. *Literacy and Health in America*, Princeton, New Jersey, Center for Global Assessment, Educational Testing Service, 2004; accessed March 2005; available from <http://www.ets.org/Media/Research/pdf/PICHEATH.pdf>.

⁶³² Canadian Public Health Association. *Second Canadian Conference on Literacy and Health. Final Report*, accessed. p. 104.

⁶³³ Ibid., accessed. p. 104.

⁶³⁴ Ibid., accessed. p. 105.

22.2.2 General measures of health literacy

The main existing tests for health literacy in North America are the Rapid Estimate of Adult Literacy in Medicine (REALM) and the Test of Functional Health Literacy in Adults (TOFHLA).⁶³⁵ Although these tests can be used on a large scale, they are mainly administered in clinical settings for patient assessment or clinical research.⁶³⁶ The first is a simple word recognition test, while the second is a functional health test, which uses examples of life situations to assess comprehension and the ability to act on information.

In their review of health literacy, Andrus and Roth note that medical practitioners have also developed disease-specific tests. For example, people with hypertension are expected to know “normal and high blood pressure readings, duration of disease, [and] lifestyle modifications needed to reduce blood pressure such as exercise, symptoms, and complications.”⁶³⁷ Diabetes patients need to know normal blood glucose levels, and that feeling shaky, sweaty, and hungry are symptoms of low blood glucose, as well as other disease management skills.⁶³⁸ Other studies have identified lack of knowledge of preventive procedures such as mammography and prostate screening as problems affecting health outcomes.⁶³⁹

Rootman and Ronson are critical of both the REALM and TOFHLA tests since they both mainly test reading in a health context, while they contain no contextual measures, and no measures of listening or speaking.⁶⁴⁰ They note: “It is conceivable that people can be functionally health literate with minimal reading and writing skills, depending on how health literacy is defined”⁶⁴¹ For example, they report the results of one U.S. study that used the TOFHLA test:

When the TOFHLA was administered to 2,659 predominantly indigent, minority emergency room patients at two public hospitals in the U.S., 41.6% were unable to comprehend directions for taking medication on an empty stomach; 26% were unable to understand information regarding when to come for a next appointment; and 59.5% could not understand a standard informed consent document. More than 80% of both English- and Spanish-speaking patients over 60 years of age were found to have inadequate or marginal health literacy. This is significantly more than younger English- and Spanish-speaking patients of whom 31% and 62% had inadequate health literacy, respectively. We do not yet know, however, how many of these patients could comprehend directions given orally as opposed

⁶³⁵ Rudd, R.E., C. Zachariae, and K. Daube. *Integrating Health and Literacy: Adult Educators' Experiences. Report #5*, Boston: National Center for the Study of Adult Learning and Literacy, 1998.

⁶³⁶ Andrus, and Roth. "Health Literacy: A Review."

⁶³⁷ Ibid.

⁶³⁸ Ibid.

⁶³⁹ Ibid.

⁶⁴⁰ Rootman, and Ronson. "Literacy and Health Research in Canada: Where Have We Been and Where Should We Go?"

⁶⁴¹ Ibid. p. S66.

to in writing, nor how many were able to find information they needed in other ways.⁶⁴²

In conclusion, Rootman and Ronson note:

Measures for literacy and health literacy today are inadequate and new ones need to be developed. There are currently no published studies on the levels of health literacy in Canada, and until such measures are developed it is unlikely that there will be [...]. There is also little research on the relationship between Literacy, Health Literacy and Quality of Life in the health literature, though much progress has been made in developing measures of Quality of Life and more is underway in measuring Health Literacy.⁶⁴³

In April 2006, the Canadian Public Health Association (CPHA) convened the Expert Panel on Health Literacy to work from March 2006 through March 2007 in order to continue the work that began in the two national conferences on health literacy that were held in 2000 and 2004.⁶⁴⁴ The Expert Panel consists of 12 members and is funded by the Canadian Council on Learning. According to the CPHA website, the mandate of the Expert Panel is “to provide advice on the state of knowledge on health literacy and the effectiveness of interventions to improve health literacy, and to generate recommendations on future research, policy and programming initiatives to facilitate health literacy.”⁶⁴⁵ One of its specific mandates is to assess the quality of existing evidence on “the extent of literacy and health literacy in the adult population in Canada, and the relationship between literacy, health literacy and health outcomes, including the financial burden produced by low levels of population health literacy.”⁶⁴⁶ In addition, the website notes:

The primary goal of the Expert Panel project is to generate a report including recommendations that will be widely disseminated to Canadians (governments, policy makers, practitioners, individuals) in order to influence policies and programs in coming years.⁶⁴⁷

22.2.3 Adult Literacy and Life Skills (ALL) survey health literacy scale

The Adult Literacy and Life Skills (ALL) survey, conducted in 2003, was a joint project between the Government of Canada, the U.S. National Center for Education Statistics

⁶⁴² Ibid. p. S66.

⁶⁴³ Ibid.

⁶⁴⁴ Canadian Public Health Association (CPHA). *CPHA Expert Panel on Health Literacy*, 2006; accessed January 2007; available from http://www.litteratiesante.cpha.ca/english/proexp_e.html.

⁶⁴⁵ Ibid., accessed.

⁶⁴⁶ Ibid., accessed.

⁶⁴⁷ Ibid., accessed.

(NCES), and the Organisation for Economic Co-operation and Development (OECD).⁶⁴⁸ Canada was the international coordinator for the ALL project, responsible for overall management and quality assurance,⁶⁴⁹ and in co-operation with the OECD, Canada was also responsible for analysis and dissemination of the international study results.⁶⁵⁰

In 2003, the Canadian component of the ALL survey, called the International Adult Literacy and Life Skills Survey (IALSS) in Canada, tested the literacy skills of more than 23,000 Canadians aged 16 and older. Although the age range in the international ALL survey included only 16–65 year olds, the 2003 IALSS added Canadians over the age of 65 to the sample.⁶⁵¹ In November, 2005, Statistics Canada and the OECD released the first results in a report entitled, *Learning a Living: First Results of the Adult Literacy and Life Skills Survey (ALL)*.⁶⁵² After the ALL scales were completed, Statistics Canada assembled a health literacy scale from the 191 health-related items used in the survey.⁶⁵³ ALL measures four domains of literacy skills—prose literacy, document literacy, numeracy, and problem solving.⁶⁵⁴ The health literacy scale forms a fifth scale.

As noted in Chapter 17 of the literature review, prose literacy is defined as the knowledge and skills needed to understand and use information from texts such as news stories, instruction manuals, poems, and fiction. Document literacy measures the knowledge and skills needed to locate and use information in formats such as job applications, maps, transportation schedules, tables, and charts. Numeracy measures the mathematical knowledge and skills needed for ordinary procedures such as balancing a chequebook, figuring out tips, completing order forms, and determining interest on a loan. Problem solving measures the ability to think with goals in mind and to act in situations where no set solutions exist.⁶⁵⁵

ALL builds on the International Adult Literacy Survey (IALS) that was undertaken in three cycles of data collection between 1994 and 1998 in 22 countries, with the data for Canada being collected in 1994. Specifically, ALL added two new domains that the IALS did not measure in the first cycle: numeracy, which expanded the quantitative measure used by the IALS in 1994, and problem-solving or analytical reasoning.

⁶⁴⁸ Statistics Canada. *The International Adult Literacy and Skills Survey, 2003: Public Use Microdata File: User's Manual*, 2002; accessed January 2007; available from <http://data.library.ubc.ca/datalib/survey/statscan/ialss/2003/cdn/ialss2003gid.pdf>.

⁶⁴⁹ Statistics Canada. "Adult Literacy and Life Skills Survey." *The Daily*, May 11, 2005, accessed May 2005; available from <http://www.statcan.ca/80/Daily/English/050511/d050511b.htm>.

⁶⁵⁰ Ibid.

⁶⁵¹ Statistics Canada. *The International Adult Literacy and Skills Survey, 2003: Public Use Microdata File: User's Manual*, accessed.

⁶⁵² Statistics Canada, and Organisation for Economic Co-operation and Development (OECD). *Learning a Living: First Results of the Adult Literacy and Life Skills Survey (ALL) [IALSS in Canada]*, Statistics Canada, Catalogue no. 89-603-XWE, 2005; accessed December 2005; available from <http://www.statcan.ca/english/freepub/89-603-XIE/89-603-XIE2005001.htm>.

⁶⁵³ Statistics Canada. *The International Adult Literacy and Skills Survey, 2003: Public Use Microdata File: User's Manual*, accessed.

⁶⁵⁴ Ibid., accessed.

⁶⁵⁵ Statistics Canada, and Organisation for Economic Co-operation and Development (OECD). *Learning a Living: First Results of the Adult Literacy and Life Skills Survey (ALL) [IALSS in Canada]*, accessed. p. 16

Describing the development of the health literacy scale, Statistics Canada notes:

Following work done at the Educational Testing Services, the Prose, Document and Numeracy domains were found to present sufficient health related information to yield a fourth psychometric measure known as Health Literacy [...]. [I]n order to add value to the dataset, the five plausible values for this added domain were calculated for the Canadian IALSS data and were merged with the dataset in this step.⁶⁵⁶

Statistics Canada also notes that health literacy in the ALL survey is defined as “the ability to use and understand health related printed information from a variety of sources,”⁶⁵⁷ that this scale is closely related to the prose and document scales, and that it can be analysed along the same continuum. Proficiencies for the prose and document scales are reported as five levels, with the whole scale ranging from 0 to 500 points. These levels are interpreted as follows:

- Level 1: (score 0–225) A person is not able to read at all or has very serious problems with reading.
- Level 2: (score 226–275) A person can read simple language.
- Level 3: (score 276–325) A person can read well enough to get along from day to day.
- Level 4: (score 326–375) A person can read complex reading material.
- Level 5: (score 376–500) A person can read extremely complex reading material and has the highest level of ability.

However, in the results Levels 4 and 5 were combined due to the small number of people scoring at Level 5.⁶⁵⁸ A person who has reached Level 3 is considered to be competent and to have an adequate level of literacy. Please see Chapters 17 and 22 in the literature review for more information on ALL.

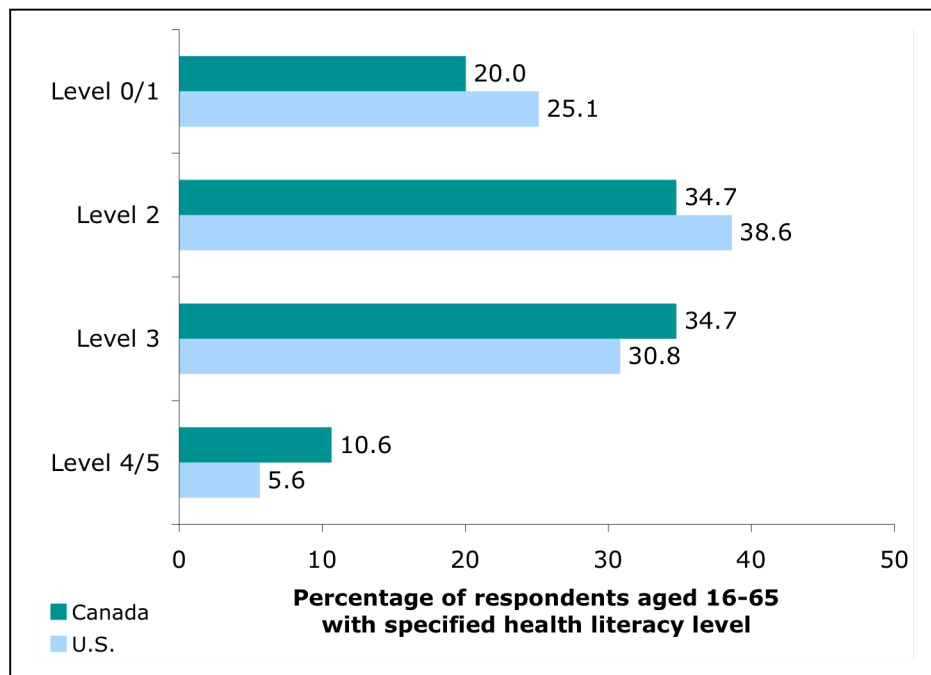
In January 2007, the Canadian Council on Learning (CCL) released a new report, *State of Learning in Canada: No Time for Complacency*. Within the Adult Learning chapter, the new report assesses health literacy using data from the Adult Literacy and Life Skills survey. We have reproduced the CCL finding below in Figures 5–8.

⁶⁵⁶ Statistics Canada. *The International Adult Literacy and Skills Survey, 2003: Public Use Microdata File: User's Manual*, accessed. p. 126.

⁶⁵⁷ Ibid., accessed. p. 15.

⁶⁵⁸ Statistics Canada. "International Adult Literacy and Skills Survey." *The Daily*, Nov 9, 2005, accessed November 2005; available from <http://www.statcan.ca:80/Daily/English/051109/d051109a.htm>, and <http://www.statcan.ca:80/Daily/English/051130/d051130b.htm>.

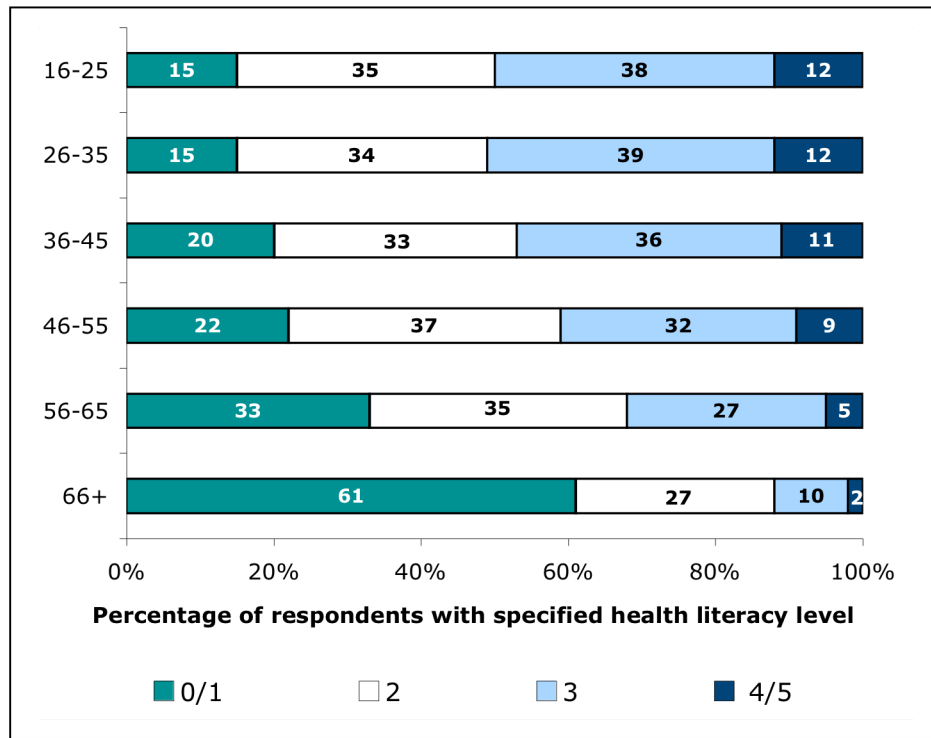
Figure 5. Percentage of respondents with health literacy levels from 0 to 5, ages 16–65, Canada and the United States, 2003



Source: Canadian Council on Learning. *State of Learning in Canada: No Time for Complacency*, 2007; accessed January 2007; available from http://www.ccl-cca.ca/NR/rdonlyres/5ECA2E9-D5E4-43B9-94E4-84D6D31BC5BC/0/NewSOLR_Report.pdf, based on data from the Adult Literacy and Life Skills Survey 2003.

Figure 5 shows Canadian health literacy levels for ages 16–65 for 2003, compared with results from the U.S. The results find that Canadians have a greater level of health literacy than do the Americans, with 34.7% of Canadian adults having skills at level 3 and 10.6% of Canadian adults having skills at level 4/5. By contrast, 30.8% of American adults have skills at level 3, and 5.6% at level 4/5. However, 54.7% of Canadian adults, compared with 63.7% of U.S. adults do not have adequate levels of health literacy.

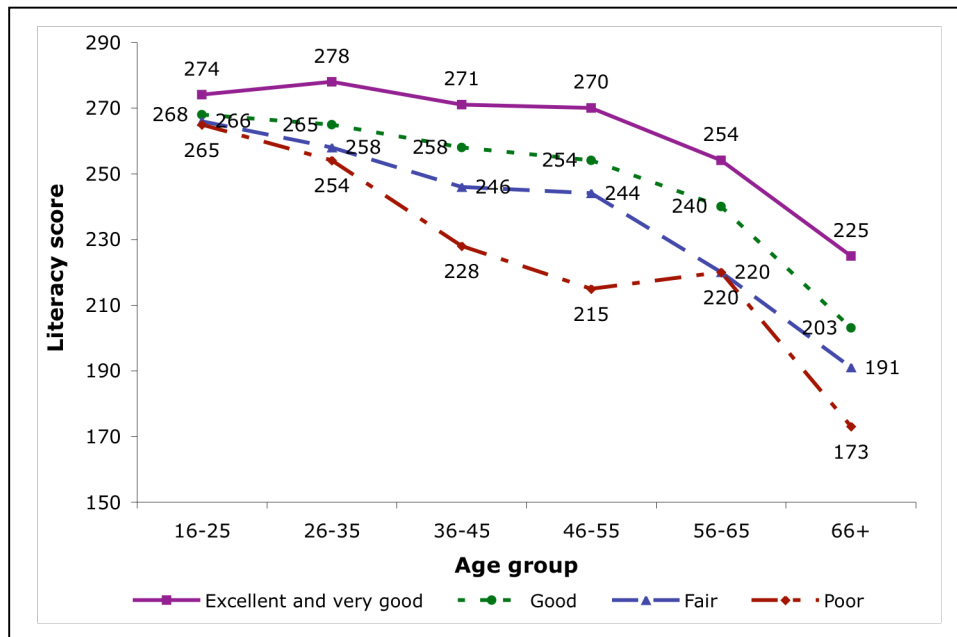
Figure 6. Percentage of Canadian respondents with health literacy levels from 0 to 5, by age group, 2003



Source: Canadian Council on Learning. *State of Learning in Canada: No Time for Complacency*, 2007; accessed January 2007; available from http://www.ccl-cca.ca/NR/rdonlyres/5ECA2E9-D5E4-43B9-94E4-84D6D31BC5BC/0/NewSOLR_Report.pdf, based on data from the Adult Literacy and Life Skills Survey 2003.

Figure 6 shows health literacy by age groups for 2003. The age group with the highest literacy is the 26–35 year old group, with 51% of those in this group having adequate health literacy skills. The level of literacy declines with each age group older than 35, with the lowest health literacy being found among those over the age of 65, with only 12% having adequate literacy skills. As the CCL notes, this is significant since seniors are the age group most likely to have ill health and to take medications, for which they need an adequate level of health literacy.

Figure 7. Health literacy scores of Canadian respondents, by age group and health status, 2003

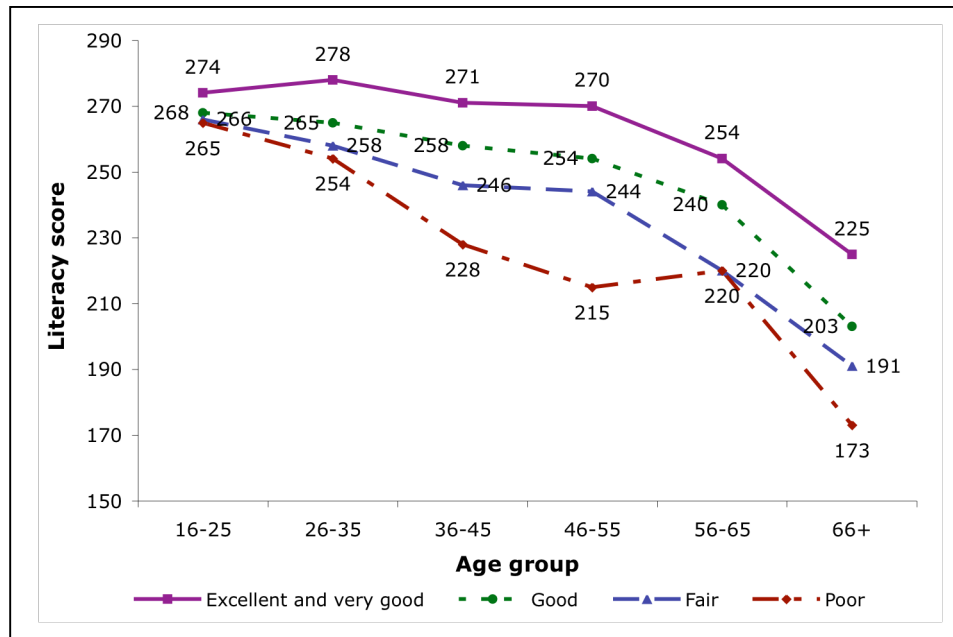


Source: Canadian Council on Learning. *State of Learning in Canada: No Time for Complacency*, 2007; accessed January 2007; available from http://www.ccl-cca.ca/NR/rdonlyres/5ECA2E9-D5E4-43B9-94E4-84D6D31BC5BC/0/NewSOLR_Report.pdf, based on data from the Adult Literacy and Life Skills Survey 2003.

Figure 7 shows health literacy as shown by literacy scores on the ALL, by age group and health status for 2003. It illustrates that people with the highest level of literacy tend to be in better health. As the CCL notes: “Those with the lowest health literacy skills are more than three times as likely to be in fair or poor health than those with the highest levels.”⁶⁵⁹ Of course, this correlation does not indicate that low health literacy skills cause ill health.

⁶⁵⁹ Canadian Council on Learning. *State of Learning in Canada: No Time for Complacency*, 2007; accessed January 2007; available from http://www.ccl-cca.ca/NR/rdonlyres/5ECA2E9-D5E4-43B9-94E4-84D6D31BC5BC/0/NewSOLR_Report.pdf. p. 51.

Figure 8. Health literacy scores of Canadian respondents, by age group and education level, 2003



Source: Canadian Council on Learning. *State of Learning in Canada: No Time for Complacency*, 2007; accessed January 2007; available from http://www.ccl-cca.ca/NR/rdonlyres/5ECA2E9-D5E4-43B9-94E4-84D6D31BC5BC/0/NewSOLR_Report.pdf, based on data from the Adult Literacy and Life Skills Survey 2003.

Figure 8 illustrates health literacy by age and education for 2003, according to the literacy scores received. Health literacy rises with the level of formal education attained, and those with a university education have the highest level of health literacy across all age groups, while those with less than a high school education have the lowest health literacy across all age groups.

As noted by the CCL, the consequences of the two trends shown in the figures—the decline in health literacy with age, and the increase in health literacy with education—contributes to a health literacy gap in the populace between those who are more educated with those who are less educated, which tends to become greater in older populations.⁶⁶⁰ This is a concern for seniors who need health literacy skills in order to make basic health-related decisions.

The CCL also notes that other groups lacking health literacy include those with very low incomes, Aboriginal Peoples, and recent immigrants with low levels of formal education and a mother tongue other than English or French.⁶⁶¹

⁶⁶⁰ Ibid., accessed.

⁶⁶¹ Ibid., accessed.

22.2.4 Specific health issue surveys

Public surveys on specific health issues are conducted by foundations and industries, often in connection with government organizations. For example, between 1988 and 1992, ten provincial heart health surveys were conducted as part of the Canadian Heart Health Initiative, which was a collaboration between provincial departments of health, Health Canada (at the time Health and Welfare Canada), the Heart and Stroke Foundation of Canada, and provincial heart and stroke foundations.⁶⁶² The surveys included knowledge and awareness of the causes and consequences of cardiovascular diseases and the associated risk factors. In a 2005 article, Petrella and Campbell argued that these surveys were the last Canadian population-based physical measures surveys that determined that hypertension in Canada was poorly managed.⁶⁶³ According to Petrella and Campbell, the results of the surveys showed:

Overall, respondents had a poor understanding of the consequences of high blood pressure or hypertension. The majority were unaware of the association between hypertension and heart disease (80%), heart attack (66%), kidney disease (98%), damage to blood vessels (95%) and premature death (74%). Respondents also had limited knowledge of lifestyle issues affecting hypertension, despite 44% indicating that they were overweight and 18% identifying themselves as smokers. Almost two-thirds (63%) thought hypertension had clearly identifiable signs or symptoms, although they believed that hypertension was not a serious medical condition.⁶⁶⁴

This work is ongoing. In 2004, the Canadian Heart Health Surveys Follow-up Study Research Team was awarded a five-year \$1.5 million New Emerging Team (NET) grant by the Canadian Institutes of Health Research (CIHR)—Institute of Nutrition, Metabolism, and Diabetes, in partnership with the Heart and Stroke Foundation of Canada, to study the individual and socio-environmental health risks of obesity.⁶⁶⁵

In 2001, Pfizer, Inc., often called “the world’s leading pharmaceutical company,” sponsored the GOAL (*G*lobal *O*pinion and *A*wareness of *C*holesterol) survey in seven countries, including Canada, France, Germany, the U.K., Italy, the Netherlands, and Spain, to examine attitudes and awareness levels about cholesterol and heart disease. In Canada, 1,000 people aged 18 and over were interviewed by telephone across the country. A press release, issued by Pfizer Canada, reported:

⁶⁶² MacLean, D.R., A. Petrasovits, M. Nargundkar, P.W. Connelly, E. MacLeod, A. Edwards, and P. Hessel. "Canadian Heart Health Surveys: A Profile of Cardiovascular Risk. Survey Methods and Data Analysis. Canadian Heart Health Surveys Research Group," *Canadian Medical Association Journal*, vol. 146, no. 11, 1992: 1969-1974.

⁶⁶³ Petrella, R.J., and N.R. Campbell. "Awareness and Misconception of Hypertension in Canada: Results of a National Survey," *Canadian Journal of Cardiology*, vol. 21, no. 7, 2005: 589-593.

⁶⁶⁴ Ibid. p. 589.

⁶⁶⁵ Queen's University. *Canadian Heart Health Surveys Follow-up Study*, 2004; accessed January 2007; available from <http://www.phe.queensu.ca/epi/chhs/>.

Overall, results from the survey reveal a general lack of knowledge around cholesterol-specific information [...]. Results show that overall, Canadians and Europeans have a similar understanding about the risks associated with high cholesterol. When asked to identify what diseases or medical problems may be caused by high cholesterol, only 50 per cent of Canadians and 58 per cent of global respondents identified heart disease. In addition, only 22 per cent of Canadians, and 20 per cent of global respondents identified stroke as a possible medical problem resulting from high blood levels of cholesterol.⁶⁶⁶

Ad hoc surveys such as these do not provide systematic data to indicate health literacy. However, they do point out the need to understand the level of health literacy in the populace.

22.2.5 New health literacy index

According to Ilona Kickbusch:

A health literacy index could become an important composite measure of the outcome of health promotion and prevention activities, could document the health competence and capabilities of the population of a given country, community or group and relate it to a set of health, social and economic outcomes.⁶⁶⁷

Irving Rootman and his colleagues are presently working on a project funded by CIHR to develop new measures of health literacy that are appropriate for different population groups in health promotion contexts.⁶⁶⁸ Rootman discussed this work during a roundtable discussion at the *Second Canadian Conference on Literacy and Health*, held in Ottawa in October 2004.⁶⁶⁹ Jim Frankish and Brenda Kwan are working with Rootman to develop the new health literacy measure in relation to use of health services, determinants of health, and quality of life—specifically appropriate to a Canadian context. Rootman, Frankish, and Kwan plan to test this measure first with older adults, immigrants, and people living in poverty. At the Literacy and Health conference, these researchers also discussed the contextual framework that will guide the measurement. Kwan added that the point of health information is to help people make decisions that will lead to positive actions and outcomes. Comments from other participants at the conference about the new measures of health literacy included concern that currently health information is seen as disease-specific, and is not provided in the broader context of determinants of health and

⁶⁶⁶ Pfizer Canada. *International Survey Finds Canadians Uncertain About Healthy Cholesterol Targets*, 2001; accessed January 2007; available from http://www.pfizer.ca/english/newsroom/press_releases/default.asp?s=1&year=2001&releaseID=62.

⁶⁶⁷ Kickbusch. "Health Literacy: Addressing the Health and Education Divide." p. 289.

⁶⁶⁸ Canadian Education Association (CEA). *Focus on Literacy: Research Profile: Irving Rootman*, CEA, 2005; accessed March 2005; available from <http://www.cea-ace.ca/foo.cfm?subsection=lit&page=map&subpage=bio&subsubpage=iro>.

⁶⁶⁹ Canadian Public Health Association (CPHA). "Staying the Course: Literacy and Health in the First Decade." Paper presented at the Second Canadian Conference on Literacy and Health, October 17-19, 2004, CPHA; accessed March 2005; available from <http://www.cpha.ca/literacyandhealth/about.html>.

healthy living.

Kickbusch recommends an indicator framework for health literacy ask questions such as: what defines the dominant health culture of a community? How is health knowledge sought out and shared within a community? How is knowledge built within a community?⁶⁷⁰ She also cites Nussbaum's argument that an indicator framework needs to take empowerment into consideration, and that capability, rather than functioning, better reflects what people are able to do or be in relation to their own health.⁶⁷¹ Kickbusch also notes: "Finding measures that reflect health literacy in terms of knowledge and in terms of the capabilities to act, solve problems and evaluate circumstances will be a challenge."⁶⁷²

Funded by the Canadian Institutes of Health Research (CIHR), Iraj Poureslami of the University of British Columbia, Rootman, et al. are also in the process of developing a web-based measurement tool to assess the health literacy of secondary students, which will be tested in British Columbia.⁶⁷³ According to Poureslami, et al.: "Such measures may be used as the basis for the development of standardized measures of health literacy for schools across Canada."⁶⁷⁴ The preliminary stage of the development included agreeing upon a definition of health literacy for school-age children, "the degree to which students are able to access, understand, evaluate and communicate basic health information." This basic definition is similar to definitions usually employed for the adult population, although not as comprehensive. Poureslami, et al. have also developed a series of standards related to health literacy skills that were classified as core and secondary.

Once such new measures of health literacy are developed and applied by Rootman, Frankish, Kwan, Poureslami and other researchers, and as soon as studies are available that do assess levels of health literacy in Canada, these results should be included in the educated populace domain of the Canadian Index of Wellbeing. Hopefully the need of the CIW for such measures will create the kind of demand that will spur further research in this important field. In the following section, we have chosen just one example—food and nutrition literacy—that not only affects population health directly, but also illustrates the importance of learning and education in enabling citizens to live their daily lives with awareness. The example also happens to illustrate the inadequacy of formal schooling structures in providing such education for daily life, and of conventional education indicators in capturing key characteristics of an educated populace.

⁶⁷⁰ Kickbusch. "Health Literacy: Addressing the Health and Education Divide."

⁶⁷¹ Nussbaum, Martha C. *Women and Human Development: The Capabilities Approach*, Cambridge, U.K.: Press Syndicate of the University of Cambridge, 2000.} cited in Kickbusch. "Health Literacy: Addressing the Health and Education Divide."

⁶⁷² Kickbusch. "Health Literacy: Addressing the Health and Education Divide." p. 293.

⁶⁷³ Poureslami, Iraj, Irving Rootman, Deborah Begoray, Jim Frankish, Joan Wharf Higgins, and Marjorie MacDonald. "Development of Measures of Health Literacy for Canadian Schools (Abstract)." Paper presented at the Today's Information for Tomorrow's Improvements, Victoria, B.C., February 15-18, 2007, Information Technology and Communications in Health (ITCH); accessed January 2007; available from <http://itch.uvic.ca/Program/Abstracts/Poureslami.pdf>.

⁶⁷⁴ Ibid.

23. Food and Nutrition Literacy

23.1 Introduction and definitions

Understanding the food we eat on a daily basis, and knowing the sources, ingredients, quality, and impacts of what we consume, is a very basic, ordinary, yet vital component of what it means to have an educated populace. Eating well and eating intelligently and with awareness are in turn key determinants of health and wellbeing. While food is one of the most basic elements of health and wellbeing, the need for education and awareness applies quite literally to all elements of consumption—including energy use, transportation, shelter, and all material possessions. Understanding the sources, origins, ingredients, and impacts of the goods and services we consume—in short, consuming with awareness—constitutes probably the most important objective of responsible lifelong and lifewide learning, and one of the most profound possible contributions to wellbeing. Indeed, that kind of learning and awareness may well be the best guarantor of movement towards sustainability.

Kim D. Raine of the University of Alberta notes that determinants of healthy eating, from a population health perspective are highly contextual and interconnected, and involve both individual and collective factors “that may be working ‘invisibly’ to structure food choice.”⁶⁷⁵ Specifically, she lists these determinants as individual determinants of personal food choice:

- physiological state
- food preferences
- nutritional knowledge
- perceptions of healthy eating
- psychological factors

Collective determinants of eating behaviour:

- the interpersonal environment created by family and peers
- the physical environment, which determines food availability and accessibility
- the economic environment, in which food is a commodity to be marketed for profit, including food advertising
- the social environment, including social status (income, education and gender)
- the cultural milieu
- public policies as promoting environments for healthy eating⁶⁷⁶

⁶⁷⁵ Raine, Kim D. "Determinants of Healthy Eating in Canada," *Canadian Journal of Public Health*, vol. 96, no. Supplement 3, 2005: S8-S14. p. S8.

⁶⁷⁶ Ibid. p. S8.

Raine suggests:

The promotion of healthy eating in Canada has significant implications for improving the health of populations, locally and globally [...]. Promoting and supporting healthy eating among Canadians, however, requires a comprehensive understanding of the multiple influences on eating behaviour and the interactions among these determinants.⁶⁷⁷

As noted above, one of the individual determinants of healthy eating is linked to nutritional knowledge. According to Lino, et al. of the U.S. Department of Agriculture's (USDA) Center for Nutrition Policy and Promotion: "People with more healthful diets generally have a greater store of nutritional information and are more aware of the links between poor diet and certain diseases."⁶⁷⁸ Using data from the U.S. Healthy Eating Index, Jayachandran Variyam and James Blaylock of the USDA note:

Many regard information and knowledge as the keys that will unlock the door to better diets and in turn better health, longer lives, and children with improved cognitive and learning abilities. We verify some of these observations with the finding that more nutrition knowledge leads to higher HEI [Healthy Eating Index] scores. Nutrition information affects overall diet quality, even after controlling for individual differences in a host of personal and household characteristics, including income, education, age, gender, race, ethnicity, smoking behavior, and body mass. The positive effects of higher incomes and education levels on diet quality are due to the greater nutrition knowledge that wealthier, more educated people possess. If this informational advantage were to disappear, for example, through nutrition-education targeted to low-income individuals or that starts early in childhood, then those with greater incomes or education may in fact have diets that are no better, or possibly poorer, than would people with lower incomes or education. This is because people with higher incomes or education may have a greater preference for convenience foods and food away from home that are often less nutritious. The strong link between nutrition knowledge and diet quality suggests a continued role for nutrition education efforts to close the persistent gap between actual and healthful diets.⁶⁷⁹

Nutrition literacy in Canada focuses mainly on the ability to read and understand nutrition literature, including labels, and understanding the nutritional content of food and its effect on health.⁶⁸⁰ However, as the Food Literacy project of the SOCRATES-GRUNDTVIG programme of the European Commission notes, nutritional literacy

⁶⁷⁷ Ibid. p. S8.

⁶⁷⁸ Lino, Mark, P. Peter Basiotis, Rajen S. Anand, and Jayachandran N. Variyam. "The Diet Quality of Americans: Strong Link with Nutrition Knowledge," *Family Economics and Nutrition Review*, vol. 12, no. 1, 1999: 49-51. p. 51.

⁶⁷⁹ Variyam, Jayachandran N., and James Blaylock. "Unlocking the Mystery between Nutrition Knowledge and Diet Quality," *Food Review*, vol. 21, no. 2, 1998: 21-28. p. 28.

⁶⁸⁰ McAmmond, Diane. *Food and Nutrition Surveillance in Canada: An Environmental Scan*, Health Canada, 2000; accessed January 2007; available from http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/surveill/environmental_scan_e.pdf.

includes cultural, social, emotional, personal, and practical factors that include, but go well beyond individual health concerns.⁶⁸¹ Because of the rising number of health issues contributed, in part, to poor nutritional understanding and habits, such as heart disease, diabetes mellitus, and obesity, understanding the relationship between nutrition and health is extremely important for a healthy populace. But also understanding, and critically evaluating, the connection of food production, safety, quality, and other factors that connect food with societal wellbeing and sustainability are crucial skills for an educated populace. As one example, the Food Literacy project points to the ecological dimension of food:

Everything we eat has, on its way from the field to the plate, an influence on the environment. It is a mutual relation, of course, since the condition of water, air, ground and climate also has an effect on food quality. Our nutrition system, ranging from burning fossil energy to the exploitation of natural resources, is responsible for a number of burdens on the environment: starting out from production (agriculture, keeping animals), through processing, packaging and transport, up to consumption in large and private households (storing, preparation, disposal) [...]. Conscious selection of foods can be a considerable contribution to the protection of nature. A way of nutrition and living that is compatible with the environment is an issue of personal preferences and also knowledge.⁶⁸²

The Food Literacy project of the European Commission, *Food Literacy—A New Horizontal Theme in Adult Education and Counselling*, defines food literacy holistically:

‘[F]unctional literacy’ comprises a whole package of technical and social competences that people need to organize their life in society by having equal rights, being active and responsible. It is in such a context that we would like to place “food literacy” as a term and content of education.

Food Literacy is the ability to organize one’s everyday nutrition in a self-determined, responsible and enjoyable way [...].

According to the guideline of ‘sustainable development’, a number of big challenges for society are connected with the field of nutrition. Dealing with nutrition in a competent way is, therefore a major element of basic education for the future. Food literacy must be regarded as part of ‘basic education’ in the way it is defined and demanded in the ‘Memorandum on Lifelong Learning’ by the European Commission.⁶⁸³

⁶⁸¹ Schnögl, Sonja, Rosemarie Zehetgruber, Silvia Danninger, Monika Setzwein, Regina Wenk, Madlen Freudenberger, Claudia Müller, and Maike Groeneveld. *Savoury Dishes for Adult Education and Counselling. Food Literacy Guidelines and Toolbox*, Vienna, Austria, SOCRATES-GRUNDTVIG programme of the European Commission: Food Literacy - A New Horizontal Theme in Adult Education and Counselling, BEST Institut für berufsbezogene Weiterbildung und Personaltraining, 2006; accessed January 2007; available from http://www.food-literacy.org/opencms/opencms/system/galleries/download/FL-public/FL_guidelines_en.pdf.

⁶⁸² Ibid., accessed. p. 28, 30.

⁶⁸³ Ibid., accessed.

In terms of the basic definition of food literacy as “the ability to organize one’s everyday nutrition in a self-determined, responsible and enjoyable way,” the Food Literacy project proposes that food literacy is “not about making people follow current nutrition requirements.”⁶⁸⁴ Rather, the key terms of organizing one’s everyday nutrition point to a more holistic understanding, including self-determination, responsibility, and enjoyability:

Self-determination implies:

- awareness of one’s own nutritional behaviour
- knowing about the social, cultural and historic influences on eating habits and understanding their respective effects
- having enough knowledge of nutrition and food in order to be able to critically question statements given in the media and made by experts
- knowing one’s personal nutritional needs
- relating to nutrition in a way that enhances one’s health

Responsibility implies:

- understanding the effect of nutrition on one’s health condition, the environment and society as a whole, and understanding the respective connections between them
- knowing about food production, processing, transport and disposal
- being informed about the composition of food and having the ability to judge its quality
- being able to select appropriate products within the framework of one’s personal budget
- making decisions as a consumer that are quality-oriented and effectively develop one’s style of living

Enjoyability implies:

- realizing that conscious perception using all the senses and a varied experience of taste is a condition of enjoyment
- appreciating cooking and eating as an aspect enriching everyday life
- regarding dealing with food as an elementary part of human culture
- being open to other culinary cultures⁶⁸⁵

Canadian researcher Kim Travers (now Kim Raine) criticizes nutritional education and research for its lack of focus on the social and environmental issues related to nutrition. She notes: “Nutrition education’s traditional (but changing) emphasis on individualistic behaviour change strategies negates the role of social context in shaping behaviour, and thus implies a separation of people and their environment.”⁶⁸⁶ Travers quotes George Kent on the subject: “[N]utritional literacy means more than knowing technical aspects of

⁶⁸⁴ Ibid., accessed. p. 12.

⁶⁸⁵ Ibid., accessed.

⁶⁸⁶ Travers, Kim D. "Nutrition Education for Social Change: Critical Perspective," *Journal of Nutrition Education*, vol. 29, no. 2, 1997: 57-62. p. 58.

nutrition [...]. The teaching of nutrition should include examination of the work which generates nutritional problems.”⁶⁸⁷ Travers calls for “education that raises consciousness of the social roots of nutrition problems.”⁶⁸⁸

In a 2005 special issue of the *Canadian Journal of Public Health*, “Understanding the Forces that Influence Our Eating Habits: What We Know and What We Need to Know,” Frank and Finegood of the Canadian Institutes of Health Research note that a comprehensive research agenda on nutrition is needed in Canada:

While the focus has largely been at the individual level (e.g., knowledge of *Canada’s Food Guide to Healthy Eating*), we need also to further understand the social, cultural and environmental determinants of healthy eating that operate at the community / neighbourhood, regional, national / provincial / territorial levels and in whole societies. These include, for example, the impacts of globalization and how it affects our food supply [...]. This evidence base is also needed to inform the policies and programs that have a significant effect on the health and lives of *all* Canadians, regardless of their income, education or ethnicity, or of the places in which they work, live, play and learn.⁶⁸⁹

Mary Bush of Health Canada, in the same issue of the *Canadian Journal of Public Health*, comments: “As we look at the issue of healthy eating within a broad population health framework, we need to challenge ourselves to consider alternative and new frameworks, to work across sectors and with other disciplines.”⁶⁹⁰

The learning outcomes from the food literacy project listed above are important prerequisites needed to translate knowledge into healthy social outcomes—social outcomes that include the food security of low-income populations, as well as the healthy behaviours of the entire populace, not only on an individual level, but also on the political, corporate, and community levels.

23.1.1 Data sources

Canada is a long way from developing holistic indicators for food and nutrition literacy that would measure learning outcomes such as those suggested by the Food Literacy project. Although knowledge of these important subjects is generally not assessed in the standardized tests that are used as the basis for most conventional education indicators,

⁶⁸⁷ Kent, George. "Nutrition Education as an Instrument of Empowerment," *Journal of Nutrition Education*, vol. 20, 1988: 193-195. p. 194, cited in Travers. "Nutrition Education for Social Change: Critical Perspective." p. 61.

⁶⁸⁸ Travers. "Nutrition Education for Social Change: Critical Perspective." p. 61.

⁶⁸⁹ Frank, John, and Diane Finegood. "Foreword from the Canadian Institutes of Health Research. Understanding the Forces That Influence Our Eating Habits. What We Know and Need to Know," *Canadian Journal of Public Health*, vol. 96, no. Supplement 3, 2005: S5. p. S5.

⁶⁹⁰ Bush, Mary. "Foreword from Health Canada. Understanding the Forces That Influence Our Eating Habits. What We Know and Need to Know," *Canadian Journal of Public Health*, vol. 96, no. Supplement 3, 2005: S4. p. S4.

the sparse evidence that does exist indicates that the general public has very little understanding of social, ecological, and economic food issues, including how its food is produced. Diane McAmmond, in a report written for Health Canada calling for a comprehensive national nutrition survey, notes that “Canada has never had a systematic program of national food and nutrition surveillance.”⁶⁹¹ In addition, she notes:

In 1996, Canada produced *Nutrition for Health: An Agenda for Action*, a national strategy developed through multisectoral collaboration. This Agenda for Action was endorsed by the Ministers of Health Canada and Agriculture and Agri-Food Canada. It includes a strategic direction to support nutrition research, with a key action being development of a national database on relevant indicators affecting nutritional health. Surveillance activities are critical to development of such a database. But to date, little has been done to put the necessary surveillance system in place.⁶⁹²

The *Nutrition for Health: An Agenda for Action* report discusses nutrition in terms of the social determinants of health, which influence the nutritional health of the populace, within the population health framework.⁶⁹³ The report recommends 16 core indicators, which are mainly health outcome indicators. However, it does include an indicator for “nutrition awareness / attitudes.”⁶⁹⁴ Such an indicator would certainly be useful to include in the Canadian Index of Wellbeing.

McAmmond provided a comprehensive list of all Canadian data sources that have any relationship to nutrition. All of the provinces conducted nutrition surveys in partnership with Health Canada between 1990 and 1999.⁶⁹⁵ However, in a report on the Ontario Food Survey, Mendelson, et al. note that although the surveys employed a common protocol, the “differences in the timing and response rates of these surveys affect the interpretation of results across provinces”; and because of the differences in response rates, “survey findings cannot be considered representative of the population” for some provinces, especially Saskatchewan and Ontario.⁶⁹⁶ Health Canada also notes:

Because the food supply and food habits can change over time, data from the provincial surveys cannot be used to obtain a clear understanding of the nutrient intakes of Canadians as a whole, or to make meaningful comparisons among provinces.⁶⁹⁷

⁶⁹¹ McAmmond. *Food and Nutrition Surveillance in Canada: An Environmental Scan*, accessed. p. iii.

⁶⁹² Ibid., accessed. p. 15.

⁶⁹³ Health Canada. *Nutrition for Health: An Agenda for Action*, 1996; accessed July 2006; available from http://www.hc-sc.gc.ca/fn-an/nutrition/pol/nutrition_health_agenda-nutrition_virage_sante_e.html.

⁶⁹⁴ Ibid., accessed.

⁶⁹⁵ McAmmond. *Food and Nutrition Surveillance in Canada: An Environmental Scan*, accessed.

⁶⁹⁶ Mendelson, Rena, Valerie Tarasuk, Janet Chappell, Helen Brown, and G. Harvey Anderson. *Report of the Ontario Food Survey (from the 1997/98 Survey)*, Ontario Ministry of Health, Health Canada, Ryerson University, and the University of Toronto, 2003; accessed July 2006; available from http://www.ryerson.ca/~foodnut/facultyandstaff/Ontario_Food_Survey_Report_June_2003.pdf. p. 14.

⁶⁹⁷ Health Canada. *Canadian Community Health Survey. Cycle 2.2, Nutrition (2004). A Guide to Accessing and Interpreting the Data*, 2006; accessed January 2007; available from http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/cchs_guide_escc_e.html.

In 2004, Statistics Canada conducted the Canadian Community Health Survey, which focused on nutrition.⁶⁹⁸ Prior to this, the only other national level nutrition survey, the Nutrition Canada Survey, was conducted between 1970 and 1972.⁶⁹⁹ However, the focus of all of these surveys, both national and provincial, is limited mainly to dietary intake and eating patterns, health conditions, and household food insecurity, although there are a few knowledge-related questions, such as those related to beliefs about risk factors for disease and high fat foods.

Verginia Mintcheva, of the International Institute for Industrial Environmental Economics at Lund University in Sweden, is working on a pilot program to develop integrative indicators to evaluate the food system as a whole.⁷⁰⁰ She reports that food packaging, processing, and shopping are “hot spots” in the chain, as well as the length of refrigeration time, which has the largest effect on energy use.⁷⁰¹ Indicators using such a life cycle approach, when developed by Mintcheva and others, will be very useful for the ecosystem domain of the Canadian Index of Wellbeing. Mintcheva’s proposed integrative indicators could be an outstanding learning and educational tool, which could be used to provide a more holistic understanding of production and consumption processes than is taught in most specialized school curricula.

This literature review has found only one consistent, national series of surveys that contain significant knowledge elements needed to indicate the nutritional literacy of Canadian adults. In 1989, the National Institute of Nutrition (NIN), in partnership with the Canadian Food Information Council (CFIC) and Health Canada, initiated a series of national surveys to track Canadian adults’ self-reported knowledge, attitudes, and behaviours with respect to food and nutrition.⁷⁰² The NIN notes that the interplay between knowledge, attitudes, and behaviours is “the key to understanding changes in nutrition in Canada.”⁷⁰³ Since 1989, there have been five additional *Tracking Nutrition Trends* (TNT) surveys, conducted in 1994, 1997, 2001, 2004, and 2006. The last survey was conducted by the Canadian Council of Food and Nutrition (CCFN), which was created in 2004 through a merger between NIN and the CFIC. Since these are the only consistent Canadian surveys conducted over a period of time that include a series of knowledge questions concerning food and nutrition, we have used them below to populate the indicators for food and nutrition literacy. While these surveys are not comprehensive, they do contain information, in part, on self-reported knowledge of

⁶⁹⁸ Statistics Canada. *Canadian Community Health Survey - Nutrition*, 2004; accessed July 2006; available from <http://www.statcan.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5049&lang=en&db=IMDB&dbg=f&adm=8&dis=2>.

⁶⁹⁹ McAmmond. *Food and Nutrition Surveillance in Canada: An Environmental Scan*, accessed.

⁷⁰⁰ Mintcheva, Verginia. "Indicators for Environmental Policy Integration in the Food Supply Chain: The Case of the Tomato Ketchup Supply Chain and the Integrated Product Policy," *Journal of Cleaner Production*, vol. 13, 2005: 717-731.

⁷⁰¹ Ibid.

⁷⁰² National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfm.ca/pdfs/TNTV-FINAL.pdf>.

⁷⁰³ Ibid., accessed. p. 15.

nutrition, sources of nutrition information, and knowledge of nutrition labels, food safety, and food quality.

Each survey cycle interviewed approximately 2000–2400 Canadians, 18 years of age or older; is nationally representative; builds on previous surveys; and expands the focus by incorporating new, current concerns. For example, the original survey in 1989 focused on fat and fibre, while later surveys expand the focus to “identify a wider range of factors influencing consumer food selection,” such as Omega-3 and trans fats.⁷⁰⁴ In order to keep the surveys a manageable length, some questions from previous surveys were dropped and others were added. In addition, in 2001, for certain questions, the rating scale was changed to reflect the change from personal interviews to telephone interviews. Therefore, direct comparisons with responses from previous years’ surveys cannot be made for some questions.⁷⁰⁵

⁷⁰⁴ National Institute of Nutrition, and Canadian Food Information Council. "Tracking Nutrition Trends, 1989-1994-1997-2001," *Rapport*, vol. 17, no. 1, 2002; accessed July 2006; available from <http://www.ccfm.ca/pdfs/rap-vol17-1.pdf> p. 7.

⁷⁰⁵ Ibid. p. 2.

23.2 Knowledge and understanding of nutrition

23.2.1 Self-rated knowledge of nutrition

According to the National Institute of Nutrition (NIN) and the Canadian Food Information Council (CFIC), self-rated knowledge is a good predictor of knowledge about nutrition, and “is a strong driver of nutrition related decisions and lifestyle choices.” They note, for instance: “Those who say they are very knowledgeable are more likely to answer questions about nutrition correctly.”⁷⁰⁶ As an example, they point out that “people who think that they are very knowledgeable about nutrition are more likely to agree that some types of dietary fibre can reduce cholesterol in the blood.”⁷⁰⁷

Self-rated knowledge of nutrition has been tracked in the TNT since 1997. Although the question is consistent in the surveys since then (How knowledgeable would you say you are about nutrition? Would you say you are [...]),⁷⁰⁸ the answer categories changed in 2001. In 1997 the categories were: extremely or very knowledgeable (33% of respondents), quite knowledgeable (43%), slightly knowledgeable (20%), and not at all knowledgeable (4%).⁷⁰⁹ In 2001, these categories were changed to: very knowledgeable, somewhat knowledgeable, not very knowledgeable, and not at all knowledgeable.⁷¹⁰ The NIN and CFIC note that this change in wording may be responsible for the change in results. Therefore we have excluded 1997 results from Figure 9 below.

Results found in Figure 9 show that the majority of Canadians feel that they are somewhat knowledgeable, and a considerable portion of adults feel they are very knowledgeable.

⁷⁰⁶ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed. p. 18.

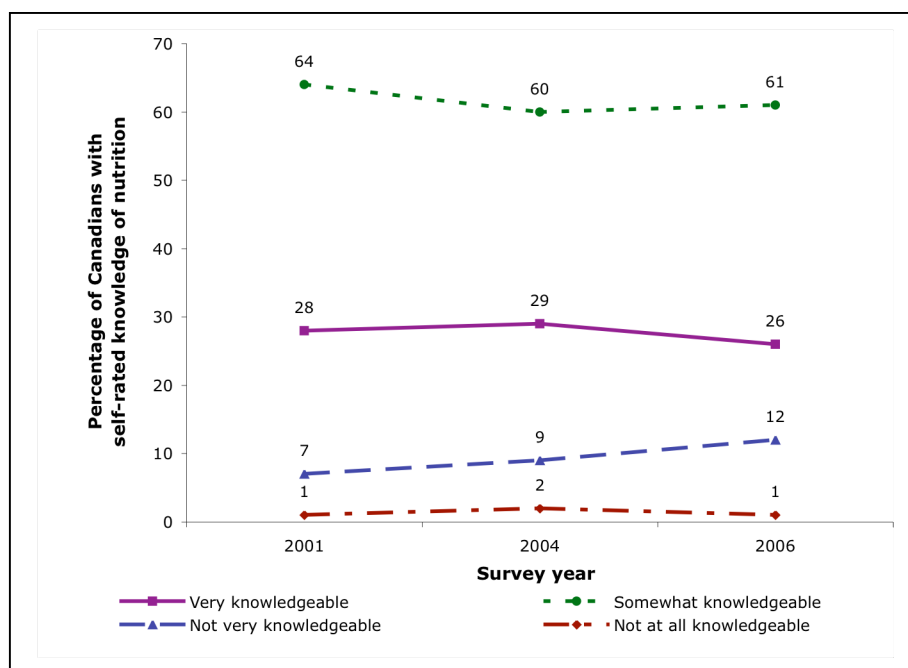
⁷⁰⁷ Ibid., accessed. p. 4.

⁷⁰⁸ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions, 2001*, Ottawa: National Institute of Nutrition, 2002.

⁷⁰⁹ National Institute of Nutrition, and Canadian Food Information Council. "Tracking Nutrition Trends, 1989-1994-1997-2001."

⁷¹⁰ Ibid.

Figure 9. Self-rated knowledge of nutrition, Canadian adults age 18 and over, 2001, 2004, and 2006



Question: How knowledgeable would you say you are about nutrition? Would you say you are very knowledgeable, somewhat knowledgeable, not very knowledgeable, or not at all knowledgeable?

Sources: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfh.ca/pdfs/TNTV-FINAL.pdf>; Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

However, as illustrated in Table 10, when disaggregated, results show that women, older Canadians, and those with higher levels of education state that they have a higher level of nutritional knowledge. In 2001, of the total adults, 30% of women, compared to 25% of men stated that they were “very knowledgeable” about nutrition. In 2004, of the total adults, 35% of women, compared to 22% of men stated that they were “very knowledgeable” about nutrition. And in 2006, of the total adults, 31% of women, compared to 20% of men, stated that they were “very knowledgeable” about nutrition.

The percentage of those who state they are “very knowledgeable” also rises with age: in 2001, from 22% of 18–24 year olds to 27% of 65+ year olds; in 2004, from 22% of 18–24 year olds to 34% of 65+ year olds; and in 2006, from 18% of 18–24 year olds to 28% of 65+ year olds, which shows a slight decline in those adults who consider themselves as very knowledgeable.

These relationships are not as clear in the “somewhat knowledgeable” responses—in 2001, 64% of women report being “somewhat knowledgeable,” whereas 65% of men report the same. In addition 67% of youth ages 18–24 report being “somewhat

knowledgeable,” while 63% of seniors report the same. In 2004, 59% of women report being “somewhat knowledgeable,” whereas 62% of men report the same. In addition 63% of youth ages 18–24 report being “somewhat knowledgeable,” while 60% of seniors report the same. In 2006, 60% of women report being “somewhat knowledgeable,” whereas 62% of men report the same. In addition 67% of youth ages 18–24 report being “somewhat knowledgeable,” while 56% of seniors report the same. However, these responses might demonstrate a lack of confidence in one’s nutritional knowledge, rather than lack of knowledge, per se.

In 2001, the disaggregated results for education are not given in detail in the NIN report, and are therefore not included in Table 10. In that year, however, the NIN noted:

Consumers with higher education and / or incomes consistently tend to rate their knowledge of nutrition higher, with 94% of university graduates rating themselves as very or somewhat knowledgeable. The comparable number among people with high school education or less is significantly smaller (89%).⁷¹¹

Results from 2004 and 2006 find that the percentage of respondents who report they are “very knowledgeable” also rises with the level of educational attainment. In 2004, 22% of those with less than a high school education state they are very knowledgeable, compared with 44% of those with post-university education reporting the same. In 2006, 21% of those with less than a high school education state they are very knowledgeable, compared with 38% of those with post-university education reporting the same.

⁷¹¹ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions, 2001*.

Table 10. Self-rated knowledge of nutrition, Canadian adults age 18 and over, by gender, age, and education, 2001, 2004, and 2006

Response	Year of survey	Total	Gender		Age			
			Men	Women	18-24	25-44	45-64	65+
Very knowledgeable	2001	28	25	30	22	-	-	27
	2004	29	22	35	22	27	32	34
	2006	26	20	31	18	22	32	28
Somewhat knowledgeable	2001	64	65	64	67	-	-	63
	2004	60	62	59	63	62	58	60
	2006	61	62	60	67	65	57	56
Not very/not at all knowledgeable	2001	8	10	6	11	-	-	10
	2004	11	16	6	15	11	10	7
	2006	13	18	9	16	12	12	16

Response	Year of survey	Total	Education, 2004, 2006					
			Some high school	High school	Some Post Secondary	Technical College	University	Post Graduate
Very knowledgeable	2004	29	22	24	31	29	31	44
	2006	26	21	15	28	25	32	38
Somewhat knowledgeable	2004	60	59	65	57	63	63	49
	2006	61	55	65	63	63	61	56
Not very/not at all knowledgeable	2004	11	19	11	13	9	6	7
	2006	13	23	20	9	12	6	6

Question: How knowledgeable would you say you are about nutrition? Would you say you are very knowledgeable, somewhat knowledgeable, not very knowledgeable, or not at all knowledgeable?

Note: In 2001, the NIN did not report disaggregated results for education. Also, only age categories for 18–24 year olds and 65+ are comparable with later years. The other age categories in 2001 are ages 25–34, 35–44, 45–54, and 55–64. In 2004 and 2006, the categories reported for these age groups are 25–44 and 45–64.

Sources: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfh.ca/pdfs/TNTV-FINAL.pdf>. and Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

23.2.2 Public understanding of nutrition

The NIN and CFIC compared self-related knowledge with specific answers to knowledge questions, noting:

Self-reported knowledge is, however, reliant on good self-assessments. In order to better understand knowledge of nutrition, we asked people to agree or disagree with eight nutrition related statements. The statements cover a range of areas including some that have recently received fairly high levels of media attention, such as trans fatty acids. In seven of the cases, we also have trend information available from the 1989, 1994 and 1997 surveys. The results suggest some awareness of the basics of nutrition but also clear areas of uncertainty, particularly when it comes to the role of trans fatty acids in the diet.⁷¹²

The TNT surveys tested public understanding of nutrition through responses to the eight statements mainly about fats and cholesterol. Respondent were asked whether they agreed (strongly or somewhat), disagreed (strongly or somewhat), or neither agreed nor disagreed (or do not know) with the statements. Results shown below sum the responses to present “agreed, disagreed, and do not know.”

Table 11 shows the statements and responses for 1989–2006. Results from 2001 are excluded since they were not included in the report from 2001.⁷¹³ Results show that most Canadians do understand these nutritional issues, and responses have remained stable over the 15-year period of the TNT surveys. For example, most people understand that “a high fibre diet may help prevent colon cancer.”⁷¹⁴ However, the responses to three statements are consistently incorrect in all years, suggesting that Canadians have not learned that the amount of cholesterol people eat is not a major factor that affects their blood cholesterol, that “margarine contains the same amount of fat as butter,” and that “trans fatty acids have about the same role in the diet as do saturated fat.”⁷¹⁵ In 2004, the NIN and CFIC noted:

Despite the fairly high profile of trans fatty acids in media coverage over the past six months, Canadians do not fully understand their role in a person’s diet. Trans fat was introduced in foods as a replacement for saturated fat. Trans fat has since been found to be similar to saturated fat in that consumption of it can increase the risk of heart disease.⁷¹⁶

⁷¹² National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed.

⁷¹³ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions*, 2001.

⁷¹⁴ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

⁷¹⁵ Ibid.

⁷¹⁶ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed. p. 29.

As shown in Table 11, in 2006, because of “the significant changes to margarine in the past decade,”⁷¹⁷ the statement “[m]argarine contains the same amount of fat as butter,” was dropped and replaced with two additional statements: “[n]on-hydrogenated or soft margarine contains less fat than butter,” and “[h]ard, stick margarine is better for you than soft margarine.” The results show that Canadians are confused on these issues. Over half (52%) of adults think that non-hydrogenated or soft margarine contains less fat than butter. And, only 36% of adults were correct in disagreeing with the statement: “Hard, stick margarine is better for you than soft margarine,” but 64% of adults either did not know (45%), or answered incorrectly (19%).

Also, two additional statements were added in 2006: “The glycemic index ranks carbohydrate foods on how they affect our blood glucose levels,” and “Omega-3 fatty acids are essential to a healthy diet.” The majority of adults (62%) responded correctly to the glycemic index statement, but 17% of adults answered incorrectly, and 21% said they did not know. The majority of adults also had a good understanding of omega-3 fatty acids, with 80% of adults responding correctly.

Table 11. Percentage of Canadian adults age 18 and over who are correctly informed, misinformed, or uninformed about nutrition knowledge statements, 1989–2006

Statements and responses	Year of survey				
	1989	1994	1997	2004	2006
A high fibre diet may help prevent colon cancer. (T)					
% agree*	75	80	77	80	83
% disagree	20	5	4	5	5
% do not know	5	15	19	15	12
Reducing fat in the diet can lower cholesterol in the blood. (T)					
% agree*	86	91	89	81	86
% disagree	5	5	5	10	6
% do not know	9	4	6	9	8
Some types of dietary fibre can help reduce cholesterol in your blood. (T)					
% agree*	74	76	73	76	76
% disagree	6	8	8	6	5
% do not know	20	16	19	18	19
The amount of cholesterol people eat is the major factor that affects their blood cholesterol. (F)					
% agree	73	69	66	70	72

⁷¹⁷ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

Statements and responses	Year of survey				
	1989	1994	1997	2004	2006
% disagree*	12	22	20	20	19
% do not know	15	9	14	10	9
Trans fatty acids have about the same role in the diet as does saturated fat. (T); 2006 question changed to: Trans fatty acids have the same effect as saturated fat. (T)					
% agree*	-	22	25	36	34
% disagree	-	16	17	33	33
% do not know	-	62	58	31	33
Most Canadians have enough antioxidant vitamins in their diet. (F)					
% agree		20	21	24	-
% disagree*		34	34	54	-
% do not know		46	45	22	-
All carbohydrates are bad for you. (F)					
% agree	-	-	-	15	-
% disagree*	-	-	-	74	-
% do not know	-	-	-	11	-
Margarine contains the same amount of fat as butter. (T) (In 2006 this statement was replaced by two different ones; see below)					
% agree*	-	50	47	36	-
% disagree	-	42	40	48	-
% do not know	-	8	13	16	-
In 2006, the following two statements replaced: Margarine contains the same amount of fat as butter (T)					
Non-hydrogenated or soft margarine contains less fat than butter. (F)					
% agree	-	-	-	-	52
% disagree*	-	-	-	-	25
% do not know	-	-	-	-	23
Hard, stick margarine is better for you than soft margarine. (F)					
% agree	-	-	-	-	19
% disagree*	-	-	-	-	36
% do not know	-	-	-	-	45
The following two statements were added in 2006:					
The glycemic index ranks carbohydrate foods on how they affect our blood glucose levels. (T)					
% agree*	-	-	-	-	62
% disagree	-	-	-	-	6
% do not know					32
Omega-3 fatty acids are essential to a healthy diet. (T)					

Statements and responses	Year of survey				
	1989	1994	1997	2004	2006
% agree*	-	-	-	-	80
% disagree	-	-	-	-	6
% do not know	-	-	-	-	14

Note: (T) and (F) indicate whether the statement is true or false; * indicates the correct response; 2001 results were not given by the NIN;

Categories for agree are combined from those who strongly agree and somewhat agree.

Categories for disagree are combined from those who strongly disagree and somewhat disagree.

Categories for do not know are combined from neither agree nor disagree, and who do not know.

Question: I will read you some statements. Please tell me whether you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree or strongly disagree with each of the following statements.

Sources: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfm.ca/pdfs/TNTV-FINAL.pdf>.
National Institute of Nutrition. *Tracking Nutrition Trends, 1989-1994-1997*, Ottawa, National Institute of Nutrition, 1997; accessed July 2006; available from <http://www.ccfm.ca/pdfs/Canadian%20Nutrition%201997.pdf> and
Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

In Table 12, the statements and responses of the total adult population for 2004 and 2006, shown in Table 11, are compared with responses to the self-rated knowledge nutrition question, shown in Figure 9. Results find that, in general, those who rate their knowledge of nutrition as “very knowledgeable” consistently give the correct response to the statement, while those who rate themselves as “not very” or “not at all knowledgeable” do not give the correct response as often. However, this pattern is not the same for the three questions that all adults consistently answered incorrectly, although those who rated themselves as very knowledgeable did respond to the statements accurately more often than did those who said they were not knowledgeable. For example, in 2006, for the incorrect statement “[t]he amount of cholesterol people eat is the major factor that affects their blood cholesterol,” only 19% of adults responded correctly, but 25% who said they were very knowledgeable responded to the question correctly. The percentage of those who answered that they were very knowledgeable and responded correctly to this statement (25%) was still higher for this statement than the percentage of those who said they were not knowledgeable and answered correctly (12% of adults). These results were very similar in 2004.

In 2004, only 36% of adults gave the correct response (agree) to the statement “[m]argarine contains the same amount of fat as butter,” while 48% gave an incorrect response. People who claimed to be very knowledgeable are divided on this statement, with 48% giving the incorrect response (disagree) and 40% answering correctly (agree). Of those who stated they were not knowledgeable, 41% answered incorrectly, and 35%

answered correctly. This statement was replaced in 2006 by two new statements: “Non-hydrogenated or soft margarine contains less fat than butter,” and “Hard, stick margarine is better for you than soft margarine.” On both statements, the majority of respondents either answered incorrectly or did not know. For the former statement, 25% of adults responded correctly, and for the latter, 36% responded correctly. Also, for the former statement, 33% who said they were very knowledgeable answered correctly, and for the latter statement, 42% who said they were very knowledgeable answered correctly.

The final statement about which there was confusion was “Trans fatty acids have about the same role in the diet as do saturated fat.” In 2006, of the total respondents, 34% answered correctly, 33% answered incorrectly, and 31% did not know. In 2006, of those who rated their knowledge highly, 40% answered correctly, while 39% did not, and 21% did not know. Of those who did not rate their level of knowledge highly, 26% answered correctly, 25% answered incorrectly, and 49% did not know. In this case, those who claimed to be very knowledgeable actually were particularly likely to answer incorrectly. In 2004, responses were almost identical to those 2006.

Table 12. Percentage of Canadian adults age 18 and over who are correctly informed, misinformed, or uninformed about nutrition knowledge statements compared with their self-rated knowledge of nutrition, 2004 and 2006

Response	2004 Total	Self-rated knowledge of nutrition, 2004			2006 Total	Self-rated knowledge of nutrition, 2006		
		Very	Some- what	Not at all/ not very		Very	Some- what	Not at all/ not very
A high fibre diet may help prevent colon cancer. (T)								
% agree*	80	88	81	57	83	89	84	68
% disagree	5	5	5	8	5	5	4	8
% do not know	15	7	14	35	12	6	12	24
Reducing fat in the diet can lower cholesterol in the blood. (T)								
% agree*	81	83	82	74	86	86	87	82
% disagree	10	10	9	12	6	7	6	5
% do not know	9	7	9	14	8	7	7	13
Some types of dietary fibre can help reduce cholesterol in your blood. (T)								
% agree*	76	83	74	68	76	82	76	65
%	6	5	6	6	5	6	5	7

Response	2004 Total	Self-rated knowledge of nutrition, 2004			2006 Total	Self-rated knowledge of nutrition, 2006		
		Very	Some- what	Not at all/ not very		Very	Some- what	Not at all/ not very
disagree								
% do not know	18	12	20	26	19	12	19	28
Most Canadians have enough antioxidant vitamins in their diet. (F)								
% agree	24	21	25	29	-	-	-	-
% disagree*	54	66	51	34	-	-	-	-
% do not know	22	13	24	37	-	-	-	-
All carbohydrates are bad for you. (F)								
% agree	15	14	15	20	-	-	-	-
% disagree*	74	80	75	58	-	-	-	-
% do not know	11	6	10	22	-	-	-	-
The glycemic index ranks carbohydrate foods on how they affect our blood glucose levels. (T)								
% agree*	-	-	-	-	62	76	60	44
% disagree	-	-	-	-	6	6	6	9
% do not know	-	-	-	-	32	18	34	47
Omega-3 fatty acids are essential to a healthy diet. (T)								
% agree*	-	-	-	-	80	88	81	62
% disagree	-	-	-	-	6	7	5	9
% do not know	-	-	-	-	14	5	14	29
The amount of cholesterol people eat is the major factor that affects their blood cholesterol. (F)								
% agree	70	68	71	69	72	67	74	75
% disagree*	20	24	19	14	19	25	18	12
% do not know	10	8	10	17	9	8	8	13
Margarine contains the same amount of fat as butter. (T) (Replaced in 2006 by the following two statements.)								
% agree*	36	40	33	35	-	-	-	-
%	48	48	49	41	-	-	-	-

Response	2004 Total	Self-rated knowledge of nutrition, 2004			2006 Total	Self-rated knowledge of nutrition, 2006		
		Very	Some- what	Not at all/ not very		Very	Some- what	Not at all/ not very
disagree								
% do not know	16	12	18	24	-	-	-	-
Non-hydrogenated or soft margarine contains less fat than butter. (F)								
% agree	-	-	-	-	52	49	53	53
% disagree*	-	-	-	-	25	33	23	21
% do not know	-	-	-	-	23	18	24	26
Hard, stick margarine is better for you than soft margarine. (F)								
% agree	-	-	-	-	19	18	18	21
% disagree*	-	-	-	-	36	42	33	32
% do not know	-	-	-	-	45	40	49	47
Trans fatty acids have about the same role in the diet as do saturated fat. (T) 2006 statement changed to: Trans fatty acids have the same effect as saturated fat. (T)								
% agree*	36	37	36	32	34	40	33	26
% disagree	33	42	31	19	33	39	33	25
% do not know	31	21	33	49	33	21	34	49

Note: Statements that are true are marked (T): statements that are false are marked (F); Cells marked with – indicate the statement was not used in that year. * indicates the correct response;

Categories for agree are combined from those who strongly agree and somewhat agree.

Categories for disagree are combined from those who strongly disagree and somewhat disagree.

Categories for do not know are combined from neither agree nor disagree, and who do not know.

Question: Q.14 I will read you some statements. Please tell me whether you strongly agree somewhat agree, neither agree nor disagree, somewhat disagree or strongly disagree with each of the following statements.

Sources: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfm.ca/pdfs/TNTV-FINAL.pdf>.

National Institute of Nutrition. *Tracking Nutrition Trends, 1989-1994-1997*, Ottawa, National Institute of Nutrition, 1997; accessed July 2006; available from <http://www.ccfm.ca/pdfs/Canadian Nutrition 1997.pdf>.

Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

23.3 Food product labels as sources of information

23.3.1 Main sources of nutrition information

The Tracking Nutrition Trends (TNT) surveys asked from which sources the respondents took information on food and nutrition from in the past year. In each survey, with the exception of 2001, respondents were read a list of possible sources and were asked: “People can get information about food and nutrition from a number of different sources. Please tell me from which of the following sources you personally got information on food and nutrition in the past year.”⁷¹⁸ The 2006 list was reduced from 17 sources to 11 sources, as shown in Table 13.

As the National Institute of Nutrition and the Canadian Food Information Council note: “People learn from these sources even if they were not explicitly looking for nutrition information,”⁷¹⁹ which points out the importance of informal learning as a source of information. However, it is interesting that, out of 17 possible choices for nutritional information on the survey list (and 11 possible sources in 2006), not one of the choices is “schools,” or nonformal classes.

Table 13 illustrates the results of the TNT surveys from 1989–2006, which find that people consistently get most of their nutrition information from food product labels. After food product labels, magazines and newspapers are the second most important source of nutrition information. (In 2006, the books category used previously was merged with magazines and newspapers.) Friends, relatives, and colleagues rank third in importance as sources of information. This ranking has remained relatively consistent over the years. In 2006, product labels were used as sources of information by 77% of Canadian adults; 76% of adults got information from magazines, newspapers, and books; and 66% of adults got information from people in their social sphere. In addition, radio and television programs, and food company materials or advertisements were also important with 65% and 52% of adults respectively getting their information from these sources.⁷²⁰ Table 13 also shows that the number of Canadians who drew information at least once from food labels in the previous year increased from 61% in 1989 to 77% in 2006.

⁷¹⁸ Ibid.

⁷¹⁹ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed. p. 31.

⁷²⁰ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

Table 13. Percentage of Canadian adults age 18 and over who reported using specific sources of nutritional information at least once in the past year, 1989–2006

Source	1989	1994	1997	2004	2006
Food product labels	61	75	71	75	77
Magazines and newspapers (2006: and books)	65	70	65	73	76
Books (2006 merged with: magazines and newspapers)	60	67	55	67	
Friends, relatives, colleagues	62	66	67	69	66
Radio and television programs	70	70	68	67	65
Food advertisements (2006: and food company materials)	41	54	58	52	52
Food company materials (2006 merged with: food advertisements)	-	32	32	36	
Health associations (cancer/heart/diabetes) 2006 changed to: health association materials	49	57	43	49	50
Family physician (2006 merged with: other health professional)	54	57	48	47	51
Other health professional (2006: or family physician)	-	-	-	45	
Internet or the web	-	-	6	43	46
In-store displays	27	36	36	39	-
Government materials	45	44	28	38	41
Health food stores	-	-	-	35	-
Statements on dietary supplements	-	-	-	32	-
Fitness and weight loss programs	20	33	27	31	27
Dietitian or nutritionist (2006: nutritionist is not included)	29	33	22	28	23

Question: People can get information about food and nutrition from a number of different sources. Please tell me from which of the following sources you personally got information on food and nutrition in the past year.

Note: Those items marked with hypens (-) were not included in those years.

Sources: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition*

Trends, 1989-1994-1997, Ottawa, National Institute of Nutrition, 1997; accessed July 2006; available from <http://www.ccfh.ca/pdfs/Canadian%20Nutrition%201997.pdf>.

National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfh.ca/pdfs/TNTV-FINAL.pdf> and Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

23.3.2 Importance of food product labels

According to Health Canada: “Nutrition labelling is a key factor in helping consumers make health choices [and,] combined with public education, reinforces healthy eating practices and enhances the nutritional health and well-being of Canadians.”⁷²¹

In 1997, prior to merging with the Canadian Food Information Council to form the Canadian Council of Food and Nutrition (CCFN), the National Institute of Nutrition (NIN) included in its survey a section devoted to assessing whether Canadians understand the information on nutrition labels. In 1997, almost one quarter of Canadians (23%) reported they had difficulty understanding the nutritional information on labels, and 16% of adults with a university education had difficulty. Thirty-one percent of those with a high school education claimed they had difficulty understanding labels, and 42% with elementary school educations claimed they had difficulty. Reasons cited were complexity of terms, lack of clarity and difficulty understanding nutrient terminology.⁷²²

Based on a review of the archived survey material available on the CCFN web site, it appears that the 1997 TNT survey was the only time an attempt was made to assess whether Canadians comprehend the information provided on food labels. With respect to nutrition labels, the later surveys asked Canadians about:

- the reasons for reading labels
- the frequency of reading labels
- their ability to find information on food labels
- the use of information on food labels
- the perceived importance of specific label information⁷²³

The 2004 TNT survey also asked about the credibility of the sources of nutrition information.⁷²⁴ This question was not included in other years, so no comparison is possible. The survey showed that labels are considered more credible on average than

⁷²¹ Health Canada. *Nutrition Labelling Education Background: Nutrition Labelling: A Strategic Framework for Public Education*, Health Canada, 2004; accessed March 2005; available from http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/labelling-etiquetage/strategic_framework_entire_toc_e.html.

⁷²² National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends, 1989-1994-1997*, Ottawa, National Institute of Nutrition, 1997; accessed July 2006; available from <http://www.ccfh.ca/pdfs/Canadian Nutrition 1997.pdf>.

⁷²³ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

⁷²⁴ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed.

mass media outlets, interpersonal relationships, or other types of food company materials. However, the 2004 survey found that the sources of information used most often were not necessarily the most “credible.” The most credible sources were health professionals, particularly dietitians, family physicians, and health association materials. The least credible sources were those associated directly with the food industry such as food company materials, in-store displays, and food advertisements.

The surveys from all years have consistently found that the main reason for reading labels was to be informed about what one is eating. People with health disorders and special dietary concerns find labels to be especially important. Others who read labels frequently include women, adults between the ages of 45 and 64 years, and those who perceive themselves to be more knowledgeable about nutrition. The survey results point out that while people with higher levels of education are less likely to “never” check labels, they are not particularly likely to “always” check them. Those who did not refer to the nutrition information reported that they were already familiar with the information, were disinterested, or had little time to read the labels.⁷²⁵

Those who state that they are very knowledgeable about nutrition, and frequently read product labels are those more likely to say they can often find the information they need. Those who report that are somewhat or not very / not at all knowledgeable about nutrition, and sometimes or rarely / never read product labels are more likely to say that they cannot find the information they need from labels.⁷²⁶ The main uses of the information on labels are to find the nutritional and calorie content of foods, or to find foods that claim to be good for health. In addition, when people read labels they find them most important for identifying ingredients and nutrition facts, rather than for identifying particular health claims.

23.3.3 Health Canada’s new labelling requirements and new nutrition education program

In 2003, Health Canada announced new labelling requirements for prepackaged foods, and gave large businesses up to three years to comply with the new regulations. Small businesses have five years to comply.⁷²⁷ At the same time, Health Canada also announced that, for the first time in Canada, diet-related claims concerning reducing the risks of heart disease, cancer, osteoporosis, and high blood pressure will be allowed on food labels. Health Canada hopes the new information will help Canadians “to compare products more easily, assess the nutritional value of more foods and better manage special diets.”⁷²⁸ Producers of prepackaged foods will have to show the number of calories as well as information on 13 nutrients that Health Canada identified as being

⁷²⁵ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

⁷²⁶ Ibid.

⁷²⁷ Health Canada. *News Release: Health Canada Announces New Mandatory Nutrition Labelling to Help Canadians Make Informed Choices for Healthy Eating*, Health Canada, 2003; accessed February 2005; available from http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2003/2003_01_e.html.

⁷²⁸ Ibid., accessed.

“key” factors for health. These are the amounts, in a specified amount of food, of fat, saturated and trans fats, cholesterol, sodium, carbohydrate, fiber, sugars, protein, vitamins A and C, calcium, and iron.

The new regulations will be supported by public education to help Canadians understand and use the nutritional information, in order “to make informed choices of healthy eating.” Health Canada has developed a tool kit with multimedia sources for educators, including one with an Aboriginal focus. The strategic framework for the new nutrition education program on Health Canada’s website⁷²⁹ includes background material and proposals for outcome and impact evaluations. These proposals recommend outcome evaluations “to measure changes in knowledge, attitudes, intentions and actions (e.g., percentage or description of target audience members participating in an activity).”⁷³⁰ Once these outcome and impact evaluations are developed and populated with data, as intended by Health Canada, they will provide very useful data for the educated populace and population health domains of the Canadian Index of Wellbeing, quantitatively linking learning outcomes with health outcomes.

In the meantime, since these outcome measures have not yet been developed, Health Canada recommends that the CCFN Tracking Nutrition Trends survey could be used to track elements of food label use by Canadians. Health Canada also recommends creating databases, perhaps through the Canadian Health Network, to track use and effectiveness of label elements, education programs, and nutrition materials. Impact evaluations would focus on long-term results of the program and changes in nutritional or health status that result.

However, Health Canada does question the feasibility of these recommendations at the present time since there is currently no national nutritional monitoring system.⁷³¹ It is not clear from the website how much or what parts of the proposals Health Canada will adopt. Hopefully, the need for these outcome and impact evaluations in new measures like the Canadian Index of Wellbeing will spur their rapid development by creating new demands for such data.

23.3.4 Labelling genetically engineered or modified (GE or GM) foods

The far-reaching potential economic, political, and social impacts of nutrition education, food labelling, and awareness of the origins of what we consume is well illustrated by the contentious issue of labelling genetically modified (GM) or genetically engineered foods (GE).⁷³² As discussed above in connection with the food literacy project, knowledge of topics such as genetically engineered foods, which have implications for sustainability as

⁷²⁹ Health Canada. *Nutrition Labelling*, 2005; accessed March 2005; available from http://www.hc-sc.gc.ca/fn-an/label-etiquet/nutrition/index_e.html.

⁷³⁰ Health Canada. *Nutrition Labelling Education Background: Nutrition Labelling: A Strategic Framework for Public Education*, accessed.

⁷³¹ Ibid., accessed.

⁷³² In the literature, genetically engineered (GE) and genetically modified (GM) are used interchangeably. We also use them interchangeably in this literature review.

well as health, are important to nutrition literacy. The issue of GM or GE food provides an excellent case study of the relationship between learning and knowledge outcomes (including information gaps) on the one hand, and social, economic, and environmental outcomes on the other.

It is estimated that at least 70% of the food on supermarket shelves may contain GM ingredients, and as many as 30,000 products on grocery store shelves are genetically modified.⁷³³ According to the Canadian Biotechnology Strategy Secretariat:

Crops such as canola, corn and soybean that have been genetically enhanced to improve productivity while better protecting the environment are now being cultivated on a commercial basis. These applications may be only the tip of the iceberg as the pace of commercialization accelerates.⁷³⁴

However, the Royal Society of Canada notes that GM food is currently introducing new organisms into the food chain, beginning with farm food production, that have unknown risks to public health and the environment.⁷³⁵ While the public generally assumes GE foods to be safe and regulated by strict standards, in actual fact, according to the RSC, no long-term health or environmental impact studies on the impact of these GE crops have been done in Canada or the United States, which also has no mandatory standards governing their use.⁷³⁶ And as Vandana Shiva notes, many developing countries charge that GE crops destroy established diversity, a millennia of seed-saving, local knowledge, and sustainable agricultural systems.⁷³⁷

GM products are currently not labelled as such, so that consumers generally have no knowledge or understanding of the degree to which they are consuming genetically modified food, nor of the fact that such food is banned in many countries, including those in the European Union, nor of the reasons why it is banned there and allowed in Canada. In that sense, labelling could be a profound and important educational tool and learning instrument—undoubtedly more powerful and far-reaching than the little that is taught on the subject in schools and universities.

The Royal Society of Canada (RSC) explains that the issue of GM foods involves more than safety considerations:

In part this issue has been cast as a human health issue—if GMO [genetically modified organisms] foods pose risks to health, the consumer should have the right of ‘informed choice; about exposure to these risks. However, it is also in

⁷³³ Canadian Press. *Survey: Canadians Suspicious of Biotec Foods*, 2005, January 21; accessed April 2005; available from <http://www.cp.org>.

⁷³⁴ Canadian Biotechnology Strategy Secretariat. *The 1998 Canadian Biotechnology Strategy: An Ongoing Renewal Process*, accessed. p. 5.

⁷³⁵ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

⁷³⁶ *Ibid.*, accessed.

⁷³⁷ Shiva, Vandana. *Stolen Harvest: The Hijacking of the Global Food Supply*, Cambridge, MA: South End Press, 2000.

significant part a socio-economic and political issue, having to do with the alleged right of consumers to participate intelligently in the marketplace and to exercise the ‘power of the pocketbook’ in support of the technologies and industries they prefer.⁷³⁸

One of the most contentious issues in the debate over food biotechnology involves consumer choice and the labelling of products. In Canada, foods that are pasteurized, irradiated, or contain possible allergens such as nuts must be labelled. As noted, products on Canadian supermarket shelves that contain or are produced from GMOs are not labelled. According to Einsiedel, et al., the reason there is no GM labelling in North America is that the multinational corporations responsible for GM food and products object to labelling, since they fear the public will see such labels as a warning and avoid and reject GM foods.⁷³⁹ BIOTECCanada argues that labels are unnecessary:

Products developed using genetic engineering have been researched and assessed as being equivalent to their traditional counterparts. This means no changes have taken place in the composition, nutrition, and health or safety status of the foods. To require labels would mislead consumers by falsely implying differences where none exist. [...] Only those foods developed using biotechnology, which are judged to be as safe as their conventional counterparts, are approved for sale in Canada.⁷⁴⁰

In October 2001, a bill to require mandatory labelling of genetically altered foods was introduced in Parliament by Liberal MP, Charles Caccia, but the bill was defeated.⁷⁴¹ Therefore, Health Canada, which both regulates and promotes biotechnology, has decided to develop standards for voluntary labelling of GM products rather than to require mandatory labelling.⁷⁴² The Canadian General Standards Board has developed a standard for the voluntary labelling of GM products, which was adopted as a National Standard of Canada in April 2004. However, it has no plans to introduce a mandatory labelling scheme.⁷⁴³ This means that Canadians do not know whether or not the food they buy has been genetically modified unless the biotechnology industry voluntarily labels these products.

Einsiedel believes that there is a precedent for labelling, which allows people to make purchases based on their values: labels which say *Against Animal Testing* and *Fair Trade*

⁷³⁸ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 220.

⁷³⁹ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed.

⁷⁴⁰ BIOTECCanada. *Biotech Classroom - What Is Biotechnology? - Dispelling the Myths*, accessed.

⁷⁴¹ CBC News. *Indepth: Genetic Modification: Genetically Modified Foods: A Primer*, accessed. Private member's bill C-287 was given a free vote in Parliament Oct. 17, 2001.

⁷⁴² Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 221.

⁷⁴³ Canadian Biotechnology Advisory Committee. *The Status of Labelling of Genetically Engineered/Genetically Modified (GE/GM) Foods in Canada*, 2005; accessed November 2005; available from <http://cbac-cccb.ca/epic/internet/incbac-cccb.nsf/en/ah00539e.html>.

currently give people the option of making a purchase based on their moral, philosophical, or political views.⁷⁴⁴ Einsiedel concludes:

[C]onsumers have expressed a preference for GM food labelling; and the imperative for building trust exists. Recognizing producer reluctance to label, it is important that such an effort be accompanied by a major public awareness effort to promote better understanding of the process of genetic modification.⁷⁴⁵

A 2003 public opinion poll, conducted by Pollara Research and Earncliffe for the Canadian government, surveyed 600 Canadians and included several questions involving the labelling of GM food.⁷⁴⁶ Overall, 85% of Canadians supported a mandatory labelling system. Pollara and Earncliffe reported in their summary of the survey:

Few people see much point in voluntary systems of labelling rather than mandatory ones. It is the outcome of full compliance that most people want and mandatory labelling is the common sense proposition to achieve that end. Informed choice is the key driver of opinion on the issue of GM food and by consequence, GM food labelling. People feel strongly that they have a right to choose to eat GM food or not and that is enabled by the creation of a labelling system.⁷⁴⁷

Worldwide, at least 35 countries require mandatory labelling for genetically modified products. In Europe, although they repealed the ban on introducing new GM products in 2003, as of April 2004 all products containing an ingredient that contains more than 0.9% of genetically modified organisms (GMOs), including animal feed, must be labelled as such.⁷⁴⁸

Again, it is a major failing of conventional education indicators that they do not acknowledge or assess the impact of learning tools like labelling and advertising on knowledge outcomes, but focus their overwhelming attention on formal schooling and standardized test indicators that may have little relation to the education required to live our daily lives with awareness. In the case of issues like GM labelling, comprehension could potentially be far-reaching, going well beyond the ingredients and impacts of particular foods to an understanding of economic structures, and of the degree to which they influence and even control knowledge dissemination.

⁷⁴⁴ Einsiedel, Finlay, and Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, accessed.

⁷⁴⁵ Ibid., accessed. p. 26.

⁷⁴⁶ Pollara Research, and Earncliffe Research and Communications. *Public Opinion Research into Biotechnology Issues in the United States and Canada – Eighth Wave*, Biotechnology Assistant Deputy Minister Coordinating Committee, Government of Canada, 2003; accessed November 2005; available from [http://biotech.gc.ca/epic/internet/incbs-scb.nsf/vwapj/Wave_8_Summary_Report.pdf/\\$FILE/Wave_8_Summary_Report.pdf](http://biotech.gc.ca/epic/internet/incbs-scb.nsf/vwapj/Wave_8_Summary_Report.pdf/$FILE/Wave_8_Summary_Report.pdf).

⁷⁴⁷ Ibid., accessed. p. 9.

⁷⁴⁸ CBC News. *Indepth: Genetic Modification: Genetically Modified Foods: A Primer*, accessed.

23.4 Public concern with food safety

23.4.1 Food safety concerns

Although Canadian and U.S. food supplies are generally considered safe, there is evidence that foodborne illnesses are not uncommon.⁷⁴⁹ Eric Schlosser and others argue that the safety of food is an important health issue.⁷⁵⁰ He notes that food poisoning often goes unrecognized and is assumed to be the flu. According to Health Canada, every year 11 to 13 million Canadians are affected by foodborne illness (also known as “food poisoning”) caused by “eating food that has been contaminated with a harmful micro-organism.”⁷⁵¹ The Centers for Disease Control and Prevention (CDC) estimates that 76 million cases of foodborne disease occur each year in the United States.⁷⁵² Most of these cases are mild, but 325,000 cases require hospitalizations, and 5,000 cases end in death.⁷⁵³

Many of the cases of foodborne illness are the result of improper food handling in the home.⁷⁵⁴ As Medeiros, et al. note: “The public has generally been quite complacent about the risk of foodborne illnesses, tending to think of the consequences as being mild.”⁷⁵⁵ They recommend that people need to be taught personal hygiene, and adequate cooking techniques, such as avoiding cross-contamination, which occurs when kitchen utensils are used to prepare meat or poultry and then are inadequately cleaned before using to prepare other foods. However, the CDC notes that foodborne diseases are constantly changing, and there are other causes for these diseases:

Newly recognized microbes emerge as public health problems for several reasons: microbes can easily spread around the world, new microbes can evolve, the environment and ecology are changing, food production practices and consumption habits change, and because better laboratory tests can now identify microbes that were previously unrecognized.⁷⁵⁶

⁷⁴⁹ Brown, Jennifer, John A. L. Cranfield, and Spencer Henson. "Relating Consumer Willingness-to-Pay for Food Safety to Risk Tolerance: An Experimental Approach," *Canadian Journal of Agricultural Economics*, vol. 53, 2005: 249–263.

⁷⁵⁰ Schlosser. *Fast Food Nation: The Dark Side of the All-American Meal*.

⁷⁵¹ Health Canada. *Food-Related Illnesses*, 2007; accessed January 2007; available from http://www.hc-sc.gc.ca/fn-an/securit/ill-intox/index_e.html.

⁷⁵² Centers for Disease Control and Prevention (CDC). *Foodborne Illness*, Atlanta, Georgia, U.S., 2005; accessed January 2007; available from http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_g.htm - Top.

⁷⁵³ Ibid., accessed.

⁷⁵⁴ Medeiros, Lydia C., Virginia N. Hillers, Patricia A. Kendall, and April Mason. "Food Safety Education: What Should We Be Teaching to Consumers?," *Journal of Nutrition Education*, vol. 33, no. 2, 2001: 108–113.

⁷⁵⁵ Ibid. p. 112.

⁷⁵⁶ Centers for Disease Control and Prevention (CDC). *Foodborne Illness*, accessed. pp. 2–3.

The CDC also claims that foodborne diseases are largely preventable and that “measures are needed to prevent or limit contamination all the way from farm to table”.⁷⁵⁷

A variety of good agricultural and manufacturing practices can reduce the spread of microbes among animals and prevent the contamination of foods. Careful review of the whole food production process can identify the principal hazards, and the control points where contamination can be prevented, limited, or eliminated.⁷⁵⁸

In order to prevent food illness, the CDC suggests that the public can play a large role:

In the end, it is up to the consumer to demand a safe food supply; up to industry to produce it; up to researchers to develop better ways of doing so; and up to government to see that it happens, to make sure it works and to identify problems still in need of solutions.⁷⁵⁹

According to Brown, Cranfield, and Henson of the University of Guelph:

Consumer and household perceptions of food-borne risks may be influenced by their demographic background, understanding of the potential risks associated with food and past experiences with food-borne disease. Individuals’ attitudes and beliefs also shape perceptions of reductions in food-borne risks.⁷⁶⁰

Clearly, for the populace “to demand a safe food supply,” they need the knowledge and understanding of food issues that go beyond the nutritional content in food, and include knowledge of food safety and production.

Food safety also involves issues other than those concerning foodborne illness. University of Guelph researchers Anne Wilcock, et al. identify potential undesirable residues in foods as spanning “from natural (e.g., mycotoxins) and environmental contaminants (e.g., dioxins) to agro-chemicals (e.g., nitrates and pesticides), veterinary drugs, growth promoters, packaging components, and many more.”⁷⁶¹

The Tracking Nutrition Trend (TNT) surveys also point to very serious food safety issues that an educated populace should be aware of and concerned about. In asking about food safety issues in the TNT, the National Institute of Nutrition pointed to food safety issues that might concern Canadians. In addition to “microbial infections,” the list includes: the effects of pesticides on foods, the use of antibiotics in food animals, the effects of fertilizers or chemicals on food, genetic modification or biotechnology, additives and

⁷⁵⁷ Ibid., accessed. p. 11.

⁷⁵⁸ Ibid., accessed.

⁷⁵⁹ Ibid., accessed. p. 11.

⁷⁶⁰ Brown, Cranfield, and Henson. "Relating Consumer Willingness-to-Pay for Food Safety to Risk Tolerance: An Experimental Approach." p. 250.

⁷⁶¹ Wilcock, Anne, Maria Pun, Joseph Khanona, and May Aung. "Consumer Attitudes, Knowledge and Behaviour: A Review of Food Safety Issues," *Trends in Food Science & Technology*, vol. 15, 2004: 56–66. p. 57.

preservatives in food, and animal husbandry practices.⁷⁶² We discuss these surveys in more detail below. First, though, we look briefly at only one of these concerns—the public perception of genetically modified foods, as a case study for food safety issues.

23.4.2 Public perception of genetically modified foods

We discussed labelling of genetically modified foods above as a case study of the relationship between learning and knowledge outcomes (including information gaps) on the one hand, and social, economic, and environmental outcomes on the other. In that case, 85% of Canadians were in favour of mandatory labelling.⁷⁶³ Here we continue that case study by looking briefly at public perceptions of genetically modified foods, which depend on awareness and knowledge of broad and contentious issues. According to Thomas Hoban, public understanding of issues such as agricultural biotechnology, including genetically modified foods, is influenced by the information the public receives in the media, the confidence it has in governmental safeguards, and cultural preferences.⁷⁶⁴ Based on a review of consumer surveys, he found that consumers from Canada, the United States, Japan, Finland, and the Netherlands are generally positive about biotechnology, while those from France, Sweden, Denmark, the United Kingdom, and Germany are very negative.

However, survey results in Canada are mixed, and it is unclear as to the extent of public concern about genetically modified food. The 2003 public opinion poll, mentioned above in connection with food product labelling, that was conducted by Pollara Research and Earncliffe for the Canadian government, included several questions involving the public's comfort with buying genetically modified food. More than half of the Canadians surveyed (52%) expressed some level of discomfort with GM food—with one in four of these saying they were very uncomfortable. The remaining 47% said they were comfortable with the idea of buying GM food. (One percent did not know.) When provided with a list of concerns from which to choose, the long-term risk of GM foods to human health was ranked as the most important concern by 59% of Canadians. However, overall, only 19% of Canadians thought GM food posed a high risk to human health and the environment.⁷⁶⁵

The Tracking Nutrition Trend survey in 2004 found that only 6% of Canadian adults were concerned about genetically modified foods as a food safety issue, which was down

⁷⁶² National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions*, 2001.

⁷⁶³ Pollara Research, and Earncliffe Research and Communications. *Public Opinion Research into Biotechnology Issues in the United States and Canada – Eighth Wave*, accessed.

⁷⁶⁴ Hoban, Thomas J. *Public Perceptions and Understanding of Agricultural Biotechnology*, Washington, D.C., International Information Programs, U.S. Department of State, 2003; accessed March 2005; available from <http://usinfo.state.gov/journals/ites/1099/ijee/bio-hoban.htm>.

⁷⁶⁵ Pollara Research, and Earncliffe Research and Communications. *Public Opinion Research into Biotechnology Issues in the United States and Canada – Eighth Wave*, accessed.

from 15% in 2001.⁷⁶⁶ However, this result appears to be dependant on the methodology used in the survey. In 2001, in an open-ended question, respondents were asked to name up to three food safety issues that concerned them personally. Later in the survey, they were then given a list of items and asked if they were concerned about any of them. The results were extremely interesting, since the percentage of people concerned with particular issues rose dramatically when they were presented with a list, rather than asked to recall issues themselves in the open-ended question. For example, in the open-question portion of the 2001 survey, 15% of respondents expressed concern with genetic modifications of food. When then asked the same question from a list that included this item, the result was that 74% were concerned with genetic modification.⁷⁶⁷ Clearly, when asked specifically about genetically modified foods, the majority of Canadians were concerned about food safety. In 2004, the open-ended question was included in the survey, but the detailed list was excluded, with the result being, as mentioned, that only 6% of Canadian adults were concerned about genetically modified foods as a food safety issue.

In 2006, the open-ended question was changed from a focus on food safety to: “What makes a food ‘healthy.’” In the responses, GM food was not mentioned, although 6% of respondents mentioned organic food, and 5% mentioned food without preservatives. Although not naming GM foods specifically, another 2006 question asked: “When you are selecting food to eat, to what degree, if any, does each of the following influence your food choice?” “A food produced using biotechnology” was one of six choices. Results on the influences on food choice were that 10% of adults said that a food produced using biotechnology was very influential to their choice, 17% said somewhat influential, 27% said not too much, 34% said not at all, and 11% did not know.

Public opinion has lead many countries all over the world to either ban or restrict GM crops. For example, Sri Lanka has banned the import of all GM foods since 2001; Thailand bans field trials and commercial planting of all GE crops; China bans commercial planting of GE rice, wheat, corn and soybean; Japan does not import GE wheat and has strict legislation concerning approvals of GM food imports; New Zealand has blocked trials of GE salmon and some local areas in Auckland and Wellington are GE free; Australia bans GE rapeseed in Tasmania, and GE commercial planting in Western Australia and other Australian states have been given the right to declare themselves GE free;⁷⁶⁸ several European countries such as Austria, Denmark, Italy, France, Germany, Greece, Luxembourg, and Norway have instituted bans on certain genetically modified crops such as corn and canola. In the United States, several

⁷⁶⁶ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed.

⁷⁶⁷ National Institute of Nutrition, and Canadian Food Information Council. "Tracking Nutrition Trends, 1989-1994-1997-2001."

⁷⁶⁸ Third World Network Information on Biosafety. *Worldwide Initiatives against GMOs: List of Nations Banning/Restricting GE Crops*, 2001; accessed November 2005; available from <http://www.safe2use.com/ca-ipm/01-05-17b.htm>.

municipalities have banned GE food such as Burlington, Vermont; Boulder, Colorado; and parts of California.⁷⁶⁹

In Canada, Salt Spring Island and Powell River in British Columbia have both passed municipal resolutions declaring themselves GE-free Crop Areas, and a number of Prairie communities have banned GE wheat. In addition, the United Church of Canada and its Biotechnology and Food Security Program, has called for a GM food approval moratorium until “a more rigorous and independent system of approving, regulating, monitoring, and labelling GM foods has been fully implemented.”⁷⁷⁰

In June 2005, a nation-wide movement, consisting of farmers, environmentalists, and ordinary Canadians concerned with food security and safety was launched, and given the name “GM-Free Canada.” The grass-roots effort concerns itself with “long-term economic sustainability, local control over food production, a healthy environment and democracy as opposed to food profiteering and the destruction of our genetic biodiversity through corporate control of seeds and agriculture.”⁷⁷¹ GM-Free Canada hopes to have 50 communities in Canada declare themselves free of genetically-engineered plants, animals, crops, and trees in the next two years.⁷⁷²

In 2005, Prince Edward Island (P.E.I.) held legislative committee hearings to decide whether to make the province GE-free. The Standing Committee on Agriculture, Forestry and the Environment will evaluate the submissions and decide whether to recommend to the government that the island ban GM crops.⁷⁷³ The hearings have divided the province. Allan Ling, President of the Atlantic Grains Council, Kevin MacAdam, P.E.I. Agriculture Minister, and Paul Mayers of Health Canada do not support a ban. Those supporting a ban include the Premier, Pat Binns,⁷⁷⁴ Danny Hendricken, District President of the National Farmers Union, Dr. Bert Christie, an agrologist formerly employed by Agriculture Canada, Irené Novaczek, Director of the Institute of Island Studies,⁷⁷⁵ and Raymond Loo, president of the P.E.I. Certified Organic Producers Co-op.⁷⁷⁶

⁷⁶⁹ Organic Consumers Association. *Despite U.S. Pressure Five E.U. States Continue Bans on GE Crops*, 2005; accessed November 2005; available from <http://www.organicconsumers.org/ge/bans062805.cfm>.

⁷⁷⁰ GM Watch. *Movement against Genetically Engineered Foods & Crops Growing in Canada*, Organic Consumers Association, 2005; accessed November 2005; available from <http://www.organicconsumers.org/biod/gmwatch060305.cfm>.

⁷⁷¹ Ibid., accessed.

⁷⁷² Ibid., accessed.

⁷⁷³ CBC News. *Prince Edward Island: Macadam against Banning GMOs*, 2005, Nov 10; accessed 2005; available from http://www.cbc.ca/pei/story/pe_gomfree_20051110.html - top.

⁷⁷⁴ Mandel, Charles. *Canada Island May Boot GMO Crops*, Organic Consumers Association, 2004; accessed November 2005; available from <http://www.organicconsumers.org/ge/canadaisland030804.cfm>.

⁷⁷⁵ Novaczek, Irené, and Laura Fanning. *The Economic, Social and Environmental Implications of Genetically Modified Crops (GMOs) on Islands*, Institute of Island Studies, 2005; accessed November 2005; available from http://www.upei.ca/islandstudies/rep_gmo_1.htm.

⁷⁷⁶ Gallant, Doug. "Canada's Prince Edward Island Debates Whether to Go GE-Free." *The Guardian*, Charlottetown, Prince Edward Island, April 3, 2004, The Province A8; available from <http://www.organicconsumers.org/ge/PEI040504.cfm>.

In 2005, in response to the P.E.I. initiative, Greenpeace Canada commissioned Leger Marketing to conduct a study of Canadian opinion on whether or not Canadians think their province should become GM-free. The sample included 1,497 English- or French-speaking adults 18-years of age or older, excluding residents of P.E.I.⁷⁷⁷ A second, identical, survey sampled 300 English-speaking residents of Prince Edward Island. The surveys asked only one question:

The government of Prince Edward Island is holding public meetings to discuss the possibility of declaring the island a GMO-free zone, that is banning genetically modified crops from being grown in that province. Do you believe that Prince Edward Island should become a GMO-free zone?⁷⁷⁸

Overall, in the survey excluding P.E.I., 43% of Canadians answered “yes,” 31% said “no,” and 27% said “don’t know / refused.” On a provincial level, “yes” was the response of 48% of Maritime residents, 53% in Quebec, 38% in Ontario, 31% in the Prairie provinces, 35% in Alberta, and 47% in British Columbia. In all the provinces, except for the Prairie provinces, where 34% answered “no,” a greater percentage of respondents were in favour of a ban than were opposed to one. In the separate P.E.I. survey,⁷⁷⁹ 53% of respondents were in favour of a ban, 33% opposed, and 14% did not know or refused to answer.

Results of all of the surveys were analyzed demographically with the following results:

- The profile of respondents who are more likely to be in favour of their province becoming a GMO-free zone is as follows: French-speaking respondents (55%), Quebecers (53%), people with a household income between \$20,000 and \$39,999 (49%) and respondents with a College level education (48%).
- The profile of respondents who are more likely to be opposed to transforming their province into a GMO-free zone is as follows: men (35%), English-speaking respondents (33%), people who are the most well-off (with a household income above \$80,000—41%) and people with a university level education (38%).
- The profile of respondents who are more likely not to express an opinion is as follows: women (30%), people aged 65 or older (39%), English-speaking respondents (29%), Ontarians (29%), those who reside in the Prairies (either Saskatchewan or Manitoba) (35%), people with a household income below \$20,000 (30%), retirees (36%) and respondents with an elementary (44%) or high school (33%) level education.⁷⁸⁰

⁷⁷⁷ Leger Marketing. *Quantitative Study on the Perceptions of Canadians Regarding the Possibility of Declaring Prince Edward Island a GMO-Free Zone*, Greenpeace Canada, 2005; accessed November 2005; available from http://www.greenpeace.ca/e/campaign/gmo/depth/pei_ge_free/Poll_results_PEI_gefree.pdf.

⁷⁷⁸ Ibid., accessed. p. 5.

⁷⁷⁹ The question posed to residents of P.E.I. was: “The government of P.E.I. is holding public consultations on GMOs (genetically modified organisms) with the possible intention to declare the island a GMO-free zone. Are you strongly in favour, somewhat in favour, somewhat opposed or strongly opposed that PEI becomes a GMO-free zone?”

⁷⁸⁰ Leger Marketing. *Quantitative Study on the Perceptions of Canadians Regarding the Possibility of Declaring Prince Edward Island a GMO-Free Zone*, accessed. p. 6.

The public understanding of genetically modified food is not clear from the surveys of public perception. It is interesting that those with the highest level of education and income are among those most opposed to banning genetically modified food in their province. Whether this result is the outcome of a heightened awareness of and learning from the media, or from a considered and critical understanding of GM food is unknown.

23.4.3 Public concern about food safety in the Tracking Nutrition Trends surveys

The Tracking Nutrition Trend surveys have consistently asked Canadians questions concerning food safety, and have found very little interest or concern among the public. In this section we examine the results of these surveys.

Food safety concerns have been treated differently by the various Tracking Nutrition Trends surveys, which make them difficult to compare since some responses are from an aided list, and some responses were unaided from an open-ended question. In 1989, 1994, and 1997, respondents were given a list of 16 items and asked if they were concerned about any of them. Food safety was not mentioned. As mentioned above, in 2001, respondents were asked about food safety concerns specifically in an open-ended question, and were also given a list to choose from later in the survey. In 2004 and 2006, respondents were only asked about food safety concerns in an open-ended question, and were not given a list.

Of the lists given in 1989, 1994, and 1997, only three items were actually concerns about food safety: food poisoning (1997 only), chemical residues in or on food, and preservation.⁷⁸¹ The other concerns on the lists were specific to nutrition. In 1997, the percent of Canadians who were “very / somewhat concerned” about food poisoning was 70% of adults, which was second highest on the list after fat, about which 79% of adults were “very / somewhat concerned.” Food poisoning was not on the 2001 list, although 68% of adults were concerned about microbial infections. In the 2001, 2004, and 2006 open-ended responses, food poisoning was a concern of 10%, 5%, and 8% of adults respectively. However, since these responses were not aided, and no distinction was made between “very or somewhat” concerned, the results are not comparable to the results of the earlier surveys.

Third on the list in the 1997 survey was “chemical residues in or on food,” about which 67% of adults were “very / somewhat concerned.” This compares with 68% of adults in 1989, and 76% in 1994 who reported the same concern. In the 2001 list, this topic was changed to “effects of fertilizers or chemicals on food,” about which 83% of adults were “very or somewhat” concerned.

“Preservatives,” in all three of the cycles, 1989–1997, was 13th in importance (out of 16) on the list of concerns, with results being 54% of adults in 1989, 62% in 1994, and 52%

⁷⁸¹ Other items on the lists were fat, vitamins, calcium, fibre, saturated fats, calories / energy, cholesterol, salt / sodium, sugar, iron, caffeine, trans fatty acids, and hydrogenation.

in 1997 were concerned about preservatives in food.⁷⁸² In 2001, on the aided list, preservatives and additives in food were a concern (very or somewhat) of 78% of adults. Other results from the 2001 aided list are shown in Figure 10.

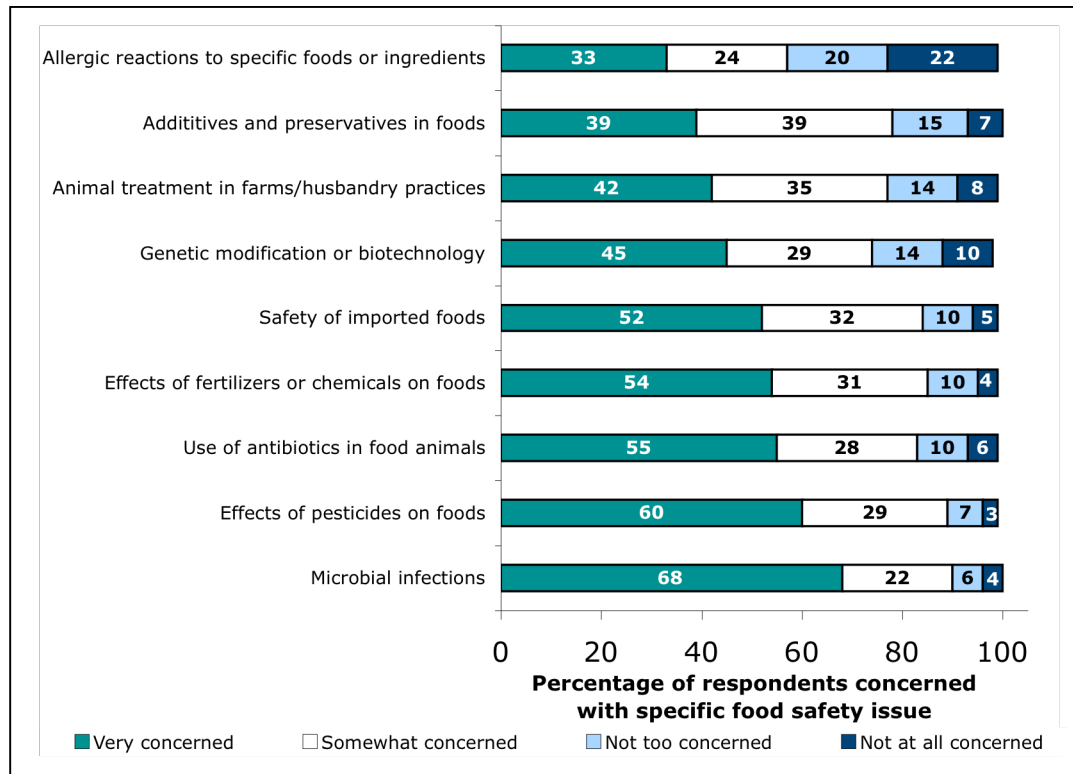
As discussed above, results from 2001 are revelatory, since the percentage of people concerned with particular issues rose dramatically when they were presented with a list, rather than asked to name issues themselves in the open-ended question. For example, in the open-question portion of the 2001 survey, 15% of respondents expressed concern with genetic modifications of food, 11% were concerned with pesticides and herbicides, and 10% were concerned with microbial infections. When then asked the same question from a list that included these three items, the results were that 74% were very or somewhat concerned with genetic modification, 89% were very or somewhat concerned with pesticides and herbicides, and 89% were very or somewhat concerned with microbial infections.⁷⁸³ This discrepancy is extremely large, but it is difficult to interpret this result. However, the NIN explains that “on an unaided basis, respondents tend to recall topics that have received media coverage, with biotechnology leading the way.”⁷⁸⁴ If this is the case, then it seems that by eliminating the aided list on the surveys, the NIN is actually testing respondents’ recall of issues, rather than their actual concerns, per se.

⁷⁸² National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends, 1989-1994-1997*, accessed.

⁷⁸³ National Institute of Nutrition, and Canadian Food Information Council. "Tracking Nutrition Trends, 1989-1994-1997-2001."

⁷⁸⁴ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions, 2001*. p. 33.

Figure 10. Percentage of Canadian adults concerned with specific food safety issues, 2001



Source: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions, 2001*, Ottawa: National Institute of Nutrition, 2002. p. 33.

Table 14 shows the 2001, 2004, and 2006 responses to the open-ended question: “Could you name food safety issues that concern you personally?” The largest category of response in all years was from those who stated that they did not have a food safety issue, which was 23% of adults in 2001, 31% in 2004, and 24% in 2006. The NIN and CFIC noted that the “nothing concerns me” response was *less prevalent* among women, those with higher levels of education, and those who rate their knowledge of nutrition as high, although they did not report specific data. These results do seem to imply that a heightened awareness of food safety issues rises with education.

In 2004 and 2006, the largest category of food safety concerns, after no concern at all, was for the “handling, preparation, or storage of food,” which 22% of respondents mentioned in 2004, and 23% mentioned in 2006. Included in this response, in 2006, were references to hygiene (5%), expiry date concerns (3%), safe food handling practices (3%), and cooking food properly (2%). Specific nutrients were mentioned by 11% of respondents in 2004, and by 12% in 2006, which was the third largest response category. This category, in 2006, included concerns with particular foods or food groups (4% of respondents), and the nutritional value of the food consumed, such as high fat content

(4%), carbohydrate content (4%), and trans fats (2%). The NIN and CFIC note that those most likely to be concerned with these issues were those who always read labels, or who have changed their eating habits in the past year.⁷⁸⁵

As shown in Table 14, concerns about pesticides and other chemicals, genetically modified food, and food poisoning / e-coli / salmonella were all lower in 2004 than in 2001, but concern about pesticides and other chemicals rose in 2006. In fact, in 2001, concerns about genetically modified foods were highest on the list with 15% of respondents mentioning this issue on the open-ended question. In 2004, only 6% of respondents mentioned the issue, and in 2006 the percentage declined to 5% of respondents. However, as noted above, in 2001, when respondents were specifically asked whether they were concerned with GM foods, 74% stated that they were very or somewhat concerned. Therefore, the 2006 response to the open-ended question of 6% of respondents expressing concern does not seem to represent concern with GM foods generally.

It is worth highlighting that in 2006, there were three categories of responses reported that concern chemicals in food—one of which was new in 2006. When these three categories are combined, a total of 32% of Canadians express concern about chemicals in food: 13% are concerned about additives and other chemicals in food; 13% are concerned about pesticides and other chemicals in food; and 6% are concerned about chemicals in food (general)—which is the new category.⁷⁸⁶ The CCFN does not mention why these three similar categories were divided. If they had been kept together, they would be the number one category (32%)—above those who have no concern (24% of adults), and above the handling / preparation / storage of food category (23% of adults), which is the highest category at present.

⁷⁸⁵ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed.

⁷⁸⁶ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

Table 14. Percentage of Canadian adults age 18 and over who mentioned the issue listed in response to the open-ended question: “Could you name food safety issues that concern you personally?” 2001, 2004, and 2006

Food safety concerns	2001	2004	2006
Handling / preparation / storage of foods	-	22	23
Food preparation	-	-	5
Meat handling / processing practices	7	-	-
Meat / chicken (general)	-	-	4
Food nutrients (e.g., fat, carbohydrate, trans fat)	6	11	12
Additives and other chemicals in foods (steroids, antibiotics)	10	11	13
Freshness / quality of foods	8	7	6
Pesticides and other chemicals	11	6	13
Chemicals in foods (general)	-	-	6
Genetically modified foods	15	6	5
Animal diseases; BSE / Mad cow disease	4	5	3
Food poisoning / e-coli / salmonella / other microbial infections	10	5	8
Food allergies / diabetes / other health concerns	-	-	3
Knowledge of source / country of origin	-	-	3
Preference for organic or natural foods	-	-	2
Use of fertilizers / chemicals on the farm	5	-	-
Use of hormones in food animals	4	-	-
Animal treatment in farms / husbandry practices	-	1	1
Pollution	-	1	
Miscellaneous other	10	21	8
None	23	31	24
Do not know	12	9	11

Note: A hyphen (-) denotes that the issue was not mentioned or reported in that year.

Sources: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions, 2001*, Ottawa: National Institute of Nutrition, 2002.

National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfh.ca/pdfs/TNTV-FINAL.pdf>. Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

23.5 Public concern with food quality

23.5.1 Importance of understanding impacts of food production

As noted, one of the key marks of an educated populace is that it is aware of the origins, ingredients, and impacts of what it produces and consumes on a daily basis. The European Commission Food Literacy project notes: “One of the main aspects of food literacy is being able to judge the quality and environmental compatibility of food products [and] it is particularly in this field that a lot of knowledge and competence for making decisions is required.”⁷⁸⁷

Industry has largely removed food production, in Western nations in particular, but also globally, from local farmers. According to the United Nations Environment Programme (UNEP), the growth of “agri-business,” along with replacement of crop diversity by monoculture production, has created tremendous pressures on the environment.⁷⁸⁸ It is crucial for both health and sustainability that the population knows not only where its food comes from, but also the implications of long-distant transportation of food products, the additives in food, the actual nutritional values of the food, the implications of agri-business production for local farmers and local economies, the treatment of farm animals, and the environmental impacts created by the production system, including the toxic residues of chemical farming.⁷⁸⁹ Implicit questions include: to what extent are Canadians aware of these and similar facts about their daily lives, how can such knowledge be assessed and measured, and (assuming that the level of awareness is currently low) what are the structures which currently fail to provide such fundamental information and through which it might be made available?

The dominant food supply chain in Canada and other Western nations is a complex network that starts from primary farm production, goes through various forms of processing and preservation, is often associated with long-distance travel to the market and to consumers, and ultimately involves the disposal or reuse of end products. The UNEP notes that the key environmental impacts of the agri-food sector include the depletion of natural resources, land contamination and degradation, water contamination, carbon dioxide and air emissions, hazardous and urban waste, and food and bio-safety issues.⁷⁹⁰ The Royal Society of Canada recognizes that sustainable agriculture might be an alternative to some biotechnology methods:

Many argue that conversion from industrial agriculture to more sustainable

⁷⁸⁷ Schnögl, Zehetgruber, Danninger, Setzwein, Wenk, Freudenberg, Müller, and Groeneveld. *Savoury Dishes for Adult Education and Counselling. Food Literacy Guidelines and Toolbox*, accessed. p. 30.

⁷⁸⁸ United Nations Environment Programme (UNEP). *Agri-Food and the Environment. Agri-Food Life-Cycle*, UNEP, 2001.

⁷⁸⁹ Ibid.

⁷⁹⁰ Ibid. cited in Mintcheva. "Indicators for Environmental Policy Integration in the Food Supply Chain: The Case of the Tomato Ketchup Supply Chain and the Integrated Product Policy." p.719.

systems that depend less on chemicals for their productivity would eliminate the need for some of the currently projected products of biotechnology. There are probably alternatives to some biotechnology products; many of these alternatives are likely not other products, but instead the systems and methods of sustainable agriculture. It seems likely that much more research and discussion will be required to enable society to make informed choices between these alternative approaches to food production. This exploration will need to address both societal concerns about how food is produced, and assessment of 'global' (or societal) costs of the choices to be made.⁷⁹¹

Thomas Hoban suggests that the public in North American countries is more concerned with taste than with other considerations, and does not concern itself with issues of food production such as whether seeds or plants have been produced by science, and whether or not seeds are fertile and can reproduce.⁷⁹² Nor are members of the general public particularly concerned with issues such as whether the tomatoes in the ketchup include tomatoes that have been developed through biotechnology. The TNT surveys also consistently find that Canadians are more concerned with taste than with nutrition, cost, or convenience of preparation.⁷⁹³ For example, the 2006 TNT survey found that, when asked which of the four factors were most important when choosing the food they eat, 71% of adults were concerned mainly with taste, 67% with nutrition, 30% with cost, and 29% with convenience, although university graduates were evenly divided on the importance of taste and nutrition, compared with those with less education (some high school through some postsecondary education) who all found taste as being most important. However, food production was not among the choices given in the TNT survey.

Hoban points out that Americans and Europeans generally have different cultural attitudes to food. In North America food is generally seen as fuel, and farms are located far from city centers, and are therefore not part of the public consciousness. In Europe, farms tend to be closer to population centres, and seen as public natural areas that can be visited, and food is appreciated for its aesthetic value, rather than only as fuel.⁷⁹⁴ In North America, Frank Cetera notes that one major stumbling block to a sustainable food system is:

... that consumers have lost contact with local food production and seasons, local farmers and farming heritage, and the ability and knowledge to grow their own food [...]. On the other hand, gardening and producing food locally may help to regain connections with nature and agrarian cultures.⁷⁹⁵

⁷⁹¹ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 29.

⁷⁹² Hoban. *Public Perceptions and Understanding of Agricultural Biotechnology*, accessed.

⁷⁹³ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

⁷⁹⁴ Hoban. *Public Perceptions and Understanding of Agricultural Biotechnology*, accessed.

⁷⁹⁵ Cetera, Frank Raymond. "Developing a Research Instrument for Uncovering Barriers and Benefits to Residential Perennial Food Production in Urban and Suburban Landscapes." Paper presented at the Richard Alsina Fulton Center for Sustainable Living Conference on Sustainability and the Environment, Wilson College, Chambersburg PA, March 26-27, 2004; accessed July 2006; available from March 26-27. p. 2.

Just as we have found the media, advertising, labelling, production and consumption habits and other structures to constitute key nonformal engines of education and information, so Hoban's argument indicates that cultural patterns are powerful agents of knowledge transmission, act as unconscious filters of information, and may determine conclusions, opinions, and consciousness in profound ways.

This is a large topic that could benefit from a detailed overview and analysis. However, at this point, we will give only a few brief examples to illustrate the type of learning that might be required to produce a genuinely educated populace. Here we extend our case study of food issues to briefly examine food production and processing and sugar consumption, and, in the next section, 23.7, the growth of interest in organic foods.

23.5.2 Public knowledge of processed food products and sugar consumption

The recent popular book, *Fast Food Nation*, is a wealth of statistics, research information, and extremely troubling anecdotes.⁷⁹⁶ Written by Eric Schlosser, it documents the production and processing of fast food. Although it is written mainly for an American audience, the globalization of the agri-food sector widens its generalizability and relevance to other peoples, including Canadians. Schlosser refers to evidence that 90% of the money Americans spend on food is used to buy processed food, and he notes that the current methods of food preparation are more likely to be found in journals such as *Food Technologist* and *Food Engineering* than in cookbooks.

The processed food industry supplies the majority of food to supermarkets, restaurants, and schools, as well as to the fast food outlets. Powers points out that the mandate of the food industry is to make a profit—not to promote healthy eating.⁷⁹⁷ According to Schlosser, so-called food that looks familiar has in fact been totally reformulated. Organic nutritional value has been replaced with chemical additives, as have taste and aroma. These additives come from dozens of internationally owned chemical plants, which have annual revenues of about \$1.4 billion dollars. These chemical companies design the food to taste good and to create a market of consumers who like the manufactured tastes and smells, but who are unaware of the negative effects of what they are ingesting on their health, the health of their children, or the health of the environment and economy as a whole. Again, Schlosser's key finding for our purposes is that the vast majority of consumers lack information and knowledge and are largely unaware of what they are consuming and of its impacts.

Schlosser also notes processed food products often have an excess of sugar. According to Doreen La Duca, there has been a sharp rise in sugar consumption since the mid-1980s, which coincides with a 47% increase in carbonated soft drink consumption, as well as

⁷⁹⁶ Schlosser. *Fast Food Nation: The Dark Side of the All-American Meal*.

⁷⁹⁷ Power, E.M. "Determinants of Healthy Eating among Low-Income Canadians," *Canadian Journal of Public Health*, vol. 96, no. Supplement 3, 2005: S37-S42.

with the rise in obesity levels among adults as well as children.⁷⁹⁸ In a compendium of statistics on soda pop consumption, Sally Squires notes that Americans drink an average of 56 gallons of soda pop per person per year, which amounts to nearly 600 cans of soda per person.⁷⁹⁹ Each can contains the equivalent of from 10–12 teaspoons of sugar, which is equivalent to the daily maximum recommended intake of sugar from all sources. Statistics show that the adult market for soda pop is stable but the child market is growing. According to Squires, carbonated soda pop provides more added sugar in a typical 2-year-old toddler's diet than cookies, candies, and ice cream combined. She finds that 56% of 8-year-olds drink soft drinks daily; and a third of teenage boys drink at least three cans of soda pop per day.⁸⁰⁰ La Duca notes that three cans of soda pop contain 3/4 cup of sugar and 420 calories.⁸⁰¹ According to Richard Troiano, et al., soft drink consumption among teenage boys nearly tripled between 1977–1978 and 1994.⁸⁰² Raine also notes that soft drink vending machines are “almost universal” in Canadian high schools, and many universities have exclusive contracts with soft drink manufacturers for exclusive rights on campuses.⁸⁰³

Again, the key issue here is that these statistics are not well known in the public arena, and that most of this soda pop is consumed without understanding and awareness of what is being ingested and of its consequences. If basic facts about sugar consumption remain generally unknown, then it is not surprising that there is even less public awareness of more subtle facts and impacts. For example, soda pop contains no nutrients and thus replaces other foods that have nutritional value. Squires also points to strong evidence linking soda pop consumption with numerous health disorders including obesity, attention deficit hyperactivity disorder (ADHD), tooth decay, tooth enamel disintegration, weakened bones, caffeine dependence, and sugar addiction, most of which are denied by the industry.⁸⁰⁴ In 2001, for example, a team of Harvard researchers reported the results of a 19-month study in *The Lancet*, and presented the first evidence linking soft drink consumption with obesity.⁸⁰⁵ In the study, the risk of obesity increased 1.6 times for each additional daily serving of a sugar-sweetened soft drink.

⁷⁹⁸ La Duca, Doreen. *Are We Drinking Too Much Soda Pop?*, Food Stamp Nutrition Education Program, Colorado State University, 2001; accessed November 2005; available from <http://www.ext.colostate.edu/pubs/columncc/cc010821.html>

⁷⁹⁹ Squires, Sally. *The Amazing Statistics and Dangers of Soda Pop*, Mercola, 2001; accessed November 2005; available from http://www.mercola.com/2001/mar/10/soda_pop_dangers.htm.

⁸⁰⁰ Ibid., accessed.

⁸⁰¹ La Duca. *Are We Drinking Too Much Soda Pop?*, accessed.

⁸⁰² Troiano, Richard P., Ronette R. Briefel, Margaret D. Carroll, and Karil Bialostosky. "Energy and Fat Intakes of Children and Adolescents in the United States: Data from the National Health and Nutrition Examination Surveys," *American Journal of Clinical Nutrition*, vol. 72, no. 5, 2000: 1343S-1353S.

⁸⁰³ Raine. "Determinants of Healthy Eating in Canada."

⁸⁰⁴ Squires. *The Amazing Statistics and Dangers of Soda Pop*, accessed.

⁸⁰⁵ Ludwig, David S, Karen E Peterson, and Steven L Gortmaker. "Relation between Consumption of Sugar-Sweetened Drinks and Childhood Obesity," *The Lancet*, vol. 357, no. 9255, 2001: 505-508.

According to Roseanne Schnoll, et al., refined sugar consumption has also been linked to hyperactivity disorder in children.⁸⁰⁶ In 2000, the U.S. Drug Enforcement Administration reported that the domestic sales of methylphenidate (Ritalin) increased by 500% from 1991 to 1999, and those for amphetamine (Adderall) increased by 2000%. Both of these types of drugs are prescribed primarily for attention deficit hyperactivity disorder (ADHD).⁸⁰⁷

Squires further notes that one 12-ounce can of pop also contains 28% of the amount of caffeine found in an 8-ounce cup of coffee, or 35 to 38 milligrams. A 12-ounce can of Diet Cola has about 42 milligrams of caffeine, and Pepsi One has 56 milligrams of caffeine.⁸⁰⁸ Squires points to evidence that people, including children, who consume a great deal of refined sugar and caffeine, experience withdrawal symptoms such as headaches, lethargy, tremors, and depression when they stop using the substances. Phosphorus is another common ingredient in soda pop and animal studies have found that phosphorus can deplete bones of calcium. Recent studies with human subjects have found that girls who drink soda are more prone to broken bones than those who do not, a possible result of the effects of phosphorus.⁸⁰⁹ A growing concern is that soda can be especially damaging to children and youth whose bones are still growing.

In all this, the remarkable finding, from a learning perspective, is that the accumulation of evidence on the harmful health effects of soft drink consumption has hitherto had minimal impact on consumption trends. This is largely due to the fact that the evidence is not well known, and that there are few effective learning mechanisms for transmitting this knowledge to the general public. This type of information is not generally taught in schools or considered relevant to school curricula, while the products are still actively promoted in advertisements and commercials and are often available to students in schools. If information critical to health is not effectively translated from scholarly journals and transmitted to the general public, if that public remains largely unaware of key social issues that affect wellbeing, and if there is such a disconnect between evidence and consumption patterns, then it cannot be claimed that the populace is adequately educated on matters that pertain directly to daily living.

One reason for public ignorance on such important issues, at least in the U.S., is that the United States Food and Drug Administration does not require disclosure of additives as long as they are considered by the agency to be “GRAS”—Generally Regarded as Safe. Even if they were listed, Schlosser notes that it would generally take the equivalent of a “rocket scientist” to understand the meanings of the list of ingredients and additives. For example, a typical fast food, artificially flavoured strawberry milk shake contains the following ingredients:

⁸⁰⁶ Schnoll, Roseanne, Dmitry Burshteyn, and Juan Cea-Aravena. "Nutrition in the Treatment of Attention Deficit Hyperactivity Disorder: A Neglected but Important Aspect," *Applied Psychophysiological Biofeedback*, vol. 28, no. 1, 2003: 63-75.

⁸⁰⁷ Rose, Nikolas. "Becoming Neurochemical Selves," in *Biotechnology, Commerce and Civil Society*, ed. Stehr, N. Piscataway, New Jersey: Transaction Press, 2004.

⁸⁰⁸ Squires. *The Amazing Statistics and Dangers of Soda Pop*, accessed.

⁸⁰⁹ *Ibid.*, accessed.

Amyl acetate, amyl butyrate, amyl valerate, anethol, anisyl formate, benzyl acetate, benzyl isobutyrate, butyric acid, cinnamyl isobutyrate, cinnamyl valerate, cognac essential oil, diacetyl, dipropyl ketone, ethyl acetate, ethyl amylketone, ethyl butyrate, ethyl cinnamate, ethyl heptanoate, ethyl heptylate, ethyl lactate, ethyl methylphenylglycidate, ethyl nitrate, ethyl propionate, ethyl valerate, heliotropin, hydroxyphenyl-2-butanone (10 percent solution in alcohol), ionone, isobutyl anthranilate, isobutyl butyrate, lemon essential oil, maltol, 4-methylacetophenone, methyl anthranilate, methyl benzoate, methyl cinnamate, methyl heptene carbonate, methyl naphthyl ketone, methyl salicylate, mint essential oil, neroli essential oil, nerolin, neryl isobutyrate, orris butter, phenethyl alcohol, rose, rum ether, γ -undecalactone, vanillin, and solvent.⁸¹⁰

According to Schlosser, other additives have other functions. For example, ethyl-2-methyl butyrate apparently smells just like an apple. Methyl-2-peridylketone makes something taste like popcorn, and so on. Schlosser notes that the label “natural flavor” is somewhat arbitrary and does not necessarily imply anything other than the way food is processed. Schlosser quotes Terry Acree, a professor of food science at Cornell University: “A natural flavor is a flavor that’s been derived with an out-of-date technology.”⁸¹¹ For example:

Natural flavors and artificial flavors sometimes contain exactly the same chemicals, produced through different methods. Amyl acetate, for example, provides the dominant note of banana flavor. When you distill it from bananas with a solvent, amyl acetate is a natural flavor. When you produce it by mixing vinegar with amyl alcohol, adding sulfuric acid as a catalyst, amyl acetate is an artificial flavor. Either way it smells and tastes the same.⁸¹²

These examples on soda pop, chemical additives, and other food-related issues, are presented here simply to indicate the type of information that the general public needs to know about what it is consuming and about significant aspects of daily life. There are inadequate data to assess quantitatively the degree and extent of public knowledge and awareness of such important issues, and this major data gap itself reveals the low priority currently assigned to transmitting information on key determinants of health and wellbeing. It can certainly be argued that if the public were well informed and educated on issues such as those described above, consumption patterns would change dramatically, with major economic consequences for the structure of the food industry.

It is a major objective of the educated populace domain of the Canadian Index of Wellbeing to eventually include indicators that measure and assess quantitatively the degree and extent of public knowledge and awareness of the origins, ingredients, and impacts of what it consumes. That objective will hopefully contribute to the demand for the research and survey work needed to gather the information required to populate these indicators.

⁸¹⁰ Schlosser. *Fast Food Nation: The Dark Side of the All-American Meal*. pp. 125–126.

⁸¹¹ Acree, Terry cited in *Ibid*.

⁸¹² *Ibid*.

23.6 Public interest in and use of organic food products

We have used the very basic example of food to indicate the importance of Canadians knowing what they are eating and what is in their food, not only for the sake of their own health and wellbeing, but to understand the economic and social structures that govern their lives. If Canadians are aware of what they consume, and of the systems and structures responsible for the production, processing, distribution, and knowledge generation concerning what they consume, then they are naturally empowered to take charge of their lives in this area, and to make informed choices that will improve both their own wellbeing and that of their society.

British researchers Peter Midmore, et al. identify the typical purchaser of organic products as being “well-educated individuals who are mindful of health issues, socially responsible and environmentally aware. Unsurprisingly, there is also a perception that they have higher product knowledge.”⁸¹³ According to Alberta Agriculture, Food, and Rural Development:

Much of what organic food offers speaks directly to the emerging values and traits of the Canadian consumer, not just those identified as organic consumers. Organics fit well with elements being sought by our society as a whole—environmentalism, wellness, back to basics and even the search for new experiences [...]. Organic foods seem to fit with and appeal to many of the current key traits, concerns and values of the Canadian population—those who purchase organics range from the health-conscious teenagers, to concerned mothers, to aging baby boomers. Organic consumers are educated, found in any age group and likely at both the high and the low-income range. They are no longer merely the stereotyped [sixties] flower child. Not only are organic consumers becoming mainstream, but so also are the channels for purchasing organic products, clearly seen in trends within the US and Canada.⁸¹⁴

Because of the rapidly growing public interest in organic food—an interest which cuts across age and income, as noted above, and because of the connections of this interest with knowledge of health and environmental sustainability—public interest in and awareness of this issue might be an important area for the CIW to track in terms of nutritional literacy.

⁸¹³ Midmore, Peter, Simona Naspetti, Anne-Marie Sherwood, Daniela Vairo, Mette Wier, and Raffaele Zanolli. *Consumer Attitudes to Quality and Safety of Organic and Low Input Foods: A Review*, Aberystwyth, U.K., University of Wales, 2005; accessed January 2007; available from http://www.unctad.org/trade_env/ITF-organic/meetings/misc/QLIF_Review_Reanalysis200509.pdf, p. 37.

⁸¹⁴ Alberta Agriculture, Food and Rural Development. *Organic Consumer Profile*, 2001; accessed January 2007; available from http://www.biorganic.ca/articles/Organic_Consumer_Profile.pdf, pp. 4, 7.

23.6.1 Definition and benefits of organic food

A succinct definition of organic agriculture, which points out its connection with sustainability, is given by Canadian Organic Growers:

Organic agriculture is a holistic production system designed to optimize productivity and encourage diversity in the agro ecosystem including soil microorganisms, plants and animals. The principal goal of organic production is to develop enterprises that are sustainable and harmonious with the environment.⁸¹⁵

After extensive consultations with many interested parties, the Canadian government has introduced a new organic regulation, which became effective in December 2006.⁸¹⁶ According to Canadian Organic Growers, the law regulates the use of the word “organic,” and introduces penalties for businesses that use the word for practices not in compliance with the national organic standard.⁸¹⁷

Organic products will now be labeled with a new Canadian Organic label. As Pamela Cuthbert reports:

To be phased in over the next two years, the Canada Organic label signifies that crops have been grown without the use of synthetic pesticides or fertilizers, animals have been reared without antibiotics or artificial hormones, food has been processed without irradiation or the use of certain food additives, and no material used in the production of the food has been genetically engineered.⁸¹⁸

Midmore, et al. note that labelling is a particularly important aspect of organic product knowledge.⁸¹⁹

In the absence of the type of direct personal contact available at farm shops or specialist organic outlets, [labels are] the only means by which consumers are able to differentiate between organic and conventional foods. Particularly in the supermarket situation, organic labelling enables this distinction to be made: it ensures authenticity, allows freedom of choice according to the quality attributes that consumers seek and, most importantly, it increases consumer trust in food safety.⁸²⁰

Samuel Bonti-Ankomah of Agriculture and Agri-Food Canada and Emmanuel Yiridoe of the Nova Scotia Agricultural College observe that interest in organically produced food is

⁸¹⁵ Canadian Organic Growers. *Quick Facts About Canada's Organic Sector*, 2005; accessed January 2007; available from http://www.cog.ca/documents/Organic_Quick_Facts.pdf.

⁸¹⁶ Cuthbert, Pamela. "Taking Stock of Big Organic." *The Walrus*, March, 2007, 26-27.

⁸¹⁷ Canadian Organic Growers. *Quick Facts About Canada's Organic Sector*, accessed.

⁸¹⁸ Cuthbert. "Taking Stock of Big Organic." p. 26.

⁸¹⁹ Midmore, Naspetti, Sherwood, Vairo, Wier, and Zanoli. *Consumer Attitudes to Quality and Safety of Organic and Low Input Foods: A Review*, accessed. p. 40.

⁸²⁰ Ibid., accessed. p. 40.

increasing world-wide, in response to concerns about conventional agricultural practices, food safety and human health, animal welfare, and the environment.⁸²¹ The Organic Consumers Association (OCA) in the U.S. also attributes the popularity of organic foods to growing concerns over unlabelled genetically engineered foods, irradiated foods, pesticide and drug residues routinely found in non-organic produce, and the increase in incidence of food poisoning, which the Centers for Disease Control estimates affects 76 million Americans annually.⁸²² Regarding pesticide and drug residues, the OCA notes:

Consumer Reports found that 77 percent of non-organic produce items in the average supermarket contain pesticide residues. The beef industry acknowledges that 94 percent of all U.S. beef cattle have hormone implants, which are banned in Europe as a cancer hazard. Some 30 percent of all U.S. dairy cows are injected with the controversial genetically engineered Bovine Growth Hormone, banned in every other industrialized country in the world. The Centers for Disease Control recently warned that 16 percent of all U.S. ground meat contains potentially dangerous antibiotic resistant bacteria. Organic farming prohibits the use of pesticides, drugs, hormones and antibiotics.⁸²³

Charles Benbrook, chief scientist with The Organic Center in the U.S., presents a wealth of evidence for the benefits of organic products, which are beyond the scope of this literature review to discuss in detail.⁸²⁴ As an example, however, citing Donald Davis, et al.,⁸²⁵ Benbrook notes:

Careful research based on USDA data on the nutrient content of common foods has shown a significant decline in the levels of six nutrients since 1950—protein, calcium, iron, riboflavin, phosphorous, and ascorbic acid (Vitamin C). Riboflavin levels have fallen on average by 37% and iron and ascorbic acid content is down by 15%. These reductions widen the gap between adequate and actual daily nutrient intakes for millions of Americans. Organic farming is a proven option to increase nutrient levels both in the soil and in harvested foodstuffs. Organic farming methods build the quality of soil over time and also increase the ability of plants to extract minerals from the soil. Several studies have shown, for example, that organic farming increases vitamin and antioxidant concentrations by, on

⁸²¹ Bonti-Ankomah, Samuel, and Emmanuel K. Yiridoe. *Organic and Conventional Food: A Literature Review of the Economics of Consumer Perceptions and Preferences*, Organic Agriculture Centre of Canada, Nova Scotia Agricultural College, 2006; accessed January 2007; available from <http://www.oacc.info/Docs/BONTI & YIRIDOE April 28 2006 Final.pdf>.

⁸²² "Organic Foods: Dangerous for Human Consumption - No: Consumers Are Flocking to Organic Foods Because They Know What's Good for Them." *Charlotte Observer*, Charlotte, North Carolina, May 18, 2002; available from http://archives.foodsafetynetwork.ca/agnet/2002/5-2002/agnet_may_21.htm.

⁸²³ Organic Consumers Association. *Despite U.S. Pressure Five E.U. States Continue Bans on GE Crops*, accessed.

⁸²⁴ Benbrook, Charles. *New Insights on the Consumer Benefits of Organic Food and Farming*, The Organic Center, 2006; accessed January 2007; available from http://www.organic-center.org/reportfiles/Res_Overview_2006.pdf, p. 3.

⁸²⁵ Davis, Donald R., Melvin D. Epp, and Hugh D. Riordan. "Changes in USDA Food Composition Data for 43 Garden Crops, 1950 to 1999," *Journal of the American College of Nutrition*, vol. 23, no. 6, 2004: 669-682.

average, about 30 percent—increases large enough to reverse the long-run decline in the concentrations of most nutrients.⁸²⁶

Given the implications for the contribution of organic products to the long-term health and wellbeing of the public and the environment, including animal and ecosystem wellbeing, scientific evidence finds few costs associated with use of organic products.⁸²⁷

23.6.2 Organic products are becoming mainstream

As Alberta Agriculture, Food, and Rural Development noted above, organic products have moved out of the specialty niche and are becoming mainstream.⁸²⁸ Organic products are becoming more accessible to the average purchaser. They have moved from being found strictly in “health food stores” into local farmers’ markets, and into mass-market outlets such as WalMart and Loblaws supermarkets.

Organic food products are growing in popularity in Canada, and worldwide. Results from a 2000 survey conducted by Environics International, and analysed by Alberta Agriculture, Food, and Rural Development, reports the frequency of organic purchases during the year. The survey found that 71% (approximately 21.8 million) of Canadian adults have tried organic food, while only 26% (approximately 8 million) have never purchased any organic food.⁸²⁹ The seventy-one percent of adults who have tried organic food is composed of eighteen percent of Canadian adults who are regular (frequent) organic food purchasers, 22% who purchase organic food several times a year, and 31% who purchase organic food one to two times per year (3 percent did not know or provided no answer).⁸³⁰

Agriculture and Agri-Food Canada reports that retail sales in the organic food industry have demonstrated a 20% annual growth over the past ten years, compared to the 2–4% growth rate for the total retail food market.^{831, 832} While only representing about 2% of the total food market, in Canada the organic food industry is worth over \$1 billion per year.⁸³³ Agriculture and Agri-Food Canada and Canadian Organic Growers produce yearly statistics for organic production in Canada.⁸³⁴ The number of certified farms in Canada has risen from 1174 in 1992 to 3618 in 2005, with another 241 farms in

⁸²⁶ Benbrook. *New Insights on the Consumer Benefits of Organic Food and Farming*, accessed. p. 3.

⁸²⁷ Ibid., accessed.

⁸²⁸ Alberta Agriculture. *Organic Consumer Profile*, accessed.

⁸²⁹ Ibid., accessed.

⁸³⁰ Ibid., accessed.

⁸³¹ Agriculture and Agri-Food Canada. *Canada's Organic Industry*, 2004; accessed January 2007; available from http://ats.agr.ca/supply/factsheets/3313_e.pdf.

⁸³² Cunningham, Rosalie. *Organic Food*, Alberta Agriculture, Food and Rural Development, 2004; accessed January 2007; available from [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/sis8434/\\$file/OrganicFood.pdf?OpenElement](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sis8434/$file/OrganicFood.pdf?OpenElement).

⁸³³ Ibid., accessed.

⁸³⁴ Macey, Anne. *Certified Organic Production in Canada 2005*, Canadian Organic Growers and Agriculture and Agri-Food Canada, 2006; accessed January 2007; available from http://www.cog.ca/documents/certifiedorganicproduction05E_000.pdf.

transition.⁸³⁵ However, 80% of organic food consumed is imported, mostly from the U.S.⁸³⁶ The organic food industry's goal is to increase its market share to 10% of the Canadian retail market by 2010.⁸³⁷

In the U.S., the Organic Consumers Association (OCA) claims that ten million U.S. households are buying organic foods on a regular basis.⁸³⁸ It reports that the organic food industry is worth \$10 billion a year, and the current growth rate for organic foods is 24% annually, which is almost 10 times the growth rate for conventional foods. The OCA predicts that organic agriculture will become the dominant form of agriculture in the U.S. by the year 2020.

23.6.3 Knowledge and educational attainment of the organic food purchaser

U.K. researchers Brewster, Glaser, and Haughton note that the organic food industry has developed and grown as a result of increased knowledge on the part of the public about how food is grown, raised, and processed.⁸³⁹

Organic food is the quintessential knowledge dependent industry. Consumers want to know that the food they consume has been grown according to certain specific standards, under certain conditions and furthermore the organic food standards guarantee that growers, processors and importers are all registered and regularly inspected. [...] One of the reasons that knowledge is so important in this industry is because so much depends on accurate trustworthy knowledge. The consumer chooses to buy organic food specifically because they have informed themselves of the benefits in environmental, ethical and health terms. It is this knowledge that allows the consumer choice and it is the relevant communication of that knowledge that allows the producer to fulfill that need.⁸⁴⁰

Bonti-Ankomah and Yiridoe report that in one U.S. study by Demeritt, in which 59% of respondents indicated that they never considered organic products because they did not know about them, lack of knowledge and awareness was considered the main reason why people do not buy organic food.⁸⁴¹

⁸³⁵ Ibid., accessed.

⁸³⁶ Cuthbert. "Taking Stock of Big Organic."

⁸³⁷ Agriculture and Agri-Food Canada. *Canada's Organic Industry*, accessed.

⁸³⁸ Organic Consumers Association. *Despite U.S. Pressure Five E.U. States Continue Bans on GE Crops*, accessed.

⁸³⁹ Brewster, Christopher, Hugh Glaser, and Barny Haughton. *AKTive [Advanced Knowledge Technologies] Food: Semantic Web Based Knowledge Conduits for the Organic Food Industry*, U.K. Engineering and Physical Sciences Research Council, 2005; accessed January 2007; available from http://eprints.ecs.soton.ac.uk/11565/01/Brewster_SWCASE.pdf

⁸⁴⁰ Ibid., accessed. p. 3.

⁸⁴¹ Demeritt, L. *All Things Organic 2002: A Look at the Organic Consumer*, Bellevue, WA.: The Hartman Group, 2002. cited in Bonti-Ankomah, and Yiridoe. *Organic and Conventional Food: A Literature Review of the Economics of Consumer Perceptions and Preferences*, accessed. p. 21.

Midmore, et al. report another European study of consumer behaviour, perceptions, and attitudes in eight European countries that found a significant difference in the knowledge levels of regular and occasional organic purchasers.⁸⁴² In this study, adults who make at least one organic purchase a week are considered to be regular consumers; adults who make two purchases a month are occasional purchasers; and those who never buy organic products are considered as non-regular consumers. Both regular and occasional groups had the same concerns, but regular purchasers, who viewed organics as a “bundle of linked attributes,” were more knowledgeable about organics in general.⁸⁴³ However, Midmore, et al. also note that levels of knowledge about organic farming standards and processes varied considerably across Europe:

In some countries, knowledge of the actual concept is still quite vague, whilst in others the relationship between reduced chemical use and organic production appears to be better understood. Most often, consumers appear to recognise the particular link between decreased pesticide / fertiliser use and the production of foods which are healthier and more environmentally friendly.⁸⁴⁴

Midmore, et al. found that organic consumption is more directly related to attitude, which in turn is connected to knowledge, than to disposable income.⁸⁴⁵ Among the reasons for non-use of organic products, Midmore, et al. note a lack of interest, “relating to the particular consciousness which is often associated with organic consumption.”⁸⁴⁶ They argue that this lack of interest arises “from lack of food culture or knowledge of food preparation and lack of concern for health or ethical production issues[...]. [S]uperior organic product knowledge appears to be associated with better overall levels of education.”⁸⁴⁷

The 2000 survey conducted by Environics International, which was mentioned above, found that 60% of regular organic purchasers are women, and that both health-conscious younger people and baby boomers, ages 35–55, are driving the market.⁸⁴⁸ The survey also found a close correlation between the education level of organic purchasers and the amount of organic foods they purchase. Alberta Agriculture, Food, and Rural Development notes: “The more educated the respondents, the more likely they are to make organic purchases.”⁸⁴⁹ In addition, the survey found that organic purchasers are likely to have either low or high incomes, but are under-represented in the \$60,000–\$80,000 income range. However, the findings by this survey on education and income levels of organic purchasers have not always been replicated, as we see below.

⁸⁴² Midmore, Naspetti, Sherwood, Vairo, Wier, and Zanoli. *Consumer Attitudes to Quality and Safety of Organic and Low Input Foods: A Review*, accessed.

⁸⁴³ *Ibid.*, accessed.

⁸⁴⁴ *Ibid.*, accessed. p. 40.

⁸⁴⁵ *Ibid.*, accessed.

⁸⁴⁶ *Ibid.*, accessed.

⁸⁴⁷ *Ibid.*, accessed. pp. 38–39.

⁸⁴⁸ Alberta Agriculture. *Organic Consumer Profile*, accessed.

⁸⁴⁹ *Ibid.*, accessed. p. 2.

The effect of education on the purchase of organic products is variable in the research. Gary Thompson, of the University of Arizona, notes that U.S. national evidence suggests that there is a positive correlation between education and organic purchases.⁸⁵⁰ However, studies from California and New York, both of which have a high level of organic purchasers, show that the “frequency of organic purchases was not associated statistically with education levels.”⁸⁵¹ And when graduate study is distinguished from undergraduate study, Thompson cites three studies that show higher educational attainment actually lowers the probability of choosing organic products or of considering organic produce better. A fourth study also found that the “presence of college education lowers the likelihood of being willing to pay more for pesticide-free produce.”⁸⁵² Thompson concludes that these conflicting results regarding the effects of educational attainment on organic purchase behaviour might reflect how education is measured, and that further investigation is needed.

Results from a small survey that was given to 300 adults in South Carolina in 2003 to assess attitudes related to purchasing organic produce also found that education or income factors did not influence attitudes towards purchase of organic produce.⁸⁵³ The survey was not a representative sample, since over half were college graduates, and 24.4% indicated that they had obtained a graduate or professional degree. Household income for over half of the respondents was greater than \$40,000. In fact, the survey found that “respondents in the highest education category demonstrated less preference for organic produce.”⁸⁵⁴ Other studies have found that organic purchasers are not necessarily the most educated. However, this is often attributed to the fact that women, who are mainly responsible for nutrition in their families, have a lower educational level than men, and that women outnumber men as organic purchasers.⁸⁵⁵

The National Institute of Nutrition (NIN), in its analysis of the 2001 Tracking Nutrition Trends survey, identified individuals who consistently select organic products as “knowledgeable naturalists.”⁸⁵⁶ It argued that these people, whom it finds comprise 22% of adults, are “extremely well versed in nutrition issues,” and “attribute a very high importance to nutrition.”⁸⁵⁷ The 2001 TNT survey was the only survey for which the NIN reported this type of analysis. While the other four groups⁸⁵⁸ that were identified also are

⁸⁵⁰ Thompson, Gary D. "Consumer Demand for Organic Foods: What We Know and What We Need to Know," *American Journal of Agricultural Economics*, vol. 80, no. 5, 1998: 1113-1118.

⁸⁵¹ Ibid. p. 117.

⁸⁵² Ibid. p. 117.

⁸⁵³ Zehnder, Geoff, Chip Hope, Hoke Hill, and James H. Blake. "An Assessment of Consumer Preferences for IPM- and Organically Grown Produce," *Journal of Extension*, vol. 41, no. 2, 2003, accessed January 2007; available from <http://www.joe.org/joe/2003april/rb3.shtml>.

⁸⁵⁴ Ibid.

⁸⁵⁵ Lockie, Stewart, Kristen Lyons, Lawrence Geoffrey, and Janet Grice. "Choosing Organics: A Path Analysis of Factors Underlying the Selection of Organic Food among Australian Consumers," *Appetite*, vol. 43, no. 2, 2004: 135-146.

⁸⁵⁶ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions, 2001*.

⁸⁵⁷ Ibid. p. 52.

⁸⁵⁸ The NIN profiles the other groups as: “frenzied families” (24%), “balanced pragmatics” (15%), “wannabe weight watchers” (17%), and “too young to care” (22%).

concerned with nutrition, the “knowledgeable naturalists” is the group that prefers to buy organic products, and is the group that is the most knowledgeable. The NIN notes: “With a national sample of 2000, one can say with 95% certainty that the overall survey results are within 2.2 percentage points of what they would have been had the entire adult Canadian population been surveyed.”⁸⁵⁹

According to the NIN analysis, the “knowledgeable naturalists” are the most knowledgeable, but not the most highly educated, which indicates that they acquired their knowledge informally, out of the realm of formal education. This population segment is evenly divided, with 32% having only a primary education, 36% having a secondary education, and 31% having a postsecondary education. Income is also evenly divided, with 22% having an income under \$30,000 per year, 26% having between \$30,000 and \$50,000, and 23% having an income between \$50,000 and \$75,000. Only 11% have an income between \$75,000 and \$100,000, and 9% have an income over \$100,000. (10% refused to give financial information.) Women comprise 58% of this group, and men 42%, with the mean age being 48 years. By contrast, the group in the 2001 TNT survey identified as having the highest education and income is called the “balanced pragmatics” by the NIN, which defines this group as “mostly middle-aged, highly educated / high income consumers pursuing healthy lifestyle and eating well, but not focusing on nutrition to a great extent.”⁸⁶⁰

In 2006, the Canadian Council of Food and Nutrition found that people who see themselves as more health- and nutrition-oriented more often choose organic food than those who are not nutrition-oriented.⁸⁶¹ The only data it gives as examples are the following:

The fact that a food is organically grown is slightly more influential for women compared with men (54% and 47%, respectively); people who always check labels versus those who almost never do (61% and 41%, respectively); and those who think that their eating habits are excellent or very good compared with those who report poor eating habits (56% and 41% respectively). In other words, people who emphasize nutrition in their life choices say that they are influenced by whether a food is organic.

Whether a food is produced using biotechnology is more influential for those who check labels frequently compared with those who rarely do (34% and 21%, respectively); those who have a higher level of perceived nutrition knowledge versus a low level (37% and 19%, respectively); and those who see themselves as having excellent eating habits compared with poor habits (29% and 23%, respectively).⁸⁶²

⁸⁵⁹ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions, 2001.*

⁸⁶⁰ Ibid. p. 52.

⁸⁶¹ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI.*

⁸⁶² Ibid. p. 53.

The NIN / CFIC reported similar results for 2004. However, it did not present specific data.⁸⁶³

In a review of the literature on perceptions about organic foods, Bonti-Ankomah and Yiridoe report key findings about the reasons for organic purchases:

Most of these studies concluded that consumers purchase organic foods because of a perception that such products are safer, healthier, and more environmental friendly than conventionally produced alternatives. Some studies reported health and food safety as the number one quality attribute considered by organic product buyers. Concern for the environment was less important compared to food safety and health concerns, suggesting that such consumers might rank private or personal benefits higher than the social benefits of organic agriculture.⁸⁶⁴

However, a Danish study reports that both health and environmental concerns are equally important influences in choosing organic products. A study by Wier and Andersen for the Danish Research Centre for Organic Farming examined actual purchasing data from 2000 households during 1997–2001, and compared actual behaviour with questionnaire responses from the same households on attitudes, stated values, and food purchasing behavior.⁸⁶⁵ Denmark has the highest per capita European consumption of organic products.⁸⁶⁶ As well, in Denmark the government subsidizes and promotes the organic industry, resulting in lower prices and an organic market share of 3–4% of the retail food market.⁸⁶⁷

Mette Wier and Laira Andersen analysed the results to form a profile of those with a high propensity to purchase organic goods. Two main characteristics were identified: organic buyers who were more health concerned and thus had “use values”, and organic buyers who were more concerned with animal welfare and the environment, and had “non-use values.” Use values are private and associated with actually consuming (eating) the product. Those who are mostly concerned with these values are also concerned with health, taste, and / or the freshness of food, in that order. Health concerns also included environmental elements such as concern about health risks from eating foods with pesticide residues. Those who are mostly concerned with non-use values are more concerned with a sustainable environment, and include ethical issues such as fair trade, third world impacts, animal welfare, and local or regional production.

⁸⁶³ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed.

⁸⁶⁴ Bonti-Ankomah, and Yiridoe. *Organic and Conventional Food: A Literature Review of the Economics of Consumer Perceptions and Preferences*, accessed. p. 24.

⁸⁶⁵ Wier, Mette, and Laura Mørch Andersen. *Consumer Demand for Organic Foods - Attitudes, Values and Purchasing Behaviour*, Institute of Local Government Studies, Denmark, Newsletter from Danish Research Centre for Organic Farming, No. 2, June, 2003; accessed January 2007; available from <http://www.darcof.dk/enews/jun03/consum.html>.

⁸⁶⁶ Midmore, Naspetti, Sherwood, Vairo, Wier, and Zanoli. *Consumer Attitudes to Quality and Safety of Organic and Low Input Foods: A Review*, accessed.

⁸⁶⁷ Thompson. "Consumer Demand for Organic Foods: What We Know and What We Need to Know."

By combining information on stated values for organic goods with actual purchase behaviour, Wier and Andersen could correlate organic purchasers with their most common values. Two-thirds of respondents reported having both types of values. Those who only held non-use values consisted of 16% of respondents, those with no stated values concerning these issues constituted 16% of respondents, and those with only use-values constituted only 1% of respondents. Organic purchases for those with both values were more than twice that of households having non-use values only. In turn, households with non-use values purchased organic products more than twice as often as did those households having no values. Organic purchases for those having only use values were negligible because most respondents who had use values reported having both types of values, so their purchases were recorded in the latter category.

The authors note that the results suggest: “[N]on-use benefits are generally acknowledged, but only those having use values in addition, actually purchase organic to a high degree.”⁸⁶⁸ The study also found that education level did significantly increase the proportion of the food budget used to purchase organic products. However, it also found that having children aged 15 to 20 years living at home reduced organic purchases, but those households having children living at home under the age of 15 increased organic purchases. In 2003, this study was repeated in Britain, which has the fastest growing market for organic products in Europe, with a similar result.⁸⁶⁹

In Sweden, people generally have very positive attitudes toward organic foods and quite negative attitudes towards genetically modified foods.⁸⁷⁰ In a study representative of the Swedish population, Ulla-Kaisa Koivisto Hursti and Maria Magnusson looked at perceptions of GM and organic foods.⁸⁷¹ In terms of perceptions of GM foods, they found that males, younger respondents, and those with a high level of education were significantly more positive than were females, older respondents, and those with a low level of education. In terms of organic foods, women were significantly more positive than men but there were no clear age or educational differences. The researchers then divided the respondents, based on survey questions, into low and high knowledge groups, and then compared high and low knowledge levels of adults about biology and genetics with their perceptions of GM and organic foods. They found no significant differences between the low and high knowledge groups in their opinions of GM or organic foods.⁸⁷²

It appears from the evidence given above, such as that reported by Thompson, that the fact that the “frequency of organic purchases was not associated statistically with education levels,”⁸⁷³ is a significant finding. This lack of connection between organic

⁸⁶⁸ Wier, and Andersen. *Consumer Demand for Organic Foods - Attitudes, Values and Purchasing Behaviour*, accessed. p. 5.

⁸⁶⁹ Midmore, Naspetti, Sherwood, Vairo, Wier, and Zanoli. *Consumer Attitudes to Quality and Safety of Organic and Low Input Foods: A Review*, accessed.

⁸⁷⁰ Koivisto Hursti, Ulla-Kaisa, and Maria K. Magnusson. "Consumer Perceptions of Genetically Modified and Organic Foods. What Kind of Knowledge Matters?," *Appetite*, vol. 41, 2003: 207-209.

⁸⁷¹ Ibid.

⁸⁷² Ibid.

⁸⁷³ Thompson. "Consumer Demand for Organic Foods: What We Know and What We Need to Know." p. 117.

purchases and education levels is usually found when the social environment is primarily supportive of organic products. However, organic purchase is associated with higher nutritional and ecological knowledge levels among purchasers than among non-purchasers, which suggests that adults are informally educating themselves about health and ecological issues.

23.6.4 Measures of public organic food choice in Canada

The Institute for Ethical Leadership in Vancouver notes that a “measure of societal well-being is the kind and quality of the food people are eating as well as the knowledge they have of what constitutes a healthy diet. The availability and affordability of organic food are key issues.”⁸⁷⁴ In addition to suggesting measuring the level of public knowledge about how diet affects health, one of the specific indicators it proposes is: “How many people eat whole organic food versus processed food?”

As discussed above, the Tracking Nutrition Trend (TNT) surveys are the only consistent Canadian nutrition surveys that include knowledge elements. The 2004 and 2006 surveys asked about factors that influence food choice, such as maintaining good health, and providing energy or stamina. Included on this list of choices were the options of whether the food is organically grown, and if a food is produced using biotechnology. Both of these issues were new to the surveys in 2004.

Figure 11 illustrates the results that find that in 2004 organic food and biotechnology were very influential for a minority of Canadian adults, and not influential for the majority.⁸⁷⁵ By 2006, half of adults were influenced by organics. Specifically, in 2004, 41% of adults indicated that whether the food is organically grown is “somewhat / very influential” in their food choice, compared with 57% who said it was “not too much / not at all influential,” and 2% who did not answer or did not know. The 2006 survey showed a growth in interest in organic food. In 2006, 50% of adults stated that whether the food is organically grown is “somewhat / very influential” in their food choice, compared with 48% who said it was “not too / not at all influential,” and 2% who did not answer or did not know.⁸⁷⁶

In terms of whether a food was produced using biotechnology, in 2004, 27% of adults said it was somewhat / very influential, compared with 64% who said it was not too much/ not at all influential. And in 2006, this result had changed very little—27% of adults said it was somewhat / very influential, compared with 61% who said it was not too much / not at all influential.⁸⁷⁷

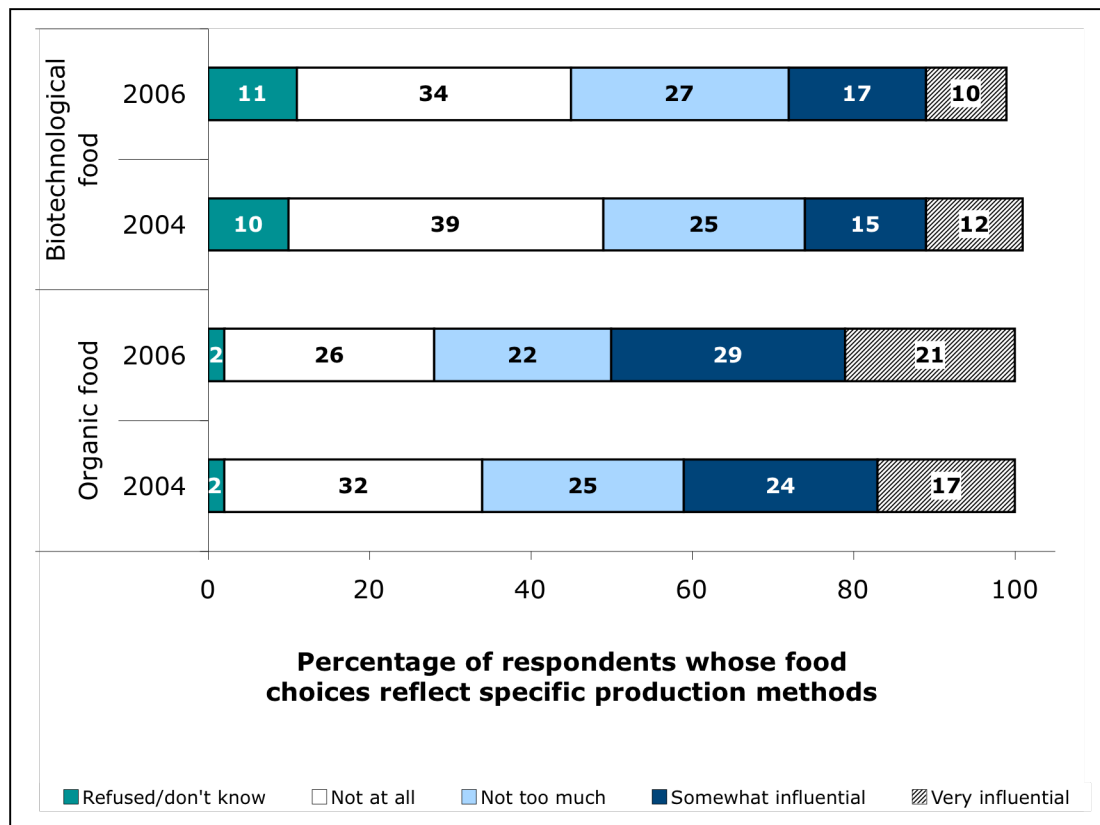
⁸⁷⁴ Institute for Ethical Leadership. *Making the Stretch. A Report on What Constitutes Societal Well-Being and How to Measure It*, Vancouver, 2002; accessed January 2007; available from <http://www.ethicalleadership.com/content/Making the Stretch.pdf>.

⁸⁷⁵ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, accessed.

⁸⁷⁶ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

⁸⁷⁷ Ibid.

Figure 11. Percentage of Canadian adults whose food choices are influenced by organic or biotechnological production methods, 2004 and 2006



Question: When you are selecting food to eat, to what degree, if any, does each of the following influence your food choice?

Note: These rows do not sum to 100%. The NIN/CFIC note that this is because of rounding. National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; p. 16.

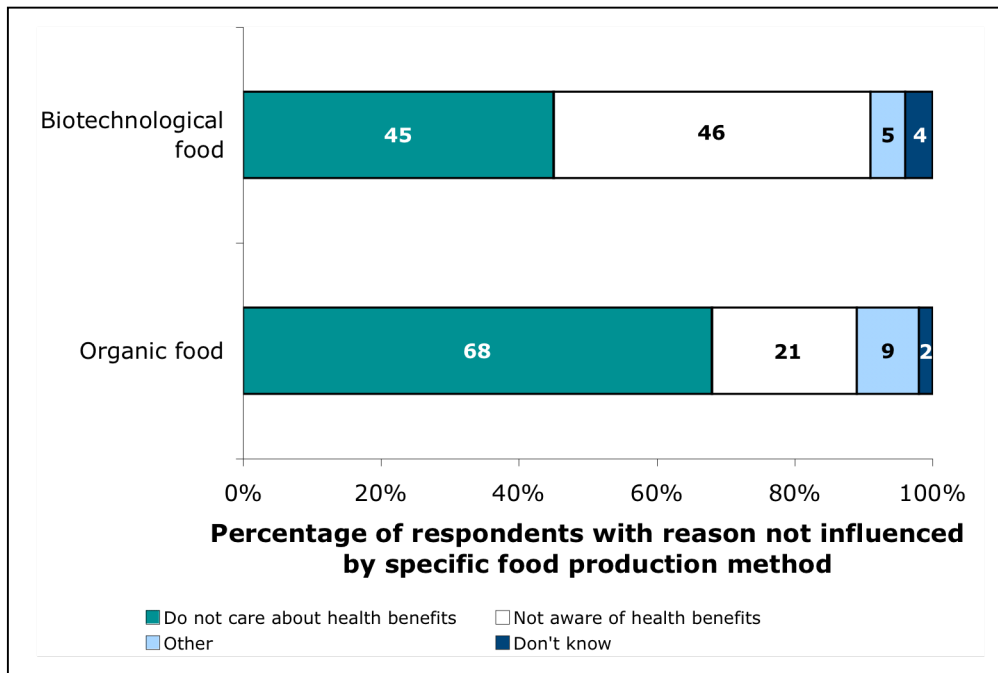
Sources: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfnc.ca/pdfs/TNTV-FINAL.pdf>.

Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

The 2006 TNT survey also asked about reasons for lack of influence, with the choices being “not aware of health benefits, do not care about health benefits, other, and don’t know.” Results seen in Figure 12 find that 68% of those who said organic food was not an influence said that reason was that they did not care, and 21% said they were not aware. Of those who did not find food produced using biotechnology an influence on

their food choice, there was an even divide between those who did not care (45%) and those who were not aware (46%).⁸⁷⁸

Figure 12. Percentage of Canadian adults with reasons why their food choices are not influenced by organic or biotechnological production methods, 2006



Question: I am going to list a series of food characteristics that you do not find influential. Please tell me if they do not influence your food choice because you are not aware of the health benefits or you do not care about the health benefits.

Note: Base: Those who were not too / not at all influenced by the food characteristics, n=939.

Source: Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

The 2004 and 2006 TNT surveys also asked about the use of information on food packages, and included “[t]o see whether the food is organic,” as one of the choices.⁸⁷⁹ In

⁸⁷⁸ Ibid.

⁸⁷⁹ Choices in 2004 included (listed in terms of response priorities, and percentage of adults who gave “sometimes” or “often” as their response):

- To find food labeled as high or low in nutrients like fat, fibre, or vitamins (86% of adults)
- To find foods that claim to be good for your health (83%)
- To get a general idea of the calorie content of a food (77%)
- To see whether food contains high/low levels of certain nutrients (76%); To see whether the food contains a specific ingredient (75%)

2004, one of the choices was also “To find foods that are not produced by genetic modification,” but this choice was eliminated in 2006. In 2004, 49% of adults answered they used the information on packages for information on GM foods. Of course, GM foods are not labelled, but organic foods do not use food products that have been genetically modified.

Results found that whether or not a food is organic was not a high priority for Canadians, although in both 2004 and 2006, as shown in Figure 13, 50% of Canadian adults responded that they sometimes or often used information on food packages to see whether the food is organic. This compares, in 2004, with 20% of adults who said rarely, and 30% who did not know, and in 2006, with 22% of adults who said rarely and 28% who did not know. In 2006, organics was the eighth priority out of nine possible choices, ahead of only “To see whether the food contains nuts.” In 2004, organics was the 10th priority out of 12, again ahead of “To see whether the food contains nuts,” and “To find foods that are kosher,” a choice dropped in 2006. Top of the list in 2006 was “To see how much of a nutrient is in a product,” which 87% of adults stated they sometimes or often did, and in 2004, “To find food labelled as high or low in nutrients like fat, fibre, or vitamins,” which 86% of adults stated they sometimes or often did.

-
- To compare similar types of foods with each other (68%)
 - To figure out how much of a food product you or your family should eat (64%)
 - To find foods that are not produced by genetic modification (49% of adults, including 22% sometimes, and 27% often)
 - To see whether the food is organic (50%)
 - To see whether the food may contain nuts (32%)
 - To find foods that are kosher (23%)

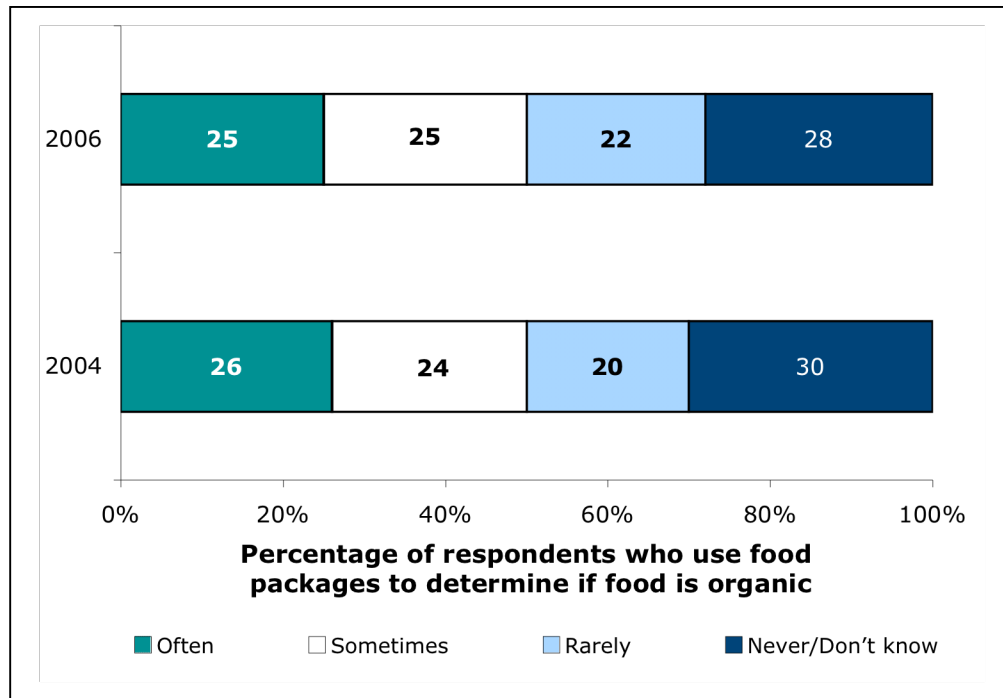
National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfh.ca/pdfs/TNTV-FINAL.pdf>.

In 2006, the choices and responses included (listed in terms of response priorities, and percentage of adults who answered sometimes or often):

- To see how much of a nutrient is in a product (87% of adults)
- To get a general idea of the calorie content of a food (78%)
- To find foods that claim to be good for your health (79%)
- To see whether the food contains a specific ingredient (74%)
- To compare similar types of foods with each other (70%)
- To compare different types of foods with each other (63%)
- To figure out how much of a food product you or your family should eat (59%)
- To see whether the food is organic (50%)
- To see whether the food contains nuts (45%).

Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

Figure 13. Percentage of Canadian adults who use information on food packages to see if the food is organic, 2004 and 2006



Question: When you look at the information on food packages, either in the store or at home, how often, if at all, do you use the information provided in the following ways. Would you say often, sometimes, rarely, or never?

Source: Sources: National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfh.ca/pdfs/TNTV-FINAL.pdf>.

Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

In 2006, as previously mentioned, an open-ended question was asked: “What makes a food “healthy?” Six percent of adults answered “organic,” and 5% said “no preservatives.” However, 30% of respondents replied, “contains good nutrients,” 21% answered “lower in negative nutrients,” and 21% indicated “fresh format.” These were the top three responses.⁸⁸⁰

Since organic food, as noted above, contains good nutrients, is lower in negative nutrients, and is often from local sources, and is therefore fresh, it would seem that Canadian adults have a lack of knowledge concerning organic food. Although 50% of adults, when give a list from which to choose, in 2004 and 2006 chose “to see whether the food is organic” as a use of information on food packages, when not give a list from which to choose, only 6% of adults thought of a food being organic as a characteristic of

⁸⁸⁰ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

healthy food. Whether Canadians learn more about organic food in the future has implications for ecological sustainability and wellbeing in general, and for health and nutritional literacy in particular.

24. Civic Literacy, Political Knowledge, and Citizenship Education

Without the knowledge to act meaningfully, citizenship is empty.
Henry Milner⁸⁸¹

The importance of the concept of citizenship for the wellbeing of society and individuals is the focus of renewed interest among government and international organizations, politicians, educators, and the general populace.⁸⁸² This is partially a response to international trends that show a growing civic or “democratic deficit,” which refers to a decline in political interest, knowledge, and citizen engagement in civic life. A key and frequently referenced marker and indicator of this democratic deficit is declining voter participation.⁸⁸³ Though many alternative explanations, hypotheses, and potential remedies have been proposed, there is a general consensus among groups concerned with this trend that a healthy democracy needs citizens who are competent in civic literacy.

Just as health literacy is both a key indicator of an educated populace and a determinant of population health, civic literacy is also a marker of an educated populace as well as a determinant of good governance and community vitality. In this way, several central indicators of the CIW educated populace domain are determinants of indicators in other domains, and the educated populace domain as a whole serves as a useful linking variable and connective tissue between the various CIW domains. Indeed, the following discussion of civic literacy illustrates the very purpose of the Canadian Index of Wellbeing in pointing to the many linked facets and dimensions of wellbeing.

Civic literacy has many interpretations, but basically it refers to civically literate citizens as those who:

- are interested in, pay attention to, and have a reasonable understanding of the world around them
- possess knowledge and understanding of civic processes
- engage in civic activities that form a foundation for democracy⁸⁸⁴

Paul Reed of Statistics Canada notes that at its root, “civic” refers to life lived in common, and in its contemporary sense it involves areas such as:

⁸⁸¹ Milner, Henry. "Informed Citizenship: Canada in a Comparative Context," *Canadian Diversity*, vol. 2, no. 1, 2003.

⁸⁸² Milner, Henry. *Civic Literacy: How Informed Citizens Make Democracy Work*, Medford, Massachusetts: Tufts University, 2002.

⁸⁸³ Hébert, Yvonne, and Alan Sears. *Citizenship Education*, Canadian Education Association, 2001; accessed July 2005; available from http://www.cca-ace.ca/media/en/Citizenship_Education.pdf.

⁸⁸⁴ Milner. *Civic Literacy: How Informed Citizens Make Democracy Work*.

- shared principal values and beliefs regarding what are the interests of the community as a whole
- majority consensus on general arrangement that enable members of a community (whether physical or otherwise) to live with minimal conflict
- a recognition that community order and continuity depends on members discharging their responsibilities as well as exercising their rights, which implies engagement by a significant portion of the community's members in governance and maintenance of their community
- a sense of attachment or loyalty to the community⁸⁸⁵

Two of the most important elements in the contemporary understanding of “civic” are:

- a capacity for co-operative, often informal collective action in support of the social good, whatever its specifics
- a concern for the well-being of those who are disadvantaged⁸⁸⁶

Jacques Delors emphasizes the importance of education, including lifelong learning, for creating an informed citizenry. In *Learning: the Treasure Within*, he notes:

[I]n every case the central aim of education is the fulfillment of the individual as a social being [...]. Its highest aim will then be to give everyone the means of playing an informed and active part as a citizen, which is something that cannot be fully achieved except within the framework of democratic societies [...]. When pupils become citizens [...] they will have to reconcile the exercise of individual rights based on public freedoms with the fulfillment of duties and responsibilities towards others and to their communities. It is thus education in general, as a process for constructing the faculty of judgement, that is being called into action.⁸⁸⁷

Mark Kingwell adds:

Citizenship is a way of meeting one of our deepest needs, the need to belong; it gives voice and structure to the yearning to be part of something larger than ourselves. By the same token, citizenship is a way of making concrete the ethical commitments of care and respect, of realizing in action an obligation to aid fellow travelers—in short, of fostering justice between persons.⁸⁸⁸

⁸⁸⁵ Reed, Paul. *Developing Civic Indicators and Community Accounting in Canada. Draft*, Ottawa, Centre for Community Enterprise, Statistics Canada Nonprofit Sector Knowledge Base Project, 2000; accessed June 2005; available from (in three parts):

http://www.cedworks.com/files/pdf/free/Developing_Civic_Indicators01.pdf.

⁸⁸⁶ Ibid., accessed. p. 10.

⁸⁸⁷ Delors, Jacques. *Learning: The Treasure Within. Report to UNESCO of the International Commission on Education for the Twenty-First Century*, Paris: UNESCO, 1996. p. 54. 62.

⁸⁸⁸ Kingwell, Mark. "The Accidental Citizen: Rethinking Civic Membership in the Age of Globalization [Excerpt from *The World We Want*]." *THIS Magazine*, February, 2000, 22-23. p. 23.

Dale Snauwaert cites Ronald A. Dahl as arguing that democracy is a system of rights premised upon the logic of equality.⁸⁸⁹

At its core is a fundamental belief in moral equality, a belief that *all* human beings possess an equal inherent dignity. Its logic runs as follows: if we are morally equal, then we also possess rights, inviolable claims to the actual enjoyment of particular social goods guaranteed by society [...]. As moral equals, all citizens of a liberal democracy have an inviolable claim to have their interests represented in the political process.⁸⁹⁰

Alan Sears and Andrew Hughes, of the University of New Brunswick, in reviewing conceptions of citizenship education in Canada, found “a commonality of perspective” across the country. All jurisdictions emphasized three key elements of citizenship—knowledge, “informed action” or participation, and multiculturalism or pluralism.⁸⁹¹

Officially, at least, good Canadian citizens are seen as people who are: knowledgeable about contemporary society and the issues it faces; disposed to work toward the common good; supportive of pluralism; and skilled at taking action to make their communities, nation, and world a better place for all people.⁸⁹²

John Willinsky, of the University of British Columbia, argues: “The goal is to raise the standards of public reason and deliberation, as a means of increasing the quality of democratic life.”⁸⁹³ Alan Sears, et al. note that a 1994 Delphi panel of Canadian academics, senior civil servants, Senators and members of the public found that the general consensus was that “good citizenship is characterized by dispositions such as open-mindedness, civic mindedness, respect, willingness to compromise, tolerance, compassion, generosity of spirit, loyalty” and “some willingness to set aside private interest in favour of the common good.”⁸⁹⁴ Furthermore, they argue:

These kinds of altruistic dispositions appear consistently in documents from across the country and are seen as key in a country where ‘cultural pluralism’ is

⁸⁸⁹ Dahl, Robert A. *On Democracy*, New Haven: Yale University Press, 2000. cited in Snauwaert, Dale T. "Editorial: Global, Cosmopolitan Democracy and Holistic Education," *Encounter: Education for Meaning and Social Justice*, vol. 14, no. 4, 2001: 2-4.

⁸⁹⁰ Snauwaert. "Editorial: Global, Cosmopolitan Democracy and Holistic Education."

⁸⁹¹ Sears, Alan M., and Andrew S. Hughes. "Citizenship Education and Current Educational Reform," *Canadian Journal of Education*, vol. 21, no. 2, 1996: 123-142.

⁸⁹² Ibid.

⁸⁹³ Willinsky, John *Raising the Standards for Democratic Education: Research and Evaluation as Public Knowledge*, Public Knowledge Project, 2000; accessed July 2005; available from <http://pkp.sfu.ca/files/Standards.pdf>.

⁸⁹⁴ Sears, A.M., G.M. Clarke, and A.S. Hughes. *Learning Democracy in a Pluralist Society: Building a Research Base for Citizenship Education in Canada*, Council of Ministers of Education, Canada (CMEC), 1998 December; accessed July 2005; available from <http://www.cmec.ca/germ/list.en.asp>.

viewed as a 'positive force in society' and citizenship education is focussed on attaining 'the pluralist ideal.'⁸⁹⁵

Henry Milner, of the Université Laval in Quebec, has done extensive research on civic literacy with research grants from the Social Sciences and Humanities Research Council (SSHRC) and the Quebec Department of Education.⁸⁹⁶ Milner notes that citizenship in a democracy implies rights, but also responsibility on the part of both citizens and the state, and that democracy implies that action is undertaken for the public good.⁸⁹⁷ In fact, it was John Dewey who, in 1916, emphasized that "democracy depends upon the willingness of learned citizens to engage in the public realm for the betterment of the larger social good."⁸⁹⁸

Walter Parker, writing in the *Phi Delta Kappan*, argues that teaching for individualistic action without consideration of the public good is "teaching for idiocy."⁸⁹⁹ The word "idiot" today is used to mean stupid or mentally deficient, but this was not the original Greek meaning of the word. Parker explains:

Idiocy shares with idiom and idiosyncratic the root *idios*, which means private, separate, self-centered—selfish. 'Idiotic' was in the Greek context a term of reproach. When a person's behavior became idiotic—concerned myopically with private things and unmindful of common things—then the person was believed to be like a rudderless ship, without consequence save for the danger it posed to others. This meaning of idiocy achieves its force when contrasted with *politēs* (citizen) or public. Here we have a powerful opposition: the private individual versus the public citizen [...]. An idiot is one whose self-centeredness undermines his or her citizen identity, causing it to wither or never to take root in the first place. Private gain is the goal, and the community had better not get in the way. An idiot is suicidal in a certain way, definitely self-defeating, for the idiot does not know that privacy and individual autonomy are entirely dependent on the community.⁹⁰⁰

Valuing action for the public good is the social outcome consistent with the value measured earlier to indicate whether the populace is moving in an individualistic or collectivist direction.

⁸⁹⁵ Ibid., accessed. p. 4.

⁸⁹⁶ Milner. *Civic Literacy: How Informed Citizens Make Democracy Work*.

⁸⁹⁷ Ibid.

⁸⁹⁸ Rhoads, Robert A. "How Civic Engagement Is Reframing Liberal Education," *Peer Review*, vol. 5, no. 3, 2003: 25-28.

⁸⁹⁹ Parker, Walter C. "Teaching against Idiocy," *Phi Delta Kappan: The Professional Journal for Education*, vol. 86, no. 5, 2005: 344-351.

⁹⁰⁰ Ibid. p. 344.

Milner defines civic literacy simply as “the knowledge and capacity of citizens to make sense of their world,” or “knowledge to be effective citizens.”⁹⁰¹ He suggested that civic literacy encourages political participation and fosters more equitable societies “based on sustainable wellbeing.”⁹⁰² In a separate report, Milner proposes:

Informed individuals can better identify the effects policy options have upon their own interests and those of others in their community and make their votes count toward attaining desired long-term economic outcomes. Low civic literacy excludes from informed political participation people with low economic and educational resources, those most dependent on social policies to address their needs.⁹⁰³

Because the social goals and outcomes outlined above have not only been identified as reflecting consensus values in Canada but also correspond completely with the values underlying the CIW, indicators of civic literacy are an essential component of the educated populace of the CIW.

According to Cesar Birzea, President of the Council of Europe project “Education for Democratic Citizenship,” the Western worldview, which values democracy as the preferred political system, characterizes democracy as providing universal suffrage and democratic representation, equal rights, pluralism, and the separation of powers.⁹⁰⁴ However, Birzea argues that citizenship is defined more broadly than such democratic attributes indicate, and includes not only areas of national concern such as political, legal, and rights issues, but also issues that are global in scope such as literacy, poverty, violence, and environmental degradation, which go beyond particular political systems, including democracy.⁹⁰⁵

Therefore, whether civic literacy is growing or declining in the population is an important aspect of wellbeing both within a particular society and for the larger world, and is important to assess as a key component of an educated populace. This area clearly has considerable overlap with the community vitality and governance domains of the CIW and, as noted above, functions as a key determinant of both. However, of the three key elements of citizenship noted by Sears and Hughes —knowledge, “informed action” or participation, and multiculturalism or pluralism—we focus here mainly on the first area concerned with political knowledge and learning. Community participation and citizen engagement are dealt with in the CIW community vitality and governance domains, and this present report has a separate section on multiculturalism that may also form part of a

⁹⁰¹ Milner, Henry. “Civic Literacy: How Informed Citizens Make Democracy Work.” Paper presented at the Conference of the Society for the Advancement of Socioeconomics (SASE), Amsterdam, June, 2001; accessed July 2005; available from http://www.sase.org/conf2001/papers/milner_henry.pdf. pp.2–3.

⁹⁰² Milner, Henry. “Compétences Civiques, Croissance Économique et Redistribution Sociale,” *Policy Options*, vol. April, 2004: 73-78. (abstract)

⁹⁰³ Milner. “Informed Citizenship: Canada in a Comparative Context.” p. 5.

⁹⁰⁴ Birzea, Cesar. *Education for Democratic Citizenship: A Lifelong Learning Perspective*, Council for Cultural Co-operation of the Council of Europe (CDCC), 2000; accessed July 2005; available from http://www.see-educoop.net/education_in/pdf/edu_dc-oth-enl-t07.pdf.

⁹⁰⁵ Ibid., accessed.

proposed eighth CIW culture domain. By restricting our present discussion of civic literacy primarily to the knowledge component of citizenship, we hope to avoid unnecessary duplication and overlap.

24.1 Holistic frameworks for civic literacy

As noted above, it is clear that civic literacy is a multidimensional construct overlapping other areas both of this literature review, such as multicultural and media literacies, and other domains of the CIW. In fact, Canadian researchers Yvonne Hébert and Alan Sears note that four sub-domains of civic literacy are commonly distinguished, including civil, political, socio-economic, and cultural or collective dimensions.⁹⁰⁶ Ideally, the most valid indicator of civic literacy would be a composite measure based on all four elements of civic literacy. However, because of the considerable overlap with the other CIW domains, as well as significant data limitations and the difficulty of constructing such a composite indicator at this time, the CIW education domain must presently rely on proxy measures for civic literacy in a limited number of areas for which some data are available.

A 2000 report from Statistics Canada candidly acknowledges:

There is, at present, little in the way of generally accepted, objective information to provide a foundation for understanding the civic domain of our society [...]. Despite the classical literature in philosophy and political economy on the character of ‘civicness’ and the civic domain, we have virtually no guiding precedents for a quantitative, social science-based development of civic descriptors.⁹⁰⁷

Despite, or perhaps in response to, this challenge, we do explore below several of the more holistic framework initiatives that have been proposed in recent times, which could potentially guide this choice of “civic descriptors” sought by Statistics Canada and other Canadian groups concerned with this issue. The frameworks that have been proposed are from Europe, the United States, and Canada, as well from an international survey. These frameworks have also produced empirical results that predict the most important influences on civic literacy, as we note below. Taking a long-term view of the development of the CIW educated populace domain, these frameworks can potentially lead to the kind of data collection and analysis in Canada that could eventually produce a highly credible composite indicator of civic literacy for this country.

24.1.1 *The Education for Democratic Citizenship project*

In 1997, the Council of Europe initiated the Education for Democratic Citizenship project (EDC), which took a “multi-dimensional, holistic and lifelong learning approach” to EDC.⁹⁰⁸ The EDC project, which concluded in December 2004, identified EDC from a lifelong learning perspective as the formal and informal education that can help youth and adults acquire:

⁹⁰⁶ Hébert, and Sears. *Citizenship Education*, accessed.

⁹⁰⁷ Reed. *Developing Civic Indicators and Community Accounting in Canada. Draft*, accessed. p. 9.

⁹⁰⁸ Council of Europe Programme on Education for Democratic Citizenship (EDC). *Website*, accessed July 2005; available from http://www.coe.int/T/E/Cultural_Co-operation/education/E.D.C/.

... the motivation, knowledge and skills to manage democratic institutions; uphold the rule of law and promote human rights; a set of values and attitudes, which includes tolerance, solidarity, compassion, respect for others, and civil courage.⁹⁰⁹

The EDC asked why humans do not use their “entire learning potential in order to improve the human condition, to do away with wars, illiteracy, poverty, social exclusion, corruption, intolerance, racism, xenophobia, etc.”⁹¹⁰ They concluded that many of these problems could be avoided or reduced by efficient and targeted learning. The Council of Europe has used the EDC recommendations to set policy standards in the field of EDC and advised that the member States of the European Union implement EDC in their curricula.⁹¹¹

Again, it is noteworthy that most conventional education indicator systems give insufficient if any attention to these key learning issues. When they do acknowledge these issues, the indicators tend to focus almost exclusively on formal schooling curricula and neglect both social outcomes and many of the key social learning mechanisms through which such important knowledge, skills, and values are transmitted. Because the European EDC Project does have this broad perspective, and because it does relate learning outcomes directly to social outcomes, it forms a potentially suitable guide and framework for this section of the educated populace domain of the CIW, and for Statistics Canada’s own future data collection efforts and attempt to identify appropriate civic descriptors.

Unfortunately, time and resources did not permit an in-depth review of the EDC here. But we have noted the main themes of the EDC project as highly relevant and important for our own effort to develop credible indicators of civic literacy and worthy of further exploration in the future development of the CIW educated populace domain. These EDC themes include: core competencies for democratic citizenship—knowledge, skills, attitudes, and values; the role of the media and information technologies; civic participation or engagement; lifelong learning for active citizenship; and citizenship education in the school context. We will look briefly at these interrelated themes below and explore possibilities for suitable indicators of civic literacy based on these themes.

24.1.2 Civic Health Index (United States)

In September 2006, the U.S. National Conference on Citizenship, a non-profit organization chartered by the U.S. Congress, released the first Civic Health Index in the United States in order to promote public deliberation about civic health and to examine

⁹⁰⁹ Birzea. *Education for Democratic Citizenship: A Lifelong Learning Perspective*, accessed. p. 15.

⁹¹⁰ Ibid., accessed. p. 25.

⁹¹¹ Council of Europe Programme on Education for Democratic Citizenship (EDC). *Website*, accessed.

ways for its improvement.⁹¹² The survey is nationally representative of the population as a whole, uses existing data from 1975 to 2004 (with information from 2005 where available), and is intended to be released annually. Data were drawn from the following U.S. instruments: The General Social Survey produced by the National Opinion Research Center (NORC); the American National Election Studies; the DDB Life Style Survey; the Census Current Population Survey; the International Revenue Service data on philanthropic contributions; and the National Assessment of Educational Progress.

The Civic Health Index measures 40 indicators in nine categories, which are weighted equally and include: connecting to civic and religious groups, trusting other people, connecting to others through family and friends, giving and volunteering, staying informed, understanding civics and politics, participating in politics, trusting and feeling connected to major institutions, and expressing political views. It is noteworthy both that the U.S. Civic Health Index provides breakdowns by age, levels of educational attainment, race and ethnicity, and state, and that Canadian data are available for several components of the U.S. Index.

While results for many of the Civic Health Index categories will be captured in the community vitality and governance domains of the Canadian Index of Wellbeing, at least four of the categories—staying informed, understanding civics and politics, participating in politics, and expressing political views—are relevant to civic literacy in the CIW educated populace domain. The CIW National Working Group may wish to consider combining results in the following four areas with some of those that will appear in the CIW community vitality and governance domains for a composite Canadian Civic Health Index based on the U.S. model.

Staying informed—This category of the U.S. Civic Health Index uses two indicators: *newspaper reading*, and *following government and public affairs*. It combines two indicators to obtain a reasonably reliable estimate of newspaper readership in the U.S.: those who read the newspaper every day are combined with those who say they read a daily newspaper twice or more in the past week. This cluster of data is added together before being included in the index as a single indicator. The index intends to include “reading blogs” as part of its newspaper reading indicator in the next release, with the index report noting that reading newspapers online should be captured in the present category.

The “staying informed” category also includes a question from the National Election Survey that asks if the respondent follows government and public affairs most of the time, some of the time, only now and then, or hardly at all. The index counts those who say “most of the time” as an indicator of “staying informed,” which in turn contributes to the composite Civic Health Index.

⁹¹² National Conference on Citizenship [United States]. *America's Civic Health Index: Broken Engagement*, produced in association with the Center for Information and Research on Civic Learning and Engagement (CIRCLE), the Saguaro Seminar: Civic Engagement in America, and a network of 250 civic institutions, 2006; accessed November 2006; available from <http://www.ncoc.net/conferences/2006civichealth.pdf>.

Understanding civics and politics—This category uses four indicators: *people’s belief that they can understand government*; *awareness of the ideological differences between the major political parties* (the ability to place the political parties on an ideological spectrum, based on questions like “Which major party is more conservative?”); *basic knowledge* (“knowledge of the names of candidates for U.S. House of Representatives who ran in the November election from the respondent’s district”); and the *National Assessment of Educational Progress 12th Grade Scores in History (1994, 2001) and Civics (1988, 1998)*.

However, the Civic Health Index report notes that the first two of these indicators, although they “typically predict political participation,” are not reliable: “This is a component of America’s Civic Index in need of reliable and regular measures.”⁹¹³ In particular, the report believes that “people’s belief that they can understand government” may reflect increased confidence rather than increased civic understanding, and “the ability to place the political parties on an ideological spectrum” may reflect increased political polarization rather than a rise in civic knowledge more generally.

Participating in politics—This category uses five indicators: *voted in presidential years* and *voted in ‘off-years’*; *attended political meeting*; *made a political donation*; and *been contacted about a campaign*. The index uses two indicators for voting since “far more” people vote every four years in the presidential election than they do in local elections. Although the report doesn’t explain the rationale, in the voting category it includes all adult residents in the calculation, including non-citizens and felons, who are not eligible to vote. “Attended a political meeting” also includes “rallies, speeches, fund raising dinners, or things like that in support of a particular candidate.” “Made a political donation” includes giving any money to an individual candidate or to a political party organization. “Been contacted about a campaign” includes whether or not anyone contacted them about registering to vote or “getting out to vote.”

Expressing political views—The report states: “Persuading other people about elections is an indicator of political deliberation.” This category incorporates four indicators: *having written a letter to an editor* of a magazine or newspaper within the last 12 months; *having given a speech* in the last 12 months; *having persuaded others about an election*; and *having displayed a button, sticker, or yard sign* during a campaign.⁹¹⁴

Methodological considerations noted in the index report include the following:

For any year, the score for a given variable is the *percentage-point change* in that variable compared to its baseline year, which was when it was first measured in available surveys. This method allows us to add new variables when data become

⁹¹³ Ibid., accessed. p. 33.

⁹¹⁴ Ibid., accessed.

available. For example, reading blogs was first measured in 2005. We can now include changes in blog-reading compared to the 2005 baseline.

When an indicator is missing in a given year after it has been introduced, we use a straight line between the available data points to calculate the trend. For example, the American National Election Studies are conducted in presidential and mid-term elections years, not in odd years. The General Social Survey was conducted annually from 1972–1994, except in 1979, 1984, and 1992, and has been conducted biennially thereafter.⁹¹⁵

If the CIW National Working Group considers the U.S. Civic Health Index as a potential model for a composite index for the CIW governance domain, it will probably select a different methodology than scoring according to percentage-point change from the baseline year in which a variable was first measured. Instead, initial efforts to construct composite scores for the CIW Living Standards and Healthy Populace domains have used a common baseline year for all headline indicators within each domain, and have used percentage rather than percentage-point changes in the calculations. The first criterion would certainly exclude the Canadian equivalents of many of the 40 indicators included in the U.S. Civic Health Index.

In terms of results, the composite U.S. Civic Health Index documents “steep declines” over the past 30 years, with each of the 40 indicators having declined by an average of seven percentage points:

Each percentage point drop is a substantial change. For example, if the proportion of the population that gives a particular answer falls from 28% to 21%, that is a drop of seven percentage points (typical of our index components), but it represents a decline of one quarter.⁹¹⁶

In particular, the results show a very significant divide between those with different levels of educational attainment—individuals with university degrees score 9–17 percentage points higher in “civic health” than those with no university experience.

The index shows little change in trends in political knowledge over the past three decades, although the report suggests that “there is a paucity of good information about Americans’ political knowledge, and recommends that “this is an area of the Civic Health Index that could be significantly improved by more regular measurement.”⁹¹⁷

Although no comparable composite index of civic health is available for Canada, and, as noted, Statistics Canada is still searching for suitable “civic descriptors,” we can speculate that the dramatic decline in civic health documented by the U.S. Civic Health Index may well be paralleled in Canada. As well, the “paucity of good information” about political knowledge noted in the U.S. Civic Health Index report is certainly true for

⁹¹⁵ Ibid., accessed. p. 41.

⁹¹⁶ Ibid., accessed.

⁹¹⁷ Ibid., accessed. p. 14.

Canada. Because of the vital importance of this area for Canadian wellbeing, as noted in the opening paragraphs and pages of this chapter, we strongly recommend both a more thorough and regular measurement of the civic health of Canadians—which will be suitable for the CIW governance domain—as well as improved and consistent data collection on Canadians’ political knowledge—which will be suitable for the civic literacy indicator of the CIW educated populace domain.

24.1.3 The International Association for the Evaluation of Educational Achievement (IEA)—IEA Civic Education Study

Between 1996–2000, the International Association for the Evaluation of Educational Achievement (IEA), which is an international consortium of educational research organizations in almost 60 countries, conducted “the largest and most rigorous study of civic education ever conducted internationally.”⁹¹⁸ David Campbell, in a recent paper presented to an Organisation of Economic Co-operation and Development symposium, suggests that the “IEA Civic Education Study is the most comprehensive source of data on the civic education received by adolescents.”⁹¹⁹

The IEA Civic Education Study was designed to assess the three key dimensions of citizenship, including (for both 14- and 16–19 year olds): “Democracy, Democratic Institutions and Citizenship,” “National Identity and International Relations,” and “Social Cohesion and Diversity.” The first dimension measures understanding of general principles and practices of democracy in its national context; the second dimension focuses primarily on the extent to which the students have a sense of national identity or national loyalty; and the third dimension addresses what the students have learned about issues of social cohesion and diversity. In addition, for the older age group (16–19 year olds), an economics literacy scale was added. Within the core dimensions, five types of items were developed for measurement: student knowledge of content; civic skills (understanding a short political article and a political cartoon); knowledge of concepts of democracy, citizenship, and government; attitudes toward civic issues; and expected political participation. Additional questions assessed various background variables, and the state of citizenship education in schools.⁹²⁰

According to Judith Torney-Purta, professor of human development at the University of Maryland at College Park, and Chair of the International Steering Committee for the IEA Civic Education Study, et al.:

⁹¹⁸ International Association for the Evaluation of Educational Achievement (IEA). *Civic Education Study*, IEA, 2005; accessed July 2005; available from http://www2.hu-berlin.de/empir_bf/iea_e.html.

⁹¹⁹ Campbell, David E. “What Is Education’s Impact on Civic and Social Engagement?,” in *Measuring the Effects of Education on Health and Civic Engagement. Proceedings of the Copenhagen Symposium* Organisation for Economic Co-operation and Development, 2006, accessed December 2006; available from http://www.oecd.org/document/61/0,2340,en_2649_35845295_37425853_1_1_1_1.00.html, p. 28.

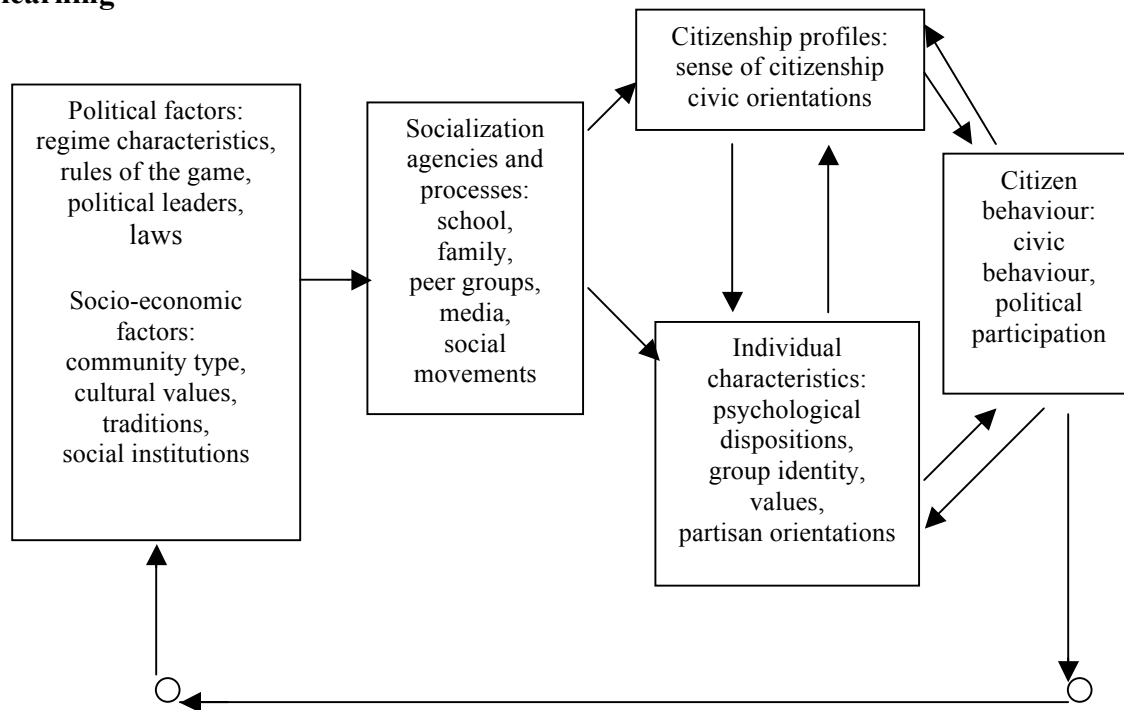
⁹²⁰ International Association for the Evaluation of Educational Achievement (IEA). *Civic Education Study*, accessed.

Broadly speaking, the overall goal of the study was to identify and examine in a comparative framework the ways in which young people are prepared for their roles as citizens in democracies. An underlying assumption was that civic education is complex and involves a variety of cognitive, conceptual, and attitudinal strands, each of which is important and can be evaluated. The findings supported that assumption and provided a portrait of adolescents' civic development.⁹²¹

A framework of the study, which was developed through an international consensus process, is shown in Figure 14. It illustrates the multidimensional aspects that comprise the concept of civic literacy. In this framework, civic literacy is not limited to the assessment of civic knowledge and skills. It also gives equal importance to measures of student attitudes and experiences, civic education, socio-economic determinants, sources of civic information, and civic engagement. The CIW National Working Group may wish to consider the framework below for the CIW governance domain, as well as for this civic literacy assessment, since the framework includes citizen engagement and political participation indicators that will be key parts of the governance domain.

⁹²¹ Torney-Purta, Judith, Jo-Ann Amadeo, and Rainer Lehmann. *Civic Knowledge and Engagement at Age 14 in 28 Countries: Results from the IEA Civic Education Study*. *Eric Digest.*, 2001; accessed November 2006; available from http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/2a/33/04.pdf.

Figure 14. A framework for the study of citizenship socialization and political learning



Source: Adapted from Torney-Purta, J., R. Lehmann, H. Oswald, and W. Schulz. *Citizenship and Education in Twenty-Eight Countries: Civic Knowledge and Engagement at Age Fourteen*, Amsterdam: International Association for the Evaluation of Educational Achievement (IEA), 2001.

This important, cross-national civic education study took place in two phases. The first phase, 1996–1997, included Canada in the 24 countries that conducted national case studies designed to look at concepts of citizenship, and programs and goals of citizenship education for 14 year-olds. This was mainly a conceptual, qualitative study that was used to prepare for the second phase, including the design of the questionnaires.⁹²² The Canadian results from phase one reported that, although education for democratic citizenship was a high priority in Canada in terms of rhetoric, in practice this priority was low in terms of allocating resources or mandating programs.⁹²³

Unfortunately, Canada decided not to participate in the second phase. In a personal correspondence with the authors of this literature review, Alan Sears stated that the reasons for non-participation were complex, but basically the CMEC needed a commitment from all of the provinces in order to continue participation in the IEA study, and Quebec was not interested in participating. Therefore, the CMEC withdrew Canada

⁹²² Torney-Purta, J., J. Schwille, and J. Amadeo. *Civic Education across Countries: Twenty-Four National Case Studies from the IEA Civic Education Project*, Amsterdam: International Association for the Evaluation of Educational Achievement (IEA), 1999.

⁹²³ Ibid. cited in Hughes, Andrew S., and Alan Sears. "The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education." Paper presented at the 2nd Annual CITIZED International Conference, Oriel College, Oxford, July 25-27, 2006, University of New Brunswick.

from the second phase.⁹²⁴ This presents a missed opportunity, since the study produced a wealth of comparative cross-national data that could have been very useful to Canadians and provided key data on civic literacy for the CIW educated populace domain.

In 1999, the second phase of the IEA project sampled 2000–3000 students per country in 28 countries on their knowledge, attitudes, and values in relation to citizenship.⁹²⁵ Fourteen-year-old students were given questionnaires that included a cognitive test as well as student background and attitude questions. The study also surveyed teachers of civic-related subjects and school principals. In 2000, 16 countries further conducted the survey with students between the ages of 16–19. In this survey, an additional and more difficult cognitive test, which included economic questions, was given.

As Torney-Purta, et al. explain, a priority of the IEA study was:

... to build a keyable test that was strong psychometrically and represented content that participating countries thought important. Over a two-year period, 38 multiple choice items measuring knowledge and skills (for 14-year-olds tested in 30 countries) and 42 items for an upper secondary population (tested in ten countries) were chosen from a pool of 140 items matched to the expectations for learning about democratic principles and issues cross-nationally. For both age groups there are also measures of students' concepts of democracy and citizenship, and scales assessing attitudes that do not have correct answers.

Perhaps most importantly, items measuring political engagement and reported behaviors—actions and community service, which the adolescent could perform—were included. Students were asked to which organizations they belonged and what political actions they expected to undertake as adults. Finally, the study examines the influences of both fact-based instruction and the climate for expressing opinions in the classroom, as well as opportunities for participation in student government and in other organizations. In addition, it takes account of out-of-school influences such as the family or the media, which may either reinforce or compete with what is presented in school.⁹²⁶

⁹²⁴ Sears, Alan, University of New Brunswick at Fredericton, personal communication with Karen Hayward, telephone conversation and email exchanges, December 18, 2006.

⁹²⁵ Torney-Purta, J., R. Lehmann, H. Oswald, and W. Schulz. *Citizenship and Education in Twenty-Eight Countries: Civic Knowledge and Engagement at Age Fourteen*, Amsterdam: International Association for the Evaluation of Educational Achievement (IEA), 2001.

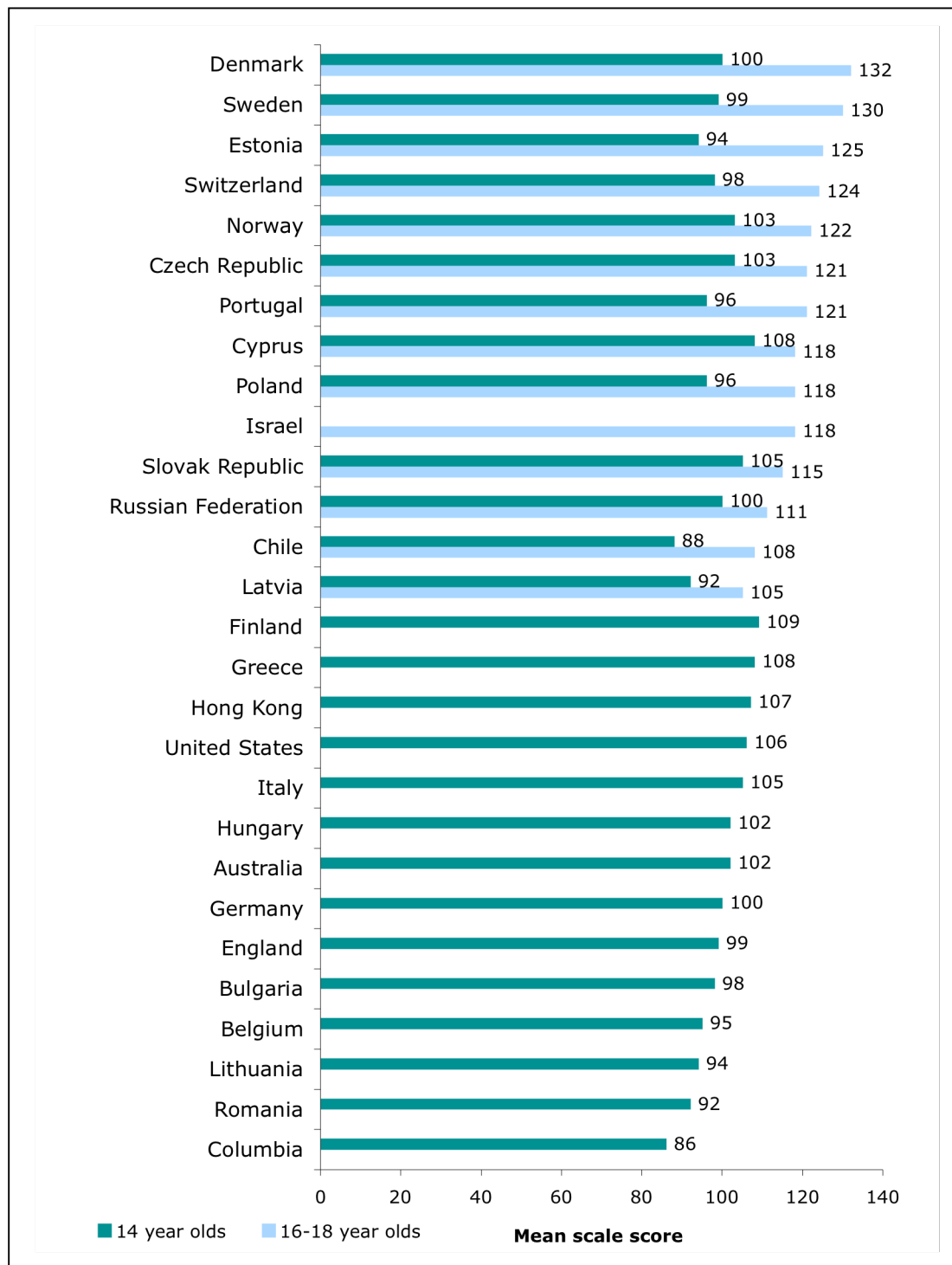
⁹²⁶ Torney-Purta, Judith, John Schwille, and Jo-Ann Amadeo. *The IEA Civic Education Study: Expectations and Achievements of Students in Thirty Countries*, International Association for the Evaluation of Educational Achievement (IEA), 1999 December; accessed July 2005; available from <http://www.indiana.edu/~ssdc/ieadig.htm>. The following countries participated in both phases of this study: Australia, Belgium (French), Bulgaria, Colombia, Cyprus, Czech Republic, England, Finland, Germany, Greece, Hong Kong, Hungary, Israel, Italy, Lithuania, Poland, Portugal, Romania, Russia, Slovenia, Switzerland, and the United States. Canada and the Netherlands participated only in Phase 1, while the following countries participated only in Phase 2: Chile, Taiwan (Taipei), Denmark, Estonia, Latvia, Norway, Slovak Republic, and Sweden.

A sample student multiple-choice questionnaire that was used in the IEA study is included in Appendix 25. The civic knowledge scale for 14 year olds includes 25 items in the civic content subscale, and 13 items in the civic skills subscale. The civic knowledge scale for 16–19 year olds includes 9 of the same items as the scale for younger students, and 10 additional questions. Appendix 25 also includes the complete list of attitudinal scales for both age groups. The questions are included in the Appendix in the hope that Canada will belatedly administer the questionnaire in this country in order to provide important comparative data that could then be used to populate the civic literacy indicators of the CIW educated populace domain.

Figure 15 shows a summary of the results of the civic knowledge scale, which includes content knowledge and skills, for the 28 countries that tested age 14 students, 13 countries that tested both 14 year olds and 16–19 year olds, and one country (Israel) that only tested 16–19 year olds.⁹²⁷ An additional two countries (Germany and Hong Kong, the latter of which is treated as a separate country for the purposes of the IEA study) surveyed both age groups but are not represented because of problems with the data. Since the economic literacy scores were not included in the comparisons, the two age groups can be directly compared. According to Amadeo, Torney-Purta, et al., generally the results showed a fairly good civic knowledge in both age groups. As expected, civic knowledge was more developed among the older group of students than among the younger group.

⁹²⁷ Two countries—Hong Kong (here considered as a country) and Germany, tested both the younger and the older students. However, comparative results for these two jurisdictions are not reported in the figure below because of methodological problems with the results for the older age group in these two jurisdictions.

Figure 15. Mean score of the civic knowledge achievement scale (content knowledge and interpretative skills) of 14-year old and 16- to 19-year old students on the IEA Civic Education Study, by nation, 1999–2000



Note: The scale was normed to have a mean of 100.

Source: Adapted from Torney-Purta, J., R. Lehmann, H. Oswald, and W. Schulz. *Citizenship and Education in Twenty-Eight Countries: Civic Knowledge and Engagement at Age Fourteen*, Amsterdam: International Association for the Evaluation of Educational Achievement (IEA), 2001.

It is beyond the scope of this literature review to present the full results of the IEA Civic Education Study, particularly since Canada did not participate in the 1999–2000 survey, and therefore there are no Canadian results. However, some of the empirical results on those variables that predict high or low civic knowledge are important for the purposes of this review, since these are highly likely to hold true for Canada, too. Jo-Ann Amadeo, et al. conducted a multivariate regression analysis to explain variance in civic knowledge and civic engagement.⁹²⁸ Civic knowledge and engagement (captured as an intention to vote) were linked to explanatory factors that grouped into four main blocks of predictors:

- Background factors—gender, home literacy resources, educational level of the parents, and family size
- School factors—open classroom climate for discussion, participation in school council, having learned about the importance of voting, expectation of further education
- Mass media exposure—frequency of watching television news, how often they read newspaper articles about what was happening in their own country
- Students’ activities out of school—evenings spent outside of home, political interest⁹²⁹

According to Amadeo, et al., the researchers found:

- There was a strong positive relationship between number of books at home—considered as a proxy for the emphasis placed on education as well as for the academic support in the family—and the students’ civic knowledge outcomes. This variable was measured by students’ reports on the number of books at home. It was coded 1 for fewer than 11 books at home, 2 for about one shelf (11 to 50 books), 3 for about one bookcase full (51 to 100 books), 4 for about two bookcases (101 to 200 books), and 5 for three or more bookcases (more than 200 books). In fact, having home literary resources was the most important predictor of civic knowledge for upper secondary students and the second most important predictor of civic knowledge in the 14-year-old study.⁹³⁰
- The most powerful predictor of civic knowledge at the 14-year-old level was student reports on their estimated years of further education, which indicates the individual’s aspirations and parental influences as well as the type of school or track the student was in. This variable was the second most important predictor of civic knowledge in the older group of students.
- The third strongest effect on students’ civic knowledge outcomes was the educational level of the parents, and the researchers found a significant difference between students from more and less educated families.

⁹²⁸ Amadeo, Jo-Ann, Judith Torney-Purta, Rainer Lehmann, Vera Husfeldt, and Roumiana Nikolova. *Civic Knowledge and Engagement. An IEA Study of Upper Secondary Students in Sixteen Countries*, 2002; accessed December 2006; available from http://www.wam.umd.edu/~jtpurta/UpperSecondary_files/CivicsBookletJA.pdf.

⁹²⁹ Ibid., accessed.

⁹³⁰ Ibid., accessed.

- Gender, which was not a significant factor among 14-year-olds, was an important predictor of civic knowledge among the upper secondary students, with female students scoring significantly lower than males in the civic knowledge test.⁹³¹
- Another factor that had a large, positive effect on both age groups was having a classroom climate that encouraged freedom of expression and was open for discussion, which is an indication of the learning condition at school.
- For the older students, frequency of reading news in the newspaper was found to have a significant positive relationship to civic knowledge (this was not measured for the younger group).
- However, for both groups, the effect of exposure to television news on civic knowledge was insignificant, although it did have a positive effect on the expectations to vote.
- Finally, political interest was also significantly related to knowledge in both age groups, but the level of political interest was found to be only moderate in both age groups in most countries.⁹³² [Emphasis removed.]

Socioeconomic status of the students' family is also an extremely important determining variable. Here home literacy resources and the educational level of the parents are used as proxies for socioeconomic status. Amadeo, et al. note the rationale for this choice: "In this model, we added to home literacy resources the educational level of parents as proxies for socioeconomic status and cultural resources, thereby allowing us to examine more explicitly the influence of the home."⁹³³

Over eighty percent of both older and younger students indicated an **intention to vote**, although—not surprisingly—the percentage of students intending to vote was higher in the older age group. The three strongest variables among the upper secondary students, which almost equally predicted voting intention, were participation in school council, having learned about voting, and civic knowledge. Of course, what students intend to do and what they actually do after their schooling is completed may be very different, as reflected in low and declining voter turnout in most countries.

In terms of **other areas of engagement**, Torney-Purta notes that four out of five students in all countries:

... responded that they do not plan on engaging in conventional political activities such as joining a political party, running for office, or writing a letter to a newspaper about a social or political concern. They were willing, however, to engage in other forms of civic engagement, such as collecting money for a social cause or participating in a non-violent protest march. They thought it is important for adult citizens to participate in groups benefiting the community and preserving the environment.⁹³⁴

⁹³¹ Ibid., accessed.

⁹³² Ibid., accessed. pp. 145–146.

⁹³³ Ibid., accessed. p. 143

⁹³⁴ Torney-Purta, Amadeo, and Lehmann. *Civic Knowledge and Engagement at Age 14 in 28 Countries: Results from the IEA Civic Education Study*. *Eric Digest*., accessed. p. 4.

However, fewer than 20% of the older students reported actual participation in an environmental organization.⁹³⁵ Among the upper level students, when asked how important it is for an adult who is a good citizen to take part in activities to protect the environment, 5% of the students responded that it was not important, 17% said it was somewhat unimportant, 46% said it was important, and 32% said it was very important.⁹³⁶

The next IEA International Civic and Citizenship Education Study (ICCS) is scheduled for 2009,⁹³⁷ and we strongly recommend that Canada participate in this study.

24.1.4 The Canadian Democratic Audit

The Centre for Canadian Studies at Mount Allison University recently launched a major research project, the Canadian Democratic Audit, partially based on similar projects undertaken in Sweden and the U.K.⁹³⁸ As a response to growing public dissatisfaction with governmental activities, as evidenced in public opinion polls and declining voter participation, the audit brought together a team of top political scientists to examine the state of democracy in Canada.

In 2004–2005, the audit released a series of volumes, published by the University of British Columbia Press, which look at particular aspects of democracy, using indicators of public participation, inclusiveness, and government responsiveness to public views as guiding principles.⁹³⁹ One volume, titled *Citizens*, called “the first comprehensive assessment of citizen engagement in Canada,”⁹⁴⁰ uses sources mainly from the Canadian Election Study and Elections Canada, the National Survey on Giving, Volunteering, and Participating from Statistics Canada, and various surveys from the Canadian Opinion Research Archives (CORA) at Queens’ University. A second volume, *Advocacy Groups*, examines who participates in advocacy groups; what kinds of groups are active on different aspects of the public agenda; and the influence of lobby groups on governments in Canada.⁹⁴¹ The Canadian Democratic Audit *Citizens* volume in particular provides a

⁹³⁵ Ibid.

⁹³⁶ Amadeo, Torney-Purta, Lehmann, Husfeldt, and Nikolova. *Civic Knowledge and Engagement. An IEA Study of Upper Secondary Students in Sixteen Countries*, accessed.

⁹³⁷ International Association for the Evaluation of Educational Achievement (IEA). *International Civic and Citizenship Education Study - ICCS 2009*, 2007; accessed; available from <http://www.iea.nl/icces.html>.

⁹³⁸ Canadian Democratic Audit. *Website*, The Centre for Canadian Studies, Mount Allison University, accessed July 2005; available from <http://www.canadiandemocraticaudit.ca/index.html>.

⁹³⁹ The Audit Team. *The Canadian Democratic Audit Overview*, The Centre for Canadian Studies, Mount Allison University, 2003; accessed July 2005; available from <http://www.canadiandemocraticaudit.ca/over.html>.

⁹⁴⁰ Gidengil, Elisabeth, André Blais, Richard Nadeau, and Neil Nevitte. *Citizens*, The Democratic Audit Series, Vancouver: University of British Columbia Press, 2005.

⁹⁴¹ Young, Lisa, and Joanna Everitt. *Advocacy Groups*, Vancouver: University of British Columbia Press, 2004. Other volumes, which are more relevant to potential indicators in the governance domain of the CIW, include: *Elections*; *Political Parties*; *Legislatures*; *Federalism*; *Communications Technology*; *The Courts*; and *Cabinets and Ministers*.

major source of information both on civic literacy and for the CIW governance domain that will be developed in the near future.

The main data source for the Canadian Democratic Audit is the Canadian Election Study (CES), conducted in partnership with Elections Canada, since it is one of the most consistent surveys of political knowledge conducted in Canada.⁹⁴² Paul Howe, of the University of New Brunswick, who researches political knowledge and its effects on voter turnout, believes that the CES is “the only [Canadian study] on which a reasonable selection of knowledge-based items appear.”⁹⁴³ We discuss the CES in more detail below in section 24.2.2 on public political knowledge data in Canada.

24.1.5 Citizenship profiles of students in Canada

Michel Pagé and Marie-Hélène Chastenay of the University of Montreal have done extensive research on citizenship in Canada, with most of their work published in French.⁹⁴⁴ In one study that is particularly relevant to development of civic literacy, they compare citizenship profiles of students, ages 18–20, in universities in three provinces including New Brunswick (N = 515), Quebec (N = 1195), and Alberta (N = 823).⁹⁴⁵

Although other Canadian research initiatives are referenced throughout this chapter of the literature review, the Pagé and Chastenay work is singled out here since it uses a generally agreed upon typology, which includes identity, diversity, and participation.⁹⁴⁶ In particular, the dimensions for comparison they use are based on social identities, agreement with equality norms or attitudes, and actual or intended civic participation, each of which, in turn, is composed of factors identified through statistical analysis.

The social identity dimension consists of two factors:

1. civic identity
2. self-defined cultural (group) identity and attitude towards linguistic diversity

The equalitarian dimension includes four factors:

1. the inclusion of cultural diversity in the perception of the province’s collective identity
2. the attractiveness of relations with people different from oneself (general unspecified difference)
3. the attitude towards reasonable accommodations [with people of different cultural backgrounds]

⁹⁴² Canadian Election Study. *Website*, accessed July 2005; available from <http://www.ces-ec.umontreal.ca>.

⁹⁴³ Howe, Paul. "Political Knowledge and Electoral Participation in the Netherlands: Comparisons with the Canadian Case." Paper presented at the Annual conference of the Canadian Political Science Association, Winnipeg, June 3-5, 2004; accessed July 2005; available from http://www.cpsa-acsp.ca/template_e.cfm?folder=conference&page_name=agm-papers-2004.htm - h. p. 3.

⁹⁴⁴ Sears, University of New Brunswick at Fredericton, personal communication.

⁹⁴⁵ Pagé, Michel, and Marie-Hélène Chastenay. "Citizenship Profiles of Young Canadians," *Canadian Diversity*, vol. 2, no. 1, 2003: 36-38.

⁹⁴⁶ Sears, University of New Brunswick at Fredericton, personal communication.

4. the attitude towards the presence of persons of diverse cultural identities in the public sphere (cultural difference)

The participation dimension consists of four factors:

1. Current participation is measured through actual political or civic participation behaviours, both inside and outside of the place of study, in the 12 months prior to filling in the questionnaire.
2. Future participation measures the declared intention of investing one's time and energy in political and community activities, opinion and interest groups, and charity work in the coming years.
3. Trust in political figures measures the extent to which respondents believe that serving the public interest is the main concern of elected officials.
4. Efficiency of participation measures respondents' estimation of the degree to which citizen investment in participation can effectively contribute to obtaining the results they seek or desire.⁹⁴⁷

Pagé and Chastenay are concerned with comparing the different forms of citizenship present in each provincial sample. Although they found differences—for example, only Quebec students distinguished both provincial and Canadian identities, while students from the other two provinces related more to a Canadian identity than a provincial one—the authors suggest that the overall pattern of response on all three dimensions of citizenship (identity, diversity, and participation) is otherwise quite similar across the three provinces. Although all of the dimensions Pagé and Chastenay measure are important for civic literacy, as previously noted, the identity and diversity aspects will be addressed in the multicultural literacy section of this literature review. In this chapter, we concentrate on the knowledge and participation aspects, which Schugurensky calls “enlightenment” and “engagement.”⁹⁴⁸

⁹⁴⁷ Pagé, and Chastenay. "Citizenship Profiles of Young Canadians."

⁹⁴⁸ Schugurensky, Daniel. "Enlightenment and Engagement in Adult Education for Democratic Citizenship: Lessons from the Citizens' Forum and the Participatory Budget." Paper presented at the Paper prepared for the Canadian Association for the Study of Adult Education (CASAE-ACÉÉA) National Conference - Twentieth Anniversary Proceedings, University of Toronto, 2001, Ontario Institute for Studies in Education; accessed July 2005; available from [http://www.chs.ubc.ca/participatory/docs/\(PB\)forum_schugurensky.pdf](http://www.chs.ubc.ca/participatory/docs/(PB)forum_schugurensky.pdf).

24.2 Competencies for democratic citizenship—knowledge, skills, attitudes, and values

Skills, attitudes, and values necessary for democratic citizenship, which have been identified by analysts as including critical thinking, compassion, tolerance, and concern for the public good, are discussed elsewhere in this literature review. Here we therefore focus more specifically on the political or civic knowledge aspect of civic literacy.

24.2.1 Political knowledge

Competency in political knowledge has been a subject for considerable debate, and deciding competence levels—or what degree and type of civic and political knowledge are needed to be a competent citizen—is controversial and normative.⁹⁴⁹ According to James Kuklinski and Paul Quirk, the book *What Americans Know about Politics and Why it Matters*, written by Delli Carpini and Keeter, constitutes one of the most comprehensive studies on political knowledge to date.⁹⁵⁰ In a related and more recent study, Delli Carpini reviews the research literature on political knowledge and suggests that democracy functions as a combination of government by “experts,” an attentive public, the use of heuristics, and collective awareness.⁹⁵¹ He describes heuristics here as the information shortcuts used by citizens (e.g., associating labels such as liberal or conservative with certain issues, or accepting the opinions of more informed and trusted people), and he notes that collective awareness refers to the whole of citizen knowledge which is greater than the sum of its individual parts.⁹⁵² Other analysts see emotion or affect, rather than knowledge, as driving public attitudes.⁹⁵³ General debate on civic literacy concerns the relative importance of each of these factors.

However, Galston notes that despite this debate and the claims of some researchers that people make use of heuristics, or shortcuts, for their political knowledge needs and therefore do not need to actually know much, there are in fact signs of an emerging consensus on what people need to know to be effective democratic citizens. Galston concludes: “Competent democratic citizens need not be policy experts, but there is a level

⁹⁴⁹ Galston, William A. “Political Knowledge, Political Engagement, and Civic Education,” *Annual Review of Political Science*, vol. 4, 2001: 217-234.

⁹⁵⁰ Delli-Carpini, and Keeter. *What Americans Know About Politics and Why It Matters*. cited in Kuklinski, James H., and Paul J. Quirk. “Conceptual Foundations of Citizen Competence,” *Political Behavior*, vol. 23, no. 3, 2001: 285-311.

⁹⁵¹ Delli Carpini, Michael X. “In Search of the Informed Citizen: What Americans Know About Politics and Why It Matters.” Paper presented at the The Transformation of Civic Life Conference, Middle Tennessee State University, Murfreesboro and Nashville, Tennessee, November 12-13, 1999; accessed July 2005; available from http://www.mtsu.edu/~seig/paper_m_carpini.html.

⁹⁵² Ibid. also see Converse. “Assessing the Capacity of Mass Electorates.”

⁹⁵³ See, for example, McGraw, Kathleen M., and Milton Lodge. “Review Essay: Political Information Processing,” *Political Communication*, vol. 13, no. 1, 1996: 131-138. and Lodge, Milton, and Charles Taber. “The Automaticity of Affect for Political Candidates, Parties, and Issues: Experimental Tests of the Hot Cognition Hypothesis,” *Political Psychology*, vol. 26, no. 3, 2005: 455-482.

of basic knowledge below which the ability to make a full range of reasoned civic judgments is impaired.”⁹⁵⁴

The U.S. uses four achievement levels to track political knowledge among school age students in its National Assessment of Educational Progress (NAEP) Civics Assessment.⁹⁵⁵ These achievement levels, which Galston notes have been challenged as “not grounded in evidence linking them to specific acts and skills of citizens,” are: below basic, which means little or no demonstrated knowledge of the subject; basic, which indicates partial mastery; proficient, which represents a standard of adequate knowledge; and advanced. These standards are based on absolute thresholds, rather than percentiles. Galston notes that, despite the growing emphasis on improving civic literacy in the U.S., assessments of 12th grade students in 1988 and 1998 found that the percentage of correct answers on the Civics Assessment showed no significant change.⁹⁵⁶ Only one quarter of all students in the U.S. meet or exceed the proficiency level.

Absolute levels have not been established on a national level in Canada, so no similar assessment is possible for this country. Because the U.S. Civics Assessment is, of course, based on a different political system, its usefulness to Canada and as a potential comparative tool is limited. In order to assess absolute achievement levels in Canada, a very different assessment tool appropriate to the Canadian parliamentary system would have to be designed.

Kuklinski and Quirk note that when absolute levels or standards have not been established, generally an unspoken standard is used—the adequate level is the actual level of those who do “best.”⁹⁵⁷ Arthur Lupia, of the University of Michigan, notes, however, that more knowledge is not always better, since “more information can lead people to make incompetent choices or it can have no affect on their choices.”⁹⁵⁸ Rather, Lupia argues that “the value of the information is contingent on what people [...] do with it.”⁹⁵⁹ He also argues that one criterion of the value of information is: “Any piece of information that induces the actor to choose the alternative that leads to the desired outcome is more valuable than information that lacks such attributes.”⁹⁶⁰ Delli Carpini and Keeter disagree, however, and argue that “more information is better than less information,” and “how informed citizenry is and who is informed become important considerations in understanding the civic competence of the general public.”⁹⁶¹

⁹⁵⁴ Galston. “Political Knowledge, Political Engagement, and Civic Education.” p. 218.

⁹⁵⁵ Ibid.

⁹⁵⁶ Ibid.

⁹⁵⁷ Kuklinski, and Quirk. “Conceptual Foundations of Citizen Competence.”

⁹⁵⁸ Lupia, Arthur. *Questioning Our Competence: Tasks, Institutions, and the Limited Practical Relevance of Common Political Knowledge Measures*, University of Michigan, 2004; accessed July 2005; available from <http://www-personal.umich.edu/~lupia/questioning.pdf>. p. 29.

⁹⁵⁹ Ibid., accessed. p. 29.

⁹⁶⁰ Ibid., accessed. p. 40.

⁹⁶¹ Delli-Carpini, and Keeter. *What Americans Know About Politics and Why It Matters*. pp. 269 and 152, cited in Lupia. *Questioning Our Competence: Tasks, Institutions, and the Limited Practical Relevance of Common Political Knowledge Measures*, accessed. p. 47.

Delli Carpini and Keeter, according to Galston, “offer a wealth of evidence that political knowledge fosters citizens’ ‘enlightened self-interest,’” by which they mean “the ability to connect personal / group interests with specific public issues and to connect those issues with candidates who are more likely to share their views and promote their interests.”⁹⁶² In other words, low-income people whose interest is to reduce poverty rates and income inequality would favour political interests and representatives that act toward this end, and therefore would not vote for politicians whose policies would increase poverty and income inequality. The ability to distinguish such policy differences and to make informed political choices in line with one’s interests requires adequate political knowledge.

Similarly, Lupia defines a competent choice as one that is the same choice a respondent would make if she had the most accurate available information about its consequences: “Would she make the same decision if more informed about the consequences of her actions? If yes, then her choice is competent.”⁹⁶³ Therefore, Lupia considers that simple measures of voter turnout do not imply anything about whether or not the vote was a competent one.

John Myers of the Ontario Institute for Studies in Education of the University of Toronto, is highly skeptical of citizenship quizzes, although he does acknowledge the need for basic citizenship knowledge:

It is certainly reasonable to expect that everyone should have a basic knowledge of the country in which she is, or desires to be, a citizen. For example, any Canadian citizen should have sufficient knowledge ‘on tap’ to pass the Citizenship Exam taken by landed immigrants. But this tells us absolutely nothing about a person’s capacity to be a good citizen [...].

[M]ultiple choice tests and quizzes focus on what is easy to measure and prevent us from exploring the uncharted territory of the complex: thinking flexibly and critically, working with others, showing initiative, identifying problems, weighing alternatives, making reasoned informed judgements, and knowing how to act ethically and responsibly [...].

Citizenship quizzes may tell you something about the breadth of knowledge a person may have but not about a person’s deep and thoughtful understandings or their ability and willingness to apply what they know and can do towards making reasoned informed judgements about citizenship issues.⁹⁶⁴

⁹⁶² Delli-Carpini, and Keeter. *What Americans Know About Politics and Why It Matters*. cited in Galston. "Political Knowledge, Political Engagement, and Civic Education." p. 223.

⁹⁶³ Lupia. *Questioning Our Competence: Tasks, Institutions, and the Limited Practical Relevance of Common Political Knowledge Measures*, accessed.

⁹⁶⁴ Myers, John "Contrived or Authentic Assessment in Citizenship Education? Taming the Beast." Paper presented at the Citizenship 2020: Assuming Responsibility for Our Future conference, Montreal, QC, October, 2000, McGill Institute for the Study of Canada; accessed July 2005; available from <http://www.misc-iecm.mcgill.ca/citizen/myers.htm>. p. 1.

Delli Carpini references critics who claim that the public might base an opinion on factual information that they know but can no longer recall. According to Delli Carpini, these critics suggest: "At best, tests of factual knowledge are indicators of one's cognitive processing ability, rather than substantively important pieces of information that are called up for active use in forming and expressing political opinions."⁹⁶⁵ Others disagree. Political scientist Philip Converse, who has studied the relationship between political knowledge and voting behaviour for many years, argues:

The conventional complaint about measures of political information is that knowledge of minor facts, such as the length of terms of US senators, cannot address what voters actually need to vote properly. This is a tiresome canard. Information measures must be carefully constructed and multi-item, but it does not take much imagination to realize that differences in knowledge of several such 'minor' facts are diagnostic of more profound differences in the amount and accuracy of contextual information voters bring to their judgements.⁹⁶⁶

Norbert Schwartz and Howard Schuman, however, note methodological problems with using political interest questions to indicate political knowledge.⁹⁶⁷ They report survey research in the U.S. that asked how much the respondent follows what is going on in government and public affairs. This question was either preceded or followed by difficult political knowledge questions, with buffer items in between. When the interest question was asked first, 75.9% of the respondents said they followed politics most or some of the time. When the difficult knowledge questions were asked before the interest question, only 57.4% of the respondents reported that they followed politics most or some of the time.⁹⁶⁸

Mondak and Davis have also researched survey protocols, and argue that the encouragement to use "don't know" (DK) answers on the surveys "violate[s] established norms in psychometric research on educational testing."⁹⁶⁹ In other words, "Questions designed to measure political knowledge elicit high 'don't know' rates, and many of these DKs mask substantive understanding."⁹⁷⁰ They have found that in surveys that do not encourage or use the "don't know" response, the "knowledge levels are at least 10 to 15% higher, and variance about 10 to 15% lower, than usually reported in empirical research."⁹⁷¹ Therefore, they argue that political knowledge levels may not be as low as surveys report. The authors, who discuss the pros and cons of both approaches, argue:

⁹⁶⁵ Delli Carpini. "In Search of the Informed Citizen: What Americans Know About Politics and Why It Matters." p. 24.

⁹⁶⁶ Converse. "Assessing the Capacity of Mass Electorates." p. 333.

⁹⁶⁷ Schwarz, Norbert, and Howard Schuman. "Political Knowledge, Attribution, and Inferred Interest in Politics: The Operation of Buffer Items," *International Journal of Public Opinion Research*, vol. 9, no. 2, 1997: 191-195.

⁹⁶⁸ Ibid.

⁹⁶⁹ Mondak, Jeffery J., and Belinda Creel Davis. "Asked and Answered: Knowledge Levels When We Will Not Take "Don't Know" for an Answer," *Political Behavior*, vol. 23, no. 3, 2001: 199-224, Special Issue: Citizen Competence Revisited.

⁹⁷⁰ Ibid. p. 219.

⁹⁷¹ Ibid. p. 200.

For decades, researchers in educational testing have agreed that DKs should be discouraged, not encouraged, on tests of factual knowledge. The logic motivating this advice is that when DKs are encouraged, knowledge batteries systematically tap two distinct constructs: knowledge and propensity to guess. The propensity to guess varies as a function of respondents' personality traits. Consequently, when DKs are encouraged, the resulting 'knowledge' data may be contaminated [...]. Today, there is overwhelming agreement that DKs should be discouraged. Researchers have found that efforts to encourage DKs invite variance in knowledge scores driven by respondents' levels of self-confidence, propensity to take risks, and competitiveness [...]. DKs decrease, and thus correct answers increase, for respondents with the highest levels of self-confidence and propensity to take risks.⁹⁷²

Mondak and Davis give an example of two people who have the same knowledge level and are 90% sure of the answer to a question. However, one may feel confident in guessing and, if he or she has guessed correctly, will receive credit for the correct response. The other respondent, who does not feel confident in guessing and who has been encouraged to use the DK response, will get no credit if he or she responds with "don't know." In their research, the authors have found that people often do know a correct answer, but, on second thought, are not sure. Therefore, the knowledge level, they argue, is "systematically understated for some test-takers when DKs are encouraged."⁹⁷³

The argument that people are more informed on issues of interest to them than on issues not interesting to them is not supported by evidence in the research literature.⁹⁷⁴ In fact, according to Delli Carpini, the evidence shows that people who are more informed in one area of politics (such as foreign affairs) are more likely to be informed in other areas of politics (such as domestic policies and political processes).⁹⁷⁵ An exception to this is that women and blacks know more about gender and race issues, respectively, than they do about other issues. Delli Carpini's review of the research literature found that more informed citizens are more likely to be interested in and follow politics, and to participate in politics by voting, working for a political party, or attending community meetings.⁹⁷⁶

Educators, politicians, researchers, and the public generally agree, however, that political knowledge or "civic literacy," as well as the amount and quality of information available to citizens, is important for all of the activities Delli Carpini mentions, as well as heuristic and affect-driven responses, which also require a level of political knowledge.⁹⁷⁷ Educational attainment and motivation, or interest, are strong predictors of political knowledge, but opportunity to learn and the availability of adequate political information are also important. Delli Carpini suggests that, in fact:

⁹⁷² Ibid. pp. 205–206.

⁹⁷³ Ibid. p. 206.

⁹⁷⁴ Delli Carpini. "In Search of the Informed Citizen: What Americans Know About Politics and Why It Matters."

⁹⁷⁵ Ibid.

⁹⁷⁶ Ibid.

⁹⁷⁷ Converse. "Assessing the Capacity of Mass Electorates."

The relationship between the availability of information and citizen knowledge levels is so strong in certain situations that the nature of the information environment is the most important predictor of knowledge, surpassing education and interest.⁹⁷⁸

Milner also found that in societies with high levels of civic literacy, such as the Nordic countries, policies that contributed to an informed media, to adult and civic education, and to institutions that contribute to knowledge dissemination, increase civic literacy.⁹⁷⁹ For example, Norway, Finland, and Sweden subsidize independent daily newspapers and public television that are not leaders in the marketplace, and these countries encourage adult informal education through sponsoring study circles that contribute to civic literacy.⁹⁸⁰ Not surprisingly, the Nordic countries scored very highly on the IEA cross-country civic literacy assessment noted above.

By contrast to the Nordic countries, public opinion polls taken in the U.S. since the 1930s show consistently low levels of political knowledge among the public.⁹⁸¹ Data from Canada, which we discuss below, are more limited, but results are similar to those in the U.S. In the U.S., for example, most of the public knew that the first George Bush hated broccoli, but they didn't know important information in the three key policy areas: institutions and how the political process works; current issues and social conditions; and key political actors and groups.⁹⁸²

In another U.S. study, conducted by the Princeton Working Group on Inequality, using National Election Studies data, Bartels notes the disconnection between group interest and behaviour when individuals supported massive tax cuts that primarily benefitted the wealthy and yet "failed to connect inequality and public policy."⁹⁸³ Three out of four survey respondents said that the difference in incomes between rich people and poor people had increased in the past 20 years, which they thought was a bad thing. As well, most of these people wanted the government to spend more money on a variety of social programs. Yet most of those people supported the tax cut. Bartels concludes:

Support for the Bush tax cuts was strongly shaped by people's attitudes about their own tax burdens, but virtually unaffected by their attitudes about the tax burden of the rich—even in the case of the estate tax, which only affects the wealthiest one or two percent of taxpayers. Public opinion in this instance was ill informed, insensitive to some of the most important implications of the tax cuts,

⁹⁷⁸ Delli Carpini. "In Search of the Informed Citizen: What Americans Know About Politics and Why It Matters." p. 35.

⁹⁷⁹ Milner. *Civic Literacy: How Informed Citizens Make Democracy Work*.

⁹⁸⁰ Ibid.

⁹⁸¹ Delli Carpini. "In Search of the Informed Citizen: What Americans Know About Politics and Why It Matters."

⁹⁸² Ibid.

⁹⁸³ Bartels, Larry M. "Homer Gets a Tax Cut: Inequality and Public Policy in the American Mind," *Perspectives on Politics*, vol. 3, no. 1, 2005: 15-31.

and largely disconnected from (or misconnected to) a variety of relevant values and material interests.⁹⁸⁴

Furthermore, Delli Carpini reviewed over 2,000 survey questions of political knowledge in the United States over the past 50 years and the corresponding results, and found that levels of knowledge have remained about the same despite the massive expansion of media and electronic penetration during this period, with the average score of correct answers remaining approximately 50%.⁹⁸⁵ This suggests that the public might be *under-informed* rather than *uninformed*, but also indicates that the increased quantities of information available over time, through the Internet and other sources, have not increased public political knowledge.

Delli Carpini also points out that these aggregate scores mask socioeconomic patterns that show substantial gaps in knowledge between demographic groups. Generally men, whites, those with higher incomes, and older people are consistently more politically informed than women, blacks, those with low incomes, and youth. This gap persists even when characteristics such as occupation or education attainment levels are taken into account.⁹⁸⁶

In a recent paper, Thomas and Young of the University of Calgary discuss their research on age, gender, and political disengagement in Canada.⁹⁸⁷ Using data from the 1984, 1997, 2000, and 2004 Canada Election Studies, they found:

... that young Canadian women are less engaged with and participate at lower rates in the formal political process than do either their male peers or older Canadian women. We find that once it is unpacked, the political disengagement of young Canadians is in fact a gendered phenomenon, produced in large part by young women's lack of interest in and knowledge about formal politics. Probing the patterns of disengagement more deeply, we conclude that socialization and the acquisition of political knowledge play a particularly important role in cueing political engagement for young women. Our findings suggest that childhood exposure to politics is a more important trigger for political engagement among women. The youngest cohort of voting age Canadians has had less exposure to political socialization than prior generations. This has had a disproportionately larger negative impact on young women than young men.⁹⁸⁸

Thomas and Young also found that education could not explain the gender differences since, within any educational level or occupational category, women are less likely to be

⁹⁸⁴ Ibid. p. 15.

⁹⁸⁵ Delli Carpini. "In Search of the Informed Citizen: What Americans Know About Politics and Why It Matters."

⁹⁸⁶ Ibid.

⁹⁸⁷ Thomas, Melanee, and Lisa Young. "More Subject Than Citizen: Age, Gender and Political Disengagement in Canada." Paper presented at the Annual Meeting of the Canadian Political Science Association, York University, Toronto, June 1-3, 2006; accessed December 2006; available from <http://www.cpsa-acsp.ca/papers-2006/Thomas-Young.pdf>. p. 2.

⁹⁸⁸ Ibid. p. 2.

interested in and knowledgeable about politics than men, and that women with post-secondary education were no better informed about politics than male high school dropouts.⁹⁸⁹ Also, gender gaps were present whether the women were employed outside the home or not, were married or single, had children or not, and were members of social organizations or not.

General explanations for the gender gap have focused on access to relevant resources (income and education), patterns of socialization (influence of cues within the home, especially levels of the mother's political interest), and access to networks and social capital.⁹⁹⁰ As noted above, Thomas and Young found socialization to have the most significant effect, especially on political interest, for women, but not for men, whose level of political knowledge and interest is more affected by university education and networks than women. They also note that the types of organizations and networks that men and women belong to are different. Men's networks are often more connected with business and politics, while women's networks are often community groups engaged in social activities.⁹⁹¹

Joel Westheimer, university research chair in Democracy and Education at the University of Ottawa, and his colleagues have identified three types of engaged citizens, which points to the fact that goals for citizenship can emphasize different levels and types of knowledge and engagement.⁹⁹² These types are: the personally responsible citizen, the participatory citizen, and the social justice oriented citizen.

- The *personally responsible citizen* is one who volunteers time and / or contributes money for social causes, votes, works and pays taxes, obeys laws, and acts responsibly in his / her community through activities such as recycling and giving blood. "Both those in the character education movement and those who advocate community service requirements would emphasize this vision of good citizenship."⁹⁹³
- The *participatory citizen* actively participates in civic affairs at the community, provincial, and national levels. For example, this citizen would be involved in organizing "community efforts to care for those in need, promote economic development, or clean up the environment." Educational programs supporting this type of citizen "focus on teaching students about how government and other institutions work and about the importance of planning and participating in organized efforts to care for those in need, for example."⁹⁹⁴
- The *social justice-oriented citizen* is one who critically assesses social, political, and economic structures, and explores the root causes of problems and strategies for change. This citizen "seeks out and addresses areas of injustice," and "knows

⁹⁸⁹ Ibid. p. 4.

⁹⁹⁰ Ibid.

⁹⁹¹ Ibid.

⁹⁹² Westheimer, Joel. "Democratic Dogma: There Is No One-Size-Fits-All Approach to Schooling for Democracy," *Our Schools. Our Selves*, vol. 15, no. 1, 2005: 25-39, The Canadian Centre for Policy Alternatives. p. 29.

⁹⁹³ Ibid. p. 29.

⁹⁹⁴ Ibid. p. 29.

about democratic social movements and how to effect systemic change.” “These [educational] programs are less likely to emphasize the need for charity and volunteerism as ends in themselves and are more likely to teach about social movements and how to effect systemic change.”⁹⁹⁵

Westheimer remarks: “If participatory citizens are organizing the food drive and individually responsible citizens are donating food, the justice-oriented citizens are asking why people are hungry and acting on what they discover.”⁹⁹⁶ He notes that, although these areas of citizenship overlap, in practice they are treated as separate. For example: “Students working in a soup kitchen or a homeless shelter might provide important direct services for individuals in need, but might do little to affect social policies that might diminish the need for these services.”⁹⁹⁷ Westheimer relates a personal incident when, at a community event, the director of a shelter proudly announced that it was now serving three times as many meals as it did the previous year. When a reporter asked whether this was good news or bad news, the director “seemed mystified by the question.”⁹⁹⁸

Westheimer argues that it is important to distinguish these goals when asking whether citizens are competent: “There is little evidence from studies of actual programs suggesting that the pursuit of one set of goals necessarily furthers another.”⁹⁹⁹ Further, he argues that although being a personally responsible citizen is a worthy goal, this goal is not limited to democratic governments, as it is likely to be pursued by government leaders in totalitarian regimes as well: “Chinese leader, Hu Jintao, would be as pleased as Canadian Prime Minister Martin were all citizens personally responsible.”¹⁰⁰⁰ Although Westheimer notes that he is not advocating a particular approach, he does find “a strict focus on volunteering, charity, and character education troubling when not also accompanied by deeper questioning and critical analysis.”¹⁰⁰¹

This analysis suggests that if a key goal of civic literacy is to produce social-justice oriented citizens, which corresponds more closely with the values and deeper analysis underlying and fostered by the CIW, then indicators of volunteerism, voting, organizational skill levels, and minimal political knowledge are insufficient to measure genuine civic literacy in the population. Following Westheimer’s analysis, true civic literacy indicators would need to assess students’ and citizens’ capacity for “deeper questioning and critical analysis.” However, at this point, there are no Canadian data available to populate potential indicators of social-justice oriented citizenship.

⁹⁹⁵ Ibid. p. 29.

⁹⁹⁶ Ibid. p. 29.

⁹⁹⁷ Ibid. p. 30.

⁹⁹⁸ Ibid. p. 31.

⁹⁹⁹ Ibid. p. 31.

¹⁰⁰⁰ Ibid. p. 32.

¹⁰⁰¹ Ibid. pp. 31–32.

24.2.2 Public political knowledge data in Canada

There is a lack of quality data for civic literacy in Canada, particularly in light of Canada's unfortunate decision not to participate in the second phase of the cross-national IEA Civic Education Study. Numerous ad hoc surveys asking political knowledge questions have been conducted, but the questions are rarely comparable, and the surveys are not repeated on a consistent basis. Milner gives examples of results from some of these surveys. For instance, a 1997 survey reported in the *Globe and Mail* asked questions similar to the 20 questions given to immigrants on the citizenship test. Forty-five per cent of the respondents failed to answer at least 12 of the 20 questions—the number required to pass the citizenship test.¹⁰⁰² The citizenship test, given only to applicants for Canadian citizenship, asks a broad range of questions about history, politics, economics, geography, voting, citizenship responsibilities, and elections.¹⁰⁰³ Since this test is reasonably comprehensive and is fully endorsed and administered by the Canadian government, it is a potentially useful tool to assess the level of political knowledge in the general public as well as among new immigrants. A selection of questions used for this test is included in Appendix 26.

Jack Jedwab, Executive Director of the Association for Canadian Studies, reports results from a survey of 1,000 Canadians conducted in 2004 by the Carleton University Survey Centre as part of the International Social Science Program Survey, with the support of the Department of Canadian Heritage.¹⁰⁰⁴ The survey covered six areas: empowerment and trust; social and political activism; knowledge and interest in politics; sources of political news; impressions of how well Canadian democracy works; and belonging and participation in the social and political life in Canada.

Knowledge of political matters is widely seen as a key measure in the degree to which citizens are engaged. Those less engaged in the political life of the nation are generally believed to be more unfamiliar with the political process and with the principle issues facing the population.¹⁰⁰⁵

However, the Carleton survey did not ask specific knowledge questions. Rather, it asks if the respondents have a good understanding of important political issues; if they are interested in politics; whether they discuss politics with friends, relatives, or co-workers; whether they have attempted to persuade others of their opinion on political issues; whether they have joined an Internet forum or discussion group; and whether they think it is important to vote.

One interesting result is that young people (ages 18–24) “agreed strongly” (26.4% of respondents) and “agreed” (35.2% of respondents) that they have “a pretty good

¹⁰⁰² Milner. "Civic Literacy: How Informed Citizens Make Democracy Work."

¹⁰⁰³ Canadian Broadcasting Corporation. *Becoming Canadian*, CBC, 2005; accessed June 2005; available from http://www.cbc.ca/news/becomingcanadian/self_citizen_quiz.html.

¹⁰⁰⁴ Jedwab, Jack. *Canada's Political Deficit: Knowledge and Interest in Politics and Political News: Part 3 & 4*, Association for Canadian Studies, 2005; accessed July 2005; available from <http://www.acs-aec.ca/Polls/Part 3 and Part 4.pdf>.

¹⁰⁰⁵ Ibid., accessed. p. 1.

understanding of the important political issues facing Canada.” The “agree strongly” result is higher for this age group than for all the other age groups: ages 25–34 (11.6% of respondents said they “agree strongly”), ages 35–44 (12.2% of respondents said they “agree strongly”), ages 45–54 (9.0% of respondents said they “agree strongly”), ages 55–64 (15.9% of respondents said they “agree strongly”), and ages 65 and over (14.0% of respondents said they “agree strongly”). Also, 41.6% of the youngest cohort said they were personally interested in politics, compared with 35.1% of 25–34 year olds. On the other hand, the youngest group of voters was least likely of all the age groups to say that voting was important. Jedwab notes: “If young people are less inclined to participate in the political domain the survey suggests that it is not a function of less knowledge about the issues.”¹⁰⁰⁶

Another outcome was that Albertans, at 53.9%, ranked the highest among those who said they had a good understanding of political issues, yet, at 54.5%, Albertans also had less personal interest in politics than residents of any other province. The province with the second highest proportion of respondents who said they had a good understanding of political issues was British Columbia (52.7% of respondents). And the province with the second lowest level of interest in politics was Quebec (42.5 % of respondents). In general, about half of Canadians expressed interest in politics, with the other half not interested. Also, nearly 59% of Canadians say they discuss politics with friends, relatives, or co-workers. On this indicator, British Columbia led the other provinces with 69.4% of British Columbians saying they “often,” or “sometimes” discuss politics with friends, relatives, or co-workers. Atlantic Canadians were least likely to discuss politics with friends, relatives, or co-workers (47% of respondents.)¹⁰⁰⁷

The Dominion Institute sponsors surveys of Canadian history and works toward “quantifying Canadians’ historical and civic knowledge.”¹⁰⁰⁸ The institute’s annual Canada Day quiz, a joint project with the Council for Canadian Unity, has surveyed approximately 1,500 adults each year since 1997. The questions are different every year, however, and are heavily weighted towards economic and military history. Not surprisingly, men do better on this quiz than do women. For example, one sports-related question used in the 2000 survey asked which hockey player scored the winning goal in the 1972 Canada–Soviet Union hockey series. The result was that 49% of the men but only 19% of the women answered correctly. Therefore, although this survey is conducted annually, the collected data are not particularly useful for the civic literacy component of the CIW educated populace domain.

¹⁰⁰⁶ Ibid., accessed. p. 1.

¹⁰⁰⁷ Ibid., accessed.

¹⁰⁰⁸ The Dominion Institute. *Website*, accessed June 2005; available from <http://www.dominion.ca/English/polls.html>.

The Canadian Election Study (CES)

The Canadian Election Study (CES) is one of the most consistent surveys of political knowledge conducted in Canada.¹⁰⁰⁹ As noted above, Paul Howe, of the University of New Brunswick, who researches political knowledge and its effects on voter turnout, believes that the CES is “the only [Canadian study] on which a reasonable selection of knowledge-based items appear.”¹⁰¹⁰ The CES is conducted in partnership with Elections Canada and the Institute for Research on Public Policy (IRPP), and is funded in part by the Social Sciences and Humanities Research Council (SSHRC) and Elections Canada.

The CES has surveyed the Canadian public through every election since 1965.¹⁰¹¹ It asks a limited number of direct knowledge questions, using a conventionally accepted knowledge battery, in addition to a number of political awareness questions that imply knowledge of prominent issues. The 1984, 1993, 1997, 2000, and 2004 Canadian Election Studies (2006 data have not been released) contain analogous measures of political interest, knowledge, efficacy, and participation, which, while the questions themselves are not always identical (since issues change over time), do allow comparative measures to be developed over a twenty-year period.¹⁰¹² Measures of political socialization in childhood were added in 2004 and do not appear earlier.

The Institute for Social Research (ISR) at York University has conducted the recent CES surveys, which were designed by five co-investigators: André Blais, Department of Political Science, University of Montreal and Current Canada Research Chair in Electoral Studies (appointed for 2001-2008); Joanna Everitt, Department of Political Science, University of New Brunswick; Elisabeth Gidengil, Department of Political Science, McGill University; Patrick Fournier, Department of Political Science, University of Montreal; and Neil Nevitte, Department of Political Science, University of Toronto.¹⁰¹³

The multi-stage CES surveys sample voting age citizens living in private residences both before and after the elections, either face-to-face or over the telephone, and also include a smaller mail-in survey to a portion of the people who responded to the pre- and post-election surveys. The CES sample sizes range from 1,000 respondents for the mail-in survey to 4,000 respondents for the pre- and post-election surveys. Many of the questions are the same in each survey, and include questions on political knowledge, voting behaviour, opinions of government performance and leaders, motivation and interest in political issues, and opinions on a wide variety of social, economic, and political issues such as education, taxes, and the environment. Specific issues relevant to each election are also included. The raw data are publicly available to researchers through the CES website (<http://www.ces-eeec.umontreal.ca>).¹⁰¹⁴

¹⁰⁰⁹ Canadian Election Study. *Website*, accessed.

¹⁰¹⁰ Howe. "Political Knowledge and Electoral Participation in the Netherlands: Comparisons with the Canadian Case." p. 3.

¹⁰¹¹ Canadian Election Study. *Website*, accessed.

¹⁰¹² Thomas, and Young. "More Subject Than Citizen: Age, Gender and Political Disengagement in Canada."

¹⁰¹³ Canadian Election Study. *Website*, accessed.

¹⁰¹⁴ *Ibid.*, accessed.

Examples of the types of questions administered in the 2004 survey that are relevant to the transmission and acquisition of civic and political knowledge include the following. (It is noteworthy that there are several questions on non-formal and informal learning mechanisms, including learning that occurs within the family, through the media, and through engagement in political activity).

Questions about:

- voting behaviour in both federal and provincial elections including why respondents did not vote, if that was the case
- which level of government has primary responsibility for health, education, and social welfare
- the names of leaders of each of the four major political parties
- trust in government and political leaders
- U.S. relations, Quebec separation, and the war in Iraq
- which political parties promised to get rid of the gun registry, do away with the GST on family essentials, increase military spending by two billion dollars each year, and increase spending to fight AIDS in poor countries
- political discussions within the family
- number of hours a day respondents currently watch TV, listen to the radio, and read newspapers
- whether respondents watched the political debates on TV
- whether respondents subscribe to a daily newspaper
- how much attention was paid to news about the Federal election on TV, radio, newspaper, the Internet; and where they get their news
- whether respondents have ever taken a civics course
- whether they ever participated in political actions such as signing a petition, joining a boycott, or attending a demonstration
- whether they ever contacted an MP or are they a member of an interest group that works for change
- how they feel about aboriginal peoples, feminists, racial minorities, gays and lesbians
- if they think the inequality gap in income is increasing or not, and whether it is important to address this issue politically
- how important are business interests and how do they feel about that
- what they think are the most important issues facing Canadians¹⁰¹⁵

Howe uses the CES 1984, 1993, 1997, and 2000 data to examine changes in *relative* levels of political knowledge across age groups.¹⁰¹⁶ Table 15 illustrates the trend over time that shows political knowledge of younger people under age 30 decreasing.¹⁰¹⁷

¹⁰¹⁵ Gidengil, Blais, Nadeau, and Nevitte. *Citizens*.

¹⁰¹⁶ Howe. "Political Knowledge and Electoral Participation in the Netherlands: Comparisons with the Canadian Case."

¹⁰¹⁷ Ibid. See pages 4–5 for detailed explanation of the methodology used.

The political knowledge items Howe used from the CES include the following, which respondents were asked to identify:

1984: 10 items:

- Names of all ten provincial premiers

1993: 7 items:

- Party positions / promises
 - Support GST
 - Oppose GST
 - Do away with NAFTA
 - Eliminate deficit in 3 years
 - Eliminate deficit in 5 years
 - Increase spending on public works
 - Kim Campbell's cabinet job before becoming PM

1997: 5 items:

- Party positions / campaign promises
 - Lower personal incomes taxes by 10%
 - Cut unemployment in half by 2001
 - Against recognizing Quebec as distinct society
 - Name of federal finance minister
 - Name of premier of own province

2000: 10 items:

- Party positions / campaign promises
 - Single tax rate
 - National prescription drug plan
 - Law to fight criminal biker gangs
 - Law to pay back debt in 25 years
- Name of premier of own province
- Names of four party leaders (all major parties but Bloc Québécois)
- Name of federal finance minister¹⁰¹⁸

Knowledge scores for each election year are based on the number of questions respondents answered correctly, which are then converted to percentile scores. Relative knowledge levels of the different age groups are calculated based on the mean percentile scores within each age group. Howe describes this methodology in further detail:

In surveys conducted at the time of the 1984, 1993, 1997 and 2000 general elections, as well as a separate study conducted in 1990, Canadians were asked a wide variety of factual questions that tapped into their knowledge of Canadian politics—questions such as the names of political leaders and the campaign promises of different parties. Each survey included a different bundle of questions, so in order to draw comparisons, it is necessary to standardize in some fashion. A simple method is to assign respondents on each survey a ranking

¹⁰¹⁸ Ibid.

between 0 and 100 (a percentile score, to be precise), based on how their knowledge level compared to other respondents in the same survey.¹⁰¹⁹

Howe's results are summarized in the Table 15 below.

Table 15: Political knowledge, by age group, given as percentile scores of correct answers in the Canadian Election Studies surveys, 1984, 1993, 1997, and 2000

Survey Year	Age Group							Number of Respondents
	18–23	24–29	30–34	35–39	40–49	50–59	60+	
1984	39.3	43.7	51.9	51.4	54.4	57.9	52.4	3319
1993	36.7	46.7	47.1	50.3	55.5	53.1	56.0	3188
1997	37.8	41.0	46.1	47.7	53.2	58.4	57.0	3883
2000	31.4	36.2	47.6	49.5	51.4	59.7	58.3	3588

Source: Howe, Paul. "Political Knowledge and Electoral Participation in the Netherlands: Comparisons with the Canadian Case." Paper presented at the Annual conference of the Canadian Political Science Association, Winnipeg, June 3-5, 2004; accessed July 2005; available from http://www.cpsa-acsp.ca/template_e.cfm?folder=conference&page_name=agm-papers-2004.htm - h.

In order to help identify general trends over time, “sub-par levels” of knowledge (below 50% correct answers) are located to the left of the red line, and “above-average” levels of knowledge (above 50% correct answers) are located to the right of the red line.¹⁰²⁰ The results show clearly that political knowledge generally increases with age, with those 50 and older being the most knowledgeable. A key issue raised by these results is whether today's young Canadians mainly are repeating patterns established by older generations at the same age—the “life-cycle effect,”—or whether they are unique in their political attitudes and behavioural dispositions—the “generational effect.” This “life-cycle” effect is to be expected and is seen as part of the developmental process. In other words, when young people get older, enter the workforce, and have families, their priorities shift and political knowledge becomes more relevant to them. Therefore, their interest and knowledge levels become higher.

¹⁰¹⁹ Howe, Paul. *Electoral Participation and the Knowledge Deficit*, Elections Canada. Electoral Insight, 2003; accessed July 2005; available from http://www.elections.ca/eca/eim/article_search/article.asp?id=50&lang=e&frmPageSize=&textonly=false. p. 2.

¹⁰²⁰ Howe. "Political Knowledge and Electoral Participation in the Netherlands: Comparisons with the Canadian Case." p. 5.

What is more a cause for concern, however, is the “generational effect.” This effect is seen by comparing young people in one year with young people the same age in previous years. Also, in comparing young people in one year with young people in the same age category in previous years, there is some indication that political knowledge among younger people 18–29 years has declined since 1984. In 1984, 39.3% and 43.7% of the questions were answered correctly by those in the 18–23 and 24–29 age groups, respectively. However, in 2000 only 31.4% and 36.2% of the questions were answered correctly by these same age groups, which represent a drop of 7.9 and 7.5 points for each group, respectively, between 1984 and 2000.

In addition, in 1984, the 18 to 23-year-old score was 18.6 points below the most knowledgeable age group in that year—the 50–59 year olds—who answered 57.9% of the questions correctly. However, in 2000, the difference between the scores of 18–23 year olds and 50–59 year olds, who were also the highest scorers in that year with 59.7% of the questions answered correctly, was 26.5 percentage points. In other words, the gap between the 18–23 year-olds and the 50–59 year-olds grew by 7.9 percentage points between 1984 and 2000. Also in 1984, only two groups had percentile scores under 50%. In 1993, these two groups were joined by 30–34 year olds, and by 1997, the 35–39 year-old group had also fallen into the low knowledge category. In 2000, these same three age groups demonstrated a low level of political knowledge again, indicating a possible overall decline in political knowledge among the younger generations. Indeed, except for those over 50, the level of political knowledge in the Canadian populace appears to be in general decline, according to the 20-year CES results.

Milner, using data from the Canadian Election Study (CES) from 1984 through 1997, also finds a “significant decline” in political knowledge over time, despite the increased quantities of information publicly available.¹⁰²¹ He notes that one of the questions the CES surveys consistently ask Canadians is to identify their provincial premier. In 1984, 90% of the public could answer this question correctly, but in 1997, only 77% of the public could do so. In 1997, three additional knowledge questions were asked: to identify the federal finance minister, the U.S. president, and Canada’s only woman prime minister. Responses, as percentages of the population who could answer these questions correctly, were 37%, 84%, and 41%, respectively. Only 21% of the public could answer all four questions (including naming their provincial premier) correctly. The 2000 and 2004 CES surveys did not repeat these additional three questions.

24.2.3 Proposed international civic literacy index

With the exception of the 1999–2000 IEA Civic Education Study, there is presently no other internationally used civic literacy index and none that consistently assesses civic literacy in comparable ways over time. Milner envisions that such an index should include three kinds of questions on issues that individuals need to know in order to make informed voting choices and to participate in politics:

¹⁰²¹ Milner. “Civic Literacy: How Informed Citizens Make Democracy Work.”

The main set of questions will test knowledge of the names of political leaders in the respondents' country (e.g., prime minister, finance minister, former prime minister of state, leader of the opposition) their political affiliation, and their position, and / or that of their party, on key issues. A second set will test knowledge of basic constitutional and institutional practices such as the time lapse between general elections, the composition of legislative committees and the powers of local governments. (In both cases, by using a battery of questions, we can compensate for the advantage particular questions give to specific countries.) A third set will test familiarity with the role, structure and leadership of international institutions, such as the United Nations and World Trade Organization.¹⁰²²

The survey would also include the subjects' experience of civic education, as well as a category of questions not directly related to politics, but testing knowledge of political geography. These additional questions would serve as a comparison with knowledge of politics, assessing the degree to which knowledge of political geography was correlated with greater direct knowledge of politics.

Since making this recommendation, Milner has joined with a group of researchers to develop an international index that will measure political knowledge cross-nationally. Some of the questions that will be used to construct this index are being included in the European Social Survey.¹⁰²³ Out of 24 potential multiple-choice questions that were identified, Milner's research group created a module of 8 questions for pre-testing. By 2003, this module had been pre-tested with upper secondary social science, law, or political science students in Finland, Spain, Poland, Canada, Taiwan, and Hungary. In addition, the 2003 Finnish Election Survey of the general population included three of the questions. Two of the eight questions were subsequently deleted since they were too easy (e.g., What is the party of [name of Chief Executive]), or no longer relevant (e.g., Saddam Hussein is president of which country?) The remaining six pre-test questions and the four multiple-choice alternative answers to each question from which respondents could choose give a flavour of the intended survey:

1. Who is the foreign minister?
 - [The name of the minister of finance]
 - [The name of the foreign minister]
 - [The name of a leading national opposition figure]
 - [The name of a leading regional political figure]
2. Which of the following parties is the largest opposition party in the [parliament]?
 - [large governing party]
 - [small governing party]

¹⁰²² Ibid. p. 4.

¹⁰²³ Milner, Henry. "Creating an Instrument for Testing Political Knowledge: Theoretical Considerations and Preliminary Findings." Paper presented at the 2nd European Consortium for Political Research Conference, Marburg Germany, September, 2003; accessed July 2005; available from <http://www.essex.ac.uk/ECPR/events/generalconference/marburg/papers/14/2/Milner.pdf>.

- [large opposition party]
 - [smaller opposition party]
3. Among the adult population in [country], who elects the members of Parliament (main chamber)?
 - Only [nationality] citizens
 - All residents
 - Only tax payers
 - The citizens elect 80 per cent, the government appoints 20 per cent
 4. Responsibility for public politics and policy is divided between the local level, the regional level and the central government. Which is primarily responsible for waste disposal?
 - The municipality
 - The Province / State / Region
 - The National government
 - It is a shared power of the Province / State / Region and the National government
 5. Let us imagine that person A earns 2.000 € per month and person B 5.000 € per month. Which of the following is normally correct according to your knowledge?
 - A and B pay the same percentage of their salary income in tax.
 - A pays a larger percentage than B.
 - B pays a larger percentage than A.
 - A does not pay any income tax; only B does
 6. Which of the following countries is a permanent member of the UN Security Council?
 - Canada
 - Japan
 - Russia
 - Italy ☐

The percentage of correct responses for question 1 (Who is the foreign minister) in five of the pre-tests was as follows: Poland—98.8%, Spain—79.5%, Taiwan—67.4%, Finland—94.7%, and Canada—30%. In fact, Canada was the lowest scoring country for five of the six retained questions. Canadian students scored second on the question concerning progressive taxation: Poland—77.5%, Spain—61.4%, Taiwan—91%, Finland—72.4%, and Canada—82.5%.

Milner is also directing another international exploratory project to collect civic literacy data in conjunction with the International Institute for Democracy and Electoral Assistance (IDEA). This project is only just beginning.¹⁰²⁴ In personal correspondence with Milner, who was contacted to get an update on the status of this proposed international civic literacy index, Milner replied: “There is as yet no such instrument that

¹⁰²⁴ Campbell. "What Is Educations' Impact on Civic and Social Engagement?"

has yet been applied in a sufficiently systematic way for your purposes. (There has been some progress, but the obstacles make a long story.)”¹⁰²⁵

In this correspondence, Milner also suggests using the International Adult Literacy Survey (IALS), which we are using for a comparative assessment of adult literacy in general. Milner has used this survey as a proxy for political knowledge in other reports.¹⁰²⁶ Milner explains that he uses reading comprehension in general, as measured in the IALS, “on the premise that individuals who lack the capacity to meaningfully read the relevant material are very unlikely to acquire the [...] minimal level of political information in an advanced democracy.”¹⁰²⁷ However, while Milner’s premise may be correct, and while we do indeed look at adult literacy in another section of this review, here we are concerned with more direct and specific measures of civic literacy than can be provided by the IALS.

¹⁰²⁵ Milner, Henry, Université Laval in Quebec, personal communication with Karen Hayward, e-mail correspondence, December 23, 2006.

¹⁰²⁶ Milner, Henry. "Civic Drop-Outs? What Young Citizens Know and Don't Know About Politics: Canada in Comparative Perspective. Draft." Paper presented at the Citizenship on Trial: Interdisciplinary Perspectives on Political Socialization of Adolescents Conference, Montreal, McGill University, June 20-1, 2002; accessed July 2005; available from <http://www.youthconference.mcgill.ca/MilnerPaper.doc>.

¹⁰²⁷ Ibid. p. 5.

24.3 Civic engagement

Civic engagement, or participation, indicators are often included in social cohesion, social capital, and community development indicator sets.¹⁰²⁸ However, they are also highly relevant to assessments of civic literacy. As Belgian researchers Mainguet and Baye note, participation in civic activities can provide new hands-on opportunities to learn, thus increasing the level of civic literacy.¹⁰²⁹

Civic engagement or participation indicators often include levels of volunteer work, generosity manifested through charitable and blood donations, and social trust; participation in religious, work-related, political, or social organizations; voting rates; and assessments of confidence in government. As well, such indicators are generally disaggregated to capture the effect of socioeconomic inequities such as income disparities on participation and engagement rates.

Some of these participation and engagement indicators will be captured in the community vitality and governance domains of the CIW. Here we will discuss those variables, like voter turnout, that have been most frequently used by analysts as proxies for civic literacy or political knowledge because of their close empirical association. According to Paul Reed, such indicators are useful as descriptive variables, but they rarely point to the systemic or structural conditions that might have led to changes such as decline in voter registration in the first place.¹⁰³⁰

Galston notes that the most significant indicators of political engagement include:

- interest in, following, or keeping up with politics
- frequently discussing politics
- the acquisition of political knowledge from traditional sources such as reading newspapers
- using the new media to replace newspapers and network TV news as sources of political information
- voter turnout¹⁰³¹

In the U.S., according to Galston, the trends in all of these indicators are negative.

[A]t some point the withdrawal from public engagement endangers the health functioning of democratic politics. At the very least, if the tendency to withdraw is asymmetrically distributed among population groups, then the outputs of the political system are likely to become increasingly unbalanced. And if those who

¹⁰²⁸ Reed. *Developing Civic Indicators and Community Accounting in Canada. Draft*, accessed.

¹⁰²⁹ Mainguet, Christine, and Ariane Baye. "Defining a Framework of Indicators to Measure the Social Outcomes of Learning," in *Measuring the Effects of Education on Health and Civic Engagement: Proceedings of the Copenhagen Symposium*, 153-163, Organisation of Economic Co-operation and Development (OECD), 2006.

¹⁰³⁰ Reed. *Developing Civic Indicators and Community Accounting in Canada. Draft*, accessed.

¹⁰³¹ Galston. "Political Knowledge, Political Engagement, and Civic Education." p. 219.

withdraw the most are those who have the least, the system will become even less responsive to their needs. Political engagement is not a sufficient condition for political effectiveness, but it is certainly necessary.¹⁰³²

Using aggregate level data for 16 OECD countries, Milner found a “clear and significant relationship” between voter turnout, especially in local elections, and civic literacy.¹⁰³³ This empirical relationship was far stronger than in the case of “trust,” and “volunteering,” which, as noted above, are sometimes used as proxies for political knowledge, social cohesion, and civic engagement. In fact, Milner contends: “[T]he best—though hardly perfect—single indicator of civic engagement [...] is turnout in municipal-level elections.”¹⁰³⁴ The connection between voter turnout and political knowledge is stronger in younger people than in older people.¹⁰³⁵ In a more recent paper, Milner cites other research that connects lack of political interest and political knowledge with low voting behaviour among the young.¹⁰³⁶ He also finds little evidence that young people are substituting “political activism” for voting or joining a political party.

One of the paradoxes of public engagement, according to Galston, is that higher levels of educational attainment in the general populace are not leading to higher rates of political engagement. All the empirical evidence indicates that people with higher levels of education are more politically engaged, vote more in elections, and have more political knowledge, than those with lower levels of education.¹⁰³⁷ However, educational attainment rates have been rising, while political engagement rates have been falling.¹⁰³⁸

One possible reason for this “participation paradox” is sometimes referred to as the “sorting model,” which claims that engagement is linked to relative rather than absolute levels of educational attainment. Citing research by Nie, et al., Galston notes:

Education serves as a sorting mechanism; whatever educational attainment may be median at a given time, individuals significantly above the median will tend to be members of social networks that can connect their views more effectively to political leaders and institutions [...]. As education levels rise across society, the positive effects of absolute increases in knowledge and understanding are counterbalanced by the negative effects of increased competition for scarce positions of social centrality. These countervailing forces explain the apparent

¹⁰³² Ibid. p. 220.

¹⁰³³ Milner. “Civic Literacy: How Informed Citizens Make Democracy Work.”

¹⁰³⁴ Ibid. p. 3.

¹⁰³⁵ Howe. “Political Knowledge and Electoral Participation in the Netherlands: Comparisons with the Canadian Case.”

¹⁰³⁶ Milner, Henry. “Are Young Canadians Becoming Political Dropouts? A Comparative Perspective,” *Choices*, vol. 11, no. 3, 2005, Institute for Research on Public Policy (IRPP); accessed July 2005; available from <http://www.irpp.org/choices/>.

¹⁰³⁷ Galston. “Political Knowledge, Political Engagement, and Civic Education.”

¹⁰³⁸ Ibid.

paradox that rising education levels over the past generation have not yielded commensurate—indeed, any—gain in political engagement.¹⁰³⁹

However, Campbell notes that the evidence for this socio-economic stratification model “cannot explain why political engagement has fallen in the wake of a more educated populace. A drop in engagement must be explained by factors other than education.”¹⁰⁴⁰ He also observes that empirical results suggest that “turnout would be even lower if education levels had not increased.”¹⁰⁴¹

Milner argues that this paradox is the result of the lack of engagement among youth, which accords with the CES results noted above on declining levels of political knowledge among youth:

We know that the decline in political knowledge and voter turnout has coincided with a rise in educational level, despite the fact that more educated persons tend not only to be more knowledgeable but to vote more. But educated people tend to be better off. If we control for socio-economic class, we find that education has less of an effect on participation than age [...]. In 1990, the Times Mirror Center analyzed survey results from the 1940s through the 1970s revealing that previous generations of young people knew as much as, if not more, than their elders [...]. We now have systematic data strongly suggesting that the secular decline in voter turnout, like in political knowledge, experienced by Western countries is in good part a matter of generations [...]. Though the life-cycle effect is substantial, amounting to an increase of about 15 points between the ages of 20 and 50, generation has now replaced life cycle as the key factor in the absence of young people among voters [...]. In sum, [...] young people today vote significantly less than other generations, and than young people in earlier decades. They also know less of politics, are less likely to be attentive to the issues and actors of electoral politics, and to feel civic duty to vote.¹⁰⁴²

Howe also notes that the “life-cycle” effect, which shows people vote less when they are young adults than in later stages of life, is no longer relevant as a key explanatory variable, since youth today vote less than the older generation did when they were young.¹⁰⁴³ According to the CDA, voter turnout among those born in the 1970s, who mostly joined the electorate in the 1990s, is “as much as 30 points lower” than turnout was among pre-baby boomers (those born before 1945) when they were young adults.¹⁰⁴⁴ André Blais, et al. note that as these younger birth cohorts have come to account for a greater proportion of the electorate due to demographic changes, their failure to turn up

¹⁰³⁹ Ibid. p. 225, citing Nie, N.H., J. Junn, and K. Stehlik-Barry. *Education and Democratic Citizenship in America*, Chicago: University of Chicago Press, 1996. Chapters 7, 8.

¹⁰⁴⁰ Campbell. “What Is Education’s Impact on Civic and Social Engagement?” p. 53.

¹⁰⁴¹ Ibid. p. 103.

¹⁰⁴² Milner. “Civic Drop-Outs? What Young Citizens Know and Don’t Know About Politics: Canada in Comparative Perspective. Draft.”, p. 5, 7, 9, 11.

¹⁰⁴³ Howe. *Electoral Participation and the Knowledge Deficit*, accessed.

¹⁰⁴⁴ Gidengil, Blais, Nadeau, and Nevitte. *Citizens*. p. 109.

on election day has started to pinch, accounting for much of the aggregate decline in voter turnout over the past several elections.¹⁰⁴⁵

One explanation for higher voter participation among the older generation is that the older generation has more sense of “civic duty” than do younger people. Howe points to research that suggests that the perceived duty to vote is one of the most important determinant of participation in voting, and that this sense of duty has been declining among youth.¹⁰⁴⁶ A major survey was conducted by Elections Canada in 2002 to examine causes for the decline in voter turnout. A short interview was conducted with 5,637 Canadians, and a longer interview was conducted with 960 reported voters in the 2000 federal election and with 960 reported non-voters in the same election. The report on this survey by Jon Pammet and Lawrence LeDuc found that reasons for not voting included “lack of interest in the election, negative attitudes toward politics, and personal / administrative factors. Young non-voters were more likely to cite lack of interest and personal / administrative reasons for not voting.”¹⁰⁴⁷

Age, education, income, place of birth, and mobility were among the socio-demographic factors correlated with not voting—with age the most important factor. Related behavioural and attitudinal factors related with voting / not voting were feelings of inefficacy; civic duty and political interest; and perception of the effectiveness of the vote.

24.3.1 Canadian data on political and civic engagement

Much of the data on political engagement in Canada come from ad hoc surveys. For example, in order to distinguish generational patterns in political attitudes and activity, Brenda O'Neill, of the University of Manitoba, uses two public opinion survey sources—the Strengthening Canadian Democracy Survey commissioned by the Institute for Research on Public Policy and carried out from February 16 to April 2 of 2000, and the 1990 and 1993 surveys conducted for the Royal Commission on Electoral Reform and Party Financing (the Lortie Commission). The variables she uses are voter turnout and political party membership to indicate political participation, and self-reported political interest to indicate political knowledge.¹⁰⁴⁸

¹⁰⁴⁵ Blais, Andre, Elisabeth Gidengil, Neil Nevitte, and Richard Nadeau. *The Evolving Nature of Non-Voting: Evidence from Canada*, Paper presented at the annual meeting of the American Political Science Association, San Francisco, August 30-September 2, 2001.

¹⁰⁴⁶ Howe. "Political Knowledge and Electoral Participation in the Netherlands: Comparisons with the Canadian Case."

¹⁰⁴⁷ Pammett, Jon H., and Lawrence LeDuc. *Explaining the Turnout Decline in Canadian Federal Elections: A New Survey of Non-Voters*, Elections Canada, 2003; accessed July 2005; available from <http://www.wegovern.ca/TurnoutDecline.pdf>. p. 1.

¹⁰⁴⁸ O'Neill, Brenda. "Generational Patterns in the Political Opinions and Behaviour of Canadians: Separating the Wheat from the Chaff," *Policy Matters*, vol. 2, no. 5, 2001, The Institute for Research on Public Policy (IRPP); accessed July 2005; available from <http://www.irpp.org/pm/archive/pmvol2no5.pdf>.

O'Neill's findings confirm that the U.S. and other results noted above are also generally true for Canada. By and large, she found that younger Canadians show less interest in politics, are less politically knowledgeable, and participate less in politics, at least by voting or joining a political party, than older Canadians. As Howe and others have also reported, O'Neill also found that young Canadians today are engaging in the political system at lower levels than previous generations did at the same age, "suggesting that recent declines in voting turnout and other measures of political participation will not be reversed in future years."¹⁰⁴⁹

Elections Canada collects the official data on voter turnout, which, since 2004, is "calculated by dividing the total number of ballots cast by the number of electors on the lists."¹⁰⁵⁰ Results over time confirm that voter participation has been declining in Canada (as well as worldwide) since at least the late 1980s, especially among the young.¹⁰⁵¹ Elections Canada reported that 60.9% (adjusted rate)¹⁰⁵² of registered citizens voted in the 2004 general election compared to 75.3% in 1988, 69.6% in 1993, 67% in 1997, and 61.2% in 2000 (later adjusted to 64.1%).¹⁰⁵³ However, in 2006, the voter turnout rose to 64.7%.¹⁰⁵⁴ It is too early to tell whether this recent increase represents an anomaly reflecting particular circumstances in that election year, or the beginning of a real reversal and shift in the long-term trend.

In 2000, only 22.4% of eligible 18–21 year-olds voted, which was the lowest level since World War II.¹⁰⁵⁵ However, Elections Canada reported an increase in the percentage of 2004 young voters since 2000. In 2004, an estimated 38.7% of 18–21 year olds voted, which was also 3.3 percentage points higher than the estimated 35.4% turnout rate for 21–24¹⁰⁵⁶ year olds in that election.¹⁰⁵⁷ Elections Canada notes that this 3.3 percentage point difference between the two young age groups falls within the margin of error for the national sample, "which means that the gap between the two estimates could be

¹⁰⁴⁹ Ibid. p. 3.

¹⁰⁵⁰ Statistics Canada. *Social Participation: Percentage of Registered Voters Who Voted in Federal Elections, 1980-2000*, Statistics Canada, Catalogue no: 89FO123XIE, 2005; accessed July 2005; available from <http://www.statcan.ca/english/freepub/89FO123XIE/00002/32.htm>.

¹⁰⁵¹ Howe. "Political Knowledge and Electoral Participation in the Netherlands: Comparisons with the Canadian Case."

¹⁰⁵² Kingsley, Jean-Pierre. *Research Seminar on the Political Engagement of Canadian Youth: Chief Electoral Officer's Keynote Speech*, Centre for Research and Information on Canada (CRIC), 2004; accessed December 2006; available from <http://www.elections.ca/content.asp?section=med&document=oct0104&dir=spe&lang=e&textonly=false>.

¹⁰⁵³ Axworthy, Thomas S. "The Democratic Deficit: Should This Be Paul Martin's Next Big Idea." *Policy Options*, December - January, 2004.

¹⁰⁵⁴ Election Canada. *Report of the Chief Electoral Officer of Canada on the 39th General Election of January 23, 2006*, 2006; accessed December 2006; available from http://www.elections.ca/gen/rep/re2/statreport2006_e.pdf.

¹⁰⁵⁵ Howe. *Electoral Participation and the Knowledge Deficit*, accessed.

¹⁰⁵⁶ The 21-year age group is split in half (i.e., 18 –21.5 years, and 21.5–24 years).

¹⁰⁵⁷ Elections Canada. *Estimation of Voter Turnout by Age Group at the 38th Federal General Election (June 28, 2004)*, 2005; accessed December 2006; available from <http://www.elections.ca/content.asp?section=loi&dir=rep&document=report38&lang=e&textonly=false>.

explained by the sampling error and does not necessarily indicate a true difference between the estimates.”¹⁰⁵⁸

Also, in 2004, Elections Canada changed the methodology used to measure turnout in general elections by age groups, by cross-referencing actual votes with data from the National Register of Electors. Therefore, the denominator for the rate of turnout in 2004 was the total actual population of the age group who were eligible to vote, as opposed to an estimate of that eligible population based on adjusted survey data, as was the case in prior elections. Elections Canada notes that this new approach does not allow for a direct comparison with previous findings, but that it does enable Elections Canada to set a new benchmark against which it can compare future trends:¹⁰⁵⁹ “Regrettably, it is not possible to look back for comparisons, as the election-day lists used for previous elections were destroyed one year after the event, as prescribed by the law.”¹⁰⁶⁰

Jean-Pierre Kingsley, the Chief Electoral Officer, explained reasons for the change:

It is well-acknowledged that public opinion surveys, no matter how well done, overestimate the rate of voter turnout. There are a variety of reasons for this, including self-selection bias, meaning that people who agree to answer surveys about elections also tend to be the people who vote, and social desirability bias, whereby respondents are simply reluctant to admit not having voted. As a result, researchers who rely on survey data must employ statistical corrections or weights to try to make their results correspond to the actual rate of turnout. This is a standard practice in social science research.¹⁰⁶¹

In fact, Elections Canada notes that self-reported voter turnout is:

... consistently and significantly higher than the official turnout, generally by about 15 to 20%. While corrective measures may be applied, there is no complete solution to the problem. More importantly, it is impossible to know whether or how this tendency may vary with the age of the respondents.¹⁰⁶²

Statistics Canada’s General Social Surveys (GSS) Cycle 12 (1998): Time Use, and Cycle 17 (2003): Social Engagement, both have a number of political engagement questions. Questions from GSS Cycle 12 ask about volunteer work and include two questions that refer to political activity: whether the respondent did any canvassing, campaigning, or fundraising as an unpaid volunteer, and whether the respondent provided information or helped to educate, influence public opinion, or lobby others on behalf of an organization.

¹⁰⁵⁸ Ibid., accessed.

¹⁰⁵⁹ Ibid., accessed.

¹⁰⁶⁰ Ibid., accessed.

¹⁰⁶¹ Kingsley. *Research Seminar on the Political Engagement of Canadian Youth: Chief Electoral Officer's Keynote Speech*, accessed. pp. 1–2.

¹⁰⁶² Elections Canada. *Estimation of Voter Turnout by Age Group at the 38th Federal General Election (June 28, 2004)*, accessed. p. 3.

GSS Cycle 17 (2003) has a section on civic participation, which includes modules on both civic engagement and political engagement. Relevant questions include whether the respondent, in the last 12 months, was a member or participant in a political party or group; whether he or she voted in a federal, provincial, or municipal election; and whether he or she did any of the following activities: searched for information on a political issue, volunteered for a political party, expressed views on an issue by contacting a newspaper or a politician, signed a petition, boycotted a product or chose a product for ethical reasons, attended a public meeting, spoke out at a public meeting, or participated in a demonstration or march. The survey also asked how frequently he or she follows news and current affairs (e.g., international, national, regional, or local), what media are used for this—newspapers, magazines, television, radio, or the Internet; and how many hours he or she spends watching TV during a typical week.

These last questions link political engagement directly with learning and knowledge transmission and provide more evidence for the finding on the relationship between TV dependency and low knowledge / participation discussed below in the next section.

Generally, the survey found that the higher the education level and household income, the more likely the respondent is to become involved in an organization or participate in political activities.¹⁰⁶³ Political activities Canadians were engaged in over the previous year included: signed a petition (27.5% of Canadians), searched for political information (25.7%), attended a public meeting (21.3%), boycotted or chose a product for ethical reasons (19.7%), contacted a newspaper or politician (12.5%), participated in a demonstration or march (6.2%), and volunteered for a political party (3%).

The Canadian Election Study (CES) also asks a few relevant questions concerning political participation: whether respondents have ever participated in political actions such as signing a petition, joining a boycott, or attending a demonstration; have they ever contacted an MP; and if they a member of an interest group that works for change.

The National Survey of Giving, Volunteering and Participating, conducted in 1997 and 2000 as a supplement to the Labour Force Survey, has now been renamed the Canadian Survey of Giving, Volunteering and Participating.¹⁰⁶⁴ Beginning in 2004, it will be conducted every three years as a stand-alone survey. It includes questions on whether the respondent has participated in a political organization, voted, or followed newsworthy events and public affairs; provided information or helped to educate, influence public opinion or lobby others; or engaged in any activities aimed at protecting the environment or wildlife.

¹⁰⁶³ Schellenberg, Grant. 2003 *General Social Survey on Social Engagement, Cycle 17: An Overview of the Findings*, Statistics Canada, Catalogue no 89-598-XIE, 2004; accessed December 2006; available from <http://www.statcan.ca/english/freepub/89-598-XIE/89-598-XIE2003001.pdf>.

¹⁰⁶⁴ Statistics Canada. *National Survey of Giving, Volunteering and Participating*, Statistics Canada, 2000; accessed December 2005; available from <http://www.statcan.ca/english/Dli/Data/Ftp/nsgvvp.htm>; Hall, Michael, Larry McKeown, and Karen Roberts. *Caring Canadians, Involved Canadians: Highlights from the 2000 National Survey of Giving, Volunteering and Participating*, Ottawa, Statistics Canada, Catalogue no. 71-542-XIE, 2001; accessed June 2005; available from <http://www.statcan.ca/english/freepub/71-542-XIE/free.htm>.

24.4 Role of media and information technologies in civic literacy

The media and information technologies are powerful purveyors of information that have the capacity to persuade, influence, and form identities. Active citizenship requires an ability to critically understand media messages, and the ability to use these messages to increase political engagement. We look briefly at this topic here in relation to its specific relevance to the acquisition of political knowledge and to political participation and civic engagement. However, the role of media as a key instrument of informal learning in general is covered more extensively in the section of this literature review on media literacy.

24.4.1 Newspaper reading

Josh Pasek, et al. note that, historically, newspaper reading has been a fairly reliable predictor of civic knowledge and engagement.¹⁰⁶⁵

Although some studies suggest that the correlation between knowledge and newspapers might be a product of demographic variables or a function of the level to which people follow politics, the consistency of the role of newspapers even after controlling for following politics and demographic variables argues against this interpretation.¹⁰⁶⁶

In their research, Pasek, et al. found that newspaper reading was related to political knowledge and awareness, but not to political engagement. They also found that searching the Internet for information appears to correlate positively with both political knowledge and engagement. Reporting the decline in newspaper reading among young people, they note that:

[T]o the degree book and newspaper reading has declined and television viewing has increased, it is quite possible that the overall favorable effects of media have declined during the television age. It remains to be seen, therefore, if the age of the Internet can reverse these patterns, leading to an increase in both political and civic activity.¹⁰⁶⁷

According to Milner, after education and media consumption in general, regular newspaper reading in particular is the main contributor to political knowledge (when not controlling for age or socio-economic class factors).¹⁰⁶⁸

¹⁰⁶⁵ Pasek, Josh, Kate Kenski, Daniel Romer, and Kathleen Hall Jamieson. "America's Youth and Community Engagement: How Use of Mass Media Is Related to Civic Activity and Political Awareness in 14- to 22-Year-Olds," *Communication Research*, vol. 33, no. 3, 2006: 115-135.

¹⁰⁶⁶ Ibid. p. 119.

¹⁰⁶⁷ Ibid. p. 131.

¹⁰⁶⁸ Milner. "Civic Literacy: How Informed Citizens Make Democracy Work."

Indeed, it is possible to regard using the media as a regular source of information as a form of adult education. Individuals who read newspapers, in Canada as elsewhere, are politically more knowledgeable. Baker, et al. report that “the predictor that accounted for the most variation in knowledge about parliament among Canadians was one that tapped whether they read a newspaper daily.”¹⁰⁶⁹

The new American Civic Health Index also confirms that newspaper reading is strongly correlated with civic participation, and that in the 2000 National Election Survey, “regular newspaper readers were more likely than other Americans to volunteer, work on issues in their communities, attend local meetings, contact public officials, belong to organizations, and belong to organizations that influence schools.”¹⁰⁷⁰ In the U.S., newspaper readership declined by about 18 percentage points between 1975 and 2002. Interestingly, most of this decline began before the Internet had a wide reach, and the Internet still lags behind newspapers and television as the main source of news, so the replacement of print media by the Internet cannot entirely explain the decline in newspaper readership.¹⁰⁷¹

24.4.2 Television dependency as an indicator of civic literacy and illiteracy

Henry Milner uses “television dependency” as a main, although indirect, indicator of civic literacy or the lack thereof. This indicator is a composite measure in which Milner combines commercial television viewing (rather than public television viewing) with the absence of gross per capita daily newspaper reading. Commercial television viewing is also a compound measure composed equally of average weekly television watching and per capita spending on television advertising by companies.¹⁰⁷² Milner notes:

There is a great deal of data showing that, other things being equal, the more commercial considerations enter into decisions on “news and public affairs” programming, the lower the actual public-affairs information content—and thus knowledge—that is disseminated.¹⁰⁷³

Milner finds that comparative scores in television dependency correspond closely “to what we know from existing international surveys of differences in levels of political knowledge.”¹⁰⁷⁴ Thus, more commercial television watching and less newspaper reading translate to lower levels of political knowledge, which in turn forms the basis of decisions

¹⁰⁶⁹ Ibid. p. 16, citing Baker, John et al. “Citizens’ Knowledge and Perceptions of Legislatures in Canada, Britain and the United States,” *Journal of Legislative Studies*, vol. 2, no. 2 (Spring), 1996: 51.

¹⁰⁷⁰ National Conference on Citizenship [United States]. *America’s Civic Health Index: Broken Engagement*, accessed. p. 13.

¹⁰⁷¹ Ibid., accessed.

¹⁰⁷² The data sources Milner uses for Canada are: 1996 International Television and Video Almanac, New York: Quigley Publishing Company, 1996, and Television Bureau of Canada, TVB Television Basics 1996/1997, Toronto, 1997.

¹⁰⁷³ Milner. “Civic Literacy: How Informed Citizens Make Democracy Work.” p. 24.

¹⁰⁷⁴ Ibid. p. 4.

such as whether to vote or participate politically. Milner uses this proxy measure, based mostly on U.S. data, since “there is no country-neutral battery of political knowledge-oriented questions comparable to those used in studies of Americans.”¹⁰⁷⁵

Pasek, et al. also note that most studies have found that television viewing is correlated with lower civic participation and knowledge, although they find that “there is evidence that television use is nonlinearly related to civic participation, positively associated at low levels of use, and then negatively related as use increases. There is no general agreement that television use represents a simple negative influence.”¹⁰⁷⁶

However, most of the research reviewed for this report does not consider television viewing alone to be a good indicator of civic literacy or illiteracy. For example, the American Civic Health Index report excludes television news:

... because exposure to [television] news programming does not, in general, accompany civic engagement. Although there are excellent news and public affairs programs, watching television news (as a general category) is not a reliable civic indicator.¹⁰⁷⁷

Sources for information on media consumption and television advertising are readily available from numerous sources, including Statistics Canada and the CES.

¹⁰⁷⁵ Ibid. p. 4.

¹⁰⁷⁶ Pasek, Kenski, Romer, and Jamieson. "America's Youth and Community Engagement: How Use of Mass Media Is Related to Civic Activity and Political Awareness in 14- to 22-Year-Olds." p. 118.

¹⁰⁷⁷ National Conference on Citizenship [United States]. *America's Civic Health Index: Broken Engagement*, accessed. p. 32.

24.5 Lifelong learning for active citizenship: adult learning

Adult formal and informal learning have both been postulated, with some supporting evidence, to contribute to civic literacy and the empowerment needed to engage in democratic processes.¹⁰⁷⁸ Daniel Schugurensky, of the Ontario Institute for Studies in Education (OISE) at the University of Toronto, sees adult education for democratic citizenship as having two key goals: citizens who are well-informed and critically aware of important issues; and citizens who can engage in deliberation and decision-making in their own communities.¹⁰⁷⁹ He calls these goals “enlightenment” and “engagement.” His main criticism of current citizenship education initiatives is that they often emphasize one or the other, but not both, and assume that the second one will arise as a consequence of the one emphasized.

Campbell notes the lack of knowledge and existing data on adult learning for civic and social engagement:

[L]ittle is known about the consequences of adult learning for civic and social engagement [CSE]. Survey data collected to measure CSE outcomes always include a measure of formal educational attainment, but rarely do such surveys inquire about adult learning. Yet there are good reasons to think that adult education would have effects on CSE; most, perhaps all, of the factors thought to link secondary and post-secondary education and higher levels of CSE also apply to adult learning. Among the dearth of studies which explore the adult learning-CSE relationship, a few rigorous findings stand out which suggest that adult education does have substantial consequences for CSE. But much more needs to be learned about these relationships.¹⁰⁸⁰

The Education for Democratic Citizenship project (EDC) discussed above recognizes the necessity of citizens being “empowered” in order to participate and engage in democratic practices.¹⁰⁸¹ The EDC recognizes empowerment, in part, as a process by which individuals, communities, and organizations become aware of the power dynamics affecting their lives, and of their individual and collective abilities to create positive change. Empowerment, according to the EDC, includes an increase in the knowledge and skills needed to influence decision-making and to create opportunities for action. The ultimate goal of empowerment initiatives is to help individuals and communities participate in civic and political activities in a way that effectively communicates their concerns. According to the EDC, particularly important issues include integrating youth into decision-making and engagement processes that have a social or political influence (e.g., through political forums, municipal councils, active engagement in organizations such as antipoverty, environmental or animal protection groups, and demonstrations).

¹⁰⁷⁸ Milner. "Civic Literacy: How Informed Citizens Make Democracy Work."

¹⁰⁷⁹ Schugurensky. "Enlightenment and Engagement in Adult Education for Democratic Citizenship: Lessons from the Citizens' Forum and the Participatory Budget."

¹⁰⁸⁰ Campbell. "What Is Education's Impact on Civic and Social Engagement?"

¹⁰⁸¹ Birzea. *Education for Democratic Citizenship: A Lifelong Learning Perspective*, accessed.

Henry Giroux is highly critical of the “rapid march to corporatized education dominated by a hardline agenda” in the U.S.¹⁰⁸² His views on the subject are highly respected and have been widely cited. As Olivia Ward notes: “Giroux has been named one of the world’s top thinkers in education in the 20th century, and is the author of some 40 books on education, cultural studies, political theory and media studies.”¹⁰⁸³ Giroux points to the need to create new *public spheres* where individuals can learn the knowledge and skills necessary to “expand and enable political agency” and “to believe that such struggles *are worth taking up*.”¹⁰⁸⁴ By public spheres he means institutions, sites, and spaces where “people not only talk, debate and reassess the political, moral and cultural dimensions of publicness but also develop processes of learning and persuasion as a way of enacting new social identities.”¹⁰⁸⁵

Giroux offers a warning about what happens, or is happening, with the lack of these public democratic spheres and the learning they can potentially engender:

As the vast majority of people become detached from public forums that nourish social critique, [political] agency not only becomes a mockery of itself, it is replaced by market-based choices in which private satisfactions replace social responsibilities and private solutions become a substitute for systemic change. As the worldly space of criticism is undercut by the absence of public pedagogies and spaces that encourage the exchange of information, opinion and criticism, the horizons of an inclusive and substantive democracy disappear against the growing militarization of public space, the attack on the welfare state, the ongoing commercialization of everyday life, and the growing isolation and depoliticization that marks the loss of a politically guaranteed public realm in which autonomy, political participation and engaged citizenship make their appearance.¹⁰⁸⁶

Milner argues that the literacy habits and political knowledge that individuals learn through civic education schooling need to be reinforced among adult citizens.¹⁰⁸⁷ In particular, he suggests this can be done in three ways: through the media, through activities of political parties and other political actors, and through educational programs (distinguished from training programs) aimed at adults. Milner gives an example of the use of the public sphere to stimulate learning in the study circles that are an important fixture of civic life in Sweden, which also, correspondingly, has a high civic literacy rate,

¹⁰⁸² Ward, Olivia. *Scholars Breathe 'Fresh Air'*, Axis of Logic, 2004; accessed July 2005; available from <http://www.axisoflogic.com/cgi-bin/exec/view.pl?archive=83&num=14327>.

¹⁰⁸³ Ibid., accessed. p.1.

¹⁰⁸⁴ Giroux, Henry A. "Utopian Thinking under the Sign of Neoliberalism: Towards a Critical Pedagogy of Educated Hope," *Democracy & Nature*, vol. 9, no. 1, 2003: 91-105. p. 96

¹⁰⁸⁵ Ibid.

¹⁰⁸⁶ Giroux. "Utopian Thinking under the Sign of Neoliberalism: Towards a Critical Pedagogy of Educated Hope." p. 91.

¹⁰⁸⁷ Milner, Henry. "Civic Literacy in Comparative Context: Why Canadians Should Be Concerned," *Policy Matters*, vol. 2, no. 2, 2001, The Institute for Research on Public Policy (IRPP); accessed July 2005; available from <http://www.irpp.org/pm/>.

as evidenced in the 1999–2000 IEA Civic Education Study described above. According to Milner:

There are in all, about 350,000 such study circles in Sweden. The ABF, the workers' educational association affiliated with the trade unions and Social Democratic Party, is the largest of 11 adult education associations, annually organizing about 100,000 study circles for over a million participants. Over 50,000 people participated in ABF study circles on EU membership in the period preceding the 1994 referendum. The fall 1999 program of the ABF in Umeå (where I visited) offered the usual range of courses in languages, computers, art, music, and nature appreciation, but also courses in organizing groups and cooperatives, in public speaking, writing and understanding media, as well as study circles on social and civil rights, the United Nations, war and peace, the future of democracy, feminism, various aspects of history, and important contemporary books.¹⁰⁸⁸

Schugurensky notes that Canada also has a history of "enlightenment" programs. In particular the Citizens' Forum, a joint civil society / government program of the Canadian Association of Adult Education (CAAE) and the Canadian Broadcasting Corporation (CBC), was previously one of the most important Canadian adult citizenship education initiatives. It became a model that was followed in other countries.¹⁰⁸⁹ From 1943 until 1967, when it was discontinued due to political and financial constraints on both sponsoring organizations, the Citizens' Forum broadcast weekly radio programs, each of which had a clearly written discussion pamphlet that presented informed and balanced perspectives on challenging issues of the day. The programs formed the basis for local study groups that were encouraged to send summaries of their deliberations to the radio station, which were then aired on the broadcasts. Among the more than 300 issues discussed were:

... the pros and cons of censorship, professionalism in sports, religious education in public schools, strikes, disciplining youth, progressive education, compulsory treatment of alcoholics, small farming, immigration policy, national planning, and labour unions' political involvement.¹⁰⁹⁰

Although a great many people participated in the study groups, and though awareness of civic and political issues was raised among many Canadians, the forum had limitations. For example, it did not encourage personal or group action, and local concerns were not addressed. Schugurensky concludes:

[The Citizens' Forum] did more to raise awareness of issues for personal enlightenment than it did to encourage personal or group action, or to develop a working model of participatory democracy. The role of the CF in promoting

¹⁰⁸⁸ Milner. "Civic Literacy: How Informed Citizens Make Democracy Work." p. 26.

¹⁰⁸⁹ Schugurensky. "Enlightenment and Engagement in Adult Education for Democratic Citizenship: Lessons from the Citizens' Forum and the Participatory Budget."

¹⁰⁹⁰ Ibid. p. 2.

citizenship education, then, was to supply a background of information and present conflicting perspectives on the critical issues of the day. Although CF sparked a few community initiatives (such as the public housing movement in Toronto during the 1940s) in overall terms it is fair to say that public information did not result in social action.¹⁰⁹¹

Thus, the Citizens' Forum likely produced desirable learning outcomes from a civic literacy perspective, but these cannot be easily linked to any definable social outcomes.

Schugurensky uses the Participatory Budget (PB) process of Porto Alegre, Brazil, as an example of citizen engagement that can be linked to desirable social outcomes, but does not incorporate a formal knowledge component.¹⁰⁹² This process has been repeated every year in Brazil since 1987 and has spawned similar processes worldwide. Schugurensky describes PB as:

... an open and democratic process of public participation through multi-tiered meetings, which enables ordinary citizens to deliberate and make decisions collectively about municipal budget allocations. This includes neighbourhood discussions and decisions about priorities regarding investments in local infrastructure (e.g., pavement, sewage, storm drains, schools, health care, child care, housing, etc.), but also forums on city-wide issues such as transit and public transportation, health and social assistance, economic development and taxation, urban development, and education, culture, and leisure [...]. Throughout the years, the PB has promoted, among many previously disengaged citizens, a sense of community and solidarity, a general understanding of urban issues, a demystification of the budget (previously a monopoly of experts in city hall), and an interest in larger political affairs.¹⁰⁹³

Although the PB process has been an effective instrument of informal learning, Schugurensky argues that it would be more effective if it had a formal knowledge component, in order to create a more appropriate balance "between micro and macro affairs, between enlightenment and engagement, between deliberation and decision-making, and between discussion and social action."¹⁰⁹⁴

There are now over 250 PB projects worldwide. The University of British Columbia's School of Community and Regional Planning (UBCSCARP), together with academics and community organizations from Vancouver and other urban areas in Canada, is currently exploring the potential for PB processes in Canadian municipalities.¹⁰⁹⁵ This five-year project was started in 2005 with funding from SSHRC through the Community-University Research Alliance (CURA) program.

¹⁰⁹¹ Ibid. p. 3.

¹⁰⁹² Ibid.

¹⁰⁹³ Ibid. p. 3.

¹⁰⁹⁴ Ibid. p. 6.

¹⁰⁹⁵ Participatory Budgeting Project @ UBC CHS. *Website*, accessed July 2005; available from <http://www.chs.ubc.ca/participatory/>.

Both the Toronto Community Housing Corporation and the City of Guelph already have experience working with PB.¹⁰⁹⁶ In particular, according to the CEO of the Toronto Community Housing Corporation:

Toronto Community Housing Corporation may have conducted the largest example of participatory budgeting in North America. Five thousand tenants participated in a process adapted from the Porto Alegre model, and directly allocated \$20 million to capital improvements to common areas of buildings and landscaping projects.¹⁰⁹⁷

An example of a community empowerment and learning initiative taking place in a public sphere in Quebec is the CAMPO (Carrefour de pastorale en milieu ouvrier), which Birzea describes as an independent, community education organization that brings people from all social and cultural backgrounds together in order to study issues, broaden debate, and encourage processes to influence practice and policy. It has monthly evening meetings for supper and thematic debates, as well as learning forums, action groups, workshops for collective action, and forums involving the jobless and those living in poverty.¹⁰⁹⁸

Federal and Provincial governments in Canada also have a history of consulting the public in such initiatives as the Citizens' Forum on Canada's Future: Report to the People and Government of Canada (1991),¹⁰⁹⁹ although such initiatives have sometimes been criticized as failing to translate deliberations into meaningful action.

As an example of a provincial initiative that does appear to have the potential to link consultation with action, in December 2003, the New Brunswick government commissioned the New Brunswick Commission on Legislative Democracy to undertake a study and citizen dialogue, and to provide recommendations in the areas of electoral, legislative, and democratic reform.¹¹⁰⁰ The commission's final report, released in January 2005, suggested sweeping reforms. In the area of democratic reform, it was especially interested in creating opportunities for greater public involvement and civic engagement. Among the recommendations were to create a mandatory civics education program for K-12. It also recommended the creation of a Public Dialogue Office that would be responsible for public engagement exercises in all governmental departments. This Office

¹⁰⁹⁶ Schugurensky, Daniel. *Participatory Budget: A Tool for Democratizing Democracy*, Talk given at the meeting "Some Assembly Required: Participatory Budgeting in Canada and Abroad," Toronto Metro Hall, April 29, 2004. OISE/University of Toronto, 2004; accessed July 2005; available from http://fcis.oise.utoronto.ca/~daniel_sch/lclp/PB_DS_talk_04-04.pdf.

¹⁰⁹⁷ Ballantyne, Derek, Evelyn Murialdo, and Mike Balkwill. *Participatory Budgeting in the Toronto Community Housing Corporation (Abstract)*, Canadian Conference on Dialogue and Deliberation (C2D2), 2005; accessed July 2006; available from http://www.confmanager.com/communities/c187/files/hidden/Participatory_budgeting.pdf.

¹⁰⁹⁸ Birzea. *Education for Democratic Citizenship: A Lifelong Learning Perspective*, accessed.

¹⁰⁹⁹ Government of Canada. *Citizens' Forum on Canada's Future: Report to the People and Government of Canada*, Ottawa: Supply and Services Canada, 1991.

¹¹⁰⁰ New Brunswick Commission on Legislative Democracy. *Website*, accessed July 2005; available from <http://www.gnb.ca/0100/index-e.asp>.

would collect knowledge and resources needed to engage the public on a wide range of issues.¹¹⁰¹ According to the Canadian Press, Premier Bernard Lord announced his government has accepted most of the recommendations of the province's Commission on Legislative Democracy, including a May 12, 2008 referendum on proportional representation, improvements to the Right to Information Act, and the introduction of a new, compulsory civics program in schools.¹¹⁰²

Many non-governmental organizations in Canada also promote public engagement and learning. Examples include the Canadian Policy Research Networks (CPRN) through its Public Involvement Network and Citizens' Dialogue project,¹¹⁰³ the Public Policy Forum (PPF),¹¹⁰⁴ and the Institute for Research on Public Policy (IRPP),¹¹⁰⁵ though again such dialogues have sometimes been criticized for failing to translate recommendations into action, and for remaining elite deliberations that fail to penetrate the larger public arena.

The Canadian Conference on Dialogue and Deliberation (C2D2) was held with approximately 300 participants in Ottawa in October 2005 to build a Canadian community of practice for dialogue and deliberation. The C2D2 website describes the conference as:

... the first official Canadian gathering of dialogue and deliberation and public involvement practitioners, scholars, trainers, consultants, artists, activists and students from all of the various streams of practice that exist in this emerging field.¹¹⁰⁶

The result of the C2D2 conference is a new organization, the Canadian Community on Dialogue and Deliberation, which consists of conference participants and interested parties who want to build on the momentum of the conference and continue to build the dialogue and deliberation community in Canada.¹¹⁰⁷

Such public engagement, deliberation, and participation initiatives may potentially promote civic literacy and engagement, and may even be designed with this goal, but

¹¹⁰¹ Belanger, Hon. Mauril, (Deputy Leader of the Government in the House of Commons, Minister responsible for Official Languages, Minister responsible for Democratic Reform and Associate Minister of National Defence). *Citizen Engagement*, Government of Canada, 38th Parliament, 1st Session, Edited Hansard Number 090, 2005 May 3; accessed June 2005; available from http://www.parl.gc.ca/38/1/parbus/chambus/house/debates/090_2005-05-03/toc090-E.html.

¹¹⁰² Canadian Press. *New Brunswick Gov't Proposes Electoral Reforms*, 2006, June 20; accessed July 2005; available from http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/20060620/nb_elxn_reforms_060620/20060620?hub=Canada.

¹¹⁰³ Canadian Policy Research Networks (CPRN). *Website*, accessed June 2005; available from <http://www.cprn.org/en/network.cfm?network=3>.

¹¹⁰⁴ Public Policy Forum (PPF). *Website*, accessed June 2005; available from <http://www.ppforum.com>.

¹¹⁰⁵ Institute for Research on Public Policy (IRPP). *Website*, accessed June 2005; available from <http://www.irpp.org>.

¹¹⁰⁶ Canadian Conference on Dialogue and Deliberation (C2D2). *Website*, accessed July 2005 and July 2006; available from <http://www.confmanager.com/main.cfm?cid=187&nid=2376>.

¹¹⁰⁷ Ibid., accessed.

there is no current evidence of their effectiveness or penetration into the larger public arena. In order to develop a coordinated strategy to enhance adult learning that effectively promotes civic literacy and engagement, it would be useful, as a start, to know how many learning initiatives, such as the Quebec example cited above, are taking place in Canada, what is studied, who participates, and how effective these initiatives are in raising knowledge levels and reaching the wider public—particularly citizens who are currently disengaged and cynical. Although there are many examples of individual initiatives, our research for this literature review did not find any systematic collection or assessment of this information.

Participation in adult learning is reflected in several surveys, including the Adult Education and Training Survey (AETS) the New Approaches to Lifelong Learning Survey (NALL), the National Survey of Giving, Volunteering and Participating (NSGVP), the General Social Surveys (GSS) (especially cycles 12 and 17 noted above), and the International Adult Literacy and Skills Survey (IALSS), all of which we have previously discussed. However, Milner notes that the AETS is mainly concerned with work-related learning, and the IALSS does not distinguish between adult education taken for specific work-related purposes and that undertaken for personal interest purposes.¹¹⁰⁸ None of these surveys capture the type of informal adult learning for civic literacy needed to construct a meaningful indicator in this area for the CIW educated populace domain. This literature review indicates the need for some systematization of data in this important area.

¹¹⁰⁸ Milner. "Civic Literacy: How Informed Citizens Make Democracy Work."

24.6 Citizenship education in the schools

Canadian researchers Yvonne Hébert and Alan Sears point to a growing and worldwide “sense of crisis” in the field of citizenship education as evidenced by reports of a growing “civic deficit” or lack of political interest, knowledge, and participation.¹¹⁰⁹ In response, a number of countries have recently made citizenship education more prominent in their school curricula.¹¹¹⁰ As previously noted, the Council of Europe created the Education for Democratic Citizenship (EDC) project in 1997, and proclaimed 2005 the “European Year of Citizenship through Education.”¹¹¹¹ In 2002, Britain made citizenship education a statutory subject and has embarked on a nine-year Citizenship Education Longitudinal Study. The study tracks over 10,000 students, ages 11 to 18, of the “first year group of young people to receive continuous entitlement of citizenship education.”¹¹¹²

Australia has recommended eight levels of civics-related courses, with the largest number being taught in grades 8 to 10. Australia’s *Discovering Democracy* program, funded with \$31.6 million over seven years, from 1997 to 2004, has helped develop its citizenship education program. In 2004, Australia embarked on a three-year program to develop key performance measures in the field.¹¹¹³ Citizenship education is also a distinct school discipline in France and Belgium. The U.S. has added civics to the areas assessed in the National Assessment of Educational Progress.¹¹¹⁴ Citizenship education is also important in the Nordic countries, and Milner found that in Sweden the most effective level for civics courses is at the secondary school level in classes attended by 16 to 18 year olds who are almost ready to vote.¹¹¹⁵

Several Canadian provinces are also making citizenship education a higher priority than it has been, as we will see below. Ken Osborne of the University of Manitoba identifies four overlapping stages in the development of citizenship education programs in Canada since the early 1900s.¹¹¹⁶ The priority in the early years of the 20th century was to

¹¹⁰⁹ Hébert, Yvonne, and Alan Sears. *Citizenship Education*, Canadian Education Association, 2001; accessed July 2005; available from http://www.cea-ace.ca/media/en/Citizenship_Education.pdf.

¹¹¹⁰ Milner, Henry. "Civic Literacy: How Informed Citizens Make Democracy Work." Paper presented at the Conference of the Society for the Advancement of Socioeconomics (SASE), Amsterdam, June, 2001; accessed July 2005; available from http://www.sase.org/conf2001/papers/milner_henry.pdf.

¹¹¹¹ Council of Europe Programme on Education for Democratic Citizenship (EDC). *Website*, accessed July 2005; available from http://www.coe.int/T/E/Cultural_Co-operation/education/E.D.C/.

¹¹¹² National Foundation for Educational Research (NFER) [U.K.]. *The Citizenship Education Longitudinal Study*, U.K. Department for Education and Skills, 2006; accessed November 2006; available from <http://www.nfer.ac.uk/research-areas/citizenship/the-citizenship-education-longitudinal-study.cfm>.

¹¹¹³ Ministerial Council on Education, Employment, Training, and Youth Affairs (MCEETYA). *National Report on Schooling in Australia: Civics and Citizenship*, MCEETYA, 2003; accessed July 2005; available from <http://cms.curriculum.edu.au/anr2003/index.htm>.

¹¹¹⁴ Hébert, and Sears. *Citizenship Education*, accessed.

¹¹¹⁵ Milner, Henry. "Are Young Canadians Becoming Political Dropouts? A Comparative Perspective," *Choices*, vol. 11, no. 3, 2005, Institute for Research on Public Policy (IRPP); accessed July 2005; available from <http://www.irpp.org/choices/>.

¹¹¹⁶ Osborne, Ken. "Public Schooling and Citizenship Education in Canada," *Canadian Ethnic Studies*, vol. 32, no. 1, 2000: 1-8.

assimilate children into a particular idea of what it meant to be a Canadian. The second stage—from the 1920s to the 1960s—consisted of teaching a mixture of civics courses and approved personal behaviour. The third stage—from the 1960s to the 1970s—was concerned with giving students a sense of Canadian identity and improving their knowledge of Canada. The fourth stage, which began in the 1980s, and is ongoing, basically ignored citizenship education, while education for job preparation, economic success, and other economic ends took precedence.

The experience of the Canada Studies Foundation (CSF) is an interesting example of the attention given to citizenship education beginning in the late 1960s and ending in the 1980s. Gallagher gives a succinct account of the CSF, which, because it illustrates the wealth of civic literacy activity at that time, and also represents what has been lost, we quote at length below:

Canada Studies Foundation, was founded [in] 1970 following revelations of the National History Project (1965–68) that the average Canadian high-school student had an abysmal knowledge of Canada. A.B. Hodgetts, who had perceived through the project, as well, that the study of Canada in schools was itself a divisive force, set out to provide opportunities for people from different levels of education and different parts of Canada to work together on Canada Studies project teams across linguistic, cultural and regional barriers. [...] The first year's expenditures were over \$500,000.

With a solid core of active participants by 1974, the foundation's support was assumed by provincial ministers of education and the federal secretary of state, and by contributions in kind from teachers, schools and local school jurisdictions; the 1975–76 budget was \$600,000.

From 1978 to 1986 direct support was almost exclusively by the Secretary of State, with yearly expenditures below \$300,000. For 15 years the foundation was the sole nonprofit developer of Canadian Studies material. It pioneered new approaches to teaching about Canada. Some 30,000 teachers in Canada received in-service education regarding Canadian Studies. The foundation developed and published some 150 volumes of teachers' manuals, stimulated a new market for Canadian textbooks publishers, established a network of more than 2000 teachers across the country, distributed a widely read bilingual newsletter (*Contact*) and promoted a structured approach to the study of Canada, as described in *Teaching Canada for the 80's* (1978). The foundation surrendered its charter in 1986, its original objectives having been met.¹¹¹⁷

Ken Osborne and others might argue, however, that the original objectives, if they were indeed met, have not been sustained.¹¹¹⁸ Educators are now revisiting the importance of

¹¹¹⁷ Gallagher, Paul. *Canada Studies Foundation*, The Canadian Encyclopedia, n.d.; accessed November 2006; available from

<http://www.canadianencyclopedia.ca/index.cfm?PgNm=TCE&Params=A1ARTA0001242>.

¹¹¹⁸ Osborne. "Public Schooling and Citizenship Education in Canada."

formal political knowledge and civic literacy courses for sustainable democracies. William Galston of the University of Maryland cites U.S. research that finds: "By itself, civic course work raises overall political knowledge by 4%; when combined with the study of a wide range of topics and regular discussion of current events in the classroom, this figure rises to 11%."¹¹¹⁹

Henry Giroux argues that, for civic education to be effective, it must:

... emphasize critical reflexivity, bridge the gap between learning and everyday life, make visible the connection between power and knowledge, and provide the conditions for extending democratic rights, values and identities while drawing upon the resources of history.¹¹²⁰

Hébert and Sears call for views of citizenship education to broaden the conception of democracy to include Francophone, Aboriginal, and other cultural views:

Views of citizenship and of citizenship education must move beyond a focus on human rights, parliamentary democracy, national ideology, and peace education, to one that allows for multiple identifications and democratic participation. Research on these topics must utilize a range of research methodologies, blend paradigms or ways of seeing, and redefine the field of citizenship education itself.¹¹²¹

Hughes and Sears note that in England, citizenship education is monitored for the "three C's" of citizenship, two of which emphasize student action, which in turn is designed to foster both efficacy, or the belief that individuals can make a difference, and the willingness to participate.¹¹²² The three C's include: citizenship in the curriculum; active citizenship in the school culture; and active citizenship through links with the wider community. In other words, effective citizenship education in formal school settings is seen as much more than adding civics courses to the curriculum. In the following section we will look at these areas, as far as the available data allow, in terms of citizenship education in Canadian curricula, classroom climate, and service learning, as well as teacher training for civic education. Unfortunately, there is presently little systematic Canadian information on and monitoring of student action either in the school culture or through links with the wider community, partly due to Canada's decision not to participate in the second phase of the IEA Civic Education Study, as discussed above.

¹¹¹⁹ Niemi, R.G., and J. Junn. *Civic Education: What Makes Students Learn*, New Haven, CT: Yale University Press, 1998., cited in: Galston, William A. "Political Knowledge, Political Engagement, and Civic Education," *Annual Review of Political Science*, vol. 4, 2001: 217-234. p. 228.

¹¹²⁰ Giroux, Henry A. "Utopian Thinking under the Sign of Neoliberalism: Towards a Critical Pedagogy of Educated Hope," *Democracy & Nature*, vol. 9, no. 1, 2003: 91-105. p. 96.

¹¹²¹ Hébert, and Sears. *Citizenship Education*, accessed. p. 16.

¹¹²² Hughes, Andrew S., and Alan Sears. "The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education." Paper presented at the 2nd Annual CITIZED International Conference, Oriel College, Oxford, July 25-27, 2006, University of New Brunswick.

24.6.1 Citizenship education and research initiatives in Canada

Alan Sears and Andrew Hughes of the University of New Brunswick in Fredericton reviewed policy documents, curriculum guides, background or discussion papers, and other resources from all provinces (except Francophone jurisdictions—which didn't respond to their requests for documents) to determine conceptions and practices of citizenship education in Canada.¹¹²³ They are careful to point out that what is said is not always what is taught, however. They did find at least “a commonality of perspective” across the country in terms of conceptions of citizenship education in Anglophone jurisdictions. In particular, as noted earlier, all jurisdictions emphasized three key elements of citizenship—knowledge, “informed action” or participation, and multiculturalism or pluralism.¹¹²⁴ The authors note:

All jurisdictions reviewed [...] agree on the broad parameters of what constitutes best practice. Best practice flows from the constructivist¹¹²⁵ principles of active learning focused on important and contested ideas and skills in the context of a relatively democratic community of learners. Further, all agree that classroom, school and community structures need to be consistent with the democratic principles being learned in that they provide opportunity for students, teachers and community members to work together to shape school practice and procedures and foster civic engagement among students.¹¹²⁶

Much of the citizenship education content in Canadian schools is taught within “social studies” classes, but many provinces are presently reviewing their programs in this field. In 2000, a new, compulsory civics education course was introduced in Ontario.¹¹²⁷ As part of the Canadian and World Studies program, all grade 10 students are now required to take a course entitled “Civics.” British Columbia is incorporating citizenship education within its Social Responsibility program, and has included citizenship education at every level of the curriculum.¹¹²⁸ As noted above, the final report of the New Brunswick Commission on Legislative Democracy, released in January 2005, recommended creation of a mandatory civics education program for grades K-12.¹¹²⁹ Quebec has introduced a module on citizenship education within its secondary level history courses. Quebec also

¹¹²³ Sears, Alan M., and Andrew S. Hughes. “Citizenship Education and Current Educational Reform,” *Canadian Journal of Education*, vol. 21, no. 2, 1996: 123-142.

¹¹²⁴ Ibid.

¹¹²⁵ Constructivist principles are discussed earlier in this review in section 6.2.4.

¹¹²⁶ Hughes, and Sears. “The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education.” p. 25.

¹¹²⁷ Howe, Paul. *Electoral Participation and the Knowledge Deficit*, Elections Canada. Electoral Insight, 2003; accessed July 2005; available from http://www.elections.ca/eca/eim/article_search/article.asp?id=50&lang=e&frmPageSize=&textonly=false.

¹¹²⁸ Hughes, and Sears. “The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education.”

¹¹²⁹ Belanger, Hon. Mauril, (Deputy Leader of the Government in the House of Commons, Minister responsible for Official Languages, Minister responsible for Democratic Reform and Associate Minister of National Defence). *Citizen Engagement*, Government of Canada, 38th Parliament, 1st Session, Edited Hansard Number 090, 2005 May 3; accessed June 2005; available from http://www.parl.gc.ca/38/1/parbus/chambus/house/debates/090_2005-05-03/toc090-E.html.

participated in the Council of Europe's Education for Democratic Citizenship project. The Atlantic Provinces specify knowledge of citizenship as one of their six *Essential Graduation Learnings* and also as one of the central purposes of social studies, as seen in the Atlantic Provinces Educational Foundation's *Foundation Document for Social Studies*.¹¹³⁰

However, writing in 2006, Hughes and Sears are critical of Canadian civics education curricula in general, arguing that they are largely adapted from American models and standards, have been given to educators—"treating them as consumer of ideas and not co-authors"—and are ineffective since they are not the product of grassroots consultative processes. This "results in a lack of understanding of and commitment to the goals and often hinders effective implementation."¹¹³¹ They elaborate:

The regional social studies committee that developed the Atlantic Provinces Educational Foundation (APEF) *Foundation Document for Social Studies* acknowledges the considerable influence of the [U.S.] National Council for Social Studies (NCSS) standards on their work (Atlantic Provinces Education Foundation, n.d.). Indeed, the document in form and substance bears a striking resemblance to the NCSS standards. This is true for social studies curriculum documents in many parts of Canada.¹¹³²

By contrast, Hughes and Sears note that the development of standards in the U.S. was:

... a widely consultative and often highly contentious endeavour [...]. We know of no such broad, open consultations taking place around the development of standards for citizenship education in Canada [...]. Neither is there a body of published work about Canadian standards—theoretical, professional and applied—as there is in the U.S. and other countries.¹¹³³

Consequently, they note in another report, "neither the Canadian public nor professional educators have a deep understanding or sense of ownership of goals for citizenship education."¹¹³⁴

In Canada there are a number of research initiatives concerned with citizenship education. In the late 1990s, for example, the Council of Ministers of Education Canada (CMEC) included citizenship and social cohesion as important themes in its Pan-Canadian Educational Research Agenda initiative.¹¹³⁵ However, Hughes and Sears note that neither this, nor the Citizenship Education Research Network initiative, discussed

¹¹³⁰ Hébert, and Sears. *Citizenship Education*, accessed.

¹¹³¹ Hughes, and Sears. "The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education." p. 12.

¹¹³² Ibid. p. 12.

¹¹³³ Ibid. p. 12.

¹¹³⁴ Hughes, Andrew S., and Alan Sears. "Citizenship Education: Canada Dabbles While the World Plays On," *Education Canada*, vol. 46, no. 4, 2006: 6-9. p. 8.

¹¹³⁵ Council of Ministers of Education Canada (CMEC). *Website*, CMEC, accessed July 2005; available from <http://www.cmec.ca/index.en.html>.

below, have ever received coordinated attention or funding.¹¹³⁶

The Citizenship Education Research Network (CERN), formed in 1998, brings together researchers and policy makers from Canadian universities, government, and the private sector. Federal participation includes the Departments of Canadian Heritage, Citizenship and Immigration, Human Resources and Social Development Canada (formerly Human Resources and Skills Development Canada), Justice, and Industry Canada.¹¹³⁷ The CERN participants have identified four themes to guide their research: citizenship conceptions and contexts; citizenship practices; citizenship values; and citizenship skills, knowledge, attitudes, and behaviours.¹¹³⁸ Each of these themes has particular sub-themes. The second theme, citizenship practices, for example, examines

... a) the current state of knowledge on what citizenship education is actually being done; b) the impact of practices and norms of institutions other than schools on citizenship education; c) the roles of schools and other institutions in citizenship education for groups such as students, parents, and community groups; and d) what is meant by the notion of 'best practices' of citizenship.¹¹³⁹

The fourth theme on the skills, knowledge, attitudes, and behaviours particular to citizenship examines four questions:

a) What are the attitudes, knowledge, skills and behaviours, not only among students, but among citizens in general, in the domain of citizenship? b) Although it is difficult to define these, how can such research guide the implementation of 'good citizen practices'? c) How do skills, attitudes and knowledge of citizenship guide behaviour? d) What influence do pedagogical approaches have in the transmission and acquisition of citizenship concepts? In other words, how can a sense of efficacy be developed so that students are confident that they can as citizens contribute to the evolution of society?¹¹⁴⁰

In a recent telephone conversation with Alan Sears, Sears explained that this research effort is ongoing. However, there are no results at the present time, and indicators have not been developed.¹¹⁴¹ Presently, Kathy Bickmore of the Ontario Institute for Studies in Education at the University of Toronto is in charge of the CERN. The initiative will hopefully lead to the development of information and data that can eventually populate

¹¹³⁶ Hughes, and Sears. "The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education." p. 24.

¹¹³⁷ Hébert, Yvonne M., with the collaboration of Michel Pagé, Daniel Schugurensky, Alan Sears, and J. Yvon Thériault. *Citizenship Education Research Network (CERN): Evolution Report, March 1998 - July 2002*, Multiculturalism Programme, Department of Canadian Heritage, 2002; accessed July 2005; available from http://canada.metropolis.net/research-policy/cern-pub/evolution_report_1998-2002_e.doc.

¹¹³⁸ Citizenship Education Research Network (CERN). *Website*, CERN, accessed July 2005; available from <http://canada.metropolis.net/research-policy/cern-pub/overview.html>.

¹¹³⁹ Ibid., accessed.

¹¹⁴⁰ Ibid., accessed.

¹¹⁴¹ Sears, Alan, University of New Brunswick at Fredericton, personal communication with Karen Hayward, telephone conversation and email exchanges, December 18, 2006.

indicators in the field of formal school-based citizenship education for the educated populace domain of the CIW.

24.6.2 Classroom climate

Hughes and Sears report:

A growing body of international research demonstrates a strong association between classrooms, schools and communities that encourage active engagement of young people around critical social and civic issues and positive citizenship outcomes [...]. The syntheses of research in the field [...] link techniques like discussion of issues and active engagement in both school and community with positive student outcomes related to citizenship.¹¹⁴²

As will be discussed below, students can become civically engaged through service learning, but this engagement begins in the classroom.

One indicator used in the IEA Civic Education Study discussed earlier measured students' perceptions of their "classroom climate" as an indication of learning conditions at school that might be conducive to effective civic education.¹¹⁴³ This is one of three sub-scales of the main category "school factors" that are seen to have an influence on the effectiveness of school-based civic education. The other sub-scales in this category are "reported participation in school council or parliament," and "students' reports about having learned about the importance of voting."

Classroom climate is defined as a classroom that encourages freedom of expression and open discussion.¹¹⁴⁴ Campbell suggests: "An open classroom climate simply refers to a style of instruction. Instead of rote learning, students are given the opportunity to discuss and debate compelling issues with a teacher's guidance."¹¹⁴⁵ This is particularly important for the kind of civic literacy required for Westheimer's social justice-oriented citizen described above, which requires critical thinking skills that may need to focus on controversial subjects both in and outside the classroom.

Educators such as Gerald Caplan often remark on the "cognitive dissonance" between what is said in the classroom and what students experience in their lives outside of

¹¹⁴² Hughes, and Sears. "The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education." p. 6.

¹¹⁴³ Amadeo, Jo-Ann, Judith Torney-Purta, Rainer Lehmann, Vera Husfeldt, and Roumiana Nikolova. *Civic Knowledge and Engagement. An IEA Study of Upper Secondary Students in Sixteen Countries*, 2002; accessed December 2006; available from http://www.wam.umd.edu/~jtpurta/UpperSecondary_files/Civics_Booklet_JA.pdf.

¹¹⁴⁴ Ibid., accessed.

¹¹⁴⁵ Campbell, David E. "What Is Education's Impact on Civic and Social Engagement?," in *Measuring the Effects of Education on Health and Civic Engagement. Proceedings of the Copenhagen Symposium* Organisation for Economic Co-operation and Development, 2006, accessed December 2006; available from http://www.oecd.org/document/61/0,2340,en_2649_35845295_37425853_1_1_1_1,00.html. p. 104.

school.¹¹⁴⁶

[O]ne faces the reality that our children receive their information from a multitude of sources each day, not all of them by any mean disseminating the same messages as those conveyed by schools. Indeed, children often see in the outside world reality in stark contrast to the one pictured in the classroom. Often, those most vocal about the importance of schools communicating proper values to students refer to ‘some sense of honesty, truth, civility, social justice and cooperation, and a determination to combat violence, racism, gender inequality and environmental degradation’. Yet in any day’s newscast a student is likely as not to find evidence of a world characterized by dishonesty, incivility, social injustice, harsh competitiveness, widespread violence, racism, sexism, and a value system that almost invariably puts economic growth ahead of environmental sustainability. Such cognitive dissonance can surely not fail to have an impact on the student’s view of what she’s been told in school.¹¹⁴⁷

John Taylor Gatto, Neil Postman, Charles Weingartner and others have written about the authoritarian nature of schools with their requirements for strict obedience to authority, and regimentation by bells that interrupt the flow of creativity and effort.¹¹⁴⁸ Such an atmosphere, according to Gerald Caplan, is hardly democratic, and may subtly—but effectively—undermine genuine citizenship education and values.¹¹⁴⁹ Caplan describes this “hidden curriculum”:

Here, then, is the elusive but unmistakable hidden curriculum of Canada’s schools, and the twin dilemma it seems forever to pose. Since, first, schools are in practice highly undemocratic and since, secondly, they help perpetuate social inequality, how can they teach impressionable young Canadians about the virtues of democratic citizenship and the ethics of equity and justice? [...] From the beginning, the instruments of this socialization were the hierarchical, authoritarian nature of school relationships combined with a pedagogy that called for omnipotent, omniscient teachers spoon-feeding the word from on high to silent, subordinate, docile, unquestioning student vessels. These relationships, and the pedagogy routinely used in most schools, deliver powerful messages about the kind of citizenship that is valued outside and certainly within the school system.

John Polanyi, Canada’s Nobel Prize-winning scientist and social activist, argues that the lessons taught via the structures and practices of our education system are passivity and submission. Neil Postman agrees that schools exist to curb and

¹¹⁴⁶ Caplan, Gerald. "Good Schools, Good Citizens: A Discussion." Paper presented at the Third National Forum on Education. Education and Life--Transitions, St. John's, Newfoundland, March 30, 1998, Canadian Teachers' Federation and the Council of Ministers of Education, Canada; accessed July 2005; available from <http://www.cmec.ca/nafored/ctf.en.stm>.

¹¹⁴⁷ Ibid. p. 1.

¹¹⁴⁸ Gatto, John Taylor. *Dumbing Us Down: The Hidden Curriculum of Compulsory Schooling*, Philadelphia: New Society Publishers, 1992. and Postman, Neil, and Charles Weingartner. *Teaching as a Subversive Activity*, New York City, Dell, 1969; accessed.

¹¹⁴⁹ Caplan. "Good Schools, Good Citizens: A Discussion."

control the natural exuberance and curiosity of children and teach them instead hierarchy, authority, discipline, conformity, uniformity, obedience, and submissiveness, not necessarily the qualities that characterize an actively engaged citizen.¹¹⁵⁰

However, Caplan does concede that it is not valid to generalize about all Canadian schools, since he notes that “there are large numbers of schools and huge numbers of teachers where children are treated with respect and where independent thought and critical thinking is actively encouraged.”¹¹⁵¹ He remarks: “[A]s Ken Osborne and others argue passionately, it’s in schools themselves that students must have the first taste of democratic citizenship, must feel that their views and their actions count, that they make a difference.”¹¹⁵²

According to Amadeo, et al., the two major IEA Civic Education Studies both demonstrated that classroom climate had a large, positive effect on the knowledge and skills of both groups of students surveyed—the 14- and 16–19 year-olds.¹¹⁵³ They observe:

An important finding from the 1971 IEA Civic Education Study¹¹⁵⁴ was that students’ beliefs that they were encouraged to speak openly in class was a potent predictor of their knowledge of and support for democratic values. This relationship was also clear in the findings from the 14-year-olds tested in 1999. Here, students’ perceptions of an open classroom climate for discussion was a predictor of both civic knowledge and civic engagement in most of the 28 participating countries.¹¹⁵⁵

Amadeo, et al. also found a high correlation between open classroom climate and civic-related competency in the older age group surveyed in 1999–2000.¹¹⁵⁶

David Campbell notes that the IEA findings provide evidence that classroom climate “has a positive impact on every dimension of engagement” including “knowledge, skills, intention of being an informed voter, intention of being civically engaged, intention of being politically engaged, institutional trust, and tolerance.”¹¹⁵⁷ Campbell makes a distinction between civic and political engagement, stating that the latter involves efforts to influence public policy, while the former does not. He recommends that an aggregated measure of “school ethos,” or culture within a school, could incorporate the openness of

¹¹⁵⁰ Ibid. pp. 8–9

¹¹⁵¹ Ibid.

¹¹⁵² Ibid. p. 11.

¹¹⁵³ Amadeo, Torney-Purta, Lehmann, Husfeldt, and Nikolova. *Civic Knowledge and Engagement. An IEA Study of Upper Secondary Students in Sixteen Countries*, accessed.

¹¹⁵⁴ There have been two IEA Civic Education Studies—one in 1971 and the one in 1999–2000 referenced above.

¹¹⁵⁵ Amadeo, Torney-Purta, Lehmann, Husfeldt, and Nikolova. *Civic Knowledge and Engagement. An IEA Study of Upper Secondary Students in Sixteen Countries*, accessed.

¹¹⁵⁶ Ibid., accessed. pp. 150–151.

¹¹⁵⁷ Campbell. “What Is Education’s Impact on Civic and Social Engagement?” p. 28.

the classroom climate, the degree to which students' opinions are respected by teachers and administrators, and the overall sense of community within the school. Development of such a composite measure of school ethos or culture would produce a highly useful indicator for the CIW educated populace domain.

In the IEA study, six items were used on the Open Classroom Climate for Discussion sub-scale, presented as statements with which students agreed or disagreed:

1. Students feel free to disagree openly with teachers about political / social issues in class
2. Students are encouraged to make up their own minds about issues
3. Teachers respect our opinions and encourage us to express them in class
4. Students feel free to express opinions in class even when their opinions are different from those of most other students
5. Teachers encourage us to discuss political or social issues about which people have different opinions
6. Teachers present several sides of an issue when explaining it in class¹¹⁵⁸

The response scale was 'never', 'rarely', 'sometimes', and 'often'. Campbell argues that the above index could possibly be reduced to include fewer items, which could be determined by pilot testing to determine the most significant and revealing statements with the least overlap.¹¹⁵⁹

Amadeo, et al. report the following results of the classroom climate scale:

Results from the upper secondary students

In general, the upper secondary students seemed to feel free to discuss issues and express their opinions in their classrooms. However, there was substantial variation in terms of the individual items in the scale. For example, across all countries, slightly less than half of the students responded that they were often encouraged to make up their own minds about issues and that they felt free to express opinions even when their opinions differed from those of their classmates. However, a much smaller percentage (about 20) of the students indicated that they were often encouraged by their teachers to discuss political or social issues about which people have different opinions. In fact, close to 10 percent of the students across countries said they were never encouraged to discuss these kinds of issues in their classrooms [...].

[T]here was also variation across countries. Students in Denmark, Estonia, Norway, the Russian Federation, Sweden, and Switzerland (German) were especially likely to report an open classroom climate for discussion. In contrast, students in Chile, Cyprus, the Czech Republic, Israel, Poland, Portugal, and Slovenia had scores below the international mean on this scale.

¹¹⁵⁸ Amadeo, Torney-Purta, Lehmann, Husfeldt, and Nikolova. *Civic Knowledge and Engagement. An IEA Study of Upper Secondary Students in Sixteen Countries*, accessed.

¹¹⁵⁹ Campbell. "What Is Education's Impact on Civic and Social Engagement?"

Analysis of 14-year-olds' and upper secondary students' results

In most of the countries where comparisons could be made, the upper secondary students were significantly more likely than the 14-year-olds to perceive that their classroom climate was open for discussion [...]. The reason for the greater openness in most countries may be because the objectives and topics of older students' courses are more likely to be appropriate for discussion than are the courses for younger students, which leads the former group to perceive that the classroom climate itself is more open for discussion.¹¹⁶⁰

In conclusion, Amadeo et. al note:

The school factors—students' perception of an open classroom climate for discussion and students' reported participation in a school council or parliament—were two factors accounting for large effects on students' civic knowledge outcomes [...]. Although these effects were not as strong as the impact of home background factors, they still had, to a considerable extent, a significant and important influence on students' acquisition of civic-related competency. Thus, individuals perceiving their classroom environment to be open for discussion or for expressing their opinions freely tended to achieve higher levels of civic knowledge scores than did those perceiving no such environment in the classroom. This finding replicates the results in the 14-year-old study and underlines the important role that schools play in fostering civic knowledge.¹¹⁶¹

Amadeo, et. al also observe that the results “reinforce the hypothesis that democratic practices at school are important in fostering civic knowledge and intention to vote.”¹¹⁶²

Knowing the proportion of Canadian students who feel they have a positive classroom climate, as defined by the six items comprising the open classroom scale listed above, would be both a highly useful indicator of learning conditions in Canadian schools in general, as well as a key determining aspect of civic literacy, including political knowledge. Significantly, the Canadian results would be internationally comparable if administered according to the IEA system and method. Unfortunately, as discussed above, there are no data to populate this indicator in Canada, since Canada did not participate in the IEA Civic Education Study. The education domain of the CIW, and Canadians in general, would benefit greatly from the availability of this information, and we recommend that these data be collected at the earliest opportunity, albeit belatedly, in all Canadian provinces.

¹¹⁶⁰ Amadeo, Torney-Purta, Lehmann, Husfeldt, and Nikolova. *Civic Knowledge and Engagement. An IEA Study of Upper Secondary Students in Sixteen Countries*, accessed.

¹¹⁶¹ Ibid., accessed. pp. 150–151.

¹¹⁶² Ibid., accessed.

24.6.3 Service learning in Canada

Hébert and Sears point to a growing trend in citizenship education that recognizes the need for active, “hands-on” participation in the community.¹¹⁶³ Service learning integrates classroom instruction with community service activities, for which academic credit is given. “The purpose of these programs is to connect the students to real issues in their community, and at the same time, develop their knowledge and skills in the area of democratic participation.”¹¹⁶⁴ According to these researchers, there is a growing recognition that civic learning requires more than classroom instruction, that parents as well as community organizations and others are all holders of citizenship knowledge, and that learning through volunteer activity in the community is important in the development of civic literacy. This understanding is in line with the “three C’s” of citizenship education recognized in England and described in section 24.6.

Referring to service learning in the U.S., which has been active for several decades, Galston explains:

The service must be organized in relation to an academic course or curriculum, must have clear learning objectives, and must address real community needs over a sustained period of time; the learning occurs through both community-based practice and regularly scheduled critical reflection on that practice. As of academic year 1998–1999, 32% of all [U.S.] public schools had incorporated service learning into their curricula, including a remarkable 46% of high schools (versus just 9% of high schools in 1984). Encouraging students to participate more actively in their communities and encouraging them to improve their knowledge of those communities are the most frequently cited goals for service learning.¹¹⁶⁵

Service learning is also becoming increasingly important in Canada, and is becoming required within some high school curricula, such as in the new Ontario civics course, which requires each student to complete 40 hours of volunteer community service in order to graduate.¹¹⁶⁶

The Canadian Association for Service Learning (CASL) was established in 2001 after a ground-breaking symposium sponsored by St. Francis Xavier University in Nova Scotia.¹¹⁶⁷ CASL is a national association established to support the active participation of students, educators and communities in community service learning, with funding from the J.W. McConnell Family Foundation. Among other activities, since 2002, CASL has conducted annual conferences, organized on a rotating voluntary basis by staff at

¹¹⁶³ Hébert, and Sears. *Citizenship Education*, accessed.

¹¹⁶⁴ Ibid., accessed. p. 5.

¹¹⁶⁵ Galston. "Political Knowledge, Political Engagement, and Civic Education." p. 229.

¹¹⁶⁶ Westheimer, Joel. "Democratic Dogma: There Is No One-Size-Fits-All Approach to Schooling for Democracy," *Our Schools. Our Selves*, vol. 15, no. 1, 2005: 25-39, Canadian Centre for Policy Alternatives.

¹¹⁶⁷ Canadian Association for Service Learning (CASL). *Website*, accessed December 2006; available from <http://www.communityservicelearning.ca/en/index.cfm - news>.

network institutions such as the University of Guelph, the University of British Columbia, and the University of Ottawa.¹¹⁶⁸ In addition, CASL recently surveyed 30 post-secondary institutions that have incorporated service learning into their curricula and found a growing interest in the area among universities.¹¹⁶⁹

In 1999, Ron Faris conducted a service learning survey of public education officials at the ministerial level for the (then) Human Resources Development Canada.¹¹⁷⁰ He found that “the term ‘service learning’ is seldom used in Canada, with less than one-third of respondents from either the education or voluntary sectors being acquainted with it or the substantial body of related American experience and research.”¹¹⁷¹

However, Faris found that four provinces have experience using student or out-of-school youth community service as a means of earning tuition credit: British Columbia, Manitoba, Nova Scotia, and Newfoundland and Labrador. As noted above, Ontario has also recently added a service learning requirement for its civic course.¹¹⁷² Newfoundland and Labrador initiated its program in 1994, and Nova Scotia completed a pilot program in 1999 with plans to expand the program. Manitoba also completed a pilot program in 1999, and British Columbia allows external credits for high school students involved in recognized community activities such as 4-H clubs, and requires a civic action project in its high school Civics Studies 11 curriculum.¹¹⁷³ Faris also notes that the Canadian Centre for Philanthropy is building partnerships to develop service learning in a national citizenship education pilot project for secondary schools.¹¹⁷⁴

In the future, it will be important to indicate the percentage of schools in Canada that have incorporated service learning into their curricula, as Galston has done for the U.S. At the present time, however, this information is not available for Canada, and Faris’ 1999 report needs to be updated in light of the rapid changes occurring in this area.

¹¹⁶⁸ Ibid., accessed.

¹¹⁶⁹ Hayes, Emilie. *Community Service-Learning in Canada: A Scan of the Field*, Canadian Association for Community Service Learning, 2006; accessed December 2006; available from http://www.communityservicelearning.ca/en/documents/ScanofCSLinCanada_000.pdf.

¹¹⁷⁰ Faris, Ron. *Service-Learning in Canada: A Survey of Policy and Practice in the Public Education Systems of Canada and the Practice of Using Voluntary Service as a Means of Earning Post-Secondary Tuition Credit*, Learning and Literacy Directorate of Human Resources Development Canada, 1999; accessed December 2006; available from <http://members.shaw.ca/rfaris/docs/LS-SL3.pdf>.

¹¹⁷¹ Ibid., accessed. p. 3.

¹¹⁷² Myers, John. "Ontario's New Civics Course: Where Is It Going?" Paper presented at the Citizenship 2020: Assuming Responsibility for our Future Conference, Montreal, QC, October, 2000, McGill Institute for the Study of Canada; accessed July 2005; available from <http://www.misc-iecm.mcgill.ca/citizen/myers2.htm>.

¹¹⁷³ Hughes, and Sears. "The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education."

¹¹⁷⁴ Faris. *Service-Learning in Canada: A Survey of Policy and Practice in the Public Education Systems of Canada and the Practice of Using Voluntary Service as a Means of Earning Post-Secondary Tuition Credit*, accessed.

24.6.4 Teacher training for civic education

The success of any school program depends on the quality of the teachers, which includes their level of knowledge and understanding of the subject, and the training they are given to develop this expertise. Hughes and Sears report that in Canada teachers “have very limited backgrounds in citizenship education and moving from standards to actual lesson and unit plans proves difficult [...] . [W]e know of no ongoing programs of pre or in-service teacher education focused directly on citizenship education.”¹¹⁷⁵

Our experience with new teachers indicates they often do not know where to begin and curriculum guides often provide very little guidance. The new social studies curriculum in Alberta, for example, includes clear outcome expectations at both general and specific levels but offers virtually no help for teachers in how to attain them. This lack of specificity is common across Canada [...]. In contrast, the international jurisdictions examined have implemented a range of initiatives to build capacity in terms of providing curriculum resources. One of the most extensive examples is the Discovering Democracy program in Australia [...]. Citizenship education initiatives in both Australia and England have included significant attention to teacher development.¹¹⁷⁶

John Myers of the Ontario Institute for Studies in Education (OISE) at the University of Toronto notes the distinction between the *intended* curriculum and what is *actually* taught and learned in the classroom.¹¹⁷⁷ Speaking of the new Ontario civics class, he describes the gap in this area as, in part, a problem of teacher support:

The history of curriculum implementation is usually a history of failure. The best of intentions fall short when teachers do not get long-term support to work through the innovation [...]. While teachers have much useful material to choose from, teacher workload and staffing issues threaten to make the implementation of this course a ‘mess’ to quote some of the teachers I have spoken to [...]. In many cases, teachers are teaching the Civics course to meet this requirement with no regard for their training or background in the area. Since department heads are also under this new teaching arrangement they lack the time to help familiarize the new teachers with the concepts or important learnings required of students by this course. Morale among Ontario teachers is poor and with tight funding, the necessary professional development is hard to come by [...]. if teachers are unwilling, unprepared or dispirited when teaching this new course what will our students really learn about citizenship, or anything else from such climate?¹¹⁷⁸

The European Council’s EDC project identified goals and competencies for teachers of EDC. Among these are:

¹¹⁷⁵ Hughes, and Sears. "The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education." pp. 16, 21.

¹¹⁷⁶ Ibid. pp. 16–19.

¹¹⁷⁷ Myers. "Ontario's New Civics Course: Where Is It Going?"

¹¹⁷⁸ Ibid.

- Knowledge of political and social systems, institutions, procedures, problems and developments
- Enabling critical reflection of recent history, political information by parties, media and press
- Supporting the individual in the formation of political values and attitudes
- Enabling active participation in the political issues of a pluralistic society
- Ability to see the problem from learners' perspectives and to respect their interests, and needs
- Capacity to deal with controversial issues
- Having an understanding of interdisciplinary, holistic and transversal approaches to curriculum
- Ability to see him/herself, as well as learners, as active participants of local, national, and global communities who have the potential to make a difference¹¹⁷⁹

Schugurensky and Myers studied the acquisition of civics knowledge in teachers who had taught the Ontario civics course.¹¹⁸⁰ They found that both pre-service and in-service training mostly influenced teaching methodology, rather than the development of civic knowledge, attitudes, values, and skills. The exceptions occurred when the courses were taught by “inspiring, committed and engaged teachers.”¹¹⁸¹

Schugurensky and Myers especially emphasize the importance of informal learning and note that that contexts such as those involving civic engagement and political participation, as well as use of the media—TV news, magazines and newspapers, documentaries, and the Internet—are also important sources of civic learning for teachers as well as for students. The authors, who interviewed all of the teachers of the new Ontario civics course, found that “the learning acquired informally through civic involvement was consistently higher than the learning acquired through nonformal means such as workshops and short courses.”¹¹⁸² This important finding indicates once again the necessity for learning and education indicators to give proper weight to informal learning processes and structures, including experiential civic involvement and participation. Conventional education indicators currently give insufficient attention to these factors, and, despite the encouraging new initiatives noted above, most conventional school curricula still rarely promote such involvement in active and practical ways.

24.6.5 Citizenship education assessments in Canada

In Canada, generally there are no school examinations in citizenship education, and

¹¹⁷⁹ Birzea, Cesar. *Education for Democratic Citizenship: A Lifelong Learning Perspective*, Council for Cultural Co-operation of the Council of Europe (CDCC), 2000; accessed July 2005; available from http://www.see-educoop.net/education_in/pdf/edu_dc-oth-enl-t07.pdf p. 47

¹¹⁸⁰ Schugurensky, Daniel, and John P. Myers. "A Framework to Explore Lifelong Learning: The Case of the Civic Education of Civics Teachers," *International Journal of Lifelong Education*, vol. 22, no. 4, 2003: 325-352.

¹¹⁸¹ Ibid.

¹¹⁸² Ibid. p. 349.

Hébert and Sears contend: "It therefore receives much less attention than those subjects which are examined."¹¹⁸³

In the late 1960s, A.B. Hodgetts, whom we discussed above in reference to the Canada Studies Foundation, and who observed classrooms, analyzed textbooks and curricula, and surveyed thousands of students and teachers, conducted the last nation-wide evaluation of civic education in Canada.¹¹⁸⁴ He examined knowledge and attitudes, as well as teacher training and practices, in a report that became a baseline for social studies learning in Canada. In particular, Hodgetts' recommendations led directly to the formation of the Canada Studies Foundation, which contributed to a transformation of social studies and history curricula in Canadian schools.¹¹⁸⁵ In 1969, Simeon reviewed Hodgett's book, *What Culture? What Heritage? A Study of Civic Education in Canada*, and quotes Hodgetts as stating: "The majority of English-speaking high school graduates leave the Canadian studies classroom without the intellectual skills, the knowledge and the attitudes they should have to play an effective role as citizens in present-day Canada."¹¹⁸⁶

Since that time, there has been almost no systematic monitoring of student achievement in citizenship education and no comprehensive evaluation of the state of citizenship education in Canada. Sears, Clarke, and Hughes are concerned with developing specific outcomes for citizenship education that could be used to assess and monitor achievement on a wide scale.¹¹⁸⁷ They note that the assessments that do exist test only factual information with little attention to context. These assessments are focused mainly on knowledge covered in particular courses, which is not related to "situated knowledge" of issues and skills needed for active citizenship. By "situated" Sears, et al. explain that they mean "not knowledge for its own sake but knowledge intended to frame and enhance thoughtful participation in civic life."¹¹⁸⁸ This perspective emphasizes the utilization of knowledge through the use of skills such as decision-making, communication, and conflict resolution. As noted above, Sears reported in a recent telephone conversation that no indicators for these skills have been developed at this point.¹¹⁸⁹

In May 1996, British Columbia conducted a social studies assessment designed to assess

¹¹⁸³ Hébert, and Sears. *Citizenship Education*, accessed. p. 4.

¹¹⁸⁴ Hodgetts, A.B. *What Culture? What Heritage?: A Study of Civic Education in Canada*, Toronto: OISE Press, 1968. cited in Sears, A.M., G.M. Clarke, and A.S. Hughes. *Learning Democracy in a Pluralist Society: Building a Research Base for Citizenship Education in Canada*, Council of Ministers of Education, Canada (CMEC), 1998 December; accessed July 2005; available from <http://www.cmec.ca/germ/list.en.asp>.

¹¹⁸⁵ Sears, University of New Brunswick at Fredericton, personal communication.

¹¹⁸⁶ Hodgetts. *What Culture? What Heritage?: A Study of Civic Education in Canada*. cited in Simeon, Richard. "Book Review: A.B. Hodgetts, What Culture? What Heritage? A Study of Civic Education in Canada," *Canadian Journal of Political Science*, vol. 2, no. 4, 1969: 539-540.

¹¹⁸⁷ Sears, Clarke, and Hughes. *Learning Democracy in a Pluralist Society: Building a Research Base for Citizenship Education in Canada*, accessed.

¹¹⁸⁸ Ibid., accessed.

¹¹⁸⁹ Sears, University of New Brunswick at Fredericton, personal communication.

the social studies knowledge and attitudes of students in grades 4, 7, and 10.¹¹⁹⁰ Approximately 45,000 students participated in the assessment, which consisted of 40 multiple choice achievement items; an attitude scale measuring community attitudes (tolerance and participation), citizenship attitudes (participation in various types of citizenship activities), and attitudes toward learning social studies; students' perceptions of the social studies methods used by their teachers; and a short questionnaire collecting demographic information. Performance was assessed across five domains—Canada; the World; the individual's role in society; knowledge / understanding and application; and higher order and critical thinking. This social studies assessment was part of a Provincial Learning Assessment Program begun in 1976 that assesses one curriculum area per year. Social studies had previously been assessed in 1977 and 1989.

In the British Columbia assessment, ratings were classified as weak, marginal, satisfactory, very satisfactory, and strong. The average result of grade 4 students on the multiple-choice achievement items was satisfactory, which was similar to the 1989 results. Results for grade 7, however, showed a decline in student performance of 5% since 1989, which was the greatest decline of the three grades participating in the assessment. Overall, in 1996, the results for grade 10 students showed a 3.8–4.7% decline in performance since 1989.¹¹⁹¹

In 1989, across all three grade levels, the results for two of the domains—the individual's role in society, and higher order and critical thinking—were very satisfactory, and the results of the other three domains were satisfactory. However, in 1996, the results for two domains—the world, and knowledge / understanding and application—were marginal, and results for the other three domains were marginal / satisfactory. In sum, for the higher grades and when assessed by subject matter, the B.C. results showed a decline in student performance since 1989. Comparable province-wide assessments are not available for other provinces.

The new, mandatory civics course in Ontario offers assessment guidelines to teachers who are, however, free to select their own form of assessment, so comparable province-wide results cannot be produced.¹¹⁹² The course profile identifies four generic categories to assess knowledge and skills in civics—Knowledge / Understanding, Thinking / Inquiry, Communication, and Application. According to the guidelines, assessments are divided into four outcome levels: limited knowledge, understanding and effectiveness; some knowledge and understanding and moderate effectiveness; considerable knowledge, understanding and effectiveness; and thorough knowledge and understanding and high degree of effectiveness.

According to the course profile:

¹¹⁹⁰ Government of British Columbia, Ministry of Education. *Social Studies in British Columbia: Results of the 1996 Provincial Learning Assessment*, 1996; accessed December 2006; available from <http://www.bced.gov.bc.ca/assessment/social96/>.

¹¹⁹¹ Ibid., accessed.

¹¹⁹² Public District School Board Writing Partnership. *Course Profile: Civics. Grade 10*, Ontario Ministry of Education and Training, 2000; accessed July 2005; available from http://www.curriculum.org/occ/profiles/10/canadian_p.shtml.

Teachers need to develop an alternative framework for collecting and measuring data to report on student achievement based on the achievement levels. Weighting for any particular assignment will depend on what the teacher wishes to assess as well as the tool or tools they use for assessment. [...] Students will succeed in this program when they are able to identify the historical roots of contemporary Canadian issues, search for historically valid evidence from a wide range of sources, read historical and contemporary materials critically, assess the point of view of presenters and use evidence to develop and defend conclusions about past events.¹¹⁹³

The new civics course is divided into three strands: informed citizenship, purposeful citizenship, and active citizenship.¹¹⁹⁴ Each of these three strands has overall outcome expectations and specific expectations. A list of these expected outcomes can be found in Appendix 15 of this literature review. Because teachers are free to choose their own assessment tools and to decide on what they want to assess, these outcome measures cannot presently be used to yield composite, quantitative, and comparative results for Ontario schools.

By contrast to the paucity of Canadian data in this area, other countries have created rich databases for assessments of civic education. As Hughes and Sears note, the U.S. National Center for Learning and Citizenship (NCLC) has established a Citizenship Education Data Base, "which provides a range of comparative information on state policies, standards, approaches and levels of student achievement in citizenship education."¹¹⁹⁵ Hughes and Sears also note that few Canadian provinces have their own capacity to create this kind of support structure or database, and that, for Canada to move forward in this area, the federal government needs to provide leadership.¹¹⁹⁶

¹¹⁹³ Ibid., accessed. p. 5, 9.

¹¹⁹⁴ Ontario Ministry of Education and Training. *Canadian and World Studies: The Ontario Curriculum, Grades 9 and 10*, 1999; accessed July 2005; available from <http://www.edu.gov.on.ca:80/eng/document/curricul/secondary/canadian/canaful.html> - civics.

¹¹⁹⁵ Hughes, and Sears. "The Sound and the Fury: Rhetoric and Reality in Canadian Citizenship Education." p. 23.

¹¹⁹⁶ Ibid. p. 26.

25. Multicultural Literacy

Culture has been defined as a common worldview and way of life of a particular group of people. This culture encompasses both the material world of tangible objects and the intangible world of beliefs, values, behaviours, norms, attitudes, and biases.¹¹⁹⁷ It is also the accumulated knowledge about how to survive as a group in specific contexts. Any culture is dynamic and embedded in a complex web of interacting sub-cultures. Individuals are involved with many such cultures at the same time, such as family culture, workplace culture, neighbourhood culture, ethnic culture, and national culture. Individuals are also simultaneously involved in cultural processes on different levels such as global / local, universal / particular, and divergent / convergent. Gerhard Budin, of the University of Vienna, further explains:

Human cognition is such an interface: while the biological basis of cognition, the human brain is (more or less) of uniform structure all over the world, the actual cognitive processes using the material basis differ and depend on cultural conventions (including [...] languages [and] social groups). The analysis of the dialectics between individual cognition and communicative action, on the one hand, and collective standardizations in symbolic systems, action schemata and social knowledge that are the basis for identities in each individual, on the other, is a prerequisite for understanding cultural processes.¹¹⁹⁸

T.R. Richardson notes that cultural knowledge is passed from generation to generation, and is learned informally through social environments and systems of shared meaning, and formally through schooling.¹¹⁹⁹ Multicultural literacy, which is sometimes referred to as a form of cultural capital,¹²⁰⁰ has been defined as “the ability to understand and appreciate the similarities and differences in the customs, values, and beliefs of one’s own culture and the culture of others.”¹²⁰¹

¹¹⁹⁷ Richardson, T.R. "Social and Cultural Issues in Education," in *Encyclopedia of Social Sciences and Humanities: Education for Sustainability in Encyclopedia of Life Support Systems (EOLSS)*, ed. Farrell, Robert V. and George Papagiannis. Oxford, U.K.: Developed under the Auspices of the UNESCO, EOLSS Publishers, 2004, accessed June 2005; available from http://www.eolss.net/eolss_samplechapters_C04.aspx.

¹¹⁹⁸ Budin, Gerhard. "Theory and History of Culture," in *Encyclopedia of Social Sciences and Humanities: Culture, Civilization and Human Society in Encyclopedia of Life Support Systems (EOLSS)*, ed. Arlt, Herbert and Donald G. Daviau. Oxford, U.K.: Developed under the Auspices of the UNESCO, EOLSS Publishers, 2004, accessed June 2005; available from http://www.eolss.net/eolss_samplechapters_C04.aspx, p. 13.

¹¹⁹⁹ Richardson. "Social and Cultural Issues in Education."

¹²⁰⁰ Kosmoski, Georgia J., Geneva Gay, and Edward L. Vockell. "Cultural Literacy and Academic Achievement," *Journal of Experimental Education*, vol. 58, no. 4, 1990: 265-272.

¹²⁰¹ Metiri Group. *Cultural Literacy*, Metiri Group in co-operation with North Central Educational Laboratory (NCREL), 2001; accessed August 2005; available from <http://www.metiri.com>, p. 1.

In 1971, Canada became the first country in the world to adopt multiculturalism as an official policy.¹²⁰² At that time, the focus of multiculturalism was to assimilate visible minorities into the dominant culture. However, it has evolved into a social justice issue that now involves trying to include pluralistic views and multicultural understanding in the dominant culture, which, according to Hidalgo, et al., otherwise tends to focus solely on its dominant worldview.¹²⁰³

Multicultural literacy includes knowledge of one's own culture, knowledge of other cultures, and an understanding and appreciation of diversity and equity issues. Writing for the Department of Canadian Heritage, Lillian Allen asserts that multiculturalism refers to the "coexistence of different cultures," whereas cultural diversity or "the diversity of cultural expression," is part of multiculturalism, but also includes equity, access, social cohesion, countering racism, and other social justice issues.¹²⁰⁴ Multicultural literacy also is part of the Delors framework section titled "learning to live together."¹²⁰⁵

In light of the significance of multiculturalism, particularly within the Canadian context where it is official policy, it is therefore important that Canadians learn about and understand multiculturalism and diversity as part of their core stock of knowledge. Indeed, the Canadian populace cannot be considered truly or fully educated if it has no knowledge, understanding, and appreciation of the diversity of cultures in Canadian society, and their respective contributions to Canadian society. With respect to the social outcomes measured in the Canadian Index of Wellbeing, knowledge of multiculturalism and "literacy" in this area have been shown to contribute to societal wellbeing through promoting tolerance, respect, openness, harmony, and other benefits. Indeed, some analysts regard multicultural literacy as key to a healthy and peaceful society.

¹²⁰² Canadian Heritage. *Canadian Multiculturalism: An Inclusive Citizenship*, Department of Canadian Heritage, 2004; accessed October 2005; available from http://www.pch.gc.ca/progs/multi/inclusive_e.cfm.

¹²⁰³ Hidalgo, Francisco, Rudolfo Chávez, and Jean C. Ramage. "Multicultural Education Landscape for Reform in the Twenty-First Century," in *Handbook of Research on Teacher Education, Second Edition*, ed. Sikula, John, Thomas Buttery and Edith Guyton, Chapter 33. New York: Macmillan, 1996.

¹²⁰⁴ Townsend, Mary. *Symposium 2003: Challenges in Survey Taking for the Next Decade: Developing Statistical Literacy in Youth*, Session 8, Education Outreach Program, Statistics Canada, Catalogue no. 11-522-XIE, 2003; accessed December 2005; available from <http://www.statcan.ca:80/english/freepub/11-522-XIE/11-522-XIE2003001.htm>.

¹²⁰⁵ Delors, Jacques. *Learning: The Treasure Within. Report to UNESCO of the International Commission on Education for the Twenty-First Century*, Paris: UNESCO, 1996.

25.1 Definitions of multicultural literacy

As noted above, multicultural literacy is concerned with providing and enhancing knowledge and understanding of, and between, diverse cultural groups. It also has the normative goal of creating and promoting equity of visible minorities within the dominant culture. Saskatchewan Education provides a comprehensive definition of multicultural literacy and the learning outcomes expected, which are regarded as valid for the general populace as well as for students in formal schooling:

Multicultural literacy is the ability to recognize that Canadian society is characterized by cultural pluralism, and that cultural retention is an individual and group right.

The goal is to develop cognitive and affective knowledge and skills that

- will enable positive self-concept development
- will facilitate intercultural understanding and appreciation
- will lead towards the elimination of racism, prejudice and intolerance in order to create a politically, socially and economically just society.¹²⁰⁶

U.S. educational consultants, The Metiri Group, offer the following detailed profile of culturally literate students, which could also apply to the general population, and assist in developing indicators of multicultural literacy for the CIW:

Culturally literate students are knowledgeable and appreciative of the way that culture and history—their own as well as those of others—impact behaviors, beliefs, and relationships in a multicultural world. Such students:

- understand that culture impacts their behavior and beliefs, and the behavior and beliefs of others
- are aware of specific cultural beliefs, values, and sensibilities that might affect the way that they and others think or behave
- appreciate and accept diverse beliefs, appearances, and lifestyles
- are aware that historical knowledge is constructed, and is therefore shaped by personal, political, and social forces
- know the history of both mainstream and non-mainstream cultures, and understand that these histories have an impact today
- are able to take the perspective of non-mainstream groups when learning about historical events
- know about major historical events of other nations and understand that these events impact behaviors, beliefs, as well as relationships with others
- are aware of the similarities between groups of different cultural backgrounds and accept the differences between them

¹²⁰⁶ Saskatchewan Education. *Multicultural Education: A Policy Document*, Multicultural and Heritage Language Education Policies. Saskatchewan Education, 1994; accessed October 2005; available from <http://www.sasked.gov.sk.ca/docs/policy/multi/index.html>.

- understand the dangers of stereotyping and other biases; are aware of and sensitive to issues of racism and prejudice
- are bilingual or multilingual, or working towards these proficiencies
- can communicate, interact, and work positively with individuals from other cultural groups
- understand how the use of technology and the Internet impacts worldviews
- use technology in order to communicate with individuals and access resources from other cultures
- are familiar with existing cultural norms of new technology environments (instant messaging, virtual workspaces, e-mail), and are able to interact successfully in such environments¹²⁰⁷

The Metiri Group also notes that multicultural learning often focusses on the importance of social context in general as a primary means of creating knowledge and meaning.¹²⁰⁸ The Metiri profile above could well be translated into a set of survey questions designed to test and assess proficiency and understanding in each of the areas identified, thereby producing data that could populate key indicators of multicultural literacy in the CIW.

The Metiri Group notes, however, that major learning models such as those based on behaviourist, humanistic, and cognitive theories,¹²⁰⁹ are mainly focused on individual autonomy and personal growth as a universal value, rather than on the social context. Amstutz suggests that the view and perspective of the individual, self-directed learner fails to consider the social context in which learning takes place. This view “interprets self-directed learning as a method that is more ‘mature,’ suggesting that collaborative, cooperative, and other forms of learning are not as potent.”¹²¹⁰ Amstutz argues that in addition to being ethnocentric, “these concepts reflect the emphasis on self and the

¹²⁰⁷ Metiri Group. *Cultural Literacy*, accessed. pp. 1–2.

¹²⁰⁸ Amstutz, Donna D. "Adult Learning: Moving toward More Inclusive Theories and Practices," *New Directions for Adult and Continuing Education*, vol. 82, no. Summer, 1999.

¹²⁰⁹ Ibid. pp. 22–23. The Metiri Group notes:

Behavioral learning is [...] the basis for instruction in competency-based curricula and programs, governmental and business training programs, and instructional design. Behavioral learning usually results in learning that promotes standardization. [...] Behavioral learning theories use instrumental definitions of knowledge that are often hegemonic. Therefore, cultural, or ‘local’ knowledge held by some learners, is not recognized as being legitimate.

Humanism also promotes individual development but is more learner centered. The goal is to produce individuals who have the potential for self-actualization. Learners are characterized as self-directed and internally motivated. Humanism goes beyond behavioral change to changes in values, attitudes, and beliefs about the self.

Cognitivism focuses learning in the mental and psychological processes of the mind, not in behavior. It is concerned with perception, insight, and meaning making [...]. Cognitivists focus on examining the mental structures that people construct to provide meaning to information.

¹²¹⁰ Ibid. p. 24.

dominant cultural value of competition.”¹²¹¹ They ignore “the group-oriented social structures and processes used by some groups [...] and the learning approaches of many women, people of color, and members of the working class.”¹²¹² She feels that what is needed is a paradigm shift that will enable various groups to decide what is important for themselves and their communities.

The observations of the Metiri Group and Amstutz on learning styles are highly relevant to a consideration of multicultural literacy, because they indicate that multicultural literacy cannot be transmitted only through content and cognitive knowledge, but depends also on learning method. Recent reviews and critiques of New Zealand’s social wellbeing indicators have noted that the country’s Maori people tend to define wellbeing in far more communal ways and in relation to the wellbeing of groups rather than in the individualistic terms used in the country’s annual Social Reports. Mason Durie, of Massey University, for example, notes that the wellbeing of the sub-tribe can be defined by its capacity to perform certain functions effectively.¹²¹³ Similarly, the individualist and self-directed learning styles described by the Metiri Group and Amstutz, which are dominant in formal schooling systems, may be inappropriate tools to teach and transmit key principles, concepts, and values of those cultures that rely more on group-oriented learning and organizational processes.

James A. Banks, of the University of Washington in Seattle, sees multicultural education as having the potential to help students think critically, and be socially active and aware members of society.¹²¹⁴ Through critical analysis, he argues, one can become aware of how and why our preconceptions dictate the way we perceive, understand, and feel about our world, and how we can change these assumptions to include perspectives that are more inclusive and integrative. Amstutz and Shered define this approach as developing “critical literacy”:

Critical literacy defines knowledge as part of a gendered, racial, economic, social class context, and thus is not neutral. These definitions encourage critical thinking about the types of literacy that are advocated by an educational system. They encourage adult learners to ask questions such as, ‘Who defines knowledge? What knowledge is included, and why? Who benefits from the knowledge presented?’ Using a critical literacy definition, programs should help learners examine the circumstances of their lives and the ways in which to effectively change not only their individual circumstances but also to control their own communities.¹²¹⁵

¹²¹¹ Ibid. p. 23.

¹²¹² Ibid. p. 23.

¹²¹³ Durie, Mason, presentation to Genuine Progress Index conference, New Zealand, May, 2005, available on request to info@gpiatlantic.org.

¹²¹⁴ Banks, James A. "Multicultural Education: Historical Development, Dimensions, and Practice," in *Handbook of Research on Multicultural Education*, ed. Banks, James A. and Cherry A. McGee, 3-24. New York: Macmillan Publishing, 1995.

¹²¹⁵ Amstutz, Donna D., and Vanessa Shered. "The Crisis in Adult Basic Education," *Education and Urban Society*, vol. 32, no. 2, 2000: 155-166. p. 157.

In sum, multicultural literacy has as much if not more to do with questioning dominant definitions of knowledge and the methods of transmitting that knowledge as with simply teaching students “about” other cultures. Indeed, in formal schooling settings, the use of conventional textbook and classroom paradigms and the individualist learning styles described above, to teach about other cultures may subtly distort and undermine the real message and essence of what other cultures have to offer. Ideally, if we follow the logic of the Metiri Group, Amstutz, Shered, and Banks above, multicultural literacy might be best transmitted if each cultural group had some influence over the content, method, and context in which the learning about its particular culture took place.

25.2 Intercultural understanding and appreciation

In a paper commissioned by the European Parliament on the relationship between cultural diversity and human capital, Jesse Marsh emphasizes one key aspect of multicultural literacy— intercultural understanding and appreciation—as follows:

Cultural literacy (*alphabétisme culturelle*) is a term appearing ever more frequently, and refers to the ability of an individual (or perhaps community) to critically relate to another culture in a positive way. This means learning from both similarities and differences.¹²¹⁶

One framework that may be a useful starting point for understanding multiple cultures and their different knowledge and worldviews is presented by Randy White, who is CEO of the White Hutchinson Leisure & Learning Group in the U.S.¹²¹⁷ White suggests looking at core values and attitudes within a culture, such as the way a culture views relationships with people, and also its attitudes to time and nature. He argues that this knowledge falls along the following continuums:

Relationships with People

- *Universalism versus Particularism*: relying on rules, codes and laws versus exceptions, special circumstances and relationships.
- *Individualism versus Collectivism*: the importance of individual and personal freedom versus the importance of the group and co-operative and harmonious relations.
- *Neutral versus Emotional*: the range of feelings expressed, whether interactions are detached or express emotion.
- *Specific versus Diffuse*: the degree of personal involvement in dealings, whether limited to the specific aspect of a transaction or with the whole person, requiring whole relationships.
- *Achievement versus Ascription*: how status is accorded by either what you have done and achieved versus who you are and whom you are connected to.

Attitudes about Time

- *Sequential versus Synchronic*: how the past, present and future relate to each other and which has greatest importance; whether time is seen as linear or as cyclic. The standard of punctuality can range from minutes to a day or more.

¹²¹⁶ Marsh, Jesse B.T. *Cultural Diversity as Human Capital*, Palermo, Italy, Atelier Studio Association, n.d.; accessed October 2005; available from <http://www.terra-2000.org/Documents/Prague/Papers/Cultural Diversity as Human Capital.pdf>, p. 6.

¹²¹⁷ White, Randy. *The Importance of Cultural Competence to Location-Based Leisure Projects*, White Hutchinson Leisure & Learning Group, 2001; accessed October 2005; available from <http://www.whitehutchinson.com/leisure/articles/culturalcompetence.shtml>.

Attitudes about the natural environment

- *Harmony versus Mastery*: whether the world is considered to be more powerful than the individual or whether the individual is seen as the source of vice and virtue; whether society should be subordinate to, in harmony with, or master over nature.¹²¹⁸

Measures of multicultural literacy could potentially be constructed from this framework, since, as a succinct typography, it provides a way of assessing people's knowledge and understanding of multiple cultures in a consistent way. Because the typography uses a standard set of criteria, it is even conceivable that a composite indicator of multicultural literacy could be constructed based on these assessments. Although such an exercise is beyond the scope of this present report, we do reference the "individualism versus collectivism" continuum in the discussion of "learning values" in this literature review. The other items in White's framework above are rarely asked or assessed in public surveys, and therefore cannot be used for evaluations of the extent and depth of multicultural literacy at this time. We look more specifically at measures of multicultural literacy in a separate section below.

According to Beairsto and Carrigan, the first step toward multicultural literacy and understanding another culture is understanding one's own culture:

Those who are part of the 'mainstream' and members of the 'dominant culture' have a tendency to assume that their decisions and actions are the norm and are not culturally determined. Just as people often think they have no accent, some people from the 'mainstream' actually believe that they themselves have no culture. This, of course, is dangerously false. All individuals are influenced by culture, and depending upon how we define culture, one could argue that each of us belongs to many cultures. The first step to understanding another culture is to recognize your own, and to know that your beliefs and perceptions are conditioned and constrained by it.¹²¹⁹

According to Andrus and Roth, understanding diverse cultural expressions at the personal and practical level of social interaction is also an extremely important element of knowledge of and respect for other cultures, especially if he or she relates to others from outside his or her own cultural norm.¹²²⁰ Andrus and Roth note that understanding cultural expressions other than one's own is not only necessary for basic communication, but is also indicative of an appreciation of other cultures. On a global level, people from different cultures have different ways of expressing themselves verbally, and they use different nonverbal clues such as "differences in eye contact, personal space, touching behaviors, and customs."¹²²¹ As Andrus and Roth point out: "An unintentional disrespect or unwillingness to acknowledge and appreciate such cultural norms may itself be a

¹²¹⁸ Ibid., accessed.

¹²¹⁹ Beairsto, Bruce, and Tony Carrigan. "Imperatives and Possibilities for Multicultural Education," *Education Canada*, vol. 44, no. 2, 2004: 1-4. p. 2.

¹²²⁰ Andrus, Miranda R., and Mary T. Roth. "Health Literacy: A Review," *Pharmacotherapy*, vol. 22, no. 3, 2002: 282-302.

¹²²¹ Ibid. p. 290.

hindrance to communication beyond that of language.”¹²²² The SBC Knowledge Network Explorer gives the following examples of such cultural differences:

- *It is considered polite among Singaporean Chinese to offer both the positive and negative possibilities in practically every question that requires a decision.* For example, rather than asking, ‘Would you like to go to the theatre?’ they are likely to ask ‘Do you want to go to the theatre or not?’
- *The way in which a question is answered may also differ across cultures.* For example, English speakers would give a negative answer to the question ‘Isn’t the document available?’ by responding ‘no.’ The intended meaning is: ‘No, the document is not available.’ The Chinese interpretation is different. The answer would be ‘yes,’ meaning ‘Yes, the document is not available.’
- *Some Native American cultures emphasize non-verbal communication.* One study showed: ‘The Navajo mothers believed the high verbal and physical activity were negative attributes, whereas the European-American mothers believed them to be positive. It is easy to imagine how differences in parents’ attitudes toward these kinds of behaviors would lead to the differences in the behavior of children.’

Another study found that the Native American participation structure for conversation does not rely so heavily on non-verbal cues (e.g., gazes, body movement, gestures) as those found among Anglo-American students. As a result, ‘when [Native American] students came to school and encountered this foreign and complicated participation structure, they reacted by withdrawing from classroom activities.’¹²²³

This again illustrates that true multicultural literacy involves far greater subtlety and depth than can be transmitted through simple facts, figures, history, and customs of other cultures taught through conventional textbooks, classroom teaching, and cognitive learning methods alone. In light of the above, it also seems particularly important for the general populace to have a knowledge and understanding of its own culture, and the ways in which its own customs, speech, and worldviews are learned and shaped, as well as a basic appreciation of other cultures. As Banks notes above, in the “globalization age,” it is necessary to learn critical thinking skills that can help one become aware of how and why our preconceptions dictate the way we perceive, understand, and feel about our world, and how we can change these assumptions to include perspectives that are more inclusive and integrative. Measuring this type of outcome in the general populace is, of course, extraordinarily difficult, and it is simply not possible at this point to develop a credible and reliable indicator for multicultural literacy for the CIW educated populace domain. However, as we will see in a later section, some Canadian researchers are currently working on developing a multicultural literacy survey, which may be useful in providing data for a multicultural literacy indicator for the CIW in the future.

¹²²² Ibid. p. 290.

¹²²³ SBC Knowledge Network Explorer. *Multicultural Literacy*, SBC, 2005; accessed August 2005; available from <http://www.kn.sbc.com/wired/21stcent/cultural.html>. pp. 1–2.

25.3 Cultural diversity and equity

Understanding multiculturalism is also about understanding diversity and equity issues. Analysts often note, as T.R. Richardson points out, that tolerance and appreciation of diversity are necessary prerequisites for achieving a healthy and peaceful planet.¹²²⁴ On a global scale, however, Jesse B.T. Marsh notes that cultural tensions are increasing and “an exponential growth of intolerance, separatism and racism based on fear, is already happening in many nation states.”¹²²⁵ If learning outcomes are linked to social outcomes, as both the CIW educated populace domain and the Canadian Centre for Learning’s new Composite Learning Index claim, then a high rate of multicultural literacy and appreciation of other cultures should manifest in greater equity and tolerance.

Despite the prominence and official recognition that multiculturalism—as both a concept and as a reality—has had in Canadian society over the last 30 years, inequities continue to exist, and observers have pointed to a lack of understanding of multiple cultures within Canadian society. For example, the incidence of poverty, unemployment and low educational attainment among the Aboriginal population in Canada is higher than that of other groups. The Aboriginal population suffers poorer health, and higher rates of suicide, mortality, and drug and alcohol addiction than do other groups.¹²²⁶

For instance, in 2001, the high school completion rate for First Nations students on reserve was 41.4%, compared to 68.7% for the general population.¹²²⁷ In 1999, the suicide rate among Aboriginal peoples was three times that of the general population, with 38% of youth deaths and 23% of young adult deaths among Aboriginal peoples being caused by suicide.¹²²⁸ In addition, all cause mortality rates for the Aboriginal population are 75% higher than those of the whole population of Canada, with the rate of Aboriginal male mortality being 561 persons per 100,000 persons vs. 340 persons per 100,000 males in the general population, and the rate for Aboriginal women being 335 per 100,000 vs. 172 per 100,000 females in the general population.¹²²⁹ And, in 2000, the infant mortality rate for First Nations was 6.4 deaths per 1,000 live births, which is 22% higher than the 2001 Canadian rate of 5.2 deaths per 1,000 live births.¹²³⁰

¹²²⁴ Richardson. "Social and Cultural Issues in Education."

¹²²⁵ Marsh. *Cultural Diversity as Human Capital*, accessed. p. 8.

¹²²⁶ Canadian Heritage. *Canadian Diversity: Respecting Our Differences*, Department of Canadian Heritage, 2004; accessed October 2005; available from http://www.pch.gc.ca/progs/multi/respect_e.cfm.

¹²²⁷ Indian and Northern Affairs Canada (INAC). *Fact Sheet - Education*, 2004; accessed August 2005; available from http://www.ainc-inac.gc.ca/nr/prs/s-d2004/02527bbk_e.html.

¹²²⁸ Centre for Suicide Prevention. *SIEC Alert #52: Suicide among Canada's Aboriginal Peoples*, Canadian Mental Health Association, 2003; accessed August 2005; available from <http://www.suicideinfo.ca/csp/assets/Alert52.pdf>.

¹²²⁹ Young, T.K. "Review of Research on Aboriginal Populations in Canada: Relevance to Their Health Needs," *British Medical Journal*, vol. 327, 2003: 419-422. cited in Caron, Nadine R. "Getting to the Root of Trauma in Canada's Aboriginal Population," *Canadian Medical Association Journal*, vol. 172, no. 8, 2005.

¹²³⁰ Health Canada. *First Nations Comparable Health Indicators*, 2005; accessed August 2005; available from http://www.hc-sc.gc.ca/fnih-spni/pubs/gen/2005-01_health-sante_indicat/index_e.html#life_expect.

It is legitimate to ask whether such continued inequities reflect some failure in multicultural literacy and lack of appreciation and respect for Aboriginal cultures in Canada. The Department of Canadian Heritage notes that legislation is not enough to ensure equity, peace, and understanding among and between multiple cultures. Rather, it remarks that multicultural literacy in the general populace, acquired through experience and informal learning as well as through formal multicultural education, is also necessary.¹²³¹

According to Richardson, educators are realizing that global problems require multicultural understanding and action, especially since many key problems arise from cultures that emphasize economic priorities and material growth, and that value dominance over nature through the application of science and technology.¹²³² Educators have also recognized the need for formal education systems to address bias, poverty, inequities in resource distribution, and racial, ethnic, and gender discrimination more effectively. According to U.S. researcher Donna Amstutz: "Marginalization occurs when one set of cultural values, assumptions, beliefs, and practices is valued at the sociopolitical and historical expense of other frameworks."¹²³³

Critical analysis based on an understanding of different cultural approaches and worldviews has also been emphasized in the sphere of informal learning as well. As one report from the European Commission observes, there is a "growing uneasiness with a perceived dominance of Western culture [...]. A one-size-fits-all mono-culture—variously confused with globalisation, capitalism and America—seems to be partly to blame."¹²³⁴ An understanding of the way other cultures might deal with issues is seen as a potential check on the present dominance of this "mono-culture."

Amstutz notes that the personal experiences of visible minority students frequently "do not agree with the mainstream cultural assumptions that are often the result of 'scientific research.'"¹²³⁵ For example, Amstutz describes a personal experience from teaching African American and Latino graduate students and asking them to reflect on their own experience of literacy in their families. In this case, the mainstream cultural assumption is that the literacy of parents, and especially the educational attainment of the mother, is the most important predictor of literacy in the children. The visible minority students in this example, however, felt that this view depreciated and painted their illiterate parents as deficient parents. Many of their parents and other members of their community were indeed illiterate, but it was the *value placed on literacy* by their parents and communities that encouraged these students in their studies, rather than the literacy level of their parents per se.¹²³⁶

¹²³¹ Canadian Heritage. *Canadian Diversity: Respecting Our Differences*, accessed.

¹²³² Richardson. "Social and Cultural Issues in Education."

¹²³³ Amstutz. "Adult Learning: Moving toward More Inclusive Theories and Practices."

¹²³⁴ European Commission. *Visions and Roadmaps for Sustainable Development in a Networked Knowledge Society*, A report prepared for the World Summit on Sustainable Development, Johannesburg. Canadian Association for the Club of Rome Proceedings: Analysis of the Human Predicament, Series 3, Number 4, 2002; accessed October 2005; available from <http://cacor.ca/projun02.pdf>, p. 5.

¹²³⁵ Amstutz, and Shered. "The Crisis in Adult Basic Education."

¹²³⁶ Amstutz. "Adult Learning: Moving toward More Inclusive Theories and Practices."

Amstutz and Shered also argue that it is important for educational programs to focus on the strengths of minority cultures rather than on addressing deficits.¹²³⁷ Amstutz remarks that space must be made in classrooms for minority voices to be heard or there will be “little change in the status of knowledge when the views of culturally marginalized students and scholars are omitted. It is our responsibility to help students identify those societal structures that create and maintain inequality.”¹²³⁸ These observations again point to the subtlety and complexity involved in achieving true multicultural literacy, since so much depends on largely unexamined methods and styles of learning and transmission and of failures to understand the implicit assumptions of the dominant culture.

At a 2002 meeting hosted by the Princeton University Center for Arts and Cultural Policy Studies, the importance of cultural diversity was likened to that of biodiversity. It was noted that there is a need to:

... develop a set of agreed-upon indicators of ‘cultural diversity’ (or heterogeneity); and then communities could evaluate whether they meet certain baseline levels and whether the cultural life of a community is getting more or less diverse over time.¹²³⁹

At this point, however, we have found no common international or national indicators for multicultural literacy that could be applied to the CIW educated populace domain.

As we will see below, however, there have been some surveys conducted that do attempt to measure at least the extent of racial or ethnic discrimination and bias in society, and whether the public has an appreciation of diversity. In addition, it is possible to measure inequities in society, such as the examples above related to the Aboriginal population, and it is possible to correlate poverty with ethnic and cultural characteristics. In most cases, however, these measures provide data for social outcomes rather than learning outcomes, and a broad range of assumptions is required for such measures to function even indirectly and partially as potential proxies for multicultural literacy. Nevertheless, based on current research in this area, we will examine some of the specific measurement possibilities that may hold promise for the CIW below.

¹²³⁷ Amstutz, and Shered. "The Crisis in Adult Basic Education." p. 161.

¹²³⁸ Amstutz. "Adult Learning: Moving toward More Inclusive Theories and Practices." p. 27.

¹²³⁹ Princeton University Center for Arts and Cultural Policy Studies. *Taking the Measure of Culture: A Meeting at Princeton University, June 7– June 8, 2002, Summary - Final Report*, 2002; accessed October 2005; available from http://www.princeton.edu/~artspol/moc_final_report.html.

25.4 Approaches to multicultural literacy

25.4.1 Governmental policy approaches

Governmental policy approaches towards multicultural literacy include both economic and “social innovation” approaches. According to Marsh, the “social innovation” approach is based on “cultural literacy as a main vehicle” for the development of sustainable societies.¹²⁴⁰ In other words, the social innovation approach aims to promote inter-cultural interaction and mutual understanding and respect. The “economic policy” approach depends on incentives and legal constraints to influence the culture industry and cultural learning.¹²⁴¹

For example, Canadian Heritage emphasizes that an understanding of diverse knowledge systems is important for economic prosperity: “Just as an ecosystem is vulnerable without biodiversity, so are our knowledge systems vulnerable without cultural diversity.” It continues:

Every culture embodies knowledge and wisdom; each brings a different understanding and approach to any given situation. The cross-fertilization of different perspectives can be our greatest competitive advantage. In today’s global knowledge-based economy, sustainable growth is predicated on the ability to generate ideas and innovate. But to do this requires access to a diversity of knowledge systems, the open exchange of ideas and a commitment to an open marketplace.¹²⁴²

Marsh explains that the prevailing policy approaches “seem to emphasize the production and distribution of information about a given culture (‘content’), without asking whether anybody understands or learns from it.”¹²⁴³ Marsh notes that the social innovation approach is growing more popular among policymakers, especially in Europe, than the economic approach. Examples of both policy approaches from the informal learning perspective are shown in Table 16.

¹²⁴⁰ Marsh. *Cultural Diversity as Human Capital*, accessed.

¹²⁴¹ Ibid., accessed. p. 6.

¹²⁴² Canadian Heritage. *Frequently Asked Questions*, International Relations and Policy Development Branch, Department of Canadian Heritage, 2003; accessed October 2005; available from http://www.pch.gc.ca/progs/ai-ia/ridp-irpd/faq/index_e.cfm.

¹²⁴³ Marsh. *Cultural Diversity as Human Capital*, accessed.

Table 16. Examples of policy approaches towards multicultural literacy

Economic policy approach	Social innovation approach
<i>Depends on incentives and legal constraints to influence culture industry markets and cultural learning, with initiatives such as:</i>	<i>Aims to promote inter-cultural interaction and mutual understanding and respect. It might respond to the issues with the following strategies:</i>
• Responding to citizens' needs for cultural identity / security with "protection": options range from broadcasting quotas to immigration quotas to airport security control.	• Responding to identity / security needs through reciprocal trust-building, from promoting cultural "imports" to opening "awareness centers" for immigrants to "tell their story."
• Financing local and linguistic "cultural industries," from regional TV broadcasters to decentralized multimedia production centers.	• Promoting open access as a means of supporting inter-cultural communication
• Digitalization of culturally-specific content and heritage as a means of preserving and distributing collective cultural "memories" through new media.	• Supporting the development of new dynamic cultural memories (e.g., Algerian-French pop music) and inter-lingual support for peer-to-peer exchanges of cultural expressions.

Source: Marsh, Jesse B.T. *Cultural Diversity as Human Capital*, Palermo, Italy, Atelier Studio Association, n.d.; accessed October 2005; available from <http://www.terra2000.org/Documents/Prague/Papers/Cultural Diversity as Human Capital.pdf>. pp. 6-7.

As Marsh explains, the above policy approaches influence the culture and its population, and a critical analysis of the actions of government in these areas could indicate the multicultural literacy level of that government.¹²⁴⁴ We look briefly at Canadian governmental approaches below.

25.4.2 Educational approaches to multiculturalism

James Banks describes four common approaches to multicultural education in schools that reflect a leaning towards the social innovation perspective, with each approach adding an increased level of sophistication.¹²⁴⁵ The first level, or "contributions" approach, is the most common. In this approach, customs, dress, festivals, music, stories, and other cultural manifestations are added to the curriculum on special days. Banks notes that this approach emphasizes differences rather than commonalities and social justice issues, and generally results in a superficial understanding of ethnic cultures that can often reinforce stereotypes and misconceptions.

¹²⁴⁴ Ibid., accessed.

¹²⁴⁵ Banks, James A. "Approaches to Multicultural Curriculum Reform," *Educational Leadership*, vol. 51, no. 8, 1991: 4-8.

The second, or “additive,” approach, adds contents and themes related to minority cultures to the curriculum without putting this content into a larger context, and without giving students the background to understand the relationship between the ethnic / minority and dominant cultures.

The third, or “transformation” approach, does provide the necessary context and critical analysis needed to allow students to view content and issues from the perspectives of the diverse cultural groups, and helps empower culturally diverse groups.

In the final “social action” approach, students identify and work with social problems and issues that affect particular cultural groups (such as the inequities affecting Aboriginal groups, for example). In this process, the students clarify their own values, increase their ability to analyze critically, make decisions, and take actions to help resolve the issue or problem. Banks notes that all of these approaches can be woven into the existing curriculum.¹²⁴⁶

Despite the rhetoric about the importance of multicultural literacy, according to Richardson, schooling often produces the opposite effect, since schooling generally reflects the dominant culture of the society, and acts to reinforce the status quo.¹²⁴⁷ Complex societies such as those making up all Western nations, as Richardson notes, are comprised of dominant, elite groups, which have the power to impose their preferences on less powerful subgroups.¹²⁴⁸ These less powerful subgroups comprise a cultural diversity of different ethnic, racial, gender, and age groups that all have needs for equity within society.¹²⁴⁹

Richardson believes that schooling is inherently conservative and serves to “reproduce the relations of power and privilege of dominant groups in society, while also providing a safety valve by offering various degrees of social mobility to the majority population.”¹²⁵⁰ Richardson also notes that mass education provides this “safety valve” by establishing a middle-class as a “buffer” between the elite rulers who establish the standards, and the less affluent working classes.

According to Richardson, children whose culture matches that of the dominant group will have a better chance of success in school and later in work. Research has found that the child’s home environment, neighbourhood, motivation, and teacher expectations predict high grades in school more often than does ability.¹²⁵¹ Richardson argues that family inequalities are translated into inequalities in schools, where standards are developed largely according to economic conditions and motivations, rather than with the more universal and altruistic goals of deepening knowledge and attaining wisdom. She notes: “The legal basis of schooling—impartiality and the requirement to treat everyone the

¹²⁴⁶ Ibid.

¹²⁴⁷ Richardson. “Social and Cultural Issues in Education.”

¹²⁴⁸ Ibid.

¹²⁴⁹ Ibid.

¹²⁵⁰ Ibid. p. 1.

¹²⁵¹ Ibid.

same—creates a paradox in that the equal treatment of unequal participants is a mechanism for the reproduction of societal inequalities through schooling.”¹²⁵² In order for this process to change in the educational system, Richardson argues that the attitudes and practices of the dominant cultures and nations need to change.

Of the various materials on multicultural literacy examined in this literature review, one that stands out as holding considerable promise for indicator development in this field is the analysis offered by Banks above,¹²⁵³ since it suggests quite explicitly what the populace would need to know in order to be multiculturally literate. Each of the qualities highlighted by Banks is, in principle, measurable, through carefully constructed survey questions that could then be scaled to provide ratings on the qualities and capacities identified. For example, Banks argues that multicultural literacy includes the ability to:

- identify and work with social problems and issues affecting particular cultures
- analyze critically both the issues and the values and attitudes of the dominant culture
- take action to help resolve problems
- view issues from the perspective of diverse cultural groups, (or at least the other side of their own view and that of the dominant culture.)¹²⁵⁴

Also, social outcomes of multicultural literacy might include whether or not:

- cultural groups feel empowered or discriminated against
- inequities are increasing or diminishing
- there is a loss of linguistic diversity or knowledge of languages
- cultural repertoires are appreciated
- the specific knowledge associated with the cultures is being sustained or lost¹²⁵⁵

At this stage of development, it is not yet possible to assess and construct indicators for multicultural learning outcomes, such as those identified by Banks, but some of the social outcomes noted above can be assessed using data from the 2003 Statistics Canada and Canadian Heritage Ethnic Diversity Survey,¹²⁵⁶ which we look at below. However, since this survey has only been conducted once, it is not yet possible to develop trend analyses for the issues it addresses.

¹²⁵² Ibid. p. 8.

¹²⁵³ Banks. "Approaches to Multicultural Curriculum Reform."

¹²⁵⁴ Ibid.

¹²⁵⁵ Ibid.

¹²⁵⁶ Statistics Canada, and Canadian Heritage. *Ethnic Diversity Survey: Portrait of a Multicultural Society*, Statistics Canada, Catalogue no. 89-593-XIE, 2003; accessed October 2005; available from <http://www.statcan.ca:8096/bsolc/english/bsolc?catno=89-593-X>.

25.5 Multiculturalism in Canada

25.5.1 Canadian multicultural policy

Canada is a culturally pluralistic nation, with one in six Canadians being a member of a visible minority.¹²⁵⁷ Toronto, the largest Canadian city, is the world's most multicultural city, having a larger visible minority population than either New York or London.¹²⁵⁸ Based on medium population growth, Statistics Canada expects visible minority groups to represent 20% of Canada's population by 2016.¹²⁵⁹ In Canada, diversity and multiculturalism are seen as national assets, which contribute to the richness of the country's cultural fibre. The Department of Canadian Heritage proposes that "Canada's approach to diversity is based on the belief that the common good is best served when everyone is accepted and respected for who they are, and that this ultimately makes for a resilient, more harmonious and more creative society."¹²⁶⁰

As previously noted, in 1971, Canada became the first country in the world to adopt multiculturalism as an official policy.¹²⁶¹ The Canadian multicultural policy affirms:

... the value and dignity of all Canadian citizens regardless of their racial or ethnic origins, their language, or their religious affiliation [...]. Multiculturalism ensures that all citizens can keep their identities, can take pride in their ancestry and have a sense of belonging [...]. Canada's laws and policies [...] guarantee to all men and women complete freedom of conscience, of thought, belief, opinion expression, association and peaceful assembly. All of these rights, our freedom and our dignity, are guaranteed through our Canadian citizenship, our Canadian Constitution, and our Charter of Rights and Freedoms.¹²⁶²

Canada's multicultural policy also confirms the rights of Aboriginal peoples to protect their cultures, customs, traditions, and languages. Canada's official cultural policy is concerned with the integration, rather than the assimilation, of Canada's multicultural population, and it specifically recognizes and acknowledges linguistic duality, gender and

¹²⁵⁷ Canadian Heritage. *Canadian Diversity: Respecting Our Differences*, accessed. Visible minorities: identified under Canada's "Employment Equity Act" include Blacks, South Asians or Indo-Pakistanis, Chinese, Koreans, Japanese, South East Asians, Filipinos, other Pacific Islanders, West Asians and Arabs, and Latin Americans. Both Statistics Canada and the federal government in general use this definition of 'visible minorities.' Over 200 different ethnic origins were reported in the 2001 Census: Treasury Board of Canada Secretariat. *Canada's Performance: Annual Report to Parliament. Supplemental Information*, Treasury Board, 2004; accessed August 2005; available from http://www.tbs-sct.gc.ca/rma/epi-ibdrp/cp-rc-04/cp-rc_e.asp.

¹²⁵⁸ Canadian Heritage. *Canadian Diversity: Respecting Our Differences*, accessed.

¹²⁵⁹ Statistics Canada. "Projections of Visible Minority Groups, 1991-2016." *Canadian Social Trends*, Statistics Canada, Summer, 1996.

¹²⁶⁰ Canadian Heritage. *Canadian Diversity: Respecting Our Differences*, accessed. p. 1.

¹²⁶¹ Canadian Heritage. *Canadian Multiculturalism: An Inclusive Citizenship*, accessed.

¹²⁶² Ibid., accessed. p. 1.

sexual orientation issues, and issues concerning national identity.¹²⁶³

The multicultural policy was further affirmed in 1988 with the passage of the Canadian Multiculturalism Act, which reflects Canada's commitments under several human rights treaties, and requires that the multiculturalism policy be incorporated into all federal departments.¹²⁶⁴

25.5.2 Multicultural education in Canada

In Canada, multicultural education was explicitly introduced into the school system in the late 1970s and early 1980s as an application of the country's official multicultural policy.¹²⁶⁵ Multicultural education basically has two goals. Although applied somewhat differently in each province, the general focus of multicultural education is both to integrate minority students into the dominant educational framework, and to develop respect for the ethno-cultural differences among all students. Most provinces have specific policies and action plans supporting multicultural education.¹²⁶⁶ The Quebec programs, with their emphasis on the survival and promotion of the French-speaking culture and language, concentrate more on cultural integration into Quebec society, rather than on the encouragement of multiculturalism per se.

In 1990, Cummins and Danesi examined the emphasis on multiculturalism in the curricula of Canadian schools and found that mainstream English and French cultural perspectives were dominant. They also found support for "celebratory multiculturalism" as seen particularly in ethnic festivals, which Banks labels the more superficial "contributions approach" (that may actually reinforce stereotypes). But they did not generally find significant support for more substantial cultural initiatives such as teaching heritage languages in regular school programs."¹²⁶⁷

More recently, James and Schecter from York University looked into the discrepancies between rhetoric and practice in Canadian multicultural education, and found that the situation since 1990 had changed very little: "for the most part, programmes under this

¹²⁶³ Canada Council for the Arts. *Artstats: Selected Statistics on the Arts and Culture in Canada*, The Canada Council. Culture link network, 1997; accessed August 2005; available from <http://www.culturelink.org/culpol/canada.html>.

¹²⁶⁴ Cliche, Danielle, and Terrence Cowl. *Cultural Policy Database: Canada*, Culturelink Network, Department of Cultural Heritage, 1997; accessed October 2005; available from <http://www.culturelink.org/culpol/ca.html>.

¹²⁶⁵ James, Carl E., and Sandra R. Schecter. "Mainstreaming and Marginalization: Two National Strategies in the Circumscription of Difference," *Pedagogy, Culture and Society*, vol. 8, no. 1, 2000: 23-41.

¹²⁶⁶ Communities and Schools Promoting Health (CSH). *Canadian Education Trend Report: Anti-Racism and Multicultural Education: Description of Some Current Activities in Canada*, CSH, 2002; accessed October 2005; available from <http://www.safehealthyschools.org/whatsnew/racism.htm>.

¹²⁶⁷ Cummins, J., and M. Danesi. *Heritage Languages: The Development and Denial of Canada's Linguistic Resources*, Toronto: Our Schools/Our Selves Education Foundation and Garamond Press, 1990. pp. 15, 25, cited in Sears, and Hughes. "Citizenship Education and Current Educational Reform." p. 136.

umbrella are not grounded in a serious critique of structural inequality.”¹²⁶⁸ They found that the main programs did have goals to increase respect and tolerance by engaging students in “heritage studies,” reading multicultural literature, participating in “multicultural days,” and going on field trips to “cultural communities.” But in many cases, expressions of culture contained in information modules pertained to food, “costume” (dress), artistic expression, and religious symbols and practices,¹²⁶⁹ and did not substantively address key issues and challenges faced by these cultures.

In an important Canadian study produced by the Vancouver Centre for Excellence, researchers from a variety of academic fields criticize Canadian multicultural education for focussing on the “celebration of cultural diversity rather than attending to endemic and persistent power inequalities related to minority racial and linguistic status, and to gender.”¹²⁷⁰ In addition:

Critical theorists argue that avoiding [these issues] implicitly asserts the ascendancy of the white Anglo-Celtic majority, and that the practical result of these policy narratives is assimilation (or Anglo-conformity). This assimilation is attended by loss of diverse linguistic and cultural repertoires; it also reinforces a hierarchical political and economic structuring of society, with entitlement and power still vested in the mainstream [...]. The power differences and inequalities revealed by critical analysis must be acknowledged and addressed if non-dominant groups are to be able to influence the authoritative discourses and educational practices attended to by socio-cultural theory.¹²⁷¹

James and Schechter also report that there is now an ongoing debate about the effectiveness and ability of multicultural education to relate to the actual needs of visible minorities in Canada. One indicator of this is that minority students often feel alienated from the school system, and therefore often do not do well academically, in many cases eventually dropping out. The authors note that some educators and parents blame this situation on systemic racism, rather than on difficulties adapting:

In jurisdictions with significant populations of African Canadians, such as Toronto, Halifax and Montreal, vocal groups of parents and educators have questioned the ‘Euro centric’ focus of multicultural policies and programmes, as represented by content matter, teaching methods and materials, and protocols for student assessment.¹²⁷²

¹²⁶⁸ James, and Schechter. "Mainstreaming and Marginalization: Two National Strategies in the Circumscription of Difference." p. 24.

¹²⁶⁹ Ibid. p. 29.

¹²⁷⁰ Beynon, June, Linda Larocque, Roumiana Ilieva, and Diane Dagenais. *A Sociocultural and Critical Analysis of Educational Policies and Programs for Minority Youth in British Columbia*, Vancouver Centre of Excellence: Research on Immigration and Integration in the Metropolis. Working Paper Series, 2005; accessed October 2005; available from http://www.riim.metropolis.net/research-policy/research-policy2/papers_e7.htm. p. 5.

¹²⁷¹ Ibid., accessed. p. 5.

¹²⁷² James, and Schechter. "Mainstreaming and Marginalization: Two National Strategies in the Circumscription of Difference." p. 31.

In the early 1990s, the NDP government in Ontario put forward an anti-racism policy and program. However, according to James and Schecter, although the government's anti-racism documents acknowledged the Eurocentric nature of many educational programs, they did not go far enough in addressing systemic issues and in questioning "the educational structures that maintained these inequitable practices."¹²⁷³

These challenges have emphasized both the inability of the formal (Eurocentric) curriculum to engage and motivate students from disenfranchised groups, and the need for additional, more culturally sensitive, measures that would expand the mandate of multicultural education beyond the treatment of surface differences. This treatment, it has been argued, does not adequately take into account social class, gender, (dis)ability and sexuality; moreover, it does not consider power relations among societal groups as salient to discussions of identity and equity.¹²⁷⁴

Some teacher training programs are attempting to make these connections between self-knowledge and social responsibility. For example, at a 2005 conference, Charlene Morton of the University of British Columbia reported on a course designed to examine the educational and social significance of "learning to live together" using an ecological framework.¹²⁷⁵ In part, the course objectives included "helping to clarify [the teachers'] own thinking about education and knowing, success and happiness, and well-being."¹²⁷⁶

Despite the importance of the systemic and structural issues outlined above, we are not yet able to develop an indicator for the CIW educated populace domain of the effectiveness of multicultural education programs in Canadian schools. The discussion above does, however, suggest some criteria and outcomes that might be applied in the eventual development of such an indicator.

25.5.3 Languages in Canada

Bilingualism is an important aspect of Canadian multicultural policy. Over the past four decades the number of people who speak both English and French has more than doubled to 5.2 million.¹²⁷⁷ Nevertheless, most of this increase simply reflects overall population growth, and the actual percentage of bilingual Canadians remains relatively small, with less than 10% of Anglophones able to speak French well. In the 2001 Census, 17.7 % of the population identified themselves as bilingual (French and English), up from 17 % in

¹²⁷³ Ibid. p. 32.

¹²⁷⁴ Ibid. p. 34.

¹²⁷⁵ Morton, Charlene. "Teaching to Live Together through the Social Foundations of Education." Paper presented at the Annual Conference of the Comparative and International Education Society (CIES -West), Sept 29 to Oct 1, 2005; accessed October 2005; available from <http://www.edst.educ.ubc.ca/CIES/Abstracts.htm - Papers>. Only the abstract was available.

¹²⁷⁶ Ibid.

¹²⁷⁷ Treasury Board of Canada Secretariat. *Canada's Performance 2004: Annual Report to Parliament*, Treasury Board, 2004; accessed October 2005; available from http://www.tbs-sct.gc.ca/report/govrev/04/cp-rc_e.asp.

1996.¹²⁷⁸ In the same Census, 43.4% of Francophones reported they were bilingual, compared with just 9% of Anglophones.¹²⁷⁹ In Canada, according to the 2001 Census, English is spoken as a first language by 58.5% of the population; French is spoken as a first language by 22.6% of the population; and 18.5% of Canadians speak another of the almost 100 languages spoken in Canada as their native tongue.¹²⁸⁰

Angela Ward of the University of Saskatchewan stresses the importance of knowing multiple languages in supporting cross-cultural understanding:

I'd first like to suggest another way of conceptualizing multicultural literacy, one that views knowledge of several languages and cultures as a distinguishing mark of the educated person. Our North American way has been to regard students who speak languages other than English as a liability to the system. More people in the world are multilingual than monolingual, yet we persist in worrying about students who are bilingual rather than lamenting those students who speak only English. As we move toward globalization, is it reasonable to assume that speaking and writing one language will be enough? I expect that many readers have had the experience of meeting people in Europe who switch between two or three languages in order to communicate with visitors. I'd like to believe that we in North America are capable of educating people to have deeper knowledge of more than one language and culture. One important offshoot of this would be increased respect and understanding for those who live and work in North America using several languages.¹²⁸¹

Martin Turcotte and John Zhao, of Statistics Canada, observe that retention of the knowledge of languages—and the insights they contain—is also extremely important for the cultural sustainability of society.¹²⁸² One indicator used in New Zealand to measure the ability of a population to retain the knowledge of its culture and pass this knowledge to succeeding generations is the proportion of the population that speaks the first language of its ethnic group. For example, the retention of Aboriginal (particularly Maori) language has been used as a proxy indicator of cultural wellbeing in New Zealand.¹²⁸³ These types of data are readily available in Canada, mainly through the Census, and the 2001 Aboriginal Peoples Survey, and we recommend their inclusion as

¹²⁷⁸ Ibid., accessed.

¹²⁷⁹ Treasury Board of Canada Secretariat. *Canada's Performance 2003: Annual Report to Parliament*, Treasury Board, 2003; accessed October 2005; available from http://www.tbs-sct.gc.ca/report/govrev/03/cp-rc2_e.asp - Toc54511413.

¹²⁸⁰ Statistics Canada, 2001 Census. The top five non-official languages spoken at home are Chinese (Mandarin and Cantonese), Italian, German, Spanish, and Punjabi, in that order, and the languages having the strongest growth are Punjabi, Arabic, and Tagalog (Philippines).

¹²⁸¹ Ward, Angela. *Literacy in Multicultural Settings: Whose Culture Are We Discussing?*, Reading Online, 1999; accessed October 2005; available from <http://www.readingonline.org/articles/ward.html>.

¹²⁸² Turcotte, Martin, and John Zhao. *a Portrait of Aboriginal Children Living in Non-Reserve Areas: Results from the 2001 Aboriginal Peoples Survey*, Ottawa, Statistics Canada, Catalogue no. 89-597-X1E, 2004; accessed November 2006; available from <http://130.15.161.74/webdoc/ssdc/cdbksnew/aps/aps2001portrait-children.pdf>.

¹²⁸³ New Zealand Statistics. *Cultural Indicators*, 2005; accessed October 2005; available from <http://www.stats.govt.nz/analytical-reports/linked-indicators/cultural-indicators.htm>.

key indicators of multicultural literacy in the CIW educated populace domain. Some specific data are included below.

Writing for Indian and Northern Affairs Canada and asking the question, “why is language important?” Norris and Jantzen answer:

Language is one of the most tangible symbols of culture and group identity. It is not only a means of communication, but a link which connects people with their past, and grounds their social, emotional, and spiritual vitality. Language is critical in transmitting culture and identity from one generation to another. Loss of language severely handicaps transmission of culture. With loss goes unique ways of looking at the world, explaining the unknown and making sense of life.¹²⁸⁴

Turcotte and Zhao (citing Kenneth Svenson and Christopher Lafontaine¹²⁸⁵) add that, in oral traditions especially, sacred stories, ceremonies, and symbols preserve fundamental teachings, including the ideas, concepts, and beliefs of the culture.¹²⁸⁶ They also note that in this context, “mastery by children of the language of their ancestors greatly aids in ensuring the transmission from generation to generation of values and beliefs (as well as the ability for a child to communicate with ‘Elders’ with whom many Aboriginal children maintain special ties).”¹²⁸⁷

According to UNESCO’s *Atlas of the World’s Languages in Danger of Disappearing*, a language is considered endangered if it is not learned by at least 30% of the children in the community.¹²⁸⁸ In Canada, the proportion of children with an Aboriginal mother tongue fell from 9% in 1996 to 7% in 2001.¹²⁸⁹ In the 2001 Canadian census, only 15.2% of Aboriginal youth, ages 15 to 24, stated that an Aboriginal language was their mother tongue. The 2001 census also found that from 1996 to 2001 several other key indicators of Aboriginal language strength declined for Aboriginal people. For example, the 2001

¹²⁸⁴ Norris, Mary Jane, and Lorna Jantzen. *From Generation to Generation: Survival and Maintenance of Canada's Aboriginal Languages within Families, Communities and Cities: Why Is Language Important?*, Indian and Northern Affairs Canada, 2004; accessed August 2005; available from http://www.ainc-inac.gc.ca/pr/ra/fgg/wili_e.html. p. 9.

¹²⁸⁵ Svenson, Kenneth A., and Christopher Lafontaine. *The Search for Wellness*, First Nations and Inuit Regional Health Survey – National Report, 1999. p 190, cited in Turcotte, and John Zhao. *a Portrait of Aboriginal Children Living in Non-Reserve Areas: Results from the 2001 Aboriginal Peoples Survey*, accessed. p. 17.

¹²⁸⁶ Turcotte, and John Zhao. *a Portrait of Aboriginal Children Living in Non-Reserve Areas: Results from the 2001 Aboriginal Peoples Survey*, accessed.

¹²⁸⁷ Ibid., accessed. p. 17.

¹²⁸⁸ United Nations Educational, Scientific, and Cultural Organization (UNESCO), ed. *Atlas of the World's Languages in Danger of Disappearing*, Edited by Wurm, Stephen A. Paris / Canberra, Unesco Publishing / Pacific Linguistics, 1996. cited in Norris, and Jantzen. *From Generation to Generation: Survival and Maintenance of Canada's Aboriginal Languages within Families, Communities and Cities: Why Is Language Important?*, accessed.

¹²⁸⁹ O'Donnell, Vivian, and Heather Tait. *Aboriginal Peoples Survey 2001- Initial Findings: Well-Being of the Non-Reserve Aboriginal Population*, Statistics Canada, Catalogue no. 89-589-XIE, 2003; accessed November 2006; available from <http://www.statcan.ca/english/freepub/89-589-XIE/89-589-XIE2003001.pdf>.

Census: Aboriginal Peoples Survey found:

[A]mong those of all ages, the percentage of non-reserve North American Indian people with an ability to speak an Aboriginal language well enough to conduct a conversation fell from 20% in 1996 to 16% in 2001. At the same time, the use of an Aboriginal language at home declined from 8% to 6%. In addition, the proportion of North American Indian people with an Aboriginal mother tongue¹²⁹⁰ fell from 16% to 13%. [...]

[B]etween 1996 and 2001, the percentage of [North American Indian children aged 14 and under in non-reserve areas] who could converse well enough in an Aboriginal language to carry out a conversation declined from 12% to 9%. The same was true for Aboriginal languages used at home, as the percentage fell from 6% to 5%. The proportion of North American Indian children with an Aboriginal mother tongue also fell from 9% in 1996 to 7% in 2001.¹²⁹¹

Interestingly, Turcotte and Zhao, in discussing the 2001 Aboriginal Peoples Survey, identify a negative relationship between children's Aboriginal language abilities and the parent's level of education: Aboriginal parents with higher levels of education are less likely to have children who can speak or understand an Aboriginal language.¹²⁹²

About 44% of Aboriginal children in non-reserve areas whose parent had not gone beyond elementary school could speak or understand an Aboriginal language. This was more than twice the proportion of 17% among those whose parent had completed some type of post-secondary education.

This difference is apparent among all three major Aboriginal groups ['Inuit, North American Indian, and Métis']. About 92% of Inuit children whose parent had not gone beyond elementary school could speak or understand an Aboriginal language. On the other hand, about one-half (51%) of Inuit children whose parent had completed some type of postsecondary education could do so.

Among North American Indian children living in non-reserve areas, 33% whose parent had not gone beyond elementary school could speak or understand an Aboriginal language. In comparison, 21% of children whose parent had completed some type of post-secondary education could do so.

Similarly, 25% of Métis children whose parent had not gone beyond elementary school could speak or understand an Aboriginal language. This is more than twice the proportion of 9% among Métis children whose parent had completed some

¹²⁹⁰ Statistics Canada defines home language as the language spoken most often at home. Mother tongue is defined as the language first learned at home in childhood and still understood.

¹²⁹¹ O'Donnell, and Tait. *Aboriginal Peoples Survey 2001- Initial Findings: Well-Being of the Non-Reserve Aboriginal Population*, accessed.

¹²⁹² Turcotte, and John Zhao. *a Portrait of Aboriginal Children Living in Non-Reserve Areas: Results from the 2001 Aboriginal Peoples Survey*, accessed.

type of post-secondary education.¹²⁹³

Given the relevance of retaining Aboriginal languages, this negative connection between Aboriginal parents' education level and the lack of ability of their children to speak their native language is an important sub-indicator to track, since it has considerable explanatory value. It is therefore recommended for inclusion in the CIW educated populace indicator suite as part of the assessment of multicultural literacy.

In the next section, we look at further measures that might be relevant to the CIW in indicating multicultural literacy.

¹²⁹³ Ibid., accessed. p. 20.

25.6 Measures of multicultural literacy

According to Geneva Gay, of the Center for Multicultural Education at the University of Washington-Seattle, there are many goals and objectives related to multicultural education and these “vary according to contextual factors such as school settings, audiences, timing, purposes, and perspectives.”¹²⁹⁴ She classifies these expected outcomes or major goals into seven general areas to provide a typology that could potentially act as an eventual framework for indicators of multicultural literacy in the CIW educated populace domain:

- ethnic and cultural literacy
- personal development
- attitude and values clarification
- multicultural social competence
- basic skills proficiency
- educational equity and excellence
- empowerment for societal reform.¹²⁹⁵

Gay notes that different conceptions of multicultural education and of the value beliefs associated with these conceptions delineate which of these areas are focused on in multicultural education.¹²⁹⁶ These conceptions then become guidelines for action and, as Gay argues, need to be clearly understood so that there is clear agreement on what is being evaluated.

Banks identifies five interrelated dimensions of multicultural education that can be used as benchmarks to assess its implementation, and that can also potentially contribute to a framework for indicators to evaluate multicultural literacy.¹²⁹⁷ These five dimensions are:

- *Multicultural content integration*—which indicates that multicultural content must be included consistently and involve all disciplines and subject areas.
- *Knowledge construction process*—refers to how students investigate and determine how cultural assumptions, perspectives and biases influence how knowledge is constructed.
- *Prejudice reduction*—involves the development of positive attitudes toward different racial, cultural and ethnic groups and helps eradicate negative attitudes.
- *Equity pedagogy*—involves modifying teaching styles to be consistent with those of diverse students and so facilitate their academic achievement. Two examples are co-operative rather than competitive learning approaches and support for inter-racial interactions.

¹²⁹⁴ Gay, Geneva. *A Synthesis of Scholarship in Multicultural Education*, Chicago, Illinois, Urban Education Monograph Series, North Central Regional Educational Laboratory (NCREL), 1994; accessed October 2005; available from <http://www.ncrel.org/sdrs/areas/issues/educatrs/leadrs/le0gay.htm>. p. 8.

¹²⁹⁵ Ibid., accessed. p. 8.

¹²⁹⁶ Ibid., accessed.

¹²⁹⁷ Banks. "Multicultural Education: Historical Development, Dimensions, and Practice."

- *Empowering school culture and social structure*—involves a critical analysis of school structures to promote equality status among students of different cultural backgrounds.¹²⁹⁸

Measures of multicultural literacy generally measure attitudes rather than learning per se. However, attitudes and values are extremely important in any assessments of multicultural literacy, and form a basis for learning in general. Indeed, the evolution and formation of such values and attitudes is itself a learning process, and the formed attitudes can be considered an outcome of both formal and informal learning. Therefore, values like tolerance, openness, and acceptance of cultural differences, or racist, prejudiced, and discriminatory attitudes, for example, might be considered a proxy for learning or, at least, an indication of the level of awareness or knowledge of multiculturalism.

Data on such values and attitudes are mostly produced by public opinion research firms that conduct periodic surveys about attitudes, interests, heritage, and perceptions of social integration, including feelings about racism and discrimination. Public opinion research has focused mainly on the following issues, which have been the subject of debate in Canada:

- Does multiculturalism place too much emphasis on our differences and detract from the identification with common values and a strong sense of citizenship?
- Does multiculturalism encourage bonding and / or ‘cohesion’—increasingly deemed essential for societal harmony?
- Does multiculturalism create or remove barriers to full and equal participation in Canadian society¹²⁹⁹

A few key findings from such public opinion research are presented below and in the accompanying indicator report.

25.6.1 Statistics Canada data sources

Statistics Canada data sources relevant to multiculturalism include the Canadian Census of Population; the Aboriginal Peoples Survey (administered as part of the Census); the Longitudinal Survey of Immigrants to Canada; and the Ethnic Diversity Survey.¹³⁰⁰ The Canadian Census is conducted every five years and was last taken in 2006, although the latest results have only been released for 2001.¹³⁰¹ The Census is the most comprehensive

¹²⁹⁸ Ibid. pp. 4–5.

¹²⁹⁹ Jedwab, Jack. *Thirty Years of Multiculturalism in Canada, 1971-2001*, Association for Canadian Studies, 2003; accessed October 2005; available from <http://www.acs-aec.ca/Polls/Poll2.pdf> p. 1.

¹³⁰⁰ Canadian Heritage. *Annual Report on the Operation of the Canadian Multiculturalism Act 2003–2004: Canada's Diversity Respecting Our Differences*, Department of Canadian Heritage, 2005; accessed October 2005; available from http://www.canadianheritage.gc.ca/progs/multi/reports/ann2003-2004/index_e.cfm.

¹³⁰¹ Statistics Canada. *2001 Census Analysis Series*, 2003; accessed November 2006; available from <http://www12.statcan.ca/english/census01/products/analytic/Index.cfm>.

source of data on the multicultural population, and provides information on the ethno-cultural, linguistic, demographic, and socioeconomic profile of Canada's population.

The 2001 Aboriginal Peoples Survey was released in 2003 and provides information on the wellbeing of non-reserve Aboriginal peoples. The Longitudinal Survey of Immigrants to Canada surveyed 12,000 immigrants aged 15 years and older who arrived in Canada between October 2000 and September 2001. The interviews, conducted over a 5-year period, are designed to track settlement experiences. The first interview took place approximately six months after the arrival of these immigrants, with follow-up interviews planned at two and four year intervals after their arrival. The final interviews took place in late 2005.¹³⁰²

Because of time and resource limitations we have not looked at these three important data sources in depth for this report, with the exception of the native language data from the Aboriginal Peoples Survey (described in the previous section and also in the accompanying indicator report). But we strongly recommend a more detailed analysis and mining of data from those three surveys to assess their relevance for future development of multicultural literacy indicators in the CIW.

Ethnic Diversity Survey (EDS)

In 2002, the Department of Canadian Heritage partnered with Statistics Canada to conduct Canada's first Ethnic Diversity Survey (EDS), which targeted 42,500 persons aged 15 and older living in private households in the 10 provinces.¹³⁰³ The EDS provides information on the ethnic and cultural background of Canadians, including knowledge and use of languages. It collected responses from three generations of ethnic minorities, where the first generation immigrated directly from the mother country and the second and third generations were born in Canada. Although this survey does not measure individual learning, it does highlight collective learning over a long period of time.

According to the Department of Canadian Heritage, the EDS survey was developed "to provide information on the ethnic and cultural backgrounds of people in Canada and how these backgrounds relate to their lives in Canada today."¹³⁰⁴ Canadian Heritage plans to use the information gathered "to improve its policies and programs that help all Canadians participate fully in society, to promote cross-cultural understanding, and to make public institutions more representative of the country's diverse population."¹³⁰⁵ Respondents were chosen from the 2001 Census to ensure a proportional mix of ethnic origins and generations. In addition to being conducted in English and French, interviews were also conducted in seven other languages including Mandarin, Cantonese, Italian,

¹³⁰² Canadian Heritage. *Annual Report on the Operation of the Canadian Multiculturalism Act 2003–2004: Canada's Diversity Respecting Our Differences*, accessed.

¹³⁰³ Statistics Canada, and Canadian Heritage. *Ethnic Diversity Survey: Portrait of a Multicultural Society*, accessed. The EDS cost \$3.2 million to produce.

¹³⁰⁴ Ibid., accessed. p. 1.

¹³⁰⁵ Canadian Heritage. *Departmental Performance Report 2003-2004*, Treasury Board of Canada Secretariat, 2004; accessed October 2005; available from http://www.tbs-sct.gc.ca/rma/dpr/03-04/PCH/PCHd3401_e.asp - so_03_04.

Punjabi, Portuguese, Vietnamese, and Spanish. Topics included: ethnic or cultural ancestry and identity, family background, language use, social networks, interaction with others, feelings of discrimination, voting practices, and civic participation in groups and organizations such as sports teams, hobby clubs, community organizations, and ethnic associations.

One of the goals of the EDS was to provide data that could indicate whether Canadians with at least one ethnic ancestry were aware of and valued their ethnic heritage, customs, and traditions. Survey respondents were asked whether they carried on the customs and traditions of that ethnic group, such as holidays, celebrations, food, clothing, or art, and how important it was to them to maintain these customs.

Continuing their customs or traditions was important to about 63% of the respondents. In terms of tolerance and general appreciation for diversity, over 20% of visible minorities felt they had experienced discrimination or unfair treatment sometimes or often in the past five years, and over half of those described the discrimination as being work-related. In the ethnic population as a whole, only 7% felt they had experienced discrimination because of their ethno-cultural background.

Data on social outcomes like discrimination can help inform educational policies and curriculum development in ways that shape learning outcomes. For example, the fact that visible minorities experience discrimination at nearly three times the rate of the ethnic population as a whole provides important information for multicultural educators, and shows that greater efforts must be made at educating Canadians in ways that particularly promote tolerance and acceptance of visible minorities, and that combat racism.

As noted, an interesting aspect of the EDS is that it looked at the attitudes and behaviours of three generations of immigrants. These kind of data can indicate changes in collective, long-term values and attitudes, as well as changes in perceptions of racism and discrimination in society over time. In this way, the EDS data can be used to show inter-generational trends, and can also indicate collective lifelong learning.

However, the EDS inter-generational data can be interpreted in different ways depending on the perspective taken. For example, the EDS data indicate that second and third generation ethnic groups appear to appreciate their original culture less than the first generations do. This represents a loss of knowledge and a loss of diversity, and may point to failures in learning processes and systems—provided that retention of cultural customs and traditions is valued and seen to contribute to overall societal wellbeing. However, the results might also be interpreted differently: from the point of view of the second and third generations the results might indicate a positive integration into the dominant culture as well as an increased knowledge of that culture.

Survey respondents who had rated at least one ethnic ancestry other than Canadian high in importance, were then asked how important it was for them to carry on the customs and traditions of that ethnic group, such as holidays, celebrations, food, clothing, or art. In the EDS, the first generation to come to Canada, in general, had a stronger sense of

belonging to its ethnic group, and a stronger sense of the importance of ethnic customs and traditions than second and third generations did. Of the first generation that had rated its ancestry highly, 68% said that it was important to carry on the customs and traditions of at least one of its ancestral groups. Among this first generation that had rated its ancestry highly, the more recent arrivals in Canada were more likely than earlier arrivals to say that their customs and traditions were important to them. For example, of the first generation who arrived in Canada after 1991, 73% reported that their customs and traditions were important to them, and they rated their ancestry highly.¹³⁰⁶ Within the second and third generations who rated their ancestry highly, 59% and 60% respectively said it was important to maintain customs and traditions. Feelings of frequent discrimination or unfair treatment were not linked to generation, however. Of first generation visible minorities, 21% reported they had sometimes or often experienced discrimination or unfair treatment in the past five years, compared with 18% of visible minorities who had been in Canada for two or more generations.¹³⁰⁷

Because these results are subject to different interpretations, we have not at this stage included the EDS results in the accompanying indicator report nor recommended them for inclusion among the multicultural literacy indicators of the CIW educated populace domain. However, a more careful and detailed analysis of the EDS results than was possible here may well yield data that could be used for such indicators in the future.

25.6.2 Treasury Board of Canada Secretariat annual report

The Treasury Board of Canada Secretariat produces an annual report measuring Canada's performance on a variety of indicators. The indicator that is most relevant to multicultural literacy is *attitudes toward diversity* as measured by personal tolerance and support for affirmative action, which measures outcomes related to "Diversity as a Fundamental Canadian Value."¹³⁰⁸ The 2003 Treasury Board reports:

Attitudes toward diversity can be used to measure the state of willingness among Canadians to accept and understand differences between socio-cultural groups. A society that is open to everyone equally is one that encourages achievement, participation, harmony, and a sense of belonging.¹³⁰⁹

The Treasury Board data for this indicator come from the Environics Research Group's Focus Canada Survey, which is Canada's longest running opinion survey on public affairs, and is conducted quarterly. The data, which are based on the self-reported views of Canadians, show that personal tolerance of others increased slightly from 1991 to 2004. For example, in 2004:

¹³⁰⁶ Statistics Canada, and Canadian Heritage. *Ethnic Diversity Survey: Portrait of a Multicultural Society*, accessed.

¹³⁰⁷ Ibid., accessed.

¹³⁰⁸ Treasury Board of Canada Secretariat. *Canada's Performance 2004: Annual Report to Parliament*, accessed.

¹³⁰⁹ Treasury Board of Canada Secretariat. *Canada's Performance 2003: Annual Report to Parliament*, accessed.

- 29 per cent of Canadians believe they are more tolerant toward ethnic groups than they used to be, an increase of 6 percentage points over results obtained in 1991, when the same question was asked
- 65 per cent feel there has been no change in how tolerant they are toward ethnic groups compared with how they felt in the past, an increase of 3 percentage points since 1991
- 8 per cent believe they are less tolerant than they used to be, a decrease of 2 percentage points since 1991

However, support for affirmative action declined between 1985 and 2004, with 28% of Canadians agreeing in 2004 that ‘Governments should require employers to advance non-whites to higher positions,’ compared with 44% who agreed in 1985.¹³¹⁰

Support for multiculturalism also seems to have grown. According to the Ipsos World Monitor Survey, reported in the Treasury Board’s 2004 annual report to Parliament (supplemental information), in 2003, 85% of Canadians agreed that multiculturalism is important to Canadian identity, compared with 74% of Canadians who agreed with this statement in 1997.¹³¹¹ In the same 2003 survey, when asked if they believe that a variety of cultures help society tackle new problems, 49% of Canadians agreed, compared with 47% of Canadians who agreed with this statement in 1991. In addition, 59% of Canadians disagreed with the statement “It is better for a country if almost everyone shares the same customs and traditions,” compared with 71% of Americans and 57% of Japanese who also disagreed with this statement.¹³¹²

25.6.3 Department of Canadian Heritage—public opinion research

In 2003, the Department of Canadian Heritage presented an overview of public opinion research on diversity and culture from Créatec+, Decima, Ekos, Environics, and Goldfarb.¹³¹³ It divided the results into three categories:

1. appreciation / interest in diversity and culture
2. retention of cultural heritage [or knowledge saved]

¹³¹⁰ Treasury Board of Canada Secretariat. *Canada's Performance 2004: Annual Report to Parliament*, accessed., Federal departments that “contribute to the pursuit of *Diversity as a Fundamental Canadian Value* through their respective department strategic outcomes” include Canadian Heritage, Canadian Human Rights Commission, Canadian Human Rights Tribunal, Citizenship and Immigration Canada, commission for Public Complaints Against the RCMP, Health Canada, Immigration and Refugee Board of Canada, and the Department of Justice Canada.

¹³¹¹ Ibid., accessed.

¹³¹² Treasury Board of Canada Secretariat. *Canada's Performance: Annual Report to Parliament. Supplemental Information*, accessed.

¹³¹³ Minister's Forum on Diversity and Culture. *Diversity and Culture: An Overview of Recent Public Opinion Research*, Canadian Heritage, 2003; accessed October 2005; available from http://www.pch.gc.ca/special/dcforum/pubs/opinion_e.cfm.

3. perceptions of social integration [or discrimination]

These three categories might also form the basis of a suitable framework for assessing multicultural literacy in the CIW education domain. Indeed, this three-part Canadian Heritage framework is somewhat more concrete and more easily populated by data than the potential frameworks outlined earlier, though it is particularly designed to accommodate the results of public opinion surveys, and does not deal with the important subtleties of knowledge formation and linkage to social outcomes that the earlier frameworks attempted to tackle.

The great advantage of the three-part Canadian Heritage division is, of course, that results from public opinion surveys are already available in all three categories. As well, the language data outlined above fit well into the second category on retention of cultural heritage. For this reason, we have used this three-part framework in the accompanying indicator report—as an interim approach—to provide some proxy assessments of multicultural literacy based on available data, while acknowledging the limitations both of this approach and of the survey data used for the results.

Although we do report the public opinion results in the accompanying indicator report, it must be clearly stated that these results do not really constitute a satisfactory indicator of multicultural literacy. The opinions that follow certainly do not tell us whether Canadians are truly multiculturally literate according to the much more sophisticated criteria of Banks and others cited earlier. So it is most important, based on the earlier discussions on the nature of multiculturalism, not to make too much out of the results that follow. It remains true, as noted earlier, that the real data needed to assess multicultural literacy in Canada are simply not yet available, and that even an agreed framework for this assessment has not yet been fully developed. In sum, these public opinion results are really no more than an interim proxy that tells us more about whether the basic concept of multiculturalism is generally accepted in Canada than about the level of multicultural literacy that exists.

For the most part, the results of Canadian public opinion surveys show that Canadians generally appreciate the value of diversity, although visible minorities do not always feel that their cultural differences are respected, as the following survey responses show. The Minister's Forum on Diversity and Culture from Canadian Heritage reported the following statistics:

Appreciation / interest in diversity and culture

- 83% of Canadians “agree” that different ethnic / racial groups enrich cultural life in Canada. (Environics, Social Cohesion Survey—2001)
- 62% of Canadians “strongly agree” that Canada's diverse ethnic cultures have made significant contributions to this country's history and development. (Environics, A&H 2001)

Retention of cultural heritage

- 31% of Canadians believe that Native customs and traditions should be a bigger part of the heritage of our country than they currently are. (Créatec+, 2001)
- 48% of Canadians “strongly agree” that the diversity of ethnic groups is part of the wealth of our heritage. (Créatec+, 2001)
- Only 24% of Canadians strongly believe that governments take account of their culture, language and traditions that they consider important and are different from those of other groups. (Créatec+, 2001)
- 48% of Canadians believe that it is very important to preserve individual ethnic heritages. (Goldfarb, 2001–2)

Perceptions of social integration

- 55% of Canadians “agree” that accepting immigrants from other cultures makes our culture stronger. (Ekos, 2000)
- Only 25% of Canadians “strongly agree” that their cultural differences and origins are respected. (Créatec+, 2001)
- 80% of Canadians believe that schools with ethnic / racial diversity provide a more enriched experience. (Environics, Social Cohesion Survey, 2001)¹³¹⁴

25.6.4 CRIC Regional and Multicultural Diversity in Canada survey

A new survey on regional and multicultural diversity in Canada was commissioned by the Centre for Research and Information on Canada (CRIC), and conducted by Decima Research in August 2005.¹³¹⁵ The survey sampled 2,032 adult Canadians across the country. In the initial release of the results, Carsten Quell, Director of Research for CRIC notes:

Our research has shown consistently that Canadians value multiculturalism as a defining characteristic of the country. For example, 86% of respondents in the present survey said that it is important for children to maintain and value some aspect of their parents’ cultural heritage. There are no significant generational differences on this. Younger people are as enthusiastic as older people to see cultural heritage maintained.¹³¹⁶

Other results of the survey included the following:

¹³¹⁴ Ibid., accessed.

¹³¹⁵ Centre for Research and Information on Canada (CRIC). *Regional and Multicultural Diversity in Canada*, 2005; accessed November 2006; available from http://www.cric.ca/pwp_re/diversite/Diversity_en.pdf.

¹³¹⁶ Centre for Research and Information on Canada (CRIC). *Diversity Survey Backgrounder*, 2005; accessed November 2006; available from http://www.cric.ca/pdf_re/diversite_poll/Diversit_Oct12_05_EN.pdf.

Thirty-nine percent of Canadians believe that the current level of celebrating and supporting Canada's Aboriginal communities should be increased, while 43% said it should remain the same; only 13% said it should be reduced.

78% of Canadians agree that it is beneficial to all Canadians that the distinctive cultures of Aboriginal communities remain strong (up from 75% in 2003). Agreement was highest in Atlantic Canada (89%), and lowest, by a significant amount, in Quebec (59%).¹³¹⁷

A section of the CRIC / Decima survey dealt with cultural openness.

Assuming that every culture and society has something that another society can learn from and apply to its own ways of doing things, people were asked if they felt that Canadians should be more open when it comes to learning from and adopting some of the practices of immigrant communities.¹³¹⁸

Results showed:

- Nationally, 38% say Canadians should be more open to this idea
- 38% say Canadians should be as open as they are now
- 22% say Canadians are too open to this approach
- Saskatchewan (45%) and Alberta (42%) residents are above the national average in terms of openness
- Atlantic Canada (53%) is the region that is most favourable
- British Columbians are most likely to say that Canadians are too open when it comes to learning from immigrant groups (26%), while Canadians in Atlantic Canada (17%) and in the Prairie provinces are least likely to agree (Manitoba: 17%; Saskatchewan: 15%; Alberta: 18%).¹³¹⁹

25.6.5 New multicultural literacy survey

One of the research projects funded in part by the Canadian Heritage-SSHRC program on multiculturalism mentioned below focusses on "Multicultural Literacy in Canada."¹³²⁰

Lisa Taylor of Bishop's University in Lennoxville, Quebec and Michael Hoechsmann of McGill University in Montreal are working towards constructing a new multicultural literacy survey that could be used in large-scale surveys. They recently conducted a large-scale survey of Canadian high school students to measure their multicultural literacy.¹³²¹

The study was presented at the 12th International Conference on Learning held at the

¹³¹⁷ Ibid., accessed.

¹³¹⁸ Ibid., accessed. p. 2.

¹³¹⁹ Ibid., accessed.

¹³²⁰ Taylor, Lisa, and Michael Hoechsmann. "Multicultural Literacy in Canada." Paper presented at the 12th International Conference on Learning, Granada, July 11-14, 2005; accessed June 2005; available from http://105.cgpublisher.com/proposals/953/index_html - author-1.

¹³²¹ Ibid.

University of Granada in July 2005. Although no written report is available at this time, there is an abstract, which summarizes:

The study is premised on the hypothesis that the values and fears which structure the cultural and historical fabric of racism are undergirded by the legacy of Eurocentrism in school curricula and in cultural and political institutions (mass media, the arts, governments, community organizations, etc.). As a step towards understanding the progress and future directions of multicultural curriculum reform, this study set out to measure the current ‘multicultural literacy’ levels of our nation’s young people: that is, the actual knowledge and understanding that youth have of the many intellectual, social and cultural contributions of the world’s diverse cultures.¹³²²

At the time of this writing, the authors had not yet been able to obtain either the results of this survey among Canadian high school students or a copy of the actual survey itself. Nor could they ascertain whether there are concrete plans to administer the survey to Canadian adults. The new Taylor-Hoeschmann survey clearly has the potential to provide far more robust data on multicultural literacy in Canada than is currently available, and holds the promise to provide needed data on this subject for the CIW educated populace domain. Clearly the most desirable direction for future indicator development in this area would be direct Statistics Canada involvement in the administration of a multicultural literacy survey, perhaps beginning with a Statistics Canada evaluation and, if appropriate, adaptation of the Taylor-Hoeschmann template.

25.6.6 Canadian initiative to increase public awareness and knowledge of multiculturalism and develop new indicators

In 2003, Canadian Heritage partnered with the Social Science and Humanities Research Council (SSHRC) to offer research grants to explore multicultural issues.¹³²³ SSHRC is the main federal granting agency for research in the social sciences and humanities. The three-year program (2003–2006), the Multiculturalism Issues in Canadian Society Strategic Grants Program, made three million dollars available for research in this area. In particular, areas of research included cross-cultural understanding, social indicators focused on racism, and follow-up research on the Ethnic Diversity Survey (EDS). Results of these research projects had not yet been released as of 2006, though the indicators portion of this research will be of particular interest to the Canadian Index of Wellbeing.

Another ongoing SSHRC-funded project is entitled “From Literacy to Multiliteracies: Designing Learning Environments for Knowledge Generation within the New

¹³²² Ibid.

¹³²³ Canadian Heritage. *News Release: Strengthening Multicultural Research Focus of New Federal Program*, Halifax,, June 2, 2003; accessed October 2005; available from http://www.canadianheritage.gc.ca/newsroom/news_e.cfm?Action=Display&code=3NO101E.

Economy.”¹³²⁴ This three-year project was started in 2002, and has now been extended another year. It has involved approximately 50 teachers and over 500 students and their families in and out of schools in Toronto, Vancouver, and Montreal. The project locates itself “within socio-cultural and situated learning approaches to literacy,” and aims to “propose some core principles to guide instruction, curriculum, *measurement*, and policy development” (emphasis added).¹³²⁵ The measurement component of this research will again be of particular interest to the CIW educated populace domain.

The Multiliteracy Project website reports:

The Multiliteracy Project, originally funded as a three-year study, has received a one-year extension from the Social Sciences and Humanities Research Council (SSHRC). As with many of the projects funded by SSHRC’s Initiative on the New Economy, the scope of the research that has been undertaken requires more time for thoughtful analysis if Canadians are to fully benefit from the project’s potential. We appreciate SSHRC’s flexibility and its commitment to providing stakeholders with meaningful research that may inform future decision-making.¹³²⁶

A number of Canadian organizations are also working to increase public awareness and knowledge of racism. According to a 2003 Ipsos-Reid survey, commissioned by the Centre for Research and Information on Canada (CRIC), 74% of Canadians believe that racism is prevalent in Canada.¹³²⁷ And, as mentioned above, visible minorities surveyed in the 2003 Ethnic Diversity Survey (EDS) also reported experiencing discrimination—over 20% of visible minorities felt they had experienced discrimination or unfair treatment sometimes or often in the past five years.¹³²⁸

In October 1996, the federal government promulgated the Canadian Race Relations Foundation Act into law and, in 1997, established the Canadian Race Relations Foundation as an arms length Crown corporation.¹³²⁹ Among its objectives, the foundation aims to increase public awareness of the importance of eliminating racism by creating a body of research that addresses systemic racism and ensures that results are widely disseminated.

¹³²⁴ Early, Margaret. "From Literacy to Multiliteracies: Implications for Lifelong Learning and Work." Paper presented at the Future of Lifelong Learning and Work International Conference, Toronto, June 22, 2004; accessed October 2005; available from <http://lifelong.oise.utoronto.ca/papers/rEarlyPaper.pdf>.

¹³²⁵ Ibid.

¹³²⁶ The Multiliteracy Project. *Website*, accessed November 2006; available from <http://www.multiliteracies.ca/>.

¹³²⁷ Centre for Research and Information on Canada (CRIC), Globe and Mail, and Canadian Opinion Research Archive (CORA). *The CRIC-Globe and Mail Survey on "The New Canada"*, Canadian Opinion Research Archive, Queen's University, 2003; accessed November 2005; available from <http://jeff-lab.queensu.ca/poadata/info/cric/cricgmnc03.shtml>.

¹³²⁸ Statistics Canada, and Canadian Heritage. *Ethnic Diversity Survey: Portrait of a Multicultural Society*, accessed.

¹³²⁹ Canadian Race Relations Foundation. *Website*, accessed October 2005; available from <http://www.crr.ca>.

An increased effort is also under way by Canadian Heritage to eliminate racism, with a five-year investment of \$56 million beginning in 2005.¹³³⁰ This program will take a lifelong learning approach to racism and will especially seek to educate children and youth on diversity and anti-racism through programs aimed to counter hatred and bias in the population. Canadian Heritage plans to develop an accountability framework to monitor progress and report back to Canadians. Those measures and the resulting data, when developed, will again be of particular interest to the CIW educated populace domain, and may assist the development of indicators of multicultural literacy, especially since a key focus of the program and of the monitoring will be specifically on the effectiveness of education and learning processes.

Also, Canadian Heritage is currently promoting initiatives to raise awareness of diversity and racism issues for the Canadian public through its \$11.1 million Multiculturalism Program, which is one of the federal initiatives designed to address multiculturalism policy goals.¹³³¹ The SSHRC initiative mentioned above and the Multiculturalism Program will collaborate specifically to identify indicators to evaluate the long-term impact of anti-racism initiatives. Annual reporting will be through the “Annual Report on the Operation of the *Canadian Multiculturalism Act*.” This indicator component of the joint initiative again has the potential to assist the development of indicators in this area for the CIW educated populace domain.

In particular, Canadian Heritage is concerned that the public is presently poorly informed about the nature of Canada’s diversity, and that public dialogue “is frequently based on misinformation and stereotypes.”¹³³² If backed by data, this Canadian Heritage concern would be an important sign that multicultural literacy in this area is presently poor, and that the prevalence of “misinformation and stereotypes” reflects a failure of existing educational structures and learning systems.

Canadian Heritage also comments: “Most government research, polling and survey work is undertaken without adequate sampling to ensure that data is available to consider and compare issues on the basis of ethnicity, race, language, and religion.”¹³³³ In an effort to remedy this shortcoming, Canadian Heritage is taking steps to increase sample size and set minimum sampling standards. Indicators for which data are currently available include:

- visible minority participation in education and educational attainment
- visible minority participation in various occupational sectors, including the federal public service
- visible minority participation in volunteerism and charitable giving

¹³³⁰ Canadian Heritage. *A Canada for All: Canada’s Action Plan against Racism*, Department of Canadian Heritage, 2005; accessed October 2005; available from http://www.pch.gc.ca/multi/plan_action_plan/pdf/action_long_e.pdf.

¹³³¹ Canadian Heritage. *The Multiculturalism Program*, Department of Canadian Heritage, 2005; accessed October 2005; available from http://canadianheritage.gc.ca/progs/multi/program/guide/program_e.cfm?nav=2.

¹³³² Ibid., accessed.

¹³³³ Ibid., accessed.

- approved funding for visible minority
- visible minority participation in the arts, museums, festivals, and other cultural areas
- wage differentials between visible minorities and the general population, and
- public opinion polling regarding attitudes toward visible minorities¹³³⁴

Specific outcome areas of the new Multiculturalism Program involve increasing public awareness, understanding, and informed public dialogue about multiculturalism and racism; increasing the participation of ethno-racial minorities in public decision-making; helping public institutions eliminate systemic barriers to equitable access; and assisting federal policy and program development to respond to diversity. As noted, the program is developing performance and social impact indicators for these outcomes that may again be of particular interest in the development of multicultural literacy indicators for the CIW educated populace domain.

The Multiculturalism Program website notes that the indicators are “still tentative, as measuring for social change is challenging, and will need to be shared and further developed with federal partners and non-governmental organizations alike.”¹³³⁵

According to the website, the new indicators are expected to correlate with broader societal goals in the social justice and civic participation areas, and to identify and measure results in the social, cultural, economic and political domains. New research strategies are designed and expected to increase knowledge in the cultural area and also to increase the availability of comprehensive data on multiculturalism, with a major new survey of public attitudes to multiculturalism and diversity that will complement the existing Ethnic Diversity Survey.

Key research and indicator development questions in the new Multiculturalism Program include:

How have public opinions on multicultural diversity changed since 1991 and on what do people base their opinions? Is racism increasing or decreasing in Canadian society? What indicators can be used to explore the extent of racism? What are the indicators of vulnerability or pre-disposition to hate and bias activity?¹³³⁶

These questions are of great interest to the Canadian Index of Wellbeing in general and to the multicultural literacy section of the CIW educated populace domain in particular.

In light of the important new indicator development work in this area, there is every hope that comprehensive and effective multicultural literacy indicators will be developed for the CIW educated populace domain in the not too distant future. We recommend that the CIW remain aware of and coordinate with the survey and indicator development initiatives noted above with a view to reporting key results in future updates.

¹³³⁴ Ibid., accessed.

¹³³⁵ Ibid., accessed.

¹³³⁶ Ibid., accessed.

26. Media Literacy

In an article titled “Expanding the Definition of Media Literacy,” media specialist Bill Walsh notes that media is the term used to refer to any medium or method that *communicates*, including books, newspapers, magazines, computers and the Internet, video, art, music, television, radio, film, and billboards.¹³³⁷ The flow of images and information from these media increases daily and is now far greater than was the case even a decade ago. Much of the research on this exponential increase in media-generated information and images focuses on the rapid growth of technology. However, as Shirato and Webb point out, there are social and political contexts that drive the production of technology and the domination of the media in the social, cultural, and political fields.¹³³⁸

Len Masterman, one of the foremost British authorities on media literacy, writes:

In contemporary societies the media are self-evidently important creators and mediators of social knowledge. An understanding of the ways in which the media represent reality, the techniques they employ, and the ideologies embedded within their representations ought to be an entitlement for all citizens and future citizens in a democratic society.¹³³⁹

Media have a profound effect on our social, economic, political, and cultural lives. They not only shape our local and national culture, including our vocabulary, common experiences, and references, but the influences and effects of Western media are also experienced pervasively in the global community as well. Masterman also notes that it is naïve to think that the primary function of the media is the production of information or entertainment. Rather, he believes:

The growth and expansion of commercially-based media has produced a situation in which advertising can no longer be seen as something which takes place between programmes on television, or in the spaces around the editorial material in the press. Rather, the whole of the media has now been opened up, not simply to advertising but to a whole range of marketing techniques such as product placement, public relations, sponsorship, plugs for films and records, advertisements, news management, and the creation of disinformation in a way which makes the old distinctions between advertising and editorial material almost obsolete. Similarly it is simply not possible for anyone to be media literate today if he or she does not understand that the primary function of commercial media is the segmentation and packaging of audiences for sale to advertisers.¹³⁴⁰

¹³³⁷ Walsh, Bill. *Expanding the Definition of Media Literacy*, Media Literacy Review, n.d.; accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/mlr/readings/articles/expanddefml.html>.

¹³³⁸ Shirato, Tony, and Jen Webb. "Cultural Literacy and the Field of the Media," *Reconstruction*, vol. 4, no. 2, 2004.

¹³³⁹ Masterman, Len. "The Media Education Revolution," *Canadian Journal of Educational Communication*, vol. 22, no. 1, 1993: 5-14. pp. 11-12.

¹³⁴⁰ *Ibid.* p. 12.

In addition, Masterman also suggests that public service and independent media are becoming impoverished. He stresses that very large issues are at stake in the increasing shift from public and independent media to commercial media that require an informed and articulate public that asks important questions:

Should information be regarded only as a commodity or does it have a social value? Is it preferable to produce information which meets general social needs or information which makes a profit? Is access to information a right, or should it be restricted to those who can pay? Is information only an extension of property rights or does it lie in the public domain? It is scarcely an exaggeration to say that the future shape of all cultures lies in the ways in which they answer these questions.¹³⁴¹

Schirato and Webb, of the University of Wellington in New Zealand, argue that:

[W]hat constitutes knowledge and understanding is not an individual, personalized process, but rather is effectively predicated on, and largely determined by, our specific cultural trajectories and context. [...W]e see and respond to what 'is there,' and what is there is largely what we know, what we expect, and what we are familiar with. [...] In other words, the issue of where 'I come from, and as a corollary the resulting predisposition with regard to how 'I see and think, is a necessary part of being culturally literate.¹³⁴²

These analysts argue that understanding the underlying aspects of the cultural context of media, including how it is controlled and censored by commercial interests, not only can change our perceptions, but can also lead to more creative and diverse content and uses of the media. Schirato and Webb argue that this is why the issues of cultural and media literacies are particularly important:

[T]he media has become the most important cultural field for the playing out of meanings and explanations of what is happening to and around us, and for debates about social issues. In a sense it more or less constitutes, as far as public sphere activity is concerned, the only game in town.¹³⁴³

Capra argues that mass media has the potential to foster social change by transmitting a new ecological awareness into our collective consciousness. Calling for a restructuring of information and knowledge, Capra envisioned, in 1982, a vastly different media in the future:

The public's right of access to the mass media will thus be an important aspect of the current social change. Once we succeed in reclaiming our mass media, we can then decide what needs to be communicated and how to use the media effectively

¹³⁴¹ Ibid. p. 13.

¹³⁴² Schirato, and Webb. "Cultural Literacy and the Field of the Media." pp. 2–3.

¹³⁴³ Ibid. p. 5.

to build our future. This means that journalists, too, will change their thinking from fragmentary to holistic modes and develop a new professional ethic based on social and ecological awareness. Instead of concentrating on sensational presentations of aberrant, violent, and destructive happenings, reporters and editors will have to analyze the complex social and cultural patterns that form the context of such events, as well as reporting the quiet, constructive, and integrative activities going on in our culture. That such a mature kind of journalism is not only socially beneficial but can also be good business is proven by the recent growth of alternative media that promote new values and life styles.¹³⁴⁴

Steven Goodman, of *Strategies for Media Literacy*, contends that we need “to wrest control of our media and culture from the tyranny of the marketplace.”¹³⁴⁵ In order to do this, he suggests that we focus our energies simultaneously on two areas. First we need to encourage a broad diversity of people to become producers of media and culture, and second, we need to develop a public that knows how to critically analyse mass media and act to change the status quo.¹³⁴⁶ Such a public could be called “media literate.”¹³⁴⁷

However, Masterman has noted that media education literature does not seem to emphasize critical thinking, at least in terms of placing questions of politics and power at the centre of the discussion.¹³⁴⁸ Instead, a “media literacy movement” of sorts has grown among a disparate group of interested parties who emphasize different aspects of the media culture.¹³⁴⁹ This movement is mainly a response to the powerful influence of the media, and in some respects is rooted in the work of Marshall McLuhan, who, in the 1960s, wrote that “the medium is the message,” meaning that the medium itself has intrinsic effects on the individual that are separate from the content presented by the media, and that individuals need to be aware of a medium’s cognitive effects.¹³⁵⁰

The media literacy movement is also partly rooted in the work of George Gerbner, of the University of Pennsylvania, who, in the 1960s, wrote on the social effects of violence that is on television.¹³⁵¹ In addition to concern over violence and other negative content in the media, this media literacy movement, according to Masterman, is also concerned with ethnic stereotyping in ads and films, and the role models put forth by the media in general.

¹³⁴⁴ Capra, Fritjof. *The Turning Point: Science, Society, and the Rising Culture*, New York: Simon and Schuster, 1982. p. 409

¹³⁴⁵ Goodman, Steven. *An Open Letter to Media Educators*, Media Literacy Review, 1993; accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/mlr/readings/articles/goodman.html>.

¹³⁴⁶ Ibid., accessed.

¹³⁴⁷ Ibid., accessed.

¹³⁴⁸ Masterman. "The Media Education Revolution."

¹³⁴⁹ Wehmeyer, Jim. "Critical Media Studies and the North American Media Literacy Movement," *Cinema Journal*, vol. 39, no. 4, 2000: 94-101.

¹³⁵⁰ McLuhan, Marshall. *Understanding Media: The Extensions of Man*, New York: McGraw-Hill, 1964.

¹³⁵¹ Burns, Alex. *George Gerbner and the Cultural Environment Movement*, Disinformation, 2001; accessed October 2005; available from <http://www.disinfo.com/archive/pages/dossier/id349/pg1/>.

Cynthia Peters, speaking from an American perspective, explains the diverse approaches found among media literacy advocates:

The people who preach media literacy hail from all over the political spectrum. Their funding sources range from the Catholic Church to the Disney Corporation and MTV. They use media literacy as a tool to counter whatever media messages they find particularly abhorrent or as a neutral form of 'education.' For the right, there's too much emphasis on birth control, homosexuality, and single motherhood on TV. For the Methodists, TV violence stands in contrast to their biblical faith that 'every person whom we encounter is as precious as one created in the image of God.' For Donna Shalala, U.S. Secretary of Health and Human Services, teachers who bring a media literacy curriculum into the classroom are doing nothing less than 'protecting the future of our country' by educating kids to say no to smoking, drinking, and marijuana use. For liberals, advertising that does not deliver on its promises abridges our rights as consumers. For grassroots organizations that put communication tools directly into the hands of urban youth, for example, media literacy helps young people 'navigate modern times.'¹³⁵²

In the media literacy movement, media images and messages have been linked to public health concerns such as poor nutrition and obesity, aggressive behaviour and violence, tobacco and alcohol use, unhealthy body image, and risky sexual behaviour and attitudes.¹³⁵³ For example, the Media Awareness Network and the Canadian Paediatric Society launched a partnership in 2003 to "raise awareness about the potential impact of media use and messages on the health and well-being of children and youth."¹³⁵⁴ With funding from Health Canada's Population Health Fund, they created *MediaPulse* to help healthcare professionals understand media influences on the health of youth.

Peters argues that a major theme running through the media literacy movement is that no one is to blame for the content and form of the media, and the solution is to change the public's ability to view and use it:

Almost no one wants to look at key questions of who owns and controls the media. There is little attention to the profit-driven nature of our economy and how that gives rise to a commercially driven media. [... M]ost of the media literacy movement emphasizes awareness over social change, and places responsibility for mediating the media squarely on the shoulders of parents and teachers, and the children themselves.¹³⁵⁵

Goodman also criticizes the mainstream media literacy movement, which mostly is interested in developing good television viewing habits in children or teaching them to

¹³⁵² Peters, Cynthia. "The Politics of Media Literacy." *Z Magazine*, February, 1998, 25-29., p. 25, Cited in: Wehmeyer. "Critical Media Studies and the North American Media Literacy Movement." p. 95-96.

¹³⁵³ MediaPulse. *MediaPulse: Measuring the Media in Kids' Lives: A Guide for Health Practitioners*, Media Awareness Network and Canadian Paediatric Society, 2003; accessed October 2005; available from http://www.media-awareness.ca/english/special_initiatives/media_pulse/resources_publications.cfm.

¹³⁵⁴ Ibid., accessed.

¹³⁵⁵ Peters. "The Politics of Media Literacy." p. 25.

use tools such as the Internet. He notes: “Their analysis remains fixed within the framework of the dominant culture they aim to critique.”¹³⁵⁶ He advocates, “in the spirit of dialogue and reflection” as developed by Brazilian educator Paulo Freire,¹³⁵⁷ the need “to develop an alternative pedagogy that transcends the market culture.”¹³⁵⁸ Goodman argues:

[A] truly critical pedagogy would teach us to be more than ‘questioning consumers’ with ‘good viewing habits.’ It would dig at the roots of the mass media and the market culture that it promotes. It would challenge the notion that we have no choice but to relate to the world as consumers. It would suggest not that we change the way we watch television but that we change the television that is created for us to watch. It would critique the commercial media’s construction of reality from a moral point of view that it is a corruption of what it means to be human to so invade the public sphere as to transform cultural expressions and social dialogue into an exchange of commodities to be marketed and sold. [...] We must present students with alternative models of communication and representation. [...] We need to struggle to democratize the classroom discourse, to open the classroom to marginalized voices, to present counter interpretations, alternative media texts, and constantly challenge the ‘master text.’¹³⁵⁹

As in our prior discussion on multicultural literacy, the development of indicators here depends on the definition of media literacy, and on the depth and subtlety with which the subject is approached. Indicators developed from the perspective of Peters and Goodman will be very different from those of the mainstream media literacy movement. We therefore begin with a few key definitions of media literacy in the literature that should be considered in the context of the alternative approaches to media literacy presented in the discussion above.

¹³⁵⁶ Goodman. *An Open Letter to Media Educators*, accessed. p. 2.

¹³⁵⁷ Freire, Paulo. *Pedagogy of the Oppressed*, London and New York: Continuum International Publishing Group, 1970.

¹³⁵⁸ Goodman. *An Open Letter to Media Educators*, accessed. p. 2.

¹³⁵⁹ *Ibid.*, accessed. p. 2.

26.1 Definitions of media literacy

In the literature, media literacy is considered an outcome of media education.¹³⁶⁰ Despite the need for a media literate populace, most of the work concerning media literacy is associated with the needs of children and youth rather than with the needs and interests of the adult population.¹³⁶¹ However, much of the media literacy work directed at children and youth is also directly relevant to adults. The definition of media literacy used most often in Canada comes from the Ontario Ministry of Education's *Media Literacy Resource Guide*.¹³⁶²

Media literacy is concerned with helping students develop an informed and critical understanding of the nature of the mass media, the techniques used by them, and the impact of these techniques. More specifically, it is education that aims to increase students' understanding and enjoyment of how the media work, how they produce meaning, how they are organized, and how they construct reality. Media literacy also aims to provide students with the ability to create media products.¹³⁶³

Barry Duncan, Founding President of Canada's Association of Media Literacy, gives six reasons why it is important to become media literate:

- Media dominate our political and cultural lives
- Almost all information beyond direct experience is 'mediated'
- Media provide powerful models for values and behaviour
- The media influence us without our being aware (or as Marshall McLuhan¹³⁶⁴ described it, 'the environment is invisible')
- Media literacy can increase our enjoyment of media
- Media literacy can make a passive relationship active¹³⁶⁵

One of the key concepts in defining media literacy is that media literacy is not about learning *through* media, it is learning *about* media.¹³⁶⁶ In summarizing the outcomes of a conference at the Harvard Institute on Media Education, Bowen notes that media literacy involves critical thinking and "all the 'habits of mind' which we associate with being

¹³⁶⁰ Fedorov, Alexander. *Media Education and Media Literacy in Knowledge Societies: Analysis of Expert Opinions*, Association of Cinema Education and Media Pedagogic (Russia), 2002; accessed October 2005; available from http://confifap.cpic.ru/upload/conf2005/reports/dokladEn_272.DOC.

¹³⁶¹ Dennis, Everette E. "Out of Sight and Out of Mind: The Media Literacy Needs of Grown-Ups," *The American Behavioral Scientist*, vol. 48, no. 2, 2004: 202-211.

¹³⁶² Pungente, John J. *Defining Media Literacy: Another Point-of-View*, Media Literacy Review, 2003; accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/mlr/readings/articles/defresponse.html>.

¹³⁶³ Duncan, Barry, John J. Pungente, and Ontario Ministry of Education. *Media Literacy Resource Guide*, Toronto: Harcourt Brace Canada, 1989. pp. 6-7.

¹³⁶⁴ McLuhan, Marshall. *The Medium Is the Massage: An Inventory of Effects*, Random House, 1967.

¹³⁶⁵ Bowen, Wally. *Defining Media Literacy: Summary of Harvard Institute on Media Education*, Media Literacy Review, 1993; accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/mlr/readings/articles/defharvard.html>.

¹³⁶⁶ Ibid., accessed.

well-educated.”¹³⁶⁷ In that sense, media literacy is an essential dimension of an “educated populace,” and an assessment of how media literate the Canadian public is therefore becomes a necessary component of the Canadian Index of Wellbeing educated populace domain. Bowen continues:

Teaching ‘about’ media opens the door to engaging students where they live: in the media-saturated world. We thus enable them to explore issues such as how media shape attitudes and values, how media shape political and social institutions, and how we can decode and resist persuasion and propaganda techniques in both print and broadcast media [...]. [M]edia analysis is pushed beyond a kind of narrow textual criticism (e.g., deconstructing and critiquing how a film or commercial are [*sic*] made) to exploring the larger questions of media economics and ownership, mythmaking, cultural hegemony, the pacification of publics, the economics of gender and ethnic stereotyping, the selling of high-consumption lifestyles, consumerism versus citizenship, the value of citizen speech versus corporate speech, etc.¹³⁶⁸

Bowen’s definition here clearly does embrace elements of Goodman’s and Peters’ critique of the mainstream media literacy movement described in the previous section, and therefore does get at some of the deeper, more contextual issues that these critics raise.

In a recent literature review of media literacy among children and youth, Buckingham reminds us of the affective elements of media literacy:

[M]edia literacy should not be seen as a purely cognitive, rational affair: it also involves emotional response, enjoyment and cultural appreciation. It is far more than simply a matter of learning to protect oneself from things that are seen as being in some way bad or harmful. Future research needs to adopt a broad, non-reductionist approach to studying media literacy in practice.¹³⁶⁹

All of these definitions of media literacy contribute important elements that can form the basis of a framework for indicator development in this field.

¹³⁶⁷ Ibid., accessed.

¹³⁶⁸ Ibid., accessed. pp. 1–2.

¹³⁶⁹ Buckingham, David. *The Media Literacy of Children and Young People: A Review of the Research Literature*, Centre for the Study of Children, Youth, and Media Institute of Education, University of London; Ofcom (Office of Communications), 2005; accessed October 2005; available from http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/?a=87101. p. 54.

26.2 Media literacy education in Canada

26.2.1 Media literacy in Canadian schools

Education for media literacy is included in the K-12 curriculum of Canada and other countries such as Great Britain, France, Spain, Australia, and, to some extent, the United States.¹³⁷⁰ In some countries, interest in media education developed as a form of “cultural protection” in response to the growing “cultural imperialism” of the United States.¹³⁷¹ For example, Renee Hobbs explains:

Like many countries, much of the momentum to establish media literacy in Australia concerned the issues of “cultural imperialism” as more and more American commercial mass media products entered into Australian homes, including television, film, books, magazines, popular music and other media. A few Australian educators understood media education as a form of cultural protection, a means to help parents and teachers illustrate differences between the values and norms of the U.S. and those of Australia.¹³⁷²

Canada is a recognized international leader in media literacy education, with Ontario introducing media literacy into secondary school curricula as early as 1987. In fact, a recent Russian survey of 26 media educators from ten countries identified Canada as the recognized leader in media education and observed: “achievements of Canada and Australia, where media education gained an official status at every secondary school, are known to media educators all over the world.”¹³⁷³

Collaboration between the Western Canadian Protocol for Collaboration in Basic Education (WCP) in the west and the Council of Atlantic Ministers of Education and Training (CAMET) in the east, as well as curricula work in Ontario and Quebec, have resulted in media education being officially endorsed as a key component of the core school curriculum across the country. In most areas, media literacy is integrated throughout the curriculum from grades K-12, rather than in stand-alone courses. The new Language Arts curriculum for secondary schools in Ontario introduces Media Studies as a separate strand that constitutes a quarter of the learning expectations and includes critical thinking components.¹³⁷⁴

¹³⁷⁰ Hobbs, Renee. *Masters Program in Media Literacy*, Media Literacy Review, 1993; accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/mlr/courses/mastersbillerica.html>.

¹³⁷¹ Hobbs, Renee. *The Acquisition of Media Literacy Skills among Australian Adolescents*, Eugene, Media Literacy Review, Media Literacy Online Project, University of Oregon, 2005; accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/mlr/readings/articles/hobbs/australia.html>.

¹³⁷² Ibid., accessed. p. 1.

¹³⁷³ Fedorov. *Media Education and Media Literacy in Knowledge Societies: Analysis of Expert Opinions*, accessed. p. 10.

¹³⁷⁴ Media Awareness Network. *Media Education in Canada: An Overview*, 2005; accessed October 2005; available from http://www.media-awareness.ca/english/teachers/media_education/media_education_overview.cfm?RenderForPrint=1.

The Ontario *Media Literacy Resource Guide*, authored by Duncan and Pungente,¹³⁷⁵ and adapted from the work of Len Masterman, suggests key concepts that provide an outcome framework for understanding media, and that represent what secondary school students, as well as adults, need to know about media messages—whether they are from print, television, radio, film, computers, video, or other media. These key concepts are included in the media literacy frameworks used in all of the provincial education departments,¹³⁷⁶ and may form a useful basis for the Canadian Index of Wellbeing to assess what an educated populace needs to know in this field. According to the Ontario *Media Literacy Resource Guide*.¹³⁷⁷

1. *All media are constructions* that are carefully manufactured by people, subjected to a broad range of determinants and decisions, and do not reflect external reality ‘as it is.’ Understanding how media is put together with its own grammar, syntax, and metaphor system increases appreciation but also helps guard against manipulation. For example, scary music creates fear, camera close up can create a feeling of intimacy, and big headlines alert one to the importance of the message.
2. *All media construct reality*. In other words they influence our attitudes, behaviour, ideas, interpretations, and conclusions about what the world is and how it works. Understanding what is left out of the message is also important in understanding its point of view.
3. *Audiences negotiate meaning in media*. Therefore, people experience media messages differently. Audiences work to make sense of the information presented in the form of codes and conventions, rather than remain passive. Who we are has a bearing on how we process information. Each of us finds or ‘negotiates’ meaning in a different way through a wide variety of factors: “personal needs and anxieties, the pleasures or troubles of the day, racial and sexual attitudes, family and cultural background.”¹³⁷⁸
4. *Media have commercial implications*. Media are largely owned and operated by business and have commercial implications and profit motives. “Commercial factors such as distribution, technical costs, labor costs, ownership and potential ad sales influence content. Advertisers are guaranteed a number of consumers who will see their ads and who they target to buy products. Advertising drives

¹³⁷⁵ Duncan, Pungente, and Ontario Ministry of Education. *Media Literacy Resource Guide*.

¹³⁷⁶ Pungente, John. *The Second Spring: Media Literacy in Canada's Schools*, Media Literacy Review, 1997; accessed October 2005; available from http://interact.uoregon.edu/MediaLit/JCP/articles_mlr/pungente/secondspring.html.

¹³⁷⁷ The following is taken from Duncan, Barry, John J. Pungente, and Ontario Ministry of Education. *Media Literacy: How the Media Constructs Reality*, Reprinted from Duncan, Barry, John J. Pungente, and Ontario Ministry of Education. *Media Literacy Resource Guide*, Toronto: Harcourt Brace Canada, 1989, 2005; accessed October 2005; available from http://www.totse.com/en/media/the_media_industrial_complex/medialit.html, pp. 1–2 and Pungente. *The Second Spring: Media Literacy in Canada's Schools*, accessed. pp 6–7. The former is a reproduction of excerpts from the Ontario *Media Literacy Resource Guide*, and the latter is partially a discussion of the guide. Direct quotes are cited.

¹³⁷⁸ Duncan, Pungente, and Ontario Ministry of Education. *Media Literacy Resource Guide*. cited in Pungente. *The Second Spring: Media Literacy in Canada's Schools*, accessed.

media businesses. The commodity that is bought and sold is the audience.”¹³⁷⁹ “A relatively small number of individuals control what we watch, read and hear in the media.”¹³⁸⁰

5. *Media contain ideological and value messages.* Media are not value free. “Media content that purports to be objective can hide explicit and implicit values and ideology. Most modern media content maintains a social status quo or ‘sells’ a consumer lifestyle.”¹³⁸¹ “All media products are advertising in some sense—for themselves but also for values or ways of life.”¹³⁸² Ideological messages can include all or some of the following: “the nature of the ‘good life’ and the role of affluence in it, the virtue of ‘consumerism,’ the role of women, the acceptance of authority, and uncompromising patriotism.”¹³⁸³ Media also have social and political implications. “Media not only seek to sell us products, but they also sell us political candidates, ideas, public health messages, and seek to shape audiences into political constituencies. Media technologies have altered our culture, our families and the way we use our leisure time.”¹³⁸⁴

The Atlantic Provinces Education Foundation’s (APEF)¹³⁸⁵ *Framework for English Language Arts* uses these key concepts for its own recommendations on the teaching of media literacy. It also suggests that, since media literacy is a form of critical thinking, it is “more about good questions than correct answers.” A series of key questions, which flow from the above concepts, can be asked about any media message. The APEF Framework identifies the following key questions as important for discussions that advance media literacy:

1. What is the message? Who created and is sending the message? Why is it being sent?
2. How is the message being sent? Who is the intended audience? What techniques are being used to attract my attention?
3. How might different people understand this message differently from me?
4. Who benefits from the message?
5. What lifestyles, values, and points of view are represented in or omitted from this message?¹³⁸⁶

¹³⁷⁹ Duncan, Pungente, and Ontario Ministry of Education. *Media Literacy: How the Media Constructs Reality*, accessed.

¹³⁸⁰ Pungente. *The Second Spring: Media Literacy in Canada's Schools*, accessed.

¹³⁸¹ Duncan, Pungente, and Ontario Ministry of Education. *Media Literacy: How the Media Constructs Reality*, accessed.

¹³⁸² Pungente. *The Second Spring: Media Literacy in Canada's Schools*, accessed.

¹³⁸³ Ibid., accessed.

¹³⁸⁴ Duncan, Pungente, and Ontario Ministry of Education. *Media Literacy: How the Media Constructs Reality*, accessed.

¹³⁸⁵ The Atlantic Provinces Education Foundation (APEF), which was established in 1994, was replaced in 2004 by the Council of Atlantic Ministers of Education and Training (CAMET), by agreement of the Atlantic ministers of education and training. See CAMET website: <http://camet-camef.ca>

¹³⁸⁶ Atlantic Provinces Education Foundation. *Framework for English Language Arts 10-12*, Media Awareness Network, 1998; accessed October 2005; available from http://www.media-awareness.ca/english/resources/educational/media_education/atlantic_provinces/subject_level_overviews/apef_ela_10-12_ov.cfm.

Chris M. Worsnop, one of the leading authorities on media literacy in Canada, has developed a conceptual framework for media education using questions such as these.¹³⁸⁷ We have included Worsnop's framework chart in Appendix 18. The five sets of questions above could also potentially form the basis of survey questions that test and assess Canadians' level of media literacy, which could then be used to provide data for CIW indicators in this field.

The Media Awareness Network recently conducted a scan of curricular outcome statements and media literacy education across the country.¹³⁸⁸ It found that outcomes in all of the provinces emphasize analysing, evaluating, and creating media texts. The Ontario Grade 10 English Academic Media Studies curriculum, in which students also design and create their own media works, has two overall expectation outcomes as well as a set of specific outcomes. Generally, it is expected that by the end of the course students will:

1. analyse a range of media forms to identify their elements, audiences, and production practices, and draw conclusions about how these factors shape media works
2. use knowledge of a range of media forms, purposes and audiences to create media works, and use established criteria to assess the effectiveness of the works¹³⁸⁹

Specific outcomes require students to be able to:

- demonstrate critical thinking skills by identifying the differences between explicit and implicit messages in media works
- identify key elements and techniques used to create media works in a variety of forms and analyse how these elements and techniques contribute to the theme or message
- analyse the elements of a variety of media works, in order to identify and describe the intended audience(s) for the works
- analyse the relationship between media works and the production and marketing of related products.¹³⁹⁰

Again, these outcomes provide a potential basis for evaluation criteria that could eventually be used to assess levels of media literacy for the CIW educated populace domain. In Atlantic Canada, media literacy is included as one of four aspects—all of

¹³⁸⁷ Worsnop, Chris. *Conceptual Framework for Media Education*, Media Awareness Network, 1999; accessed October 2005; available from http://www.media-awareness.ca/english/resources/educational/teaching_backgrounders/media_literacy/conceptual_framework_worsnop.cfm?RenderForPrint=1.

¹³⁸⁸ Media Awareness Network. *Media Education in Canada: Introduction*, 2003; accessed October 2005; available from http://www.media-awareness.ca/english/teachers/media_education/index.cfm.

¹³⁸⁹ Ontario Ministry of Education and Training. *Course Profile: English, Grade 10, Academic*, 2000; accessed October 2005; available from <http://www.curriculum.org/csc/library/profiles/10/pdf/ENG2DP.pdf>. p. 18.

¹³⁹⁰ Ibid., accessed. p. 18.

which are often included in media literacy *per se*—of English Language Arts, which is subdivided into four areas, with corresponding definitions:

- *Information Literacy* is the ability to access, interpret, evaluate, organize, select, produce and communicate information in and through a variety of media technologies and contexts to meet diverse learning needs and purposes.
- *Media Literacy* is the ability to understand how mass media, such as TV, film, radio and magazines, work, produce meanings, and are organized and used wisely.
- *Visual Literacy* is the ability to understand and interpret the representation and symbolism of a static or moving visual image—how the meanings of the images are organized and constructed to make meaning—and to understand their impact on viewers.
- *Critical Literacy* is the ability to understand how all speakers, writers, and producers of visual texts are situated in particular contexts with significant personal, social and cultural aspects.¹³⁹¹

The Media Awareness Network concluded its scan of curricular outcome statements and media literacy education, however, by stating: “Canada has come a long way in giving official recognition to media literacy, but there is still a long way to go before the subject is integrated fully into Canadian classrooms,” mainly due to lack of funding and inadequate professional development.¹³⁹² The major Media Awareness Network criticism of media literacy programs was the discrepancy between rhetoric and practice, since it was found that the programs lack a focus on critical analysis:

[T]he majority of ‘media’ courses still focus on using media as an educational tool, or using media to produce learning resources. Courses that focus on bringing critical thinking skills to popular culture, or on classroom strategies for media education, are beginning to grow in number but they are still relatively scarce [...]. The skills for distinguishing reality from fantasy, and for determining what the real messages are, who are behind the messages, and why—are becoming ever more important in an environment in which information, education, advertising and entertainment are becoming seamlessly interwoven.¹³⁹³

The Media Awareness Network suggested a range of topics that could better help focus critical thinking skills, and which it deems essential to media literacy. These topics include: stereotyping, bias, gender and minority portrayal; objectivity and point of view; fashion, advertising and self-image; questions of ownership and content; the globalization of media; the relationship between audience and content; the effects of interactivity; the protection of personal privacy; anonymity and identity; cyberhate—its tactics and motives; the impact of new technologies on personal communication; the potential of electronic democracy; freedom of expression versus censorship; and the skills to decode

¹³⁹¹ Media Awareness Network. *Media Education in Canada: An Overview*, accessed. pp. 1–2.

¹³⁹² Media Awareness Network. *Media Education in Canada: Introduction*, accessed.

¹³⁹³ Media Awareness Network. *Media Education in Canada: An Overview*, accessed. p. 2.

online marketing and to determine the differences between fact and opinion.¹³⁹⁴ Although the Network found that these topics are reflected, to some extent, in new curricula across the country, it remarked: “It will take years to filter down to mainstream classroom activity.”¹³⁹⁵ Again, this list of topics is very useful in providing a potential basis for assessing levels of media literacy in Canada that could then be reported in the CIW educated populace domain.

26.2.2 Canadian media literacy associations

Canada has a number of associations that work to “advocate, promote and develop” media literacy in Canada, using varying degrees of critical analysis—mostly within the formal education system.¹³⁹⁶ These include the Canadian Association of Media Education Organizations (CAMEO) and its members:

- British Columbia Association of Media Education (BCAME), Alberta Association for Media Awareness (AAMA), Media Literacy Saskatchewan (MLS), Manitoba Association for Media Literacy (MAML), Association for Media Literacy (AML) in Ontario, Association for Media Education Quebec (AMEQ), Media Literacy Nova Scotia (MLNS),¹³⁹⁷ Association for Media Literacy New Brunswick (A-4-ML NB), Association for Media Literacy Newfoundland and Labrador, as well as Centre de ressources en éducation aux médias (CREM)
- Concerned Children’s Advertisers (CCA)
- Jesuit Communication Project (JCP)
- Media Awareness Network (MNET)—the only on-line Canadian clearinghouse dedicated to media literacy

CAMEO has been active in media education issues, such as its successful action to keep the Youth News Network (YNN) from selling its commercial network to Canadian

¹³⁹⁴ Ibid., accessed.

¹³⁹⁵ Ibid., accessed.

¹³⁹⁶ Canadian Association of Media Education Organizations (CAMEO). *Website*, accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/CAMEO/>.

¹³⁹⁷ Media Literacy Nova Scotia was previously called Association for Media Literacy Nova Scotia (AML-NS). The Media Awareness Network reports the following: “Media Literacy Nova Scotia (MLNS)—formerly the Association for Media Literacy-Nova Scotia (AML-NS)—is struggling. This diverse group of parents, journalists, activists, filmmakers, teachers and academics joined together in 1992 to stop the Youth News Network (YNN) from selling its commercial news service to Nova Scotia schools. At its peak (in 1994) AML-NS had over a hundred members and actively supported media education in Nova Scotia through workshops, in-service training for parents and teachers, and a semi-annual newsletter, *The Mediator*. At present, the executive has disbanded and the organization is in the process of regrouping.” Kipping, Pat. *Media Literacy Nova Scotia*, Media Awareness Network, 2002; accessed January 2007; available from http://www.media-awareness.ca/english/resources/educational/media_education/professional_associations/ns_prof_association.ns.cfm.

schools.¹³⁹⁸ The Canadian Teacher's Federation explains the opposition to the Youth News Network:

The Canadian Teachers' Federation (CTF) has reaffirmed its strong opposition to YNN as a crass commercial venture and is committed to working with other national partners to make sure that YNN stays out of Canadian schools. [...] YNN, at first glance, seems attractive because it offers schools electronic equipment including televisions, VCRs, satellite dishes and computer equipment. But nothing is free. In exchange, YNN's news and commercial programming—10 minutes of news accompanied by 2.5 minutes of advertisements—is compulsory viewing for students. According to the Canadian Association of Media Education (CAMEO), 'the national movement that continues to oppose YNN rejects both the educational legitimacy and morality of forcing children to watch advertising during classroom time (in exchange for 'free' a/v equipment) as well as forcing them to watch news programming from unknown sources.'¹³⁹⁹

¹³⁹⁸ Pungente. *The Second Spring: Media Literacy in Canada's Schools*, accessed.

¹³⁹⁹ Canadian Teachers' Federation (CTF). *Press Release: Teachers Don't Want YNN [Youth News Network] in Schools*, March 1, 1999; accessed November 2006; available from <http://www.ctf-fce.ca/en/press/1999/pr41.htm>.

26.3 Adult media literacy

In 1993, Masterman critiqued conventional media for producing “a counterfeit culture which is a direct threat to genuine culture, and to authentic cultural values.”¹⁴⁰⁰ He noted that, although this situation continues to escalate, it actually began when advertising revenue replaced readers’ payments in the late nineteenth century—well before the introduction of television. At that time, the media demanded shorter attention spans in the audience by creating short, fragmented stories, attention-getting headlines, and less emphasis on information, and developed a preference “for the sensational expressed in slick, smart and superficial language.”¹⁴⁰¹ Criticism at the time deplored this change as an attack on the foundations of a serious reading public. Masterman saw this trend as essentially an “audience problem” and suggested the corruption of the audience by the media could be countered by the cultivation of media literacy in adults. He asserted that knowledge gained in media literacy studies must be critically applied outside of school settings and that, furthermore, if media education is to be of value, it must be a lifelong learning process.¹⁴⁰²

As previously noted, media literacy for adults is rarely addressed in the literature, although the term is not specific to any age.¹⁴⁰³ Everette Dennis, who reviewed the media literacy needs of adults, finds: “With few exceptions, virtually all inventories of research on media literacy, actual media literacy programs, and controversies concerning media literacy involve younger readers, listeners, and viewers.”¹⁴⁰⁴ She argues the importance of media literacy for adults noting that for the most part, mass media is produced “by adults, for adults, about adults,” and she observes that media literacy in children and youth is “not widespread enough to guarantee a media-literate adult populace anytime soon.”¹⁴⁰⁵ In addition, Dennis speculates:

With most [...] adults having no formal exposure to media literacy, whether as school children or college students, it can be assumed that few know much about the media they encounter, cope with, and depend on for news and information, opinion, and entertainment, as well as advertising and other commercial messages. The idea of an omnicompetent media-literate adult is hard to imagine, although media use across many new and evolving platforms—from traditional publishing and electronic media to wireless, broadband, and video on demand—continues to grow.¹⁴⁰⁶

But it is precisely such an “omnicompetent media-literate adult” that must be part of the definition of an “educated populace” and that the CIW educated populace domain should

¹⁴⁰⁰ Masterman, Len. “The Media Education Revolution,” *Canadian Journal of Educational Communication*, vol. 22, no. 1, 1993: 5-14. p. 6.

¹⁴⁰¹ *Ibid.* p. 6.

¹⁴⁰² *Ibid.*

¹⁴⁰³ Dennis, Everette E. “Out of Sight and Out of Mind: The Media Literacy Needs of Grown-Ups,” *The American Behavioral Scientist*, vol. 48, no. 2, 2004: 202-211.

¹⁴⁰⁴ *Ibid.* p. 202.

¹⁴⁰⁵ *Ibid.* p. 210.

¹⁴⁰⁶ *Ibid.* p. 207.

assess. Dennis notes that “audience studies” presently come closest to “media literacy studies,” although the former mostly document media use and have found a decline in newspaper readership and an increase in the proportion of adults using television more often as a source of news. Also, growing homogenization of the conventional media, which are owned by a few large corporations, and a lack of media diversity are prominent research concerns, although the Internet is now providing alternative news sources for those with access and an interest in exploring these sources. Dennis notes that those who get their news mainly from the Internet tend to be youth and high-Internet users.¹⁴⁰⁷

In the U.K., the 2003 Communications Act authorized the Office of Communications (Ofcom), the independent regulator for the U.K. communications industry, to promote media literacy within the population.¹⁴⁰⁸ Ofcom’s responsibility to promote media literacy involves the development of public understanding and awareness of:

... the nature and characteristics of material published by electronic media; the process by which materials are selected and made available; the systems by which access to materials is or can be regulated; and the systems by which the public may control what is received.¹⁴⁰⁹

We will look more closely at this new Ofcom audit below, with a view to assessing its potential applicability to Canada, and the potential utility of such a survey in providing data for indicators of media literacy in the CIW educated populace domain.

As part of its mandate, Ofcom commissioned a literature review on adult media literacy, authored by Sonia Livingstone, et al., which was released in 2005. Generally, the review found: “More work is needed to specify in detail the skills and expectations that ‘public understanding and awareness’ includes, together with the standards or levels of understanding and awareness that is considered desirable.”¹⁴¹⁰ These standards and levels are necessary to define as the basis for the development of assessments and indicators of media literacy in the CIW educated populace domain.

The framework of Livingstone, et al.’s review used Ofcom’s simple definition of media literacy—“the ability to access, understand and create communications in a variety of contexts.”¹⁴¹¹ The ability to access and create communications, including both broadcast and computer media, mainly focusses on inputs such as the skills and tools needed to access and use electronic media, find appropriate content, and protect against unwanted content. As such, this focus includes information retrieval and computer training, currently referred to as “information literacy.” Livingstone, et al. found that research in the area of “understanding” media is extensive and includes “audience studies.”

¹⁴⁰⁷ Ibid.

¹⁴⁰⁸ Livingstone, Sonia, Elizabeth Van Couvering, and Nancy Thumim. *Adult Media Literacy: A Review of the Research Literature*, London, Department of Media and Communications, London School of Economics and Political Science; Ofcom (Office of Communications), 2005; accessed October 2005; available from http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/?a=87101.

¹⁴⁰⁹ Ibid., accessed. p. 9.

¹⁴¹⁰ Ibid., accessed. p. 9.

¹⁴¹¹ Ibid., accessed. p. 2.

However, the findings, which are mostly from small-scale, qualitative research, are mixed. For example, the authors note:

Research on the audience's understanding of television content is divided between evidence pointing to a creative, sophisticated, 'media-savvy' audience and evidence pointing to an often forgetful, confused, biased or inattentive audience low in critical literacy skills.¹⁴¹²

Livingstone, et al. make a distinction between comprehending the content of media and critiquing media. Research concerning comprehension is extensive and encompasses the relationship between media and public perceptions of issues such as crime, the environment, news, health issues, and the family. Livingstone, et al. define "critical media literacy" as "the ability to evaluate texts and sources and to differentiate in levels of trust between them."¹⁴¹³ Research concerning critical evaluation of media by the public mainly looks at the public understanding of the news and generally finds a growing lack of interest by youth but a high level of trust in the objectivity of television news by the general public, which can indicate a lack of critical awareness. Research, according to Livingstone, et al., "raises concerns that audiences lack the more complex skills for a sufficiently discerning or critical understanding to deal with the highly sophisticated construction of media messages."¹⁴¹⁴ The authors also found that age, gender, socioeconomic status, ethnicity, and religion all affect media understanding.¹⁴¹⁵

The available research also places primary responsibility for low public understanding and awareness on the media industry itself, and it finds that media literacy results from the interaction between the audience's motivation and understanding and the "production, framing, and presentation of the news itself."¹⁴¹⁶ In general, the research suggests that "audience responses are subtle and discerning, yet also dependent in ways people do not always recognise on the journalistic conventions and economic imperatives that frame the media reporting."¹⁴¹⁷ Livingstone, et al. note that if a book is badly written, we do not say that the reader is illiterate if he or she cannot understand it.

If the news provides no accessible information about its sources, journalist conventions or editorial policy it is not the viewer who is at fault in struggling to evaluate the message. If a search engine appears to offer unbiased access to information resources while operating with commercial priorities invisible to the user, this limits how the user can critically evaluate the information accessed. Media literacy, in short, derives from an effective interaction between the public and the media—the term 'media literacy' is thus better thought of as referring to a process rather than a 'thing'. The effectiveness of this relationship may be both facilitated and impeded by individual or societal factors or by a range of

¹⁴¹² Ibid., accessed. p. 3.

¹⁴¹³ Ibid., accessed. p. 33.

¹⁴¹⁴ Ibid., accessed. p. 3.

¹⁴¹⁵ Ibid., accessed.

¹⁴¹⁶ Ibid., accessed. p. 38.

¹⁴¹⁷ Ibid., accessed. p. 34.

institutional, textual and technological factors, which shape the interface with the user or audience. [...]he changing conditions of advertising, sponsorship, branding, merchandising, paid-for-content, and other forms of promotion through broadcasting, the internet and mobile phones, set new literacy requirements. Little research exists on adults' critical awareness of such promotional practices.¹⁴¹⁸

Again, this analysis is useful in providing guidelines for the development of indicators of media literacy for the CIW educated populace domain. Livingstone, et al. consistently find research that correlates peoples' interest in the news with their understanding—"if they do not understand, they lose interest."¹⁴¹⁹ Viewer interest and critical understanding are reduced by violence in television news and by the lack of background information and historical context. A BBC study found media coverage of the news did not present either the basic facts or the bigger picture and, therefore, did not give people a clear basis for understanding the issues. In the study, people wanted journalists to cut through "the spin" and explain directly why the events were happening. They also wanted to understand the history and context of the issues.

Livingstone, et al. conclude that more research is needed into the extent to which people are aware of advertising's "promotional practices," and the extent to which the population understands the way media content is organized.¹⁴²⁰ Important considerations were identified:

What factors structure the field of information, opportunities and skills, so that some are disadvantaged, excluded, even vulnerable? What are the upper and lower bounds of the range of media literacy in society: how far behind can some be permitted to fall, how far ahead must some people get? [...] How can these differential levels of media literacy be assessed?¹⁴²¹

These are vital questions in the development of media literacy indicators for the CIW educated populace domain.

26.3.1 Canadian associations concerned with adult media literacy

Although most of the Canadian media literacy associations are concerned with media literacy within the formal school system, as noted above, a number of them also include media literacy projects for adult learners. For example, the former Association for Media Literacy-Nova Scotia (AML-NS) co-sponsored a project for adults that produced a workshop manual, a collection of resources, and an annotated guide.¹⁴²²

¹⁴¹⁸ Ibid., accessed. pp. 52–53, 60.

¹⁴¹⁹ Ibid., accessed.

¹⁴²⁰ Ibid., accessed. p. 50.

¹⁴²¹ Ibid., accessed. p. 52.

¹⁴²² Pungente, John. *The Second Spring: Media Literacy in Canada's Schools*, Media Literacy Review, 1997; accessed October 2005; available from http://interact.uoregon.edu/MediaLit/JCP/articles_mlr/pungente/secondspring.html.

In addition, the Media Foundation in Vancouver publishes *Adbusters* Magazine, which has 120,000 subscribers in more than 60 countries. *Adbusters* is a not-for-profit, reader-supported magazine “concerned about the erosion of our physical and cultural environments by commercial forces.”¹⁴²³ It also presents itself as an “ecological magazine, dedicated to examining the relationship between human beings and their physical and learning environment.”¹⁴²⁴

The National Film Board of Canada (NFB) has produced a number of films that deal with issues in media literacy, including the following three video resource packages, which were designed to be used by teachers in classrooms, but which are also relevant for adults:

1. *Images and Meaning* is an anthology of nine NFB productions, which can be used to spark discussion and learning in media literacy courses.
2. *Media and Society* is a video package that consists of 19 NFB films or film excerpts, in the form of short documentaries, animated films, and advertisements, as well as a 124 page Resource Guide, which includes activities, interviews with filmmakers, backgrounds on the films, student handouts, articles and quotes. The package looks at media in contemporary society under four main topics: Advertising and Consumerism, Images of Women, Cultural Sovereignty, and Shaping the Truth.
3. *Constructing Reality* is an anthology of films, film excerpts, interviews, original production material, and an in-depth Resource Guide for use in senior media literacy classes. It deals with truth, fact, objectivity and the nature of propaganda in the media. It is organized in six sections: The Documentary Process, The Viewing Experience, Documentary Traditions, The Search For Truth, Many Voices, and New Directions.¹⁴²⁵

The CBC has also produced videos and teachers’ guides on various aspects of television including children’s television, and television and the consumer.

¹⁴²³ Adbusters Magazine. *Website*, Adbusters Media Foundation, accessed October 2005; available from http://www.adbusters.org/network/about_us.php.

¹⁴²⁴ Ibid., accessed.

¹⁴²⁵ Pungente. *The Second Spring: Media Literacy in Canada's Schools*, accessed.

26.4 Media literacy standards and measurement

Livingstone, et al. found in their literature review on adult media literacy that the literature contains few “highly-regarded models” of evaluation studies, studies that track changes, or longitudinal studies.¹⁴²⁶ They conclude with news that is not favourable for the development of reliable media literacy indicators for the CIW educated populace domain:

[I]t is difficult to determine the specific factors that improve (or undermine) media literacy among the population. The lack of resolution, as yet, on the basis for standards (or the definition of levels) of media literacy also hampers assessment of changes in media literacy over time.¹⁴²⁷

Nevertheless, researchers, especially in Australia, Canada, and the U.S., have attempted to identify specific aspects of media analysis and to measure these quantitatively.¹⁴²⁸ In an earlier report, Livingstone and Thumim reviewed media literacy assessment literature drawing on diverse sources that “more-or-less indirectly reveal the nature and extent of adult media literacy.”¹⁴²⁹ The sources mainly concentrate on audiovisual and computer-based media. The findings suggest that there is little consensus on the most appropriate means to measure media literacy. Most of the work is based on small samples and concentrates on particular aspects of media literacy, such as access to media as a prerequisite to literacy, or technical skills, which are basically inputs rather than outcomes. In addition, most academic research is medium-specific, with different researchers specializing in particular media forms. This work does not try to identify or assess overall media literacy in the population per se, so estimates of scale are rare. As Livingstone and Thumim point out: “[T]here are no claims of the kind that, for example, 75% of people are literate in respect of x but only 30% are literate in respect of y.”¹⁴³⁰ Again, what is missing here is precisely the kind of measurement capacity we are seeking for indicators of media literacy in the CIW educated populace domain.

David Buckingham, who recently released a literature review of the media literacy of children and youth, found few criteria to measure media literacy in this population.¹⁴³¹

¹⁴²⁶ Livingstone, Couvering, and Thumim. *Adult Media Literacy: A Review of the Research Literature*, accessed. p. 56.

¹⁴²⁷ Ibid., accessed. p. 57.

¹⁴²⁸ Hobbs, Renee. *The Acquisition of Media Literacy Skills among Australian Adolescents*, Eugene, Media Literacy Review, Media Literacy Online Project, University of Oregon, 2005; accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/mlr/readings/articles/hobbs/australia.html>.

¹⁴²⁹ Livingstone, Sonia, and Nancy Thumim. *Assessing the Media Literacy of U.K. Adults: A Review of the Academic Literature*, Broadcasting Standards Commission, Independent Television Commission, NIACE, 2003.

¹⁴³⁰ Ibid. p. 9.

¹⁴³¹ Buckingham, David. *The Media Literacy of Children and Young People: A Review of the Research Literature*, Centre for the Study of Children, Youth, and Media Institute of Education, University of London; Ofcom (Office of Communications), 2005; accessed October 2005; available from http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/?a=87101.

We do not know if young people today are more media literate than young people twenty years ago, although such claims are often made. Nor do we have any broad agreement about how media literate they actually need to be. Are young people sufficiently media literate to cope with the changing demands of contemporary society? And on what basis could such a judgment be made?¹⁴³²

Again, such findings are not good news for our efforts to develop indicators of media literacy for the CIW educated populace domain.

Assessment of media education within formal schooling is usually based on achievement tests in the classroom, performance tasks, and teacher discretion. In addition, jurisdictions that have developed standards generally do so in order to clarify expectations, rather than to develop a “strict rote map” for assessments.¹⁴³³ Canadian educator Chris M. Worsnop has been especially active in helping teachers develop “authentic assessments in media education.”¹⁴³⁴ He distinguishes between assessments and evaluation by defining assessments as qualitative, educational measures that pinpoint individual student performance and that function as helpful diagnostic and formative learning tools.¹⁴³⁵ Evaluations, on the other hand, are large-scale, quantitative measures that focus on the group, set values on assessment information, and are most useful to administrators, politicians, and parents. According to Worsnop, the outcome of assessment is information while the outcome of evaluation is a statistic.¹⁴³⁶

The National Communication Association in the U.S. has developed general standards for media literacy in a first attempt to develop a “certified national standard.”¹⁴³⁷ It has developed competency statements according to three dimensions of communication competence—knowledge, behaviours, and attitudes—which it has then applied to five standard outcomes. These outcomes demonstrate knowledge and understanding of the ways people use media in their personal and public lives; of the complex relationships among audiences and media content; of the fact that media content is produced within social and cultural contexts; of the commercial nature of media; and of the ability to use media to communicate to specific audiences.¹⁴³⁸ That U.S. model might also have potential applicability to the development of a framework for media literacy indicators in the CIW educated populace domain.

¹⁴³² Ibid., accessed. p. 31.

¹⁴³³ Worsnop, Chris M. *Assessment in Media Education*, Reading Online, International Reading Association, Inc, 2000; accessed October 2005; available from <http://www.readingonline.org/newliteracies/worsnop/index.html - menu>.

¹⁴³⁴ Worsnop, Chris M. *Assessing Media Work: Authentic Assessment in Media Education*, Mississauga, ON: Wright Communications, 1996.

¹⁴³⁵ Worsnop. *Assessment in Media Education*, accessed.

¹⁴³⁶ Ibid., accessed.

¹⁴³⁷ Scharrer, Erica. "Making a Case for Media Literacy in the Curriculum: Outcomes and Assessment," *Journal of Adolescent & Adult Literacy*, vol. 46, no. 4, 2002: 354-358.

¹⁴³⁸ National Communication Association (NCA). *Competent Communicators: K-12 Speaking, Listening, and Media Literacy Standards and Competencies*, NCA, 1998; accessed October 2005; available from <http://www.natcom.org/nca/Template2.asp?bid=257>, p. 3.

The U.K. Department for Culture, Media and Sport produced a “Media Literacy Statement” in 2001 in which it emphasized the importance of “critical viewing skills” as an outcome for media literacy.¹⁴³⁹ These skills, which constitute a typology that can also contribute to a framework for media literacy indicators in the CIW educated populace domain, include the ability to:

- distinguish fact from fiction, including the ability to identify differing degrees and genres of realism
- understand the mechanisms of production and distribution which result in propaganda
- distinguish reportage from advocacy, weigh evidentiary standards, and recognise and assess commercial messages in programmes and advertising
- recognise the economic, cultural and presentational imperatives in news management
- explain and justify media choices in order to inform choice and sustain appropriate degrees of critical distance¹⁴⁴⁰

The research suggests there may not be simple “right answers” to questions of skill levels. In the following example, which illustrates one reason that it has been so difficult to date to develop comprehensive and impartial assessments of media literacy, Livingstone and Thumim suggest that it is not always obvious which group is “more literate.”

[I]n analysing focus group discussions about talk shows, Livingstone and Lunt found that some people are sophisticated in their critique of the genre (for its lack of objectivity, representativeness or balance); yet at the same time they are blind to the values of the genre which are important to—and equally well articulated by—others (such as its inclusiveness, diversity and authenticity of expression). These two groups thus differ in the skills and expectations they bring to bear in evaluating the genre, and so make different choices in their everyday lives. There are also clear demographic correlates of these different positions (the former being more male, middle-class and older than the second). [...] Are viewpoints expressed in a talk show balanced or biased? Is a website propaganda or authoritative? Is the news objective or value-laden? Both children and adults should be equipped with criteria to make such decisions, but this is not the same as saying that everyone will reach the same conclusion, thereby posing problems for measuring ‘levels’ of literacy.¹⁴⁴¹

¹⁴³⁹ U.K. Department for Culture, Media and Sport. *A General Statement of Policy by the Department for Culture, Media and Sport on Media Literacy and Critical Viewing Skills*, Dept for Culture, Media and Sport, 2001., cited in: Livingstone, and Thumim. *Assessing the Media Literacy of U.K. Adults: A Review of the Academic Literature*.

¹⁴⁴⁰ Livingstone, and Thumim. *Assessing the Media Literacy of U.K. Adults: A Review of the Academic Literature*. p. 7.

¹⁴⁴¹ Ibid. pp. 18–19.

26.4.1 Large-scale quantitative measurements of media literacy

There are very few reports of large-scale quantitative measurements of media literacy in the literature. In 1991, Robin Quin and Barrie McMahon in Australia conducted the first comprehensive quantitative measurement of media literacy.¹⁴⁴² The researchers used outcome statements from syllabus documents as the basis for their measurement instrument. Tests were given to a random sample of 1,500 Grade 10 Western Australian students, where media analysis is an integral part of the curriculum in secondary schools. The students were given the tasks of analyzing part of a television situation comedy and analyzing newspaper advertisements. In order to enhance the precision of the measures, the evaluation instrument contained both open-ended questions and checklist instruments.

From the syllabus documents, ten stages, representing a continuum of difficulty or outcome level, rather than of age or grade level, were chosen to indicate key understandings in five categories—language, narrative, production techniques, target audience, and values. Quin and McMahon remark:

The ten levels of understanding identified on the continuum are not related to year levels, nor do they cover every aspect of the syllabus. The ten stages indicate key understandings only, and do not offer a comprehensive summary of the syllabus. Although there is no nexus between the grade levels of students and the ten stages of the continuum, year ten students (fifteen year olds) could be expected to perform at the higher levels of the continuum. The continuum identifies a content strand with the organisers of language and narrative, and a context strand containing the organisers of production / circulation, audiences and values. Ten levels of difficulty are identified for each organiser. The continuum was used to develop the appropriate tests and later as the basis for marking student work.¹⁴⁴³

Understanding symbols formed the least difficult part of the continuum in each of these areas and understanding cultural values formed the most difficult section. For example, the 10 key outcomes for the language strand—arranged from least to most difficult—were as follows:

1. Identifies simple iconic symbols (e.g., no smoking signs).
2. Links simple arbitrary symbols to their meaning (e.g., ring and marriage).
3. Identifies symbolic significance of colour, gesture, expression. Identifies symbolic use of music, voice style. Distinguishes one shot from the next in the sequence.
4. Selects appropriate images to establish a given mood. Identifies shot types (e.g., closeup, pan).
5. Recognizes the organization of symbols into codes. Links shot types to a purpose (e.g., establishing shot). Selects and organizes images and sound to match a given mood.

¹⁴⁴² Quin, Robyn, and Barrie McMahon. "Evaluating Standards in Media Education," *Canadian Journal of Educational Communication*, vol. 22, no. 1, 1993: 15-25.

¹⁴⁴³ Ibid. pp. 16–17.

6. Identifies editing techniques for continuity. Identifies the emotive value of language, especially as it applies to race and gender. Identifies the emotive effect of a given montage (e.g., advertising).
7. Identifies medium-specific conventions in continuity editing (e.g., eyeline matches).
8. Links some codes to cultural values. Recognizes the interdependence of visual and verbal codes in the construction of meaning (e.g., voice and appearance of newsreader credibility).
9. Recognizes the values operating in a given product (e.g., the values in a family sit-com).
10. Analyzes a complete media product in terms of the cultural values it reflects / projects (e.g., the patterns, codes, and conventions of a complete news program).¹⁴⁴⁴

Results of trial tests were used to distinguish between levels of responses, and tests were marked by trained coders. Quin and McMahon note:

The results gave us information about students' strengths and weaknesses, their position on the continuum of outcome statements, and their position in relation to others in the sample. In addition, the results offered information about the differences in performances of males and females; those from English speaking backgrounds compared to those from non-English speaking backgrounds; those of Aboriginal extraction compared with those from nonAboriginal backgrounds, and heavy consumers of television compared with light users.¹⁴⁴⁵

Most of the students performed at levels 4 and 5 and could identify elements such as character types and stereotypes. However, less than 10% of the students demonstrated the higher critical analysis skills required for levels higher than 6 on the continuum. These levels related to cultural values and meanings of text. The results showed that schooling had imparted basic skills but, as the researchers concluded, "unless students develop the capacity to make the link between particular media texts and the broader cultural context, the skills have little value."¹⁴⁴⁶

Subsequent studies of media literacy have often used the methodology developed by Quin and McMahon because it has been seen as a viable approach to measuring media literacy skills that actually relates to levels of competency.¹⁴⁴⁷ For example, in 2003, Hobbs and Frost conducted the first large-scale empirical work measuring media literacy skills in the United States.¹⁴⁴⁸ They designed a measurement protocol based on both the procedures and instruments used by Quin and McMahon, and on their own previous 1999

¹⁴⁴⁴ Quin, Robyn, and Barrie McMahon. *Groundbreaking Assessment from Australia*, Eugene, Media Literacy Review, Media Literacy Online Project, University of Oregon, 1994; accessed October 2005; available from <http://interact.uoregon.edu/MediaLit/mlr/readings/articles/standard.html>. pp. 1–2.

¹⁴⁴⁵ Quin, and McMahon. "Evaluating Standards in Media Education." p. 18.

¹⁴⁴⁶ Quin, and McMahon. *Groundbreaking Assessment from Australia*, accessed. p. 2.

¹⁴⁴⁷ Hobbs. *The Acquisition of Media Literacy Skills among Australian Adolescents*, accessed.

¹⁴⁴⁸ Hobbs, Renee, and Richard Frost. "Measuring the Acquisition of Media-Literacy Skills," *Reading Research Quarterly*, vol. 38, no. 3, 2003: 330-355.

study.¹⁴⁴⁹ The test was given to 293 students in Grade 11 English classes in media / communications as well as to 89 students in a control group who had not studied media education. The researchers distinguished skills that demonstrated comprehension, writing, and message analysis. Questions were based on 5 analysis skills, which teachers commonly use to strengthen critical-thinking skills. These were identified as:

1. the ability to identify a message's purpose and target audience
2. identification of techniques used to construct the message
3. identification of values and point of view
4. identification of information omitted from a message
5. comparison-contrast between messages using similar formats¹⁴⁵⁰

The students responded to questions that referred to a print, news-magazine article, a radio news commentary, and a television news segment targeted at teenagers. The Viewing Comprehension and Analysis Test asked the following 8 questions in Table 17.

¹⁴⁴⁹ Hobbs, Renee, and Richard Frost. "Instructional Practices in Media Literacy Education and Their Impact on Students' Learning," *New Jersey Journal of Communication*, vol. 6, no. 2, 1999: 123-148.

¹⁴⁵⁰ Hobbs, and Frost. "Measuring the Acquisition of Media-Literacy Skills." p. 338.

Table 17. Viewing Comprehension and Analysis Test

After viewing the news story about Hurricane Andrew, answer the following questions below:	
1. Write a sentence or two to describe the main idea of this broadcast. Use the WHO, WHAT, WHERE, WHEN, WHY, and HOW structure to explain the main ideas.	
2. What was the most memorable information?	
3. Identify three relevant questions, facts, or pieces of information that were omitted from the message.	
4. What was the purpose of this message? (check all that apply) ___ to inform ___ to entertain ___ to persuade ___ for self-expression ___ to make money ___ to teach	
5. What techniques were used to attract and hold your attention?	
6. What values or points of view were represented in this message?	
7. List three ways that this news story was similar to and three ways it was different from local or national television news.	
8. Who was the target audience for this message? (check all that apply) ___ 2- to 11-year-olds ___ men ___ 12- to 17-year-olds ___ women ___ 18- to 25-year-olds ___ 25- to 40-year-olds ___ poor people ___ 40- to 60-year-olds ___ working-class people ___ 60- year-olds and older ___ middle-class people ___ upper-middle-class people ___ wealthy people Whites Blacks Hispanics Asians Other	

Source: Hobbs, Renee, and Richard Frost. "Measuring the Acquisition of Media-Literacy Skills." *Reading Research Quarterly*, 38, no. 3 (2003): 330-55, p. 355.

Coders were given a list of acceptable answers to look for. For example, question 5 asked, "What techniques were used to attract and hold your attention?" For the television segment, points were awarded for answers that included reference to specific use of language, imagery, sound or music, production values, camera movement, voice quality, editing, graphs, informative content, or the use of emotional appeals. Hobbs and Frost noted that "the ability to recognize the constructedness of various forms of texts [is a] central concept in media literacy education."¹⁴⁵¹

The ability to identify omitted information, as in question 3, is seen as important for identifying points of view and is a measurement of strategic, higher order comprehension since the student is required to connect new ideas to the topic. Question 7 uses a comparison-contrast technique, which is a fundamental strategy to promote critical thinking. In reference to question 7, the researchers noted:

Similarities included the use of interviews, maps and graphs, anchor people addressing the viewer directly, taped footage from on location, voice-overs

¹⁴⁵¹ Ibid. p. 351.

explaining visuals, rapid editing, and dramatic statistics. Differences included the use of dramatic music, a wider variety of ethnic groups represented, teenagers as anchors, teens and young people interviewed on camera, rapid editing, and more depth of detail.¹⁴⁵²

One of the important contributions of this study was the ability to use generic critical thinking skills across three formats—print, radio, and television. The study found, in part, that students in the media literacy classes “were more likely to recognize the complex blurring of information, entertainment, and economics that are present in contemporary nonfiction media” when compared with the control group. The media literacy students also had a better understanding of identifying an author’s multiple purposes and intended target audiences.¹⁴⁵³ Replication of a form of this study in Canada would be useful to assess the degree to which formal media literacy education in Canadian schools is effective in enhancing media literacy skills—which in turn could provide a potential indicator for the CIW educated populace domain. However, because of the need to view a television segment, the open-ended questions, and the difficulty coding answers, this evaluation format would not be useful for large-scale assessments of media literacy in the adult population.

26.4.2 Measurement for non-school settings

Hobbs and Frost stress that it will be important in the future to measure whether the media literacy skills learned in school transfer to experiences in non-school settings.¹⁴⁵⁴ Behaviour change in non-school settings is considered a social outcome of effective formal media education in schools. However, Scharrer points out that enhanced critical thinking may not always lead to behaviour change or resistance to the effects of media.¹⁴⁵⁵

We may criticize a movie for being too violent or graphic but still be interested in an exiting action sequence or suspenseful plot. We may be well aware that media characters have body sizes that bear little resemblance to that of the general public, but we may still have a lapse in self-esteem as we watch them. We may know that the news media doesn’t allot much airtime to third-party political candidates, but we still get the impression from news viewing that such candidates don’t stand a chance of election.¹⁴⁵⁶

Scharrer also suggests that resistance to media effects may not be an appropriate outcome of media literacy since any resistance achieved over time might also decay over time mainly “due to the onslaught of potentially competing information from the media themselves,” and the amount of time people watch television and spend with types of

¹⁴⁵² Ibid. p. 343.

¹⁴⁵³ Ibid.

¹⁴⁵⁴ Ibid.

¹⁴⁵⁵ Scharrer. "Making a Case for Media Literacy in the Curriculum: Outcomes and Assessment."

¹⁴⁵⁶ Ibid. p. 356.

media.¹⁴⁵⁷ The amount of exposure to media literacy education may pale by comparison with the exposure to television and other media that continually reinforce the very symbols, images, messages, and stereotypes that media literacy education may attempt to critique.

Outcomes that Scharrer finds useful to assess—and which could also contribute to the development of assessment instruments and future indicators of media literacy in the CIW educated populace domain—are increased knowledge of key concepts in media literacy and increased awareness of central issues. Examples could include:

[K]nowledge of strategies used in advertising to encourage favorable responses; awareness of the ways that violence is shown in the media that make it look cool; or attention to roles that women, people of color, and other ‘minorities’ are given in the media. [...] Overall, if a student develops the ability to ‘deconstruct’—break down the components of and closely analyze—media messages, practices, processes, institutions, or influence, then media literacy has been effective and that student is becoming a ‘critical thinker’ about the media.¹⁴⁵⁸

26.4.3 U.K. adult media literacy audit

As noted above, the U.K. Communications Act 2003 authorized the Office of Communications (Ofcom), the independent regulator for the U.K. communications industry, to promote media literacy within the population.¹⁴⁵⁹ Ofcom defines media literacy simply as “the ability to access, understand and create communications in a variety of contexts.”¹⁴⁶⁰ Ofcom’s responsibility involves the development of public understanding and awareness of the content of (mostly) electronic media, the processes involved with the selection of material, and public regulation systems. To this end, between June and August 2005, Ofcom administered the first adult media literacy audit in the U.K. to 2,357 adults aged 16 and over in face-to-face interviews in their homes. In addition, it also conducted separate audits for children, and members of ethnic minority groups.¹⁴⁶¹ Ofcom presented results of the audit in 2006.

The media literacy audit focusses on “access, understanding, and creation” of electronic communications in media formats which Ofcom refers to as “platforms.”¹⁴⁶² Specifically, the media formats or platforms audited were television, radio, the Internet, and mobile phones, and in particular Ofcom was mainly, though not exclusively, interested in digital formats. Ofcom notes that its definitions of access and understanding are wider than those

¹⁴⁵⁷ Ibid.

¹⁴⁵⁸ Ibid. p. 357.

¹⁴⁵⁹ Livingstone, Couvering, and Thumim. *Adult Media Literacy: A Review of the Research Literature*, accessed.

¹⁴⁶⁰ U.K. Office of Communications (Ofcom). *Media Literacy Audit. Report on Adult Media Literacy*, 2006; accessed November 2006; available from http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/medialit_audit/. p. 3.

¹⁴⁶¹ Ibid., accessed.

¹⁴⁶² Ibid., accessed. p. 4.

in current usage. Access goes beyond simple availability of “platforms,” such as television or the Internet, and includes “interest, awareness, usage, and competence”¹⁴⁶³ relating to each platform. Understanding includes processes such as how content (e.g., television and radio programmes, or Internet websites) are funded and regulated.¹⁴⁶⁴ Creation includes issues such as knowledge of how to create a website, which only relate to the Internet. Ofcom lists the “key” or “core” elements of media literacy as:

- Interest in (digital) features (specific features prompted)
- Awareness of (digital) features of interest
- Competence (for tasks of interest)
- Knowledge of content controls [e.g., parental controls of programmes available to children; ability to block computer viruses or spam]
- Concern (platform generically)
- Knowledge of industry funding / regulation [e.g., license fees, advertising]
- Trust in news outlets
- Creating content (only for the Internet)¹⁴⁶⁵

Our review finds that the Ofcom media literacy audit takes an instrumental approach, and attempts to include critical thinking are extremely limited. As well, the focus on whether a respondent was interested in, aware of, and competent in the use of specific instrumental features on each platform are mainly input features, rather than outcomes of media literacy learning. The audit was designed to answer questions such as: “[I]s the level of an individuals’ competence in using the features available on a given platform related to how long they have owned the device and how often they use it?”¹⁴⁶⁶ To this end, in the “access” sections, the U.K. audit measures ownership of the platform instrument, frequency of use, and the main uses for each platform (e.g., for entertainment, to get information, or to receive and send emails).

Also, in the access sections, interest, awareness, and competence are measured by asking about specific features available on each platform—such as programming digital television, recording programs, or setting up a menu of favourite channels. For example, in the Internet section, questions are asked concerning interest in, awareness of, and competence in using specific features available on the Internet, including using email, finding news, editing photos, or blocking computer viruses. Also under the access section, respondents were asked an open-ended question about concern: “Can you tell me if you have any concerns about what is on TV?” And, if the answer is yes, it asks an open-ended question: “What sorts of things are you concerned about?”¹⁴⁶⁷ It then asks: “Overall, how concerned are you about what is on TV?” with the responses ranging from not at all concerned to very concerned.

¹⁴⁶³ Ibid., accessed. p. 4.

¹⁴⁶⁴ Ibid., accessed.

¹⁴⁶⁵ Ibid., accessed. p. 15.

¹⁴⁶⁶ Ibid., accessed. p. 6.

¹⁴⁶⁷ U.K. Office of Communications (Ofcom). *Questionnaire - Ofcom Media Literacy Audit. All UK Adults Aged 16+, 2005*; accessed November 2006; available from http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/medialit_audit/adult_questionnaire.pdf. pp. 16–17.

The “understanding” sections ask basic questions about knowledge of regulation rules, such as whether the respondent knows if television or the Internet are regulated or not, and industry funding, such as whether the platform is funded by “advertising, license fees, government, programme sales to other countries, programme sponsorship, magazine, book / video / DVD sales, or other.”¹⁴⁶⁸

Trust in news outlets is the only area where critical media literacy is addressed, although Ofcom stresses the importance of critical thinking skills in media literacy:

At a more advanced level [media literacy] moves from recognising and comprehending information to the higher order critical thinking skills such as questioning, analysing and evaluating that information. This aspect of media literacy is sometimes referred to as ‘critical viewing’ or ‘critical analysis’.¹⁴⁶⁹

However, the indicator chosen to measure critical thinking skills is “trust in news outlets on each medium,” and “trust in internet sites.”¹⁴⁷⁰ The rationale used is:

Opinions about news across the different platforms provide a useful indicator of the extent to which people evaluate content according to the platform it is received from. It is also, of course, a key factor in democratic engagement and understanding, and as such [is] an important component of media literacy.¹⁴⁷¹

Respondents were asked to use a five-point scale to indicate the extent to which they “would trust” or “would not trust” particular news outlets. Ofcom explains that trust in the news is a neutral element of media literacy, and whether the result is high or low trust is not the concern of the audit. Ofcom remarks that the audit does not have a prescriptive agenda, but provides an overview of key constituent parts of medial literacy to act as a resource for policy makers and researchers. It acknowledges that media literacy is not related to higher “scores,” and analysis of the results are based on whether the elements of media literacy measured provide benefits or not.

Media literacy is not a ladder, whereby the more you ‘score’, the greater your media literacy. For example, it is not the case that higher levels of trust in news sources, or higher levels of concern about media, or higher levels of usage, necessarily indicate ‘greater’ or ‘lesser’ media literacy. [...] The ‘positive’ elements of media literacy, whereby higher levels of score are generally agreed to approximate with benefits, are interest, awareness, competence, breadth of use, knowledge and creation. The ‘contested’ or neutral elements of media literacy, whereby higher levels are not necessarily an indication of benefit, are concern, trust, and volume of use. We report on all of these elements together, to provide a

¹⁴⁶⁸ Ibid., accessed. p. 16.

¹⁴⁶⁹ U.K. Office of Communications (Ofcom). *Media Literacy Audit. Report on Adult Media Literacy*, accessed. p. 7.

¹⁴⁷⁰ Ibid., accessed. p. 8.

¹⁴⁷¹ Ibid., accessed. p. 65.

varied picture of the extent and range of media literacy. There is a further debate about whether a ‘lack’ of media literacy in these areas is necessarily a bad thing. ‘Rational rejection’¹⁴⁷² is a legitimate response to the digital world, if it is a response formed from knowledge and understanding of what is on offer.¹⁴⁷³

Results of the audit were not surprising. For example, television was the main platform in terms of interest and knowledge of specific features, and, in general, levels of interest, competence and usage were highest for the core, familiar functions of each platform. In general, those respondents with greater interest, awareness, and competence were those under the age of 45, males, those who are working, have higher incomes, and have children at home. Those with lesser interest, awareness, and competence were the opposite—those over the age of 45, females, and those not working, having lower income, and no children at home.¹⁴⁷⁴ Ofcom summarizes the results:

[A]n individual with a higher level of interest in the digital features of a platform is likely to have a higher level of awareness of those benefits, a greater breadth of use of the possible tasks, and a higher degree of competence for platform tasks. Because these elements are related to each other, it is also true that an individual with a lower level of interest is likely to have a lower level of awareness of digital features, less breadth of use and a lower degree of competence.¹⁴⁷⁵

The highest area of concern was about offensive content, and this concern rises with age, i.e., older people are more concerned about offensive content than are younger people. Knowledge of industry funding and regulations were higher for television than for the Internet. Young adults, ages 16–24, show the highest levels of media literacy, in terms of competence and use, but not in terms of knowledge of regulations and funding. However, three fourths of U.K. adults responded correctly to questions about television funding and regulation. For trust in the news, results showed that 78% of adults trusted television news, 8% did not trust it, and 14% did not know. For Internet news websites: 76% of adults trusted them, 7% did not trust them, and 17% did not know. And for newspapers: 46% of adults trusted them, 27% did not trust them, and 27% did not know.¹⁴⁷⁶

Prior to reviewing the audit, we had hoped that the Ofcom Adult Media Literacy Audit could provide a potential model for a Canadian composite index of media literacy. However, the instrumentalist approach and lack of significant content for critical media literacy make its usefulness to the CIW limited.

¹⁴⁷² Ofcom defines “rational rejection” as “a lack of engagement by people due to their decision that the benefits of the technology are insufficiently attractive or compelling.” Ibid., p. 9.

¹⁴⁷³ U.K. Office of Communications (Ofcom). *Media Literacy Audit. Report on Adult Media Literacy*, accessed. p. 9.

¹⁴⁷⁴ Ibid., accessed. p. 27.

¹⁴⁷⁵ Ibid., accessed. p. 26.

¹⁴⁷⁶ Ibid., accessed.

26.5 Canadian attitudes and behaviour surrounding the news media and media credibility

The Canadian Media Research Consortium (CMRC) is a partnership of three universities including the UBC School of Journalism, the York Ryerson Graduate Program in Culture and Communications, and Centre d'études sur les médias at Université Laval. The Consortium “promotes economic, social and cultural research on Canadian media and communications issues.”¹⁴⁷⁷

In 2004, the CMRC released the first independent national survey of Canadian attitudes and behaviour regarding news media and media credibility.¹⁴⁷⁸ The survey interviewed 3,012 Canadian adults to determine what they think about the news they are getting, and whether or not they trust the media. The researchers also worked with the U.S. based Pew Research Center for the People and the Press, which has a 30-year track record of doing this type of investigation, in order to make Canadian comparisons with U.S. data. Although the survey does not measure media literacy, some elements of it are relevant to assessments of media literacy. Some of the results of the survey include the following:

Use and source of news:

- 67% of Canadians watch television news daily and 42% of Canadians read a newspaper every day. Nearly 90% watch television news several times a week, while only 6% never watch the news;
- 57% of Canadians listen to radio news daily for news;
- 67% of Canadians rarely or never use the Internet for news. Of the 33% who do use the Internet for news, many use the websites of mainstream media. Groups who are most likely to use the Internet for news every day are Canadians under the age of 35 with a university education and incomes over \$75,000. The percentage of Americans who use the Internet for news three or more days a week is up from 23% in 2000 to 29% in 2004.

Perception of news credibility, accuracy, and bias:

- 59% of Canadians felt the news “gets the facts straight” and is accurate.¹⁴⁷⁹ “This finding is rather surprising considering that according to content analyses completed in the United States, approximately one in two newspaper stories contain at least one error.”
- 37% thought the news is often fair and balanced, however, 62% felt the opposite. 19% thought the news is seldom or never balanced.

¹⁴⁷⁷ Canadian Media Research Consortium (CMRC). *Website*, Vancouver, CMRC. The Consortium is a partnership of three universities: the UBC School of Journalism, the York Ryerson Graduate Program in Culture and Communications, and Centre d'études sur les médias at Université Laval, accessed October 2005; available from <http://cmrccrm.ca/english/index.html>.

¹⁴⁷⁸ Logan, Donna, Fred Fletcher, Angus Reid, Colette Brin, Stephen Ward, and Mary Lynn Young. *Report Card on Canadian News Media*, Canadian Media Research Consortium (CMRC), 2004; accessed October 2005; available from <http://cmrccrm.ca/english/research.html>.

¹⁴⁷⁹ Accuracy is defined as lacking in factual errors, and subjective errors such as over-emphasis, under-emphasis, or other omissions.

- 74% of Canadian youth, ages 19 to 25, saw a lack of balance in news reporting at least sometimes.
- Almost 80% of Canadians think that reporters' bias influences news often or sometimes.
- 54% of Canadians think the news media try to cover-up their mistakes; 34% think the media are willing to admit mistakes; and 68% of Canadians aged 19–25 think the news media try to cover up mistakes.
- When asked questions about sensationalism, 92% of Canadians reported seeing sensationalism in the news, and 63% of those respondents said sensationalism affects their trust in the news media.¹⁴⁸⁰

Perceptions of news independence:

- 19% of Canadians thought news organizations were mostly independent. However, 76% of adult Canadians overall and 81% of youth, aged 19 to 25, thought that news organizations are often influenced by powerful people and organizations.
- The group most frequently mentioned as exerting influence on the news was political interests (42%), which included local and federal governments, politicians and bureaucrats.
- The second-largest group (27%) involved economic interests, including people with money and perceived influence, businesses and large corporations.
- 12% of Canadians saw media owners as influencing the news, and 56% of Canadians saw consolidation of media ownership as having a negative impact on their trust in the media.
- Other groups that were seen as influencing the news were lobby groups (12% of Canadians), advertisers (4%), and protest groups (3%).

Influence of the media on the country and its ability to solve problems:

- 48% of Canadians believe the news media help society solve problems.
- In the United States, only 31% of Americans have that opinion.¹⁴⁸¹

The results above, which are among the few statistics available on the subject, indicate the great need for assessments of media literacy. In the absence of effective evaluations of media literacy, as discussed earlier, the results above are reproduced in the accompanying indicator report. Needless to say, no pretence is made that these results represent the adequate, reliable, and consistent data that are really needed to assess media literacy in Canada, and for which several useful frameworks have been suggested in our earlier discussion.

However, the above results do serve a purpose in spurring the development of good media literacy indicators. After all, if most Canadians think that the news is generally not fair and balanced, that the media try to cover up their mistakes, that reporters' bias influences reporting, that news sensationalism reduces their trust, and that news

¹⁴⁸⁰ Sensationalism is defined as exaggeration or focus on emotional details in order to attract attention or make a point.

¹⁴⁸¹ Logan, Fletcher, Reid, Brin, Ward, and Young. *Report Card on Canadian News Media*, accessed.

organizations are not independent but subject to influence by powerful people and organizations, then there is clearly a serious problem in public perceptions of the media and a correspondingly pressing need for Canadians to be able to evaluate the media critically and effectively. This is especially true if, as the above results show, more than two-thirds of Canadians watch television news daily and nearly 90% watch it several times a week. An influence and source of informal learning as pervasive as this in Canadians' daily lives requires careful analysis and genuine understanding.

David Buckingham argues that media industries often conduct research (such as that cited above), which they do not make available in the public domain, and he calls for a renewed dialogue between academic researchers and these organizations in order to access this information.¹⁴⁸² In light of the scepticism and lack of trust of media news organizations revealed in the CMRC survey, it is perhaps not surprising that such evidence is suppressed by the media organizations themselves. However, this illustrates the great need for reputable data gathering agencies like Statistics Canada to become involved in media literacy evaluations. This is also essential for the development of adequate indicators of media literacy for the CIW educated populace domain.

¹⁴⁸² Buckingham. *The Media Literacy of Children and Young People: A Review of the Research Literature*, accessed.

26.6 Media use in the home

Peter Worth and Donald Roberts, of Stanford University, call for more effective evaluation of school-based media literacy. They also point out that since most media use occurs in the home, making families aware of critical media literacy practices and skills is an important step in helping both adults and children become media literate. In this case, from an evaluation, indicator, and measurement perspective, finding ways to measure such media literacy abilities in the home will become essential.¹⁴⁸³

MediaPulse, the collaborative effort between the Media Awareness Network and the Canadian Paediatric Society cited above, provides a guide for health practitioners that includes an assessment tool for measuring both media use by children in the home and also their parents' involvement in that use.¹⁴⁸⁴ We have included these *MediaPulse* survey questions in Appendix 19, since they are relevant to our discussion, even though they provide media use rather than media literacy evaluations.

The Media Awareness Network initiated the Young Canadians in a Wired World (YCWW) research project in 2000 that tracks and investigates the behaviours, attitudes, and opinions of Canadian children and youth with respect to their use of the Internet.¹⁴⁸⁵ In 2000–01, it conducted two surveys as part of Phase I of the project, which were the first surveys of their kind in Canada: “Young Canadians In A Wired World: The Parents’ View;” and “Young Canadians In A Wired World: The Students’ View.”¹⁴⁸⁶ The first surveyed 1,100 parents, and the second surveyed 5,682 Canadian students aged 11 to 17. The surveys investigated Internet use among Canadian youth, exploring what they do online, how they perceive the Internet, and what they know about it.

Results showed widespread knowledge of and use of the Internet by Canadian youth that surpassed that of their parents. The survey results also showed a discrepancy between what parents thought the children were doing and what they actually were doing, and they found areas of risk such as “children and youth using private and adult chat rooms, meeting Internet acquaintances in person, being exposed to sexually explicit and hateful material and sharing personal information.”¹⁴⁸⁷ Again, these results indicate the pressing need for media literacy education and measures in this field, so that both students and parents are better able to understand and evaluate Internet use critically, and so that this understanding is regularly tracked.

¹⁴⁸³ Worth, Peter L., and Donald F. Roberts. *Evaluating the Effectiveness of School-Based Media Literacy Curricula*, Stanford University, 2004; accessed October 2005; available from http://ldt.stanford.edu/~pworth/papers/effectiveness_medialit.doc, p. 15.

¹⁴⁸⁴ MediaPulse. *MediaPulse: Measuring the Media in Kids’ Lives: A Guide for Health Practitioners*, Media Awareness Network and Canadian Paediatric Society, 2003; accessed October 2005; available from http://www.media-awareness.ca/english/special_initiatives/media_pulse/resources_publications.cfm.

¹⁴⁸⁵ Media Awareness Network. *Young Canadians in a Wired World - Phase II Overview*, 2005; accessed November 2005; available from <http://www.media-awareness.ca/english/research/YCWW/phaseII/>.

¹⁴⁸⁶ MediaPulse. *MediaPulse: Measuring the Media in Kids’ Lives: A Guide for Health Practitioners*, accessed.

¹⁴⁸⁷ Ibid., accessed.

Phase II of the research project, considered “the most comprehensive and wide-ranging study of its kind in Canada,” explored new areas of interest and updated initial findings from the 2001 baseline study.¹⁴⁸⁸ This phase of the project was initiated in 2003 with focus group discussions on the survey content, which were followed in 2005 with a second national student survey, conducted by ERIN Research, in consultation with an international advisory committee, in classrooms that had participated in the 2001 Phase I study. In Phase II, 5,200 students were surveyed to understand how their online activities, behaviours, and attitudes had changed since 2001.

This phase found that “an astonishing 94% of young people access the Internet from home, with students as early as Grade 4 beginning to rely on the Internet to explore social roles, stay connected with friends and develop their social networks.”¹⁴⁸⁹ This compares with 79% of students in 2001 who had Internet access from home. The survey found the same hazards as the Phase I surveys, but also found more positive impacts of parental involvement, with the surveys showing an increase from 7% of students in 2001 to 13% of students in 2005 reporting parental involvement in their Internet use. Despite this increase in parental involvement, it is noteworthy that the vast majority of Canadian youth report no parental involvement in their Internet use, again pointing to the great need for media literacy education in this area in schools so that students are better able to understand the various aspects (including hazards) of Internet use.

¹⁴⁸⁸ Media Awareness Network. *Young Canadians in a Wired World - Phase II Overview*, accessed.

¹⁴⁸⁹ *Ibid.*, accessed.

27. Statistics Literacy

Mary Townsend from Statistics Canada comments that statistics are ubiquitous:¹⁴⁹⁰

We live in an environment where data are everywhere. Graphs, charts, rates, percentages, probabilities, averages and forecasts are part of our everyday life. People are becoming accustomed to seeing the results of surveys reported in the daily press, incorporated in messaging by advertisers, mentioned by political and social analysts and used by economic forecasters.¹⁴⁹¹

But does the public understand what is being presented by statistics, what they mean, how they are constructed, and how to use them in daily life? These questions are critical for the Canadian Index of Wellbeing as well, since the CIW presents trends and results in statistical terms, and will require that Canadian policy makers and members of the public are able to access, understand, and analyse the results properly and effectively, and use them to make policy and improve wellbeing. Statistical literacy is a key dimension of an educated populace, and assessing Canadians' statistical literacy—their ability to understand and use statistics—is properly part of the CIW educated populace domain.

Iddo Gal, of the University of Haifa, elaborates on the public need for statistics literacy:

Statistical literacy is a key ability expected of citizens in information-laden societies, and is often touted as an expected outcome of schooling and as a necessary component of adults' numeracy and literacy [...]. It is needed if adults are to be fully aware of trends and phenomena of social and personal importance: crime rates, population growth, spread of diseases, industrial production, educational achievement, or employment trends. It can contribute to people's ability to make choices, when confronted with chance-based situations (e.g., buying lottery tickets or insurance policies, and comprehending medical advice). It can support informed participation in public debate or community action.¹⁴⁹²

In an attempt to demystify statistics for the public, sociologist Joel Best wrote the book *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists*.¹⁴⁹³ In it, Best makes the point that statistics are socially constructed, which

¹⁴⁹⁰ Townsend, Mary. *Symposium 2003: Challenges in Survey Taking for the Next Decade: Developing Statistical Literacy in Youth*, Session 8, Education Outreach Program, Statistics Canada, Catalogue no. 11-522-XIE, 2003; accessed December 2005; available from <http://www.statcan.ca:80/english/freepub/11-522-XIE/11-522-XIE2003001.htm>.

¹⁴⁹¹ Ibid., accessed. p. 2.

¹⁴⁹² Gal, Iddo. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities," *International Statistical Review*, vol. 70, no. 1, 2002: 1-25. p. 3.

¹⁴⁹³ Best, Joel. *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists*, Berkeley, CA: University of California Press, 2001. Best takes the title from the well-known phrase, "lies, damned lies, and statistics," which was first uttered by Benjamin Disraeli and subsequently popularized by Mark Twain. From: Schield, Milo. "Information Literacy, Statistical Literacy, Data Literacy," *IASSIST*

simply means that people choose what to count or measure, and that someone is doing the counting.¹⁴⁹⁴ He notes that we often conceptually confuse statistics with numbers: Since numbers don't lie, we assume the same of statistics. After all, a statistic is a number and numbers seem factual and proof that someone counted something.¹⁴⁹⁵ Best suggests that statistics are often thought of as "little nuggets of truth that we uncover, much as rock collectors find stones."¹⁴⁹⁶ However, he recommends that a better metaphor might be to think of statistics as jewels that "must be selected, cut, polished, and placed in settings so that they can be viewed from particular angles."¹⁴⁹⁷ He says, all statistics "are products of choices and compromises that inevitably shape, limit, and distort the outcome."¹⁴⁹⁸

Milo Schield, director of the W.M. Keck Statistical Literacy Project, notes that [s]tatistics are numerical summaries about things in reality," and as such they can be difficult to comprehend, can be misleading, and even completely untrue.¹⁴⁹⁹ Best remarks that in order to ascertain whether statistics are biased or inaccurate, the public needs to ask who produced the statistics, for what reason, and by which procedure. These are all elements of statistical literacy that could potentially constitute a framework for assessment. For example, Best describes the prevalence of "mutant statistics," which are originally produced within a specific context, but are then quoted by writers who do not include this context. These mutant statistics then acquire a life of their own as the secondary sources are erroneously cited and the meaning changed in the process. Best notes that people most often read these mutant statistics and assume them to be correct.¹⁵⁰⁰ That, in turn, would be a mark of statistical illiteracy.

In order to be able to sort the "wheat from the chaff" and make statistics meaningful, people need to be statistically literate. John Dewey's 1930s description of literacy, which he called *popular enlightenment*, could just as easily describe statistical literacy today. This is the ability to think for oneself, judge independently, and discriminate between good and bad information, rather than the ability to understand instructions and carry out procedures, as required in passive literacy.¹⁵⁰¹

Quarterly (International Association for Social Science Information Service & Technology), vol. 28, no. 2/3, 2004: 6-11. p. 7.

¹⁴⁹⁴ Best. *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists*.; Best, Joel. *More Damned Lies and Statistics: How Numbers Confuse Public Issues*, Berkeley, CA: University of California Press, 2004.

¹⁴⁹⁵ Best. *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists*.

¹⁴⁹⁶ Best, Joel. *People Count: The Social Construction of Statistics*, Joint Statistical Meetings (JSM) of the American Statistical Association (ASA), 2002; accessed December 2005; available from <http://www.statlit.org/PDF/2002BestASA.pdf>. p. 1.

¹⁴⁹⁷ Ibid., accessed. p. 1.

¹⁴⁹⁸ Ibid., accessed. p. 2.

¹⁴⁹⁹ Schield. "Information Literacy, Statistical Literacy, Data Literacy."

¹⁵⁰⁰ Best. *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists*.

¹⁵⁰¹ Moreno, Jerry L. *Toward a Statistically Literate Citizenry: What Statistics Everyone Should Know*, John Carroll University, 2002; accessed December 2005; available from http://www.stat.auckland.ac.nz/~iase/publications/1/1b6_more.pdf.

There are many definitions of statistical literacy. However, the definition given by Townsend, of Statistics Canada, captures the salient points. She believes that, in order to be statistically literate, people need to be able to:

- understand and interpret statistical data
- critically evaluate statistical information and data-related arguments
- use the information in the context of daily life
- be able to discuss or communicate one's reactions¹⁵⁰²

Schild notes that there are two key elements to understand about statistics: how they are assembled—that is, how the statistics are defined, selected, and presented—and the importance of context and confounding factors.¹⁵⁰³ Writing for the *IASSIST Quarterly* (International Association for Social Science Information Service & Technology), Schild includes information literacy and data literacy as key prerequisites for statistical literacy, because these forms of literacy are interrelated.¹⁵⁰⁴ He uses the definition of information literacy from the higher education competency standards endorsed by the Association of College and Research Libraries (ACRL), a division of the American Library Association (ALA):

Information literacy is a set of abilities requiring individuals to 'recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.'¹⁵⁰⁵

Furthermore, an information literate person has the ability to:

- determine the extent of information needed
- access the needed information effectively and efficiently
- evaluate information and its sources critically
- incorporate selected information into one's knowledge base
- use information effectively to accomplish a specific purpose
- understand the economic, legal, and social issues surrounding the use of information
- access and use information ethically and legally¹⁵⁰⁶

In addition, Schild suggests that students in a number of fields also need to be data literate, or able to access, convert, and manipulate data.¹⁵⁰⁷

¹⁵⁰² Townsend. *Symposium 2003: Challenges in Survey Taking for the Next Decade: Developing Statistical Literacy in Youth*, accessed. p. 2.

¹⁵⁰³ Schild. "Information Literacy, Statistical Literacy, Data Literacy." p. 7.

¹⁵⁰⁴ Ibid.

¹⁵⁰⁵ Association of College and Research Libraries. *Information Literacy Competency Standards for Higher Education*, American Library Association, 2000; accessed December 2005; available from <http://www.ala.org/ala/acrl/acrlstandards/informationliteracycompetency.htm>. pp. 2 – 3, cited in Schild. "Information Literacy, Statistical Literacy, Data Literacy." p. 6.

¹⁵⁰⁶ Association of College and Research Libraries. *Information Literacy Competency Standards for Higher Education*, accessed. pp. 2–3, cited in Schild. "Information Literacy, Statistical Literacy, Data Literacy." p. 6.

27.1 Statistical anxiety

Best and others believe that statistics and numbers intimidate most people, including journalists and reporters.¹⁵⁰⁸ For example, Onwuegbuzie and Wilson have studied statistical anxiety among university students and teachers and found “between two-thirds and four-fifths of graduate students appear to experience uncomfortable levels of statistics anxiety.”¹⁵⁰⁹ Here, statistical anxiety is defined as:

[A] performance characterized by extensive worry, intrusive thoughts, mental disorganization, tension, and physiological arousal [...] when exposed to statistics content, problems, instructional situations, or evaluative contexts, and is commonly claimed to debilitate performance in a wide variety of academic situations by interfering with the manipulation of statistics data and solution of statistics problems.¹⁵¹⁰

According to Onwuegbuzie and Wilson, this anxiety adversely affects the ability to analyze and interpret statistical data, and to fully understand reports using statistical data. Employing Gardner’s theory of multiple intelligences, Onwuegbuzie and Wilson identified teachers with statistical anxiety as those more oriented towards “special and interpersonal intelligence” and less oriented towards “linguistic and logical-mathematical intelligence.” They also found that females and older students tend to have the highest levels of statistical anxiety.¹⁵¹¹

According to Onwuegbuzie and Wilson, there are several instruments designed to measure attitudes toward statistics and statistics anxiety.¹⁵¹² However, they note that the majority of research on statistical anxiety use measures of mathematics anxiety, and, although the two are related, they are separate constructs. Therefore, they argue that a measure of mathematics anxiety is not valid for statistical anxiety. The scales that Onwuegbuzie and Wilson note were specifically designed to directly measure statistics anxiety include the Statistics Anxiety Scale (SAS), the Multifactorial Scale of Attitudes Toward Statistics (MSATS), the Statistics Anxiety Inventory (SAI), an unnamed instrument measuring statistics anxiety and attitudes developed by Zanakakis and Valenza, and the Statistics Anxiety Rating Scale (STARS). STARS is the scale that is used most

¹⁵⁰⁷ Schield. "Information Literacy, Statistical Literacy, Data Literacy." p. 8. More specifically, data literacy includes the ability to understand tools such as “structured query language (SQL), relational databases (e.g. MS Access), data manipulation techniques, statistical software (e.g., SPSS, STATA, Minitab and MS Excel) and data presentation software (e.g., MS Excel and MS PowerPoint).

¹⁵⁰⁸ Best. *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists*.

¹⁵⁰⁹ Onwuegbuzie, Anthony J., and Vicki A. Wilson. "Statistics Anxiety: Nature, Etiology, Antecedents, Effects, and Treatments—a Comprehensive Review of the Literature," *Teaching in Higher Education*, vol. 8, no. 2, 2003: 195–209. p. 195.

¹⁵¹⁰ Zeidner, M. "Does Test Anxiety Bias Scholastic Aptitude Test Performance by Gender and Sociocultural Group," *Journal of Genetical Psychology*, vol. 150, 1990: 175–185. p. 319. cited in Onwuegbuzie, and Wilson. "Statistics Anxiety: Nature, Etiology, Antecedents, Effects, and Treatments—a Comprehensive Review of the Literature." p. 196.

¹⁵¹¹ Onwuegbuzie, and Wilson. "Statistics Anxiety: Nature, Etiology, Antecedents, Effects, and Treatments—a Comprehensive Review of the Literature." p. 198.

¹⁵¹² Ibid.

often by researchers, and Onwuegbuzie and Wilson report that it the one that is considered most valid. The STARS scale is a 51-item, 5-point Likert-format measure that assesses six components of statistics anxiety, including:

- perceptions of the worth of statistics
- interpretation anxiety
- test and class anxiety
- computational self-concept
- fear of asking for help
- fear of teachers¹⁵¹³

Despite the prevalence of statistical anxiety, only a few investigators have investigated ways of reducing it. For example, a few studies have found that humour reduces statistical anxiety.¹⁵¹⁴ In a ranking of 16 anxiety-relieving factors, students mentioned humour third, after open-book tests and an instructor's positive and encouraging attitude.¹⁵¹⁵

¹⁵¹³ Ibid. p. 202.

¹⁵¹⁴ Schacht, S., and B.J. Stewart. "What's Funny About Statistics? A Technique for Reducing Student Anxiety," *Teaching Sociology*, vol. 18, 1990: 52–56.; and Wilson, Vicki A. "Reducing Statistics Anxiety: A Ranking of Sixteen Specific Strategies." Paper presented at the Annual Meeting of the Mid-South Educational Research Association, Point Clear, AL, November, 1999.

¹⁵¹⁵ Wilson. "Reducing Statistics Anxiety: A Ranking of Sixteen Specific Strategies."

27.2 What the educated public needs to know about statistics and probability

27.2.1 Framework for statistics literacy

According to Joan Garfield, new educational reforms have shifted the focus of much mathematics education from mathematical computation and procedures to an emphasis on statistical reasoning and thinking. Garfield defines statistical reasoning as:

[T]he way people reason with statistical ideas and make sense of statistical information. This involves making interpretations based on sets of data, representations of data, or statistical summaries of data. Much of statistical reasoning combines ideas about data and chance, which leads to making inferences and interpreting statistical results. Underlying this reasoning is a conceptual understanding of important ideas, such as distribution, centre, spread, association, uncertainty, randomness, and sampling.¹⁵¹⁶

In order to understand and interpret statistics, people need a rudimentary knowledge of mathematics, as noted above, but they also need other “knowledge elements.” Gal, who explored what adults (rather than students) need to know about statistics, developed a succinct model of statistical literacy that includes both a knowledge component and a dispositional component, which are both context dependent, and which together enable statistically literate behaviour. He argues that statistical literacy depends on possession of Gal describes the interrelated knowledge components as:

- literacy skills
- statistical knowledge
- mathematical knowledge
- context / world knowledge
- critical questioning skill¹⁵¹⁷

In addition, Gal includes a two-part dispositional component:

- critical stance
- beliefs and attitudes

We describe each of these elements below—some very briefly, where the meaning is clear, and others in more detail—since these five dimensions of statistical literacy could potentially contribute to the development of a framework for assessing statistical literacy in the CIW educated populace domain.

¹⁵¹⁶ Garfield, Joan. "Assessing Statistical Reasoning," *Statistics Education Research Journal*, vol. 2, no. 1, 2003: 22-38; accessed December 2005; available from [http://www.stat.auckland.ac.nz/~iase/serj/SERJ2\(1\).pdf](http://www.stat.auckland.ac.nz/~iase/serj/SERJ2(1).pdf).

¹⁵¹⁷ Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities." pp. 3–4.

Gal also argues that, although a statistically literate person does not need a sophisticated understanding of all of the above elements for applications of statistical understanding, at least a rudimentary understanding is necessary. He believes that statistical literacy “should be regarded as a set of capacities that can exist to different degrees within the same individual, depending on the contexts where it is invoked or applied.”¹⁵¹⁸ Contexts such as work, home, public discourse, and formal learning may require different aspects of statistical literacy.

Literacy skills

Literacy skills include understanding prose texts but also understanding documents and mathematics. They were first analysed in detail in the influential work of Kirsch, et al., and were subsequently assessed in the International Adult Literacy and Skills Survey, discussed briefly below.¹⁵¹⁹ Document literacy is an ability to identify, interpret, and use information displayed in lists, tables, indexes, schedules, charts, and graphical displays.

Statistical knowledge

Statistical knowledge includes knowledge of basic statistical and probabilistic concepts and procedures. Gal divides this knowledge base into five parts, which are described in greater detail below:

1. Knowing why data are needed and how data can be produced
2. Familiarity with basic terms and ideas related to descriptive statistics
3. Familiarity with basic terms and ideas related to graphical and tabular displays
4. Understanding basic notions of probability
5. Knowing how statistical conclusions or inferences are reached¹⁵²⁰

Knowing why data are needed and how data can be produced includes having some knowledge about the key “big ideas” that underlie statistical investigations, especially those involving variation, which Gal says provide the basis for accepting the use of statistical summaries. Data need to be reduced in order to identify key features and trends from within the noise and variation that could confuse the issue under investigation. In addition, adults need to understand the logic behind key research designs discussed in the media, which include censuses, polls, surveys, and experiments and control groups used to determine causal influences.

They also need to understand the difference between convenience sampling and probability sampling, inferences from samples to populations, the notions of

¹⁵¹⁸ Ibid. p. 20.

¹⁵¹⁹ Kirsch, I.S., A. Jungeblut, and P.D. Mosenthal. "The Measurement of Adult Literacy," in *Adult Literacy in OECD Countries: Technical Report on the First International Adult Literacy Survey*, ed. Murray, S.T., I. S. Kirsch and L.B. Jenkins, 105-134. Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 1998. cited in Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities." p. 8.

¹⁵²⁰ Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities." p. 10.

representation and bias in sampling, and the influence of the sampling process, sample size, and sample composition on the researcher's ability to generalize about a population from the data. To take just one example, if a given sample size is sufficient to make statistically valid generalizations about the general population, it may be insufficient to make valid generalizations about males vs. females, or about youth, the elderly, the unemployed, or other sub-samples, which involve reduced sampling numbers.

Familiarity with basic terms and ideas related to descriptive statistics such as percents, means or averages, and medians. Specifically, the public needs to understand that simple summary indices may give different and sometimes conflicting views of the same phenomena. They also need to understand that means are affected by extreme values more than are medians, and that:

... measures of the center can mislead when the distribution or shape of the data on which they are based is uneven or bi-modal, or when the data or sample from which they are calculated is not representative of the whole population under study.¹⁵²¹

Misunderstandings on these issues are very common. For example, when an increase in average income is reported, few Canadians are likely to understand that this increase may be almost entirely driven by the gains of the rich while most Canadians are actually losing real income, as occurred in Canada in the 1990s.¹⁵²²

Familiarity with basic terms and ideas related to graphical and tabular displays means that adults should know that data can be illustrated in graphs and tables, which organize the information and enable the detection or comparison of trends in the data. They should also know how to recognize mistakes such as the relative length of bars not being proportional to the actual percentages reported, and they should be able to look at overall patterns and not only at specific points on the graph or table.

Understanding basic notions of probability is important because standard statistical inference is based on probability, which describes the variation that is expected in repeated samples from the same population. Probability statements regarding chance or random events are included in many reports such as the likelihood of obtaining certain results, e.g., specific diseases. Professionals, such as weather forecasters, genetic counsellors, and physicians commonly predict the likelihood of events such as rain, risks, and side effects, and some of these predictions may be made on the basis of subjective estimates rather than probabilistic studies.

Gal suggests that adults should understand terms such as percents, odds, ratios, or verbal estimates that are used in probability estimates. In addition, they should understand the notion of randomness, including that events vary in their degree of predictability and can

¹⁵²¹ Ibid.

¹⁵²² Dodds, Colin, and Ronald Colman. *Income Distribution in Nova Scotia*, Genuine Progress Index Atlantic (GPI Atlantic), 2001; accessed March 2005; available from <http://gpiatlantic.org/>.

be unpredictable, and that co-occurrence of certain events does not necessarily mean they are related or causal. In addition, estimates may vary in terms of credibility and accuracy.

Knowing how statistical conclusions or inferences are reached requires an understanding that errors or biases can occur in sampling, measurement, and inference, and that these errors can be controlled through research design and can be estimated and described by means of probability statements such as the “margin of error,” which is often listed in media reports without explanation. Also, attention to the size of group studies, the quality of the sampling process, and the possibility of bias in a sample can help determine the significance of a difference between groups. Finally, it is important for adults to understand the concept of statistical validity and to know that observed differences or trends may exist but may not be large enough to be important.¹⁵²³

Mathematical knowledge

Mathematical knowledge is the third knowledge element that Gal describes. He explains that only a basic knowledge of math is needed for the public to understand statistics in a limited way. The public does need to understand the different types of numbers used in statistics, such as large numbers used in GDP trends and small numbers, including fractions, decimals, and percents. They should also know how an arithmetic mean is computed and that a mean can be influenced by extreme values and may not represent the “middle” of a set of values—as in the average income example cited on the previous page. Also, they should be aware that percents can have multiple meanings and statistical uses. That is, a percent may be expressed as a number, a relationship, a statistic, a function, or an expression of likelihood, and may be linked to concepts that also have multiple meanings such as “15% below average,” or “2% margin of error.” They should also understand the difference between a percentage increase or decrease and a percentage point increase or decrease. Terms often used in the media such as “margin of error” and “statistically significant difference” can be understood superficially in an intuitive way without extensive formal mathematical training.¹⁵²⁴

Context / world knowledge

Context / world knowledge has to do with placing information into context in order to make it meaningful. However, the ability to do this depends on the level of detail and clarity supplied about the background of the information. As a key component of statistical literacy, therefore, people need to have a sense of the elements of good journalistic writing and accuracy in reporting. For example, if a journalist does not supply the context for some statistical material in a media report, then the public needs to rely on its own knowledge of the world in order to reflect critically upon the statistical message and its implications.¹⁵²⁵

¹⁵²³ Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities." p. 10.

¹⁵²⁴ Ibid.

¹⁵²⁵ Ibid.

Critical questioning skills

Critical questioning skills are necessary in order to understand that statistical messages and their context, as communicated in the media, are shaped by political, commercial, or other agendas, which may not be entirely objective. Data can be manipulated to serve various needs. For example, using absolute numbers (e.g., 2,500 people nationwide suffer from X) may make something appear more significant, while using incidence rate (e.g., 1 in every 100,000 people suffer from X) will downplay the importance. The public has to examine the veracity of the claims, and be concerned about the validity of messages as well as the credibility of the underlying evidence. Gal cites an article in *Newsweek*, that selectively analyzed and intentionally manipulated trend data that had been collected by the Institute for Social Research (ISR):

Newsweek attempted to create a sense of national danger by reporting that the use of LSD is ‘rising alarmingly’ and that for the first time since 1976, more high school seniors used LSD than cocaine. However, analysis of the ISR data on which *Newsweek* based this argument showed that this argument had no empirical basis. Cocaine use decreased from 6.5% in 1989 to 5.3% in 1990, a statistically significant change (given sample size used), whereas LSD use increased from 4.9% to only 5.4%, which was within the range of sampling error. The contrast between these figures, which were available to *Newsweek*, and the narrative and graphs used in the articles published, suggest an intentional misuse of data and highlights the media’s tendency for sensational reporting practices.¹⁵²⁶

In order to support the process of critical evaluation of statistical messages, Gal developed a list of “worry questions” that readers and observers can ask about the issues of concern to them. These questions are reproduced in Table 18 below.

¹⁵²⁶ Ibid. p. 16.

Table 18. Sample “worry questions” about statistical messages

1. Where did the data (on which this statement is based) come from? What kind of study was it? Is this kind of study reasonable in this context?
2. Was a sample used? How was it sampled? How many people did actually participate? Is the sample large enough? Did the sample include people / units, which are representative of the population? Is the sample biased in some way? Overall, could this sample reasonably lead to valid inferences about the target population?
3. How reliable or accurate were the instruments or measures (tests, questionnaires, interviews) used to generate the reported data?
4. What is the shape of the underlying distribution of raw data (on which this summary statistic is based)? Does it matter how it is shaped?
5. Are the reported statistics appropriate for this kind of data, e.g., was an average used to summarize ordinal data; is a mode a reasonable summary? Could outliers cause a summary statistic to misrepresent the true picture?
6. Is a given graph drawn appropriately, or does it distort trends in the data?
7. How was this probabilistic statement derived? Are there enough credible data to justify the estimate of likelihood given?
8. Overall, are the claims made here sensible and supported by the data? e.g., is correlation confused with causation, or a small difference made to loom large?
9. Should additional information or procedures be made available to enable me to evaluate the sensibility of these arguments? Is something missing? e.g., did the writer ‘conveniently forget’ to specify the base of a reported percent-of-change, or the actual sample size?
10. Are there alternative interpretations for the meaning of the findings or different explanations for what caused them, e.g., an intervening or a moderator variable affected the results? Are there additional or different implications that are not mentioned?

Source: Gal, Iddo. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities." *International Statistical Review*, 70, no. 1 (2002): 1-25, p. 16.

Gal refers to dispositions as necessary elements for statistical literacy and the ability to think critically.¹⁵²⁷ Dispositions consist of three related but distinct concepts: critical stance, beliefs, and attitudes.

Critical stance

Critical stance suggests a questioning attitude toward statistical information that, intentionally or unintentionally, may be misleading, biased, one-sided, or incomplete in some way.

[The public] should be able and willing to spontaneously invoke their personal list of worry questions [see Table 18 above] when faced with arguments that purport to be based on data or with reports of results or conclusions from surveys or other empirical research.¹⁵²⁸

Beliefs and attitudes

Beliefs and attitudes are similar but distinct. Based on the work of McLeod,¹⁵²⁹ Gal says that beliefs have less emotional intensity and a larger cognitive component than attitudes, and are also more resistant to change than attitudes. He distinguishes them as follows:

Attitudes are relatively stable, intense *feelings* that develop through gradual internalization of repeated positive or negative emotional responses over time. Attitudes are expressed along a positive-negative continuum (like-dislike, pleasant-unpleasant), and may represent, for example, feelings towards objects, actions, or topics ('I don't like polls and pollsters, they always confuse me with numbers').

Beliefs are individually held *ideas* or opinions, such as about a domain ('government statistics are always accurate'), about oneself ('I am really naïve about statistical information,' 'I am not a numbers person'), or about a social context ('the government should not waste money on big surveys'). Beliefs take time to develop and cultural factors play an important part in their development.¹⁵³⁰

In order to develop statistical literacy, Gal suggests that adults need to appreciate the power of the statistical process, have a view of themselves as capable of critical analysis, and be comfortable with "temporary confusion or a state of uncertainty."¹⁵³¹

¹⁵²⁷ Ibid.

¹⁵²⁸ Ibid. p. 18.

¹⁵²⁹ McLeod, Douglas B. "Research on Affect in Mathematics Education: A Reconceptualization.," in *Handbook of Research on Mathematics Teaching and Learning: A Project of the National Council of Teachers of Mathematics*, ed. Grouws, Douglas A., Ch. 23: pp. 575-596. New York: Macmillan, 1992. cited in Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities."

¹⁵³⁰ Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities." p. 18.

¹⁵³¹ Ibid.

27.3 Commonly misunderstood statistical topics

Using a model similar to Gal's, Jessica Utts, a statistics professor of the University of California, lists seven commonly misunderstood topics that she argues every educated citizen and journalist needs to understand about elementary statistics.¹⁵³² These topics are also based on the need to understand how statistical studies are conducted and interpreted, rather than the need to learn calculations or to conduct statistical studies. Utts warns that a lack of understanding of these key issues can lead to public cynicism and the misuse of study results by policy makers, physicians, and others. These seven topics can again make a contribution to the development of a framework for indicators of statistical literacy in the CIW educated populace domain. We look at each of these topics below, with definitions provided by Utts, in some detail, since these topics could inform instruments for the evaluation of statistical literacy in the general populace.

1. Cause and effect

"When it can be concluded that a relationship is one of cause and effect, and when it can not, including the difference between randomized experiments and observational studies."¹⁵³³

Utts claims that the confusion between causes and correlations is probably the most common misinterpretation of statistical studies in the news. A relationship may be statistically significant, which is a technical term. However, in observational studies, it is rarely appropriate to state that one variable caused another, since there may be other possible confounding variables that could also account for the observed relationship. A causal relationship can be concluded only under restrictive conditions such as those in large randomized experiments.

2. Statistical significance and practical importance

"The difference between statistical significance and practical importance, especially when using large sample sizes."¹⁵³⁴

Utts notes that large sample sizes can show statistically significant differences but often these differences are too small to make a practical difference to the public. Utts gives an example of a *New York Times* article that reported: "People who spend even a few hours a week online have higher levels of depression and loneliness than they would if they used the computer network less frequently."¹⁵³⁵ Upon closer inspection, the magnitude of difference was very small for those who used the Internet less frequently. For example, "On a scale from 1 (more lonely) to 5, self-reported loneliness decreased from an average

¹⁵³² Utts, Jessica. "What Educated Citizens Should Know About Statistics and Probability," *The American Statistician*, vol. 57, no. 2, 2003: 74-79.

¹⁵³³ Ibid. p. 74

¹⁵³⁴ Ibid. p. 74.

¹⁵³⁵ Ibid.

of 1.99 to 1.89, and on a scale from 0 (more) to 3 (less), self-reported depression decreased from an average of .73 to .62.”¹⁵³⁶

According to Utts, a related problem is the multiple analysis problem—when multiple comparisons are done but only those that seem to have “statistical significance” are reported as if those were the only ones tested. In another report, Schield also points out that factors that are “statistically significant” in one study may turn out to be insignificant when another factor is taken into account in a multivariate regression and vice versa.¹⁵³⁷

Milo Schield emphasizes that readers often think a big difference means a big effect and a big ratio means a big difference.¹⁵³⁸ He gives the following examples:

[People] hear that ‘The sun is about 5 million miles closer to the earth at its closest than at its furthest’; they mistakenly conclude that difference is so big that it causes the seasons: the difference between summer and winter. In fact, that difference is less than 5% of the average distance and it does not cause the seasons [...]. They hear that, ‘In the US in 1998, the synthetic-drug arrest rate was twice as high in the West (10 per 100,000) as in the Midwest (5 per 100,000).’ An innumerate reader mistakenly concludes this big ratio (twice as high) means there is a big difference when the actual difference is only 5 such arrests per 100,000 people.¹⁵³⁹

3. Low power versus no effect

“The difference between finding “no effect” or “no difference” and finding no statistically significant effect or difference, especially when using small sample sizes.”¹⁵⁴⁰

Small sample sizes generally cannot be said to show whether or not a relationship or difference is “statistically significant.” A finding of “no difference” can simply mean that the study did not have the power to find a difference. Utts gives the following example:

Suppose a study is done to determine whether more than a majority of a population has a certain opinion, so the test considers $H_0 : p = .5$ versus $H_a : p > .5$. If in fact as much as 60% of the population has that opinion, a sample size of 100 will only have power of .64. In other words, there is still a 36% chance that the null hypothesis will not be rejected. Yet, reporters often make a big deal of the fact that a study has ‘failed to replicate’ an earlier finding, when in reality the

¹⁵³⁶ Ibid. p. 75.

¹⁵³⁷ Schield, Milo. "Statistical Prevarication: Telling Half Truths Using Statistics." Paper presented at the IASE/ISI (International Association of Statistical Educators/ International Statistical Institute) Satellite meeting, Sydney, Australia, April 4 -5, 2005; accessed December 2005; available from <http://www.stat.auckland.ac.nz/~iase/publications/14/schild.pdf>. p. 6.

¹⁵³⁸ Ibid.

¹⁵³⁹ Ibid. p. 1.

¹⁵⁴⁰ Utts. "What Educated Citizens Should Know About Statistics and Probability." p. 75.

magnitude of the effect mimics that of the original study, but the power of the study was too low to detect it as statistically significant.¹⁵⁴¹

In another example, a meta-analysis of eight studies on the effectiveness of mammography as a screening device found that women aged 40–49 showed no reduction in breast cancer in the first 5–7 years after study entry. The meta-analysis concluded that there was no reduction in breast cancer that can be attributed to screening. Utts points out that this conclusion is misleading since the “confidence interval for the relative risk after seven years of follow-up was .85 to 1.39, with a point estimate of 1.08.” This indicates that either there may be a small reduction in mortality or a slight increase.¹⁵⁴²

Garfield observes that students often assume that good samples have to represent a high percentage of the population.

While the Law of Large Numbers guarantees that large samples will be representative of the population from which they are sampled, students’ intuitions tell them that it is the ratio of the sample size to the population that is more important to consider. Many believe that it does not matter how large a sample is or how well it was chosen, but that it must represent a large percentage of a population to be a good sample. Therefore, they may be skeptical about a sample that is very large, but represents a small percentage of the population. They do not realize that well-chosen samples do a good job of representing a population, even if the ratio sample size to population size is small.¹⁵⁴³

4. Bias in surveys and media messages

“Common sources of bias in surveys and experiments, such as poor wording of questions, volunteer response, and socially desirable answers.”¹⁵⁴⁴

There are many ways that bias can enter into surveys, such as the way the questions are worded and the order in which questions are asked. Issues that are brought to mind first may influence subsequent answers. Utts gives an example of a poll that asked two related questions: “Do you favor or oppose teaching creationism ALONG WITH evolution in public schools?” and “Do you favor or oppose teaching creationism INSTEAD OF evolution in public schools?” In response to the first question, 68% of the respondents said they were in favor, while in response to the second question, 40% of the respondents said they were in favor. Depending on the point of view of a reviewer, these results could be reported that either 68% or 40% of the respondents were in favor of creationism being taught in the schools.¹⁵⁴⁵ Similarly, *GPLAtlantic’s* Work Hours report notes that dramatically different response rates have been received to questions about voluntary

¹⁵⁴¹ Ibid. p. 76.

¹⁵⁴² Ibid.

¹⁵⁴³ Garfield, Joan. “The Challenge of Developing Statistical Reasoning,” *Journal of Statistics Education*, vol. 10, no. 3, 2002: 1-9. p. 4.

¹⁵⁴⁴ Utts. “What Educated Citizens Should Know About Statistics and Probability.” p. 75.

¹⁵⁴⁵ Ibid. p. 75.

work hours reductions depending on how the questions are asked and what kind of background information is provided.¹⁵⁴⁶

Gal explains that “message originators” may want to convince the reader or listener of a particular point of view and may therefore use one-sided arguments, present selective information, or use modifiers (e.g., “a startling 5% gain [...]”) to create the desired impression.¹⁵⁴⁷ Schield presents the following example of bias, which shows that statistics can be used accurately, but at the same time they can be slanted to create a certain “spin”:

Consider two views of a proposed tax cut.

1. The Republican math shows the tax cut as ‘an even cut across the board.’ The rich—those with incomes of \$200,000 and over—get a 2.9% tax cut.
2. The Democratic math shows the same tax cut as ‘a select few get the benefits.’ The rich—those with incomes of 200,000 and over—get 28% of the tax cut.

How can the rich get only a 2.9% tax cut and yet get 28% of the tax cut? It seems they can get either 2.9% or 28% but not both. The answer is that these are two different kinds of percentages. The 3% tax cut is a percentage change; the 28% is a part-whole percentage share. The key word is ‘of’ which introduces the whole or the pie—the entire tax cut, so the 28% is their share of the total tax cut. The keyword ‘cut’ is ambiguous. In the percentage change, ‘cut’ is the change or the difference. In the percentage share, ‘cut’ is the whole that is being distributed among the income classes as parts. At this level there is no prevarication even though an innumerate reader may not understand the difference. Both sets of statistics can be true for the same group of people at the same time. But suppose we asked, ‘What fraction of the tax cut goes to the rich?’ If the Republicans replied, ‘The rich only get a tax cut of 3%’ then they would be prevaricating. Suppose we asked, ‘What is the reduction in taxes for the rich?’ If the Democrats replied, ‘The rich will get 28% of the tax cut’, then they would be prevaricating. In each case, the respondents told a truth, but not the whole truth relevant to the question being asked.¹⁵⁴⁸

5. Probable coincidences

“The idea that coincidence and seemingly very improbable events are not uncommon because there are so many possibilities.”¹⁵⁴⁹

¹⁵⁴⁶ Pannozzo, Linda, and Ronald Colman. *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, Halifax, Genuine Progress Index Atlantic (GPI Atlantic), 2004; accessed April 2004; available from <http://www.gpiatlantic.org/>.

¹⁵⁴⁷ Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities."

¹⁵⁴⁸ Schield. "Statistical Prevarication: Telling Half Truths Using Statistics." p. 2.

¹⁵⁴⁹ Utts. "What Educated Citizens Should Know About Statistics and Probability." p. 75.

Utts reports that it is not easy to calculate precise probabilities for coincidences, but it is possible to calculate an approximate order of magnitude. One of the frequent mistakes that occurs is that coincidences are often cited but no mention is made of the topics that did not match.¹⁵⁵⁰ She notes that, given that there are over 6 billion people in the world, if something has a probability of one in a million of happening to any particular person on a given day, it will happen, on average, to over 6,000 people in the world, each day.

Garfield provides an example of how people misunderstand the concept of chance. Stressing that people estimate the likelihood of an event “based on how closely it resembles the population,” she argues:

Therefore, a particular sequence of n tosses of a fair coin that has an approximately even mix of heads and tails is judged more likely than a sequence with more heads and fewer tails. For example, the result HTHHTT is judged as a more likely sequence of 6 tosses of a fair coin than HTHHHH. Another example of this misconception is the Gambler’s Fallacy, which is found in people who believe that after a long series of heads when tossing coins, a tail is more likely to occur on the next toss than another head. This is a fallacy, because if the coin is fair, then the probability of getting a head or a tail on the next toss is equally likely [...].

Another example is when students are asked to compare the chances of getting different outcomes of three dice rolls, students tend to judge as equally likely the chance of rolling three fives and the chance of obtaining exactly one five. However, the probability of rolling one five is higher than the probability of obtaining three fives, because there are several ways to roll one five, and only one way to roll three fives.¹⁵⁵¹

6. Confusion of the inverse

“‘Confusion of the inverse,’ in which a conditional probability in one direction is confused with the conditional probability in the other direction.”¹⁵⁵²

Utts illustrates this with an example from the medical profession. If a lump is truly malignant, mammograms are 80% accurate, but 20% of the time they will report that the lump is benign. On the other hand, if the lump is truly benign, 90% of the time the results will be accurate, but 10% of the time they will show a false positive rating. The question is, given that a woman with a lump in her breast may have a 1% chance of it being malignant, and when she is given a mammogram test the results are positive, what are the chances that it is actually malignant? The response from most of the physicians in the study cited said that the probability that the woman had cancer was approximately 75% when the correct answer should have been a 7.5% chance that she had cancer. What the

¹⁵⁵⁰ Ibid. p. 77.

¹⁵⁵¹ Garfield. "The Challenge of Developing Statistical Reasoning." p. 4.

¹⁵⁵² Utts. "What Educated Citizens Should Know About Statistics and Probability." p. 75.

physicians had done was assumed that the probability of cancer given that the x-ray was positive was the same as that of a patient who actually had cancer. According to Utts, “the physicians confused the probability of a positive test given that the woman has cancer with the probability that the woman has cancer *given* that the test was positive.”¹⁵⁵³

To clarify further: out of 100,000 people, the probability that a patient has cancer is 1% or 1,000 people out of 100,000. Of these 1,000 with cancer, 800 (80%) would have test results that showed malignancy and 200 (20%) would have false test results that showed the lump was benign. Of the 100,000 people, 99% of them (99,000) would not have cancer and, of those, 90% of the people, or 89,100, would have tests that showed the lump to be benign. Those whose lump was actually benign but who received a false positive test would be 10% of the 99,000 people or 9,900 people. Of those who received the positive test, 800 and 9,900, or a total of 10,700 people, only 800 actually had a real malignancy. The result is that of the 10,700 whose test showed a malignancy, only 800, or 7.5% of those with the positive tests actually had a malignancy. Because there were so many more women with lumps that were benign compared with those that were malignant, the 10% of those with a false positive test (9,900) made up the majority of positive test results.¹⁵⁵⁴

Clearly, if physicians are making the type of statistical errors that Utts notes, there are very serious practical consequences. They may be over-diagnosing cancer and over-prescribing treatments that are not necessary. It is particularly disturbing to find such statistical illiteracy among highly educated professionals with post-graduate degrees. In other words, statistical literacy and its assessment is not a luxury since the lack of it—namely statistical illiteracy—can have serious implications that affect people’s lives. Tracking levels of statistical literacy in the CIW educated populace domain can potentially provide educators with important information on those areas that most require remedial interventions and educational reforms, on the educational levels at which such interventions can be most useful, and on population groups where higher levels of literacy are most necessary.

In a similar example provided by Schield, a person who sees a claim that an HIV-1 test is 99.9% accurate might conclude that this means that 99.9% of those who test positive have AIDS (HIV antibodies). However, the 99.9% accuracy means accuracy in confirmation. In other words, 99.9% of those who do have HIV antibodies will test positive. Schield explains:

[I]f the person being tested is a member of a group where the actual incidence of AIDS is very low (say one in 1,000), then 50% of the people in that group who test positive will be false positives [...]. The 50% is accuracy in prediction: 50% of those who test positive will have AIDS. The term ‘accuracy’ is equivocal and

¹⁵⁵³ Ibid. p. 77.

¹⁵⁵⁴ Ibid. p. 77.

so the related statistic is a half-truth. This ambiguity in ‘% accuracy’ makes the related claim a statistical prevarication.¹⁵⁵⁵

7. Average versus normal

“Understanding that variability is natural, and that ‘normal’ is not the same as ‘average.’”¹⁵⁵⁶

For example, according to Utts, a normal rainfall is variable and can be shown in summary numbers that represent the low, first quartile, median, third quartile, and high values over a period of time. If these number go from 6.1 inches as a low value, to 12.1 inches in the first quartile, 16.7 inches in the median, 25.4 inches in the third quartile, and 37.4 inches as a high value over a period of time, a new rainfall amount of 29.7 inches at another time would be within a normal range. A common mistake is to add and average the five numbers and then report the average rainfall as 19.54 inches during the period of time the rainfall was measured. Since the new rainfall was 29.7 inches, it looks a lot higher than the normal rainfall calculated (19.54 inches). This mistake could then be reported as extreme rainfall of about 150% higher than normal ($29.7/19.54 = 1.52$).¹⁵⁵⁷

Garfield believes that adults frequently confuse averages, which are viewed as the most common number, and means and medians, which are viewed as the same.¹⁵⁵⁸ She notes:

Averages are viewed as the most common number (the value that occurs more often than the others). People often believe that to find an average one must always add up all the numbers and divide by the number of data values (regardless of outliers). A mean is viewed as the same thing as a median, and there is a belief that one should always compare groups by focusing exclusively on the difference in their averages.¹⁵⁵⁹

Garfield also gives other examples of statistical ideas that are often misunderstood and misused. People frequently make decisions about single events rather than looking at the series of events, as the following example illustrates:

[A] weather forecaster predicts the chance of rain to be 70% for 10 days. On 7 of those 10 days it actually rained. How good were his forecasts? Many students will say that the forecaster did not do a good job, because it should have rained on all days on which he gave a 70% chance of rain. These students appear to focus on outcomes of single events rather than being able to look at series of events. To students with an outcome orientation, a 70% chance of rain means that it should rain. Similarly, a forecast of 30% rain would mean it will not rain.¹⁵⁶⁰

¹⁵⁵⁵ Schield. "Statistical Prevarication: Telling Half Truths Using Statistics." p. 3.

¹⁵⁵⁶ Utts. "What Educated Citizens Should Know About Statistics and Probability." p. 75.

¹⁵⁵⁷ Ibid.

¹⁵⁵⁸ Garfield. "The Challenge of Developing Statistical Reasoning."

¹⁵⁵⁹ Ibid. p. 3.

¹⁵⁶⁰ Ibid. p. 3.

As noted, these statistical issues are presented in some detail here along with examples, because evaluations of statistical literacy in the general populace could well use concrete examples of Utts' seven commonly misunderstood topics above in tests and questionnaires. While the aggregate results might be suitable for reporting on levels of statistical literacy in the CIW educated populace domain, the disaggregated results could, as noted above, provide highly useful information for educators concerned to design courses that emphasize study in those areas in which respondents score particularly poorly.

27.4 Statistical demands created by interactions with the media

Media reports are typically of uneven quality and accuracy, especially when statistics are cited, which reinforces the need in the general populace for statistical literacy and the ability to distinguish between good and bad data. If almost three-quarters of Canadians watch television news daily and nearly 90% watch it several times a week, and since news reports frequently cite statistical information, then it is clear that the need for statistical literacy is not confined to professionals and academics, but is a requirement for everyone. Organizations of all sorts frequently send news releases (or press releases) to the media in the hopes that the media will cover the results of their studies and disseminate the information to the public. Best argues that this is an extremely competitive process and that newspapers are often inundated with releases they must choose from to report.¹⁵⁶¹ As a result, organizations often slant the statistics to make them more dramatic or newsworthy, which can result in an issue being exaggerated or distorted.

Best uses a widely reported article published in the *Journal of the American Medical Association* (JAMA) as an example of what frequently occurs in JAMA and other journals.¹⁵⁶² The article, titled “Bullying Behaviors Among U.S. Youth,” indicated that 30% of students in the sixth through tenth grades had moderate or frequent involvement in bullying. Best points out that 30% is a significant and newsworthy number, more so than 10% would be. In fact, he notes that everyone involved in the process, including the media, JAMA, the researchers, and the funders, would most likely prefer the higher percentage as a means to catch the public’s attention. He suggests that while methodological choices shaped the publicized results of the study, which involved careful analysis, and a large, well-drawn sample, the study itself was certainly not fraudulent:

In this study, students were asked whether they bullied others or were themselves bullied, and they were asked how often this bullying occurred. The key finding—that 30 percent of youths are involved in bullying—depended upon two choices. First, the authors combined all students who reported bullying others and all students who reported being bullied into students who were ‘involved’ in bullying. Second, they classified bullying that occurred at least once a week as ‘frequent’ and bullying that occurred ‘sometimes’ as moderate. The product of these choices was that 30 percent of students had moderate or frequent involvement in bullying. Other choices would have produced other results—the percentage of students who reported being victims of frequent bullying, for example, was about 8 percent. Both figures—30 percent and 8 percent—appear in the report, but it was the larger number that was featured in the article’s abstract, the press release, and the resulting media coverage.¹⁵⁶³

¹⁵⁶¹ Best. *People Count: The Social Construction of Statistics*, accessed.

¹⁵⁶² Nansel, Tonja R., and et al. "Bullying Behaviors among U.S. Youth," *Journal of the American Medical Association (JAMA)*, vol. 285, no. April 25, 2001: 2094-2100.

¹⁵⁶³ Ibid. p. 2.

Schild argues that statistics more often are “half-truths” than lies.¹⁵⁶⁴ Half-truths are prevarications that bend the truth using ambiguity, misleading statements, or omissions of important information. He gives many examples of statistical prevarications that are commonly seen in everyday life, including the following:

- ‘Sale: 50% off.’ The half-truth omits the basis: 50% off of what starting price? Is this the dealers cost, yesterday’s price, or the manufacturer’s suggested retail price?
- ‘More doctors prefer Crest.’ The half-truth omits the rest of the comparison. More doctors prefer Crest more than any other toothpaste? Than cigars? Than dentists like Crest?
- ‘Are you more likely to worry about your health than most people?’ Answer: ‘Yes, most people don’t worry about my health.’ The half-truth used an incomplete comparison.
- ‘Jimmy John’s Sandwich franchise is the fastest growing franchise in the U.S.’ The half-truth omits the base. It is easier for a small operation to grow fast than it is for for a large one to grow fast.
- ‘Black sheep eat less grass than white sheep.’ This half-truth equivocates on whether ‘sheep’ is considered collectively (as a group) or individually (per sheep).
- ‘The typical salary is \$80,000.’ The half-truth equivocates on whether ‘typical’ means average (the mean), the middle (the median), or most common salary (the mode).
- A t-shirt is marked as ‘100% natural cotton.’ One shopper sees this as saying, ‘100% of the material in this t-shirt is natural cotton.’ Another shopper sees this as saying, ‘100% of the cotton in this t-shirt is natural.’ So what was the truth? In this case another label said, ‘70% cotton’ instead of 70% natural fiber [...].¹⁵⁶⁵

Schild also notes:

- Comparing statistics [can be confusing] when the relevant base is not stated [...]. Suppose we have a fixed pie as in the vote for the candidates and we note that one candidate’s share increased from 10% to 15%. As a percentage change, it increased by 50%. As a share of the total vote, it increased by 5%. So is the increase 50% or 5%? Unless the basis of the comparison is clearly stated—as part of the sentence—as being the 100% size of the fixed pie, the default is to presume the comparison is a percentage change. Journalists who use this ‘% increase of 100% pie’ without explicitly mentioning the fixed pie participate in statistical prevarication.
- Rates [can be confusing] when a relevant whole is omitted [...]. The 4-year graduation rate of students was higher at private colleges than at public colleges. The numerator is slightly ambiguous (graduate in exactly four years or graduate within four years or graduate in about 4 years). The denominator (students) is quite ambiguous: (a) all students who enter as Freshman, (b) all students who enter as Freshman and take a full load of classes every term, or (c) all students

¹⁵⁶⁴ Schild. "Statistical Prevarication: Telling Half Truths Using Statistics."

¹⁵⁶⁵ Ibid.

who enter as Freshman, take a full-load of classes every term and get a grade of C or better in each class.¹⁵⁶⁶

As previously mentioned, “mutant statistics” are those that are quoted out of context and then continue to be quoted in this misleading way by authors citing the erroneous secondary source.¹⁵⁶⁷ These mutant statistics can turn into “urban myths,” such as the belief in poisoned Halloween candy, and are taken to be true by many in the population.

There is also evidence that even though peer-reviewed articles are sometimes retracted when errors are uncovered, the flawed evidence continues to be cited by researchers. A study reported in JAMA, the Journal of the American Medical Association, searched MEDLINE from 1966 through August 1997 and found 235 articles that had been retracted during that time due to error, results that were unable to be replicated, misconduct, or other reasons. The study also found that the retracted articles were cited 2,034 times after the retraction notice. An examination of 299 of the 2,034 citations only found 19 instances that noted the retraction. The rest treated the pre-retraction work as still valid. The authors concluded that when researchers unwittingly depend upon erroneous and fraudulent work that “lives on in the literature,” this could signal potential problems for research, and they questioned how much fraudulent or erroneous work goes undetected or unacknowledged.¹⁵⁶⁸

It is assumed that higher levels of statistical literacy in the populace in general, and in scholarly circles in particular, would increase the ability to detect and see through slanted and dramatized statistics, statistical prevarications, and mutant statistics—all of which have been shown to be prevalent in media reports. Higher levels of statistical literacy among journalists in particular, it is hoped, might even reduce the incidence of statistical distortions and half-truths in the media. Certainly the examples given in all the sections above make the case that statistical literacy is an important marker of an educated populace and one that merits reporting in the CIW educated populace domain.

¹⁵⁶⁶ Ibid. pp. 2–3.

¹⁵⁶⁷ Best. *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists*.

¹⁵⁶⁸ Budd, John M., Mary Ellen Sievert, and Tom R. Schultz. “Phenomena of Retraction: Reasons for Retraction and Citations to the Publications,” *JAMA (Journal of the American Medical Association)*, vol. 280, no. 3, 1998: 296-297.

27.5 Statistics literacy in Canadian schools

Most individuals receive their only exposure to statistical education, and therefore their only literacy training in this field, in formal school settings.¹⁵⁶⁹ Even though statistics are generally included within the branch of mathematics, Garfield points out that statistical educators view these disciplines as distinct and requiring different skills.¹⁵⁷⁰ Garfield argues that the “indeterminacy or ‘messiness’ of data distinguishes statistical investigations from the more precise, finite nature characterizing mathematical explorations.”¹⁵⁷¹ In statistics, context is the most important element since it motivates procedures, is the source of meaning, and is the basis for the interpretation of results. In mathematics, reasoning is more abstract than contextual.

Garfield notes that statistical problems start with a question and result in an opinion supported by the findings and assumptions. She also argues that the goal of statistics education is “to enable students to produce reasoned descriptions, judgments, inferences, and opinions about data [...] and to help students comprehend and deal with uncertainty, variability, and statistical information in the world around them.”¹⁵⁷²

Mary Townsend, Coordinator of the Education Outreach Program at Statistics Canada, reports that statistics and probability education in Canada has moved from emphasizing computations and procedures to focussing on statistical reasoning.¹⁵⁷³ Statistics is one of four teaching strands in the new mathematics curricula in schools across the nation. Townsend reports:

Starting in kindergarten with fundamental data discovery, students now move to sophisticated data applications that require, by Grade 12, a solid understanding of the concepts and processes used in data analysis. For instance, the statistics and probability strand at an elementary school level identifies the following outcomes:

- With assistance, kindergarten and Grade 1 students (approximately 6 years of age) collect, organize and analyze data based on first-hand information.
- By Grade 4, students assess and validate the data collection process.
- Starting in Grade 5, students develop and implement a plan for the collection, display and interpretation of data to answer a question.
- In Grade 8, students (approximately 13 years of age) should be able to evaluate and use measures of central tendency and variability.¹⁵⁷⁴

¹⁵⁶⁹ Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities."

¹⁵⁷⁰ Garfield. "Assessing Statistical Reasoning."

¹⁵⁷¹ Ibid. p. 23.

¹⁵⁷² Ibid. p. 24.

¹⁵⁷³ Townsend. *Symposium 2003: Challenges in Survey Taking for the Next Decade: Developing Statistical Literacy in Youth*, accessed.

¹⁵⁷⁴ Ibid., accessed. p. 3.

In Canada, the provinces are now working together to develop a “national” mathematics curriculum, based on international trends.¹⁵⁷⁵ In general, provincial mathematics curriculum designs have undergone various changes since the 1960s. However, since the mid to late 1990s major changes have occurred in mathematics curriculum design in Canada, mainly due to the influence of the U.S.-based National Council of Teachers of Mathematics Standards.

The new approach mirrors internationally accepted initiatives and represents a major shift from more traditional algebra to investigative processes emphasizing statistics.¹⁵⁷⁶ The new curriculum, which has sparked considerable debate among educators,¹⁵⁷⁷ is focused on the need for all students to have a working knowledge of mathematics in the “technological society” and on the ability of mathematics in the lives of students to solve real problems, communicate, and reason.¹⁵⁷⁸ Statistics and probability are new additions to this agenda, and have been included in standards documents. However, there is some evidence that, in many cases, these topics have not yet made their way into Canadian classrooms. Examples of the statistical portions of the new high school mathematics courses in Atlantic Canada include:

- Course 1: Data management: a statistics unit which includes topics like lines of best fit which are part of some second year university courses.
- Course 2: Statistics using survey results to draw inferences about a population, confidence intervals, hypothesis testing—all university-level material.
- Course 3: Rate of change: students discover how the shape of a graph indicates change and how the slope of the tangent relates to change.¹⁵⁷⁹

With the move toward a standardized nationwide curriculum, additional mathematics classes are now required for all Canadian students. Most of the provinces and territories have moved to requiring math until Grade 11, considerably longer than the previous requirement cut-off points of Grades 8 or 9. Although the new mathematics curriculum has two streams—one for students not intending to attend university, and one for those students planning to attend university—the content of the courses is similar but the two streams require different levels of competency.

¹⁵⁷⁵ O'Shea, Thomas. *The Canadian Mathematics Curriculum: From New Math to the NCTM Standards*. Simon Fraser University, 2003, accessed December 2005; available from <http://www.cms.math.ca/Events/CSMF2003/panel/oshea.pdf>.

¹⁵⁷⁶ Tingley, Maureen, Maxim Burke, Robert Dawson, Edgar G. Goodaire, Paul Gosse, John Hildebrand, Donna Karsten, Patricia Maxwell, and Kenneth Roper. "High School Mathematics in Atlantic Canada." Paper presented at the Canadian School Mathematics Forum, Montreal, May 16–18, 2003, University of New Brunswick; accessed December 2005; available from <http://www.cms.math.ca/Events/CSMF2003/panel/AtlanticReport.pdf>.

¹⁵⁷⁷ Mathematics/Statistics Committee. *The Atlantic High School Mathematics Curriculum: Implications for Universities*, Atlantic Provinces Council on the Sciences, 2002; accessed December 2005; available from <http://www.math.mun.ca/~apics/hscurr4.pdf>.

¹⁵⁷⁸ Suydam, Marilyn N. "Curriculum and Evaluation Standards for Mathematics Education," *Mathematics Education Digest*, 1990, ERIC Clearinghouse for Science Mathematics and Environmental Education; accessed December 2005; available from <http://www.ericdigests.org/pre-9215/evaluation.htm>.

¹⁵⁷⁹ Tingley, Burke, Dawson, Goodaire, Gosse, Hildebrand, Karsten, Maxwell, and Roper. "High School Mathematics in Atlantic Canada." p. 15.

27.6 Assessment of statistics literacy

O'Shea points out that there is little consistent and comparable information on the relative performance of students with regard to statistical literacy in Canada, since not all provinces require students to pass external examinations for school graduation. There are scores available from international tests such as TIMSS (Third International Mathematics and Science Study), PISA (Program for International Student Assessment), and IALSS (International Adult Literacy and Skills Survey).¹⁵⁸⁰ However, Murray and Gal note that the skills examined by these instruments "by no means cover all the knowledge bases that underlie people's statistical literacy."¹⁵⁸¹

Little comparative information exists regarding [...] understanding of basic statistical concepts that often appear in the official reports or in media articles, such as average, median, sample, margin of error, significant difference, understanding of chance-related statements and so forth.¹⁵⁸²

These instruments are discussed in more detail below.

27.6.1 PISA (*Program for International Student Assessment*)

As discussed in section 6.4.4 of this literature review, the Programme for International Student Assessment (PISA) is a large-scale, international assessment program, coordinated by the Organisation for Economic Co-operation and Development (OECD), that measures the abilities of 15-year olds from 57 countries (in 2006), primarily for reading skills, mathematics, and science.¹⁵⁸³ Canadian organizations that work in partnership to administer PISA include HRSDC, CMEC, and provincial ministries and Departments of Labour and Education. In Canada, all of the provinces participated in PISA, but the territories did not.

The first cycle of PISA began in 2000 with 43 countries, with reading as the primary focus. The second cycle was completed in 2003 with 41 countries, with mathematics being the primary focus, and the third cycle was completed in 2006 with 57 countries, with science as the primary focus. PISA will be continued every three years, and, in 2009, the focus will shift back to reading, and 62 countries have now agreed to participate. In Canada, approximately 28,000 15-year-old students from more than 1,000 schools participated in PISA in 2003.¹⁵⁸⁴

¹⁵⁸⁰ O'Shea, *The Canadian Mathematics Curriculum: From New Math to the NCTM Standards*, accessed.

¹⁵⁸¹ Murray, Scott, and Iddo Gal. "Preparing for Diversity in Statistics Literacy: Institutional and Educational Implications." Paper presented at the Sixth International Conference on Teaching Statistics: Developing a Statistically Literate Society, Cape Town, South Africa, July 7-12, 2002; accessed December 2005; available from http://www.stat.auckland.ac.nz/~iase/publications/1/02_mu.pdf p. 4.

¹⁵⁸² Ibid. p. 4.

¹⁵⁸³ Government of Canada. *PISA 2006*, 2006; accessed September 2006; available from http://www.pisa.gc.ca/pisa2006_e.shtml.

¹⁵⁸⁴ Government of Canada. *Programme for International Student Assessment (PISA)*, 2004; accessed January 3 2006; available from http://www.pisa.gc.ca/what_pisa.shtml.

The Canadian Council on Learning (CCL) uses 2003 data from PISA in its new Composite Learning Index (CLI). Specifically, the CLI uses the estimated mean reading, mathematics, and problem solving scores to indicate student reading skills, student math skills, and student problem solving skills respectively as the indicators in its “Learning to Know” section.¹⁵⁸⁵ As well, the Pan-Canadian Education Indicator Program (PCEIP) sponsored by CMEC uses all of the PISA scores for reading, mathematics, and science for its indicator of student achievement.¹⁵⁸⁶ The OECD also uses PISA scores for its mathematics achievement indicator.¹⁵⁸⁷

Carlson notes that, although PISA measures mathematics literacy rather than statistics literacy per se, it does include elements of statistics literacy since it is concerned with the ability to put mathematical knowledge and skills to functional use in a lifelong context, rather than measuring mathematics knowledge within a school curriculum. She notes that within PISA: “Mathematical literacy also implies the ability to pose and solve statistical problems in a variety of situations as well as the inclination to do so which often relies on personal traits such as self confidence and curiosity.”¹⁵⁸⁸

The Government of Canada PISA website notes that PISA assesses mathematical literacy in three dimensions:

First, the **content of mathematics**, as defined mainly in terms of broad mathematical concepts underlying mathematical thinking (such as chance, change and growth, space and shape, reasoning, uncertainty and dependency relationships), and only secondarily in relation to ‘curricular strands’ (such as numbers, algebra and geometry). The PISA 2000 assessment, in which mathematics is a minor domain, focuses on two concepts: change and growth, and space and shape. These two areas allow a wide representation of aspects of the curriculum without giving undue weight to number skills.

Second, the **process of mathematics** as defined by general mathematical competencies. These include the use of mathematical language, modelling and problem-solving skills. The idea is not, however, to separate out such skills in different test items, since it is assumed that a range of competencies will be needed to perform any given mathematical task. Rather, questions are organized

¹⁵⁸⁵ Canadian Council on Learning (CCL). *Website*, CCL, accessed March 2006; available from <http://www.ccl-cca.ca/>.

¹⁵⁸⁶ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2005*, Ottawa, Toronto, CMEC, Canadian Education Statistics Council, Statistics Canada, Catalogue no. 81-582-XIE, 2006; accessed January 2007; available from <http://www.statcan.ca/english/freepub/81-582-XIE/2006001/pdfdocs.htm>.

¹⁵⁸⁷ Organisation for Economic Co-operation and Development (OECD). *Education at a Glance. OECD Indicators, 2006*, Paris, OECD, 2006; accessed January 2007; available from http://www.oecd.org/document/52/0,2340,en_2649_34515_37328564_1_1_1_1,00.html.

¹⁵⁸⁸ Carlson, Beverley. *Preparing Workers for the 21st Century: The Importance of Statistical Competencies*, International Association for Statistics Education, 2002; accessed January 2007; available from http://www.stat.auckland.ac.nz/~iase/publications/1/4g3_carl.pdf. p. 4.

in terms of three ‘competency classes’ defining the type of thinking skill needed.

1. The first class of mathematical competency consists of simple computations or definitions of the type most familiar in conventional mathematics assessments.
 2. The second class requires connections to be made to solve straightforward problems.
 3. The third competency class consists of mathematical thinking, generalization and insight, and requires students to engage in analysis, to identify the mathematical elements in a situation and to pose their own problems.
- Third, the **situations in which mathematics are used**, ranging from private contexts to those relating to wider scientific and public issues are taken into account.¹⁵⁸⁹

In 2003, mathematical literacy also included four sub-domains: space and shape, change and relationships, quantity, and uncertainty. Statistics Canada defines these sub-domains as follows:

- *Space and shape* relates to spatial and geometric phenomena and relationships, drawing on the discipline of geometry.
- *Change and relationships* involves mathematical manifestations of change as well as functional relationships and dependency among variables. It relates most closely to algebra [...]. Relationships are given a variety of different representations, including symbolic, algebraic, graphical, tabular, and geometrical representations.
- *Quantity* involves numeric phenomena as well as quantitative relationships and patterns. It relates to the understanding of relative size, the recognition of numerical patterns, and the use of numbers to represent quantities and quantifiable attributes of real-world objects (counts and measures).
- *Uncertainty* involves probabilistic and statistical phenomena and relationships that become increasingly relevant in the information society. These phenomena are the subject of mathematical study in statistics and probability.¹⁵⁹⁰

The “uncertainty” scale of the PISA mathematical literacy is the section most related to statistics literacy. The OECD defines this sub-domain as follows:

Uncertainty is intended to suggest two related topics: data and chance. These phenomena are respectively the subject of mathematical study in statistics and probability. Relatively recent recommendations concerning school curricula are unanimous in suggesting that statistics and probability should occupy a much

¹⁵⁸⁹ Government of Canada. *Programme for International Student Assessment (PISA)*, accessed.

¹⁵⁹⁰ Bussière, Patrick, Fernando Cartwright, and Tamara Knighton. *Measuring Up: Canadian Results of the OECD PISA Study. The Performance of Canada's Youth in Mathematics, Reading, Science and Problem Solving. 2003 First Findings for Canadians Aged 15*, Statistics Canada, 2004; accessed September 2006; available from <http://www.pisa.gc.ca/81-590-xie2004001.pdf> pp. 13–14.

more prominent place than has been the case in the past. Specific mathematical concepts and activities that are important in this area are collecting data, data analysis and display / visualisation, probability and inference.¹⁵⁹¹

Mathematics achievement is divided into six proficiency levels, with Level 6 as the highest and Level 1 as the lowest. Scores include: Level 1 (score from 359 to 420), Level 2 (score from 421 to 482), Level 3 (score from 483 to 544), Level 4 (score from 545 to 606), Level 5 (score from 607 to 668), and Level 6 (score above 668).¹⁵⁹² According to researchers from Statistics Canada: “The mathematics scores are expressed on a scale with an average of 500 points for the OECD countries and about two-thirds of the students scoring between 400 and 600 (i.e., a standard deviation of 100).”¹⁵⁹³ Table 19 describes the proficiency levels in the uncertainty sub-domain.

Table 19. Summary description of six levels of proficiency in the uncertainty sub-domain of Programme for International Student Assessment (PISA)

Level summary description	Illustrative competencies
1 Understand and use basic probabilistic ideas in familiar experimental contexts.	– Understand basic probability concepts in the context of a simple and familiar experiment (e.g., involving dice or coins) – Systematic listing and counting of combinatorial outcomes in a limited and well-defined game situation
2 Locate statistical information presented in familiar graphical form; understand basic statistical concepts and conventions.	– Identify relevant information in a simple and familiar graph – Link text to a related graph, in a common and familiar form – Understand and explain simple statistical calculations (e.g. average) – Read values directly from a familiar data display (e.g. bar graph)
3 Interpret statistical information and data, and link different information sources; basic reasoning with simple probability concepts, symbols and conventions and communication of reasoning.	– Interpret tabular information – Interpret and read from non-standard graphs – Use reasoning to identify probability outcomes in the context of a complex but well-defined and familiar probability experiment – Insight into aspects of data presentation (e.g. number sense, link related information from two different tables), link data to suitable chart type – Communicate common-sense reasoning

¹⁵⁹¹ Organisation for Economic Co-operation and Development (OECD). *The PISA [Programme for International Student Assessment] 2003 Assessment Framework - Mathematics, Reading, Science and Problem Solving, Knowledge and Skills*, OECD, 2003; accessed September 2006; available from <http://www.pisa.oecd.org/dataoecd/46/14/33694881.pdf>, p. 37.

¹⁵⁹² Bussière, Cartwright, and Knighton. *Measuring Up: Canadian Results of the OECD PISA Study. The Performance of Canada's Youth in Mathematics, Reading, Science and Problem Solving. 2003 First Findings for Canadians Aged 15*, accessed. p. 23.

¹⁵⁹³ Ibid., accessed.

Level summary description	Illustrative competencies
4 Use basic statistical and probabilistic concepts combined with numerical reasoning in less familiar contexts to solve simple problems; carry out multi-step or sequential calculation processes; use and communicate argumentation based on interpretation of data.	– Interpret text, including in an unfamiliar (scientific) but straight-forward context – Show insight into aspects of data from tables and graphs – Translate text description into appropriate probability calculation – Identify and select data from various statistical graphs and carry out basic calculations – Show understanding of basic statistical concepts and definitions (e.g. probability, expected value, randomness) – Use knowledge of basic probability to solve problems – Construct a basic mathematical explanation of a verbal real-world quantitative concept (e.g. “huge increase”) – Use mathematical argumentation based on data – Use numerical reasoning – Carry out multi-step calculations involving the basic arithmetic operations, and working with percentage – Draw information from a table and communicate a simple argument based on that information
5 Apply probabilistic and statistical knowledge in problem situations that are somewhat structured and where the mathematical representation is partially apparent. Use reasoning and insight to interpret and analyse given information, to develop appropriate models and to perform sequential calculation processes; communicate reasons and arguments.	– Interpret and reflect on the outcomes of an unfamiliar probabilistic experiment – Interpret text using technical language and translate to an appropriate probability calculation – Identify and extract relevant information, and interpret and link information from multiple sources (e.g. from text, multiple tables, graphs) – Use reflection and insight into standard probabilistic situations – Apply probability concepts to analyse a non-familiar phenomenon or situation – Use proportional reasoning and reasoning with statistical concepts – Use multi-step reasoning based on data – Carry out complex modelling involving the application of probability knowledge and statistical concepts (e.g. randomness, sample, independence) – Use calculations including addition, proportions, multiplication of large numbers, rounding, to solve problems in non-trivial statistical contexts – Carry out a sequence of related calculations – Carry out and communicate probabilistic reasoning and argument
6 Use high-level thinking and reasoning skills in statistical or probabilistic contexts to create mathematical representations of real-world situations; use insight and reflection to solve problems and to formulate and communicate arguments and explanations.	– Interpret and reflect on real-world situations using probability knowledge and carry out resulting calculations using proportional reasoning, large numbers, and rounding – Show insight into probability in a practical context – Use interpretation, logical reasoning and insight at a high level in an unfamiliar probabilistic situation – Use rigorous argumentation based on insightful interpretation of data – Employ complex reasoning using statistical concepts

Level summary description	Illustrative competencies
	– Show understanding of basic ideas of sampling and carry out calculations with weighted averages, or using insightful systematic counting strategies – Communicate complex arguments and explanations

Source: Organisation for Economic Co-operation and Development (OECD). *PISA 2003 Technical Report*, 2005; accessed September 2006; available from <http://www.pisa.oecd.org/dataoecd/49/60/35188570.pdf>, p. 267.

General results showed that among 41 countries, Canadian students, when taken as a whole, performed well in mathematics, with only six countries¹⁵⁹⁴ performing better than Canada on the combined mathematics scale.¹⁵⁹⁵ Within the four mathematics sub-domains, students from three countries¹⁵⁹⁶ performed better than Canadian students in the uncertainty sub-domain.¹⁵⁹⁷ Students from eight countries¹⁵⁹⁸ performed better than Canadian students in the quantity sub-domain, and students from five countries¹⁵⁹⁹ performed better than Canadian students in the change and relationships sub-domain. Finally, twelve countries¹⁶⁰⁰ performed significantly better than Canadian students in the space and shape sub-domain.¹⁶⁰¹

In terms of provincial results, researchers at Statistics Canada report:

Most provinces performed well in mathematics. All provinces performed at or above the OECD mean in the combined mathematics scale and mathematics sub-scale with one exception: Prince Edward Island performed below the OECD mean in the space and shape sub-domain. Several provinces performed as well as the top-ranked countries. For example, on the combined mathematics scale the

¹⁵⁹⁴ These countries were Hong Kong-China, Finland, Korea, Netherlands, Liechtenstein, and Japan.

¹⁵⁹⁵ Statistics Canada reported that only two countries were ahead of Canada on the combined mathematics scale. However, these two countries only performed better than Alberta, not Canada as a whole. See: Bussière, Cartwright, and Knighton. *Measuring Up: Canadian Results of the OECD PISA Study. The Performance of Canada's Youth in Mathematics, Reading, Science and Problem Solving. 2003 First Findings for Canadians Aged 15*, accessed.

¹⁵⁹⁶ These countries were Hong Kong-China, Netherlands, and Finland.

¹⁵⁹⁷ Statistics Canada also reported that "only Hong Kong-China students performed significantly better than Canada in the uncertainty sub-domain." However, Hong Kong-China students only performed better than Alberta and British Columbia students, not Canadian students as a whole. See: Bussière, Cartwright, and Knighton. *Measuring Up: Canadian Results of the OECD PISA Study. The Performance of Canada's Youth in Mathematics, Reading, Science and Problem Solving. 2003 First Findings for Canadians Aged 15*, accessed.

¹⁵⁹⁸ These countries were Finland, Hong Kong-China, Korea, Liechtenstein, Macao-China, Switzerland, Belgium, and Netherlands.

¹⁵⁹⁹ These countries were Netherlands, Korea, Finland, Hong Kong-China, and Liechtenstein.

¹⁶⁰⁰ These countries were Hong Kong-China, Japan, Korea, Switzerland, Finland, Liechtenstein, Belgium, Macao-China, Czech Republic, Netherlands, New Zealand, and Australia.

¹⁶⁰¹ Bussière, Cartwright, and Knighton. *Measuring Up: Canadian Results of the OECD PISA Study. The Performance of Canada's Youth in Mathematics, Reading, Science and Problem Solving. 2003 First Findings for Canadians Aged 15*, accessed.

performance of students in Alberta, Quebec and British Columbia compared favourably with the performance of students in Hong Kong-China [...]. Students in Newfoundland and Labrador, Saskatchewan, Nova Scotia, New Brunswick and Prince Edward Island performed significantly lower than the Canadian average across all mathematics scales.¹⁶⁰²

Statistics Canada also reports that it is not possible to compare the overall mathematics scores of 2000 and 2003, because of differences between the PISA 2000 and 2003 in the content areas covered in each assessment. However, two sub-domains remain the same in both assessments—space and shape, and change and relationships. Statistics Canada notes:

Across the provinces, there was also no significant change in the performance in the space and shape sub-domain. Performance in the change and relationships sub-domain improved in Newfoundland and Labrador, New Brunswick, Ontario, Alberta, and British Columbia while performance was not significantly different in Prince Edward Island, Nova Scotia, Quebec, Manitoba, and Saskatchewan.¹⁶⁰³ More detailed results, including figures, are included in the final education domain report.

27.6.2 TIMSS (Third International Mathematics and Science Study)

TIMSS (Third International Mathematics and Science Study) is sponsored by the International Agency for the Evaluation of Educational Achievement and Canadian participants are Statistics Canada and CMEC. Statistics Canada chose a representative sample of Canadian schools to participate in the study. In total, approximately 50 countries and 500,000 students participated. As noted earlier in this review, TIMSS was first administered in 1995 to a sample of students in third, fourth, seventh, and eighth grades, as well as the last year of secondary school. Canada has no results from the secondary school study since student participation fell below the 85% sampling criteria that were required.¹⁶⁰⁴

A second round of tests was administered in 1999 to Grade 8 students, and a third round in 2003 to Grade 8 students in Ontario and Quebec. Since this third round had limited participation, results are not comparable with the earlier years. Future rounds are intended to provide follow-up data on those students who participated in the first round in 1995. The 1995 and 1999 rounds focused mainly on mathematical knowledge that is taught in the school curriculum. Since 2003, TIMSS has placed more emphasis on the analytical, problem-solving, and inquiry skills of students.

¹⁶⁰² Ibid., accessed. p. 21.

¹⁶⁰³ Ibid., accessed. p. 30.

¹⁶⁰⁴ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 1999*, CMEC and Statistics Canada, Catalogue no. 81-582-XIE, 2000; accessed January 2007; available from <http://www.cmec.ca/stats/pceip/1999pdf/en.pceip1999.full.pdf>.

In both 1995 and 1999, Canadian national and provincial results were “significantly higher than the international average in both mathematics and science.”¹⁶⁰⁵ In 1999, mean national mathematics scores ranged from a high of 60 in Singapore to a low of 28 in South Africa, with the Canadian being 53 and the international mean being 49. Only 6 countries, out of the 38 countries that participated in the mathematics component, had mathematics scores that were significantly higher than Canada, and these scores ranged from 60 to 56.¹⁶⁰⁶

Gal notes that TIMSS tests include a few statistical items, but not enough to devise a separate scale describing student outcomes in statistics.¹⁶⁰⁷ He reports one task given in the test that “exemplifies one of the most basic skills educators usually use as an example for a statistical literacy skill expected of all citizens: i.e., the ability to detect a discrepancy between displayed data and a given interpretation of these data.”¹⁶⁰⁸ Gal describes this task as follows:

[E]xplain whether a reporter’s statement about a ‘huge increase’ was a reasonable interpretation of a bar graph showing the number of robberies in two years that was manipulated to create a specific impression. The graph included a bar for each year but a truncated scale, causing a small difference between years to appear large.¹⁶⁰⁹

Although performance level varied across countries, Gal notes that, on average, less than half of all students in grade 12 “appeared to be able to cope (at least partially) with this task.”¹⁶¹⁰ However, as noted above, Canada does not have results from grade 12.

27.6.3 International Adult Literacy Survey (IALS)

Gal suggests that more focused studies are needed that can provide more information on the statistical literacy skills of adults. The International Adult Literacy Survey (IALS) and the International Adult Literacy and Skills Survey (IALSS) measure the prose, numerative, and document literacies, upon which, as discussed above, statistical literacy is dependent.¹⁶¹¹ Scores in these basic literacies, while not direct measures of statistical literacy per se, might therefore be interpreted as partial predictors of statistical literacy.

¹⁶⁰⁵ Robitaille, David F., and Alan R. Taylor. "Third International Mathematics and Science Study: Canada Report," *Education Quarterly Review*, vol. 7, no. 4, 2001: 37-41, Statistics Canada, Catalogue no. 81-003-XIE; accessed January 2007; available from

<http://www.statcan.ca/english/freepub/81-003-XIE/0040081-003-XIE.pdf> pp. 38–39.

¹⁶⁰⁶ Ibid. These countries were Singapore, Korea, Taiwan, Hong Kong, Japan, and Belgium (Flemish).

¹⁶⁰⁷ Gal. "Adults’ Statistical Literacy: Meanings, Components, and Responsibilities."

¹⁶⁰⁸ Ibid. p. 20.

¹⁶⁰⁹ Ibid. p. 20.

¹⁶¹⁰ Ibid. p. 20.

¹⁶¹¹ Statistics Canada, and Organisation for Economic Co-operation and Development (OECD). *Learning a Living: First Results of the Adult Literacy and Life Skills Survey (ALL) [IALSS in Canada]*, Statistics Canada, Catalogue no. 89-603-XWE, 2005; accessed December 2005; available from <http://www.statcan.ca/english/freepub/89-603-XIE/89-603-XIE2005001.htm>.

The IALSS is the Canadian component of the Adult Literacy and Life Skills survey (ALL), which is a joint project of the Government of Canada, the U.S. National Center for Education Statistics, and the Organisation for Economic Co-operation and Development.¹⁶¹² We have discussed these surveys briefly earlier in this literature review. However, questions on these surveys do not reflect the critical reasoning skills or complete knowledge elements necessary for statistical literacy, and cannot therefore be used for comprehensive evaluations of the level of statistical literacy in the Canadian populace.

Gal notes that ALL does include a broader coverage of statistical matters than IALS. ALL is a major new international survey that tested more than 23,000 Canadians aged 16 and over in 2003 on prose, document, numeracy, and problem solving literacies. The first results were released by Statistics Canada in November, 2005. IALSS added two new domains that the IALS (1994) did not measure: numeracy, which expanded the quantitative measure used by the IALS in its 1994 cycle, and problem-solving, or analytical reasoning. Results of the IALSS showed, in general, that Canadians aged 16 to 65 have average document literacy scores at Level 3 (out of 5 levels¹⁶¹³), which is “the desired threshold for coping with the increasing skill demands of a knowledge economy and society,” as well as average numeracy literacy scores slightly below Level 3.¹⁶¹⁴ These results are reported in the basic literacy section of the accompanying indicator report rather than in the statistical literacy section, since they are not direct or comprehensive measures of statistical literacy.

27.6.4 Statistical Reasoning Assessment (SRA) and other assessment instruments

Most of the instruments designed to measure statistical competency or reasoning specifically, as well as attitudes towards statistics, have been developed for use in small-scale interview or classroom settings.¹⁶¹⁵ These statistical reasoning assessments, some of which were mentioned above in connection with statistical anxiety testing, are based on well-documented aspects of statistical reasoning that have been developed using theoretical studies since the 1970s.¹⁶¹⁶ They include the Statistics Attitude Survey (SAS), the Statistical Anxiety Rating Scale (STARS), the Statistical Anxiety Inventory (SAI), the Survey of Attitudes Towards Statistics (SATS), and the Statistical Reasoning Assessment (SRA). The SRA is one of very few instruments developed to date that

¹⁶¹² Statistics Canada. "International Adult Literacy and Skills Survey." *The Daily*, Nov 9, 2005, accessed November 2005; available from <http://www.statcan.ca:80/Daily/English/051109/d051109a.htm>, and <http://www.statcan.ca:80/Daily/English/051130/d051130b.htm>.

¹⁶¹³ Level 5 is considered to be an “expert” level and very few people reached that level.

¹⁶¹⁴ Statistics Canada. "International Adult Literacy and Skills Survey."

¹⁶¹⁵ Tempelaar, Dirk. "Statistical Reasoning Assessment: An Analysis of the SRA Instrument." Paper presented at the ARTIST Roundtable Conference on Assessment in Statistics, Lawrence University, August 1-4, 2004; accessed December 2005; available from <http://www.rossmanchance.com/artist/proceedings/tempelaar.pdf>.

¹⁶¹⁶ Ibid.

possibly could be applied on a large scale, that could be used for an adult population,¹⁶¹⁷ and that could therefore produce important results for an indicator in the statistical literacy section of the CIW educated populace domain. We therefore recommend that the SRA be explored for this potential use in Canada. To this end, it is described below.

Joan Garfield and Cliff Konold developed and validated the SRA as part of the U.S.-based National Science Foundation Chance Plus Project, to use in gathering limited indicators of students' statistical reasoning and in evaluating the effectiveness of the new statistics curriculum for high school students.¹⁶¹⁸ As Garfield suggests, there was a need:

... to have an easily scorable instrument that captures students' thinking, reasoning, and application of knowledge, rather than a test where students 'tell' the teacher what they have remembered or show that they can perform calculations or carry out procedures correctly.¹⁶¹⁹

Since 1997, the SRA has continued to undergo content validation, pilot testing in different settings, and internal consistency validation.

The SRA is a multiple-choice, closed-format test consisting of 20 items that describe a statistics or probability problem. Each problem gives several possible responses, both correct and incorrect, that include a statement of reasoning that explains a rationale. Students are instructed to choose the response that best matches their thinking about the problem. Results are indicated by 16 scores that indicate the level of correct reasoning in eight areas, and the level of incorrect reasoning in eight areas. Items used in the SRA are based on reasoning about: data, representations of data, statistical measures, uncertainty, samples, and association.

The scale also uses common misconceptions often associated with statistical concepts, such as those concerning averages, the outcome orientation, good samples, the law of small numbers, representation misconceptions, and equiprobability bias. The reasoning and misconception scales, and the items on the questionnaire that correspond to and measure each conception and misconception, which are used in the questions on the SRA, are shown in Table 20. The actual questionnaire can be found in Joan Garfield's "Assessing Statistical Reasoning."¹⁶²⁰

¹⁶¹⁷ Ibid.

¹⁶¹⁸ Garfield. "Assessing Statistical Reasoning."

¹⁶¹⁹ Ibid. p. 23.

¹⁶²⁰ Ibid.

Table 20. Correct reasoning scales, misconceptions scales, and corresponding items for measuring each conception and misconception in the Statistical Reasoning Assessment (SRA)

Correct reasoning scales	Corresponding items on the questionnaire
CC1: <i>Correctly interprets probabilities.</i> Assesses the understanding and use of ideas of randomness, chance to make judgments about uncertain events	a. 8c b. 13a, 18b, 19a, 20b
CC2: <i>Understands how to select an appropriate average.</i> Assesses the understanding of what measures of centre, spread, and position tell about a data set, and which are best to use under different conditions.	19e, 10df, 11e
CC3: <i>Correctly computes probability, both a. understanding probabilities as ratios, and b. using combinatorial reasoning.</i> Assesses the knowledge that in uncertain events not all outcomes are equally likely, and how to determine the likelihood of different events using an appropriate method.	14b, 15d
CC4: <i>Understands independence.</i>	16c
CC5: <i>Understands sampling variability.</i>	5, 1d
CC6: <i>Distinguishes between correlation and causation.</i> Assesses the knowledge that a strong correlation between two variables does not mean that one causes the other.	6b, 12b
CC7: <i>Correctly interprets two-way tables.</i> Assesses the knowledge of how to judge and interpret a relationship between two variables, knowing how to examine and interpret a two-way table.	2d, 3d
CC8: <i>Understands the importance of large samples.</i> Assesses the knowledge of how samples are related to a population and what may be inferred from a sample; knowing that a larger, well-chosen sample will more accurately represent a population; being cautious when making inferences based on small samples.	1d, 4ab, 17c

Misconception scales	Corresponding items on the questionnaire
MC1: <i>Misconceptions involving averages</i> . This category includes the following pitfalls: a. averages are the most common number; b. failing to take outliers into consideration when computing the mean; c. comparing groups on their averages only; and d. confusing mean with median.	7bc, 16ad
MC2: <i>Outcome orientation</i> . Students use an intuitive model of probability that leads them to make yes or no decisions about single events rather than looking at the series of events. (See Konold, "Informal Conceptions of Probability") ¹⁶²¹	12a, 14c
MC3: <i>Good samples have to represent a high percentage of the population</i> . Here the misconception is thinking that size of the sample and how it is chosen are not important, but that the sample must represent a large part of the population to be a good sample.	9abd, 10e, 11c
MC4: <i>Law of small numbers</i> . Here the pitfall is thinking that small samples best resemble the populations from which they are sampled, so are to be preferred over larger samples. This misconception is documented in Kahneman, Slovic, & Tversky. ¹⁶²²	16be
MC5: <i>Representativeness misconception</i> . In this misconception, the likelihood of a sample is estimated on the basis of how closely it resembles the population. This mistaken view is documented in Kahneman, Slovic, & Tversky. ¹⁶²³	13c, 18a, 19d, 20d
MC6: <i>Correlation implies causation</i> .	6a
MC7: <i>Equiprobability bias</i> . Events of unequal chance tend to be viewed as equally likely. (See Lecoutre, "Cognitive Models and Problem Spaces in 'Purely Random' Situations") ¹⁶²⁴	a. 1c b. 1a, 17e c. 17a d. not listed
MC8: <i>Groups can only be compared if they have the same size</i> .	2e, 3ab, 11abd. 12c, 13b

Source: Tempelaar, Dirk. "Statistical Reasoning Assessment: An Analysis of the SRA Instrument." Paper presented at the ARTIST Roundtable Conference on Assessment in Statistics, Lawrence University 2004, August 1-4.

¹⁶²¹ Konold, C. "Informal Conceptions of Probability," *Cognition and Instruction*, vol. 6, 1989: 59–98.

¹⁶²² Kahneman, D., P. Slovic, and A. Tversky. *Judgment under Uncertainty: Heuristics and Biases*, Cambridge: Cambridge University Press, 1982.

¹⁶²³ Ibid.

¹⁶²⁴ Lecoutre, M.P. "Cognitive Models and Problem Spaces in 'Purely Random' Situations," *Educational Studies in Mathematics*, vol. 23, 1992: 557–568.

Scores for the SRA are tabulated by first adding the scale scores based on the number of correct responses in each scale. Different scales have a different weight in the total score, since the number of items per scale ranges from 1 to 4. These scores, which are regarded as weighted averages, are then aggregated by adding the cumulative scale scores.

Dirk Tempelaar tested the SRA with 1,000 Dutch and foreign students in a first-year Quantitative Methods course at the University of Maastricht in the Netherlands in 1999/2000 and 800 similar students in 2003/2004.¹⁶²⁵ He then compared the aggregated scores with those obtained by a study using the SRA that compared U.S. and Taiwan students. In reporting the results, Tempelaar notes:

Broadly speaking, the patterns in the UM data are similar to those found for the USA and Taiwan students in the sense that, of the correct reasoning scales, the means CC7 and CC8 are highest and those of CC3 and CC5 are lowest for all three samples. Of the misconception scales, MC7 and MC8 are highest for the USA and Taiwan students and, although for UM students MC7 ranks highest as well, MC8 ends up somewhere in the middle region. MC3, MC5 and MC6 are lowest for all three samples. Two other general patterns emerge in the UM data. Similar to Garfield [...], we find a nationality effect in half of all scales, and both aggregate scores. That effect has always the same direction: Dutch students have higher correct reasoning and lower misconception scores than foreign students. Once again similar to Garfield [...], we find a gender effect in the UM data: in 11 out of 16 of the individual scale, and in both total scales. The gender effect has, except for MC5, a consistent direction: males score higher on correct reasoning and lower on misconceptions than females.¹⁶²⁶

DelMas, Garfield, et al. note that some of the limitations of the SRA are that it “focuses heavily on probability, and lacks items related to data production, data collection, and statistical inference.”¹⁶²⁷ In summary, Garfield notes:

Although there is a growing emphasis on developing students’ statistical reasoning, assessing statistical reasoning remains a challenging task, and one that needs more attention in the research literature. Although the SRA is an easy to administer, paper-and-pencil instrument that provides some useful information regarding the reasoning of students, it is nonetheless an imperfect research and evaluation tool. The 16 scales represent only a small subset of reasoning skills and strategies, and attempts to establish the reliability and validity have raised new issues and yielded incomplete results [...]. [T]here is still ample room for more

¹⁶²⁵ Tempelaar. "Statistical Reasoning Assessment: An Analysis of the SRA Instrument."

¹⁶²⁶ Ibid. p. 9.

¹⁶²⁷ delMas, Robert, Joan Garfield, Ann Ooms, and Beth Chance. "Assessing Students' Conceptual Understanding after a First Course in Statistics." Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, California, April 9, 2006; accessed January 2007; available from https://app.gen.umn.edu/artist/articles/AERA_2006_CAOS.pdf. p. 4.

studies that develop new assessments of statistical reasoning, as well as studies that investigate or build on current instruments and items.¹⁶²⁸

Other instruments are also being developed that build on the SRA. For example, Donna Sundre, Executive Director of the Center for Assessment and Research Studies at James Madison University in Harrisonburg, Virginia, and her colleagues have slightly revised the SRA to develop a new instrument called the Quantitative Reasoning Quotient (QRQ).¹⁶²⁹ Basically, this new, 40-item instrument (recently reduced from 43 items) broadens the conception of correct reasoning and misconceptions in students by creating additional items from the SRA through splitting single SRA items into several items in the QRQ.

Review of the instrument format suggested that requesting students to respond to each alternative of the original items could create additional items. Rather than asking students to check from a list of possible rationales those they considered important, each rationale was presented as an item and students were requested to indicate whether they agreed or disagreed with the reasoning. We reasoned that a student may be able to recognize from a list an example of correct reasoning, but this would not eliminate the possibility that they might also endorse a common misconception when reviewing the same incident. By forcing students to respond to each alternative, we were able to create additional items. Adding to the sample of items from the construct domain is a sure way of enhancing the consistency or reliability of measurement. At the same time, we believed that this would retain potentially useful information that was not collected in the original item scoring that could contribute to both misconception and correct reasoning scores.¹⁶³⁰

The QRQ assesses 11 quantitative correct reasoning skills and 15 quantitative misconceptions, is useful for large samples, and is easily scored by computer.¹⁶³¹ In addition to the eight correct reasoning skills used in the SRA, the QRQ adds three additional skills, including:

1. correctly interprets measures of central tendency
2. understands sources of bias and error
3. recognizes features of good experimental design

The QRQ also adds seven additional measures to the original eight misconception scales from the SRA, including:

1. failure to distinguish the difference between a sample and a population
2. failure to consider and evaluate all of the data

¹⁶²⁸ Garfield. "Assessing Statistical Reasoning." p. 31.

¹⁶²⁹ Sundre, Donna L. "Assessment of Quantitative Reasoning to Enhance Educational Quality." Paper presented at the American Educational Research Association Annual Meeting, Chicago, Illinois, 2003; accessed December 2005; available from <http://course1.winona.edu/cblumberg/sundreqrqpaper.pdf>.

¹⁶³⁰ Ibid. p. 5.

¹⁶³¹ Tempelaar. "Statistical Reasoning Assessment: An Analysis of the SRA Instrument."

3. inability to create and evaluate fractions or percents
4. only large effects can be considered meaningful
5. failure to recognize potential sources of bias
6. assumes more decimal places indicate greater accuracy
7. inability to interpret probabilities.¹⁶³²

In scoring the QRQ, a correct response is given 2 points (for 80 possible points); 1 point is given for response options that are partially correct; and no points are given for completely wrong answers. The QRQ instrument is available from <http://www.jmu.edu/assessment>.

27.6.5 Comprehensive Assessment of Outcomes in Statistics (CAOS)

In addition, the Assessment Resource Tools for Improving Statistical Thinking (ARTIST)¹⁶³³ has developed the Comprehensive Assessment of Outcomes in Statistics (CAOS) instrument. ARTIST is a web-based assessment resource, funded by the National Science Foundation in the U.S. and developed at the University of Minnesota by principle investigators Garfield, delMas, and Chance, “to develop reliable, valid, practical, and accessible assessment items and instruments.”¹⁶³⁴ It has collected a large, online, assessment-item database of tools for assessing statistical reasoning and student outcomes, containing over 1,000 items.¹⁶³⁵

The newly developed CAOS is a 40 item multiple-choice test, which also builds on the SRA, that tests what non-mathematics students, completing any introductory statistics course in university, would be expected to understand. The CAOS test was designed to measure students’ *conceptual understanding* of important statistical ideas, and all items on the CAOS test require students to think and reason, rather than to compute, use formulas, or recall definitions. Although it was designed for introductory statistics students in university, it might also be useful to assess statistical literacy in the general public, since it uses basic material, and, as such, it might also be useful for the CIW in developing a statistical literacy indicator.

According to delMas, et al., after a three-year period, during which items were developed, revised, tested, and evaluated by content experts, the current instrument now has content validity for students enrolled in a college-level non-mathematical first course in statistics.¹⁶³⁶ The final version of the test, called CAOS 4, consists of 40 multiple-

¹⁶³² Sundre. "Assessment of Quantitative Reasoning to Enhance Educational Quality." pp. 7–8.

¹⁶³³ Assessment Resource Tools for Improving Statistical Thinking (ARTIST). *Website*, accessed December 2005; available from <https://app.gen.umn.edu/artist/>.

¹⁶³⁴ delMas, Garfield, Ooms, and Chance. "Assessing Students' Conceptual Understanding after a First Course in Statistics." p. 4.

¹⁶³⁵ Garfield, Joan, Robert delMas, and Beth Chance. *Assessment Resource Tools for Improving Statistical Thinking (ARTIST)*, University of Minnesota, 2005; accessed December 2005; available from <https://app.gen.umn.edu/artist/>.

¹⁶³⁶ delMas, Garfield, Ooms, and Chance. "Assessing Students' Conceptual Understanding after a First Course in Statistics."

choice items. It was administered in a second large scale testing during the fall of 2005, and, in March 2006, a final analysis of the content validity of CAOS4 was conducted. DelMas, et al. note:

There was unanimous agreement by the expert raters that CAOS 4 measures important basic learning outcomes, and 94% agreement that it measures important learning outcomes [...]. Based on this evidence, the assumption was made that CAOS4 is a valid measure of important learning outcomes in a first course in statistics.¹⁶³⁷

During the trial phase, the CAOS was given at “a variety of institutions,” both before and after the statistics course. DelMas, et al. report the results indicated that, although at the start of the course, students understood some concepts, at the end of the course, in general the results suggested:

[M]any students do not demonstrate a good understanding of much of the content covered by the CAOS 4 test, content that statistics faculty agreed represents important learning outcomes for an introductory statistics course. At the end of their respective courses, students still had difficulty with identifying appropriate types of graphic representations, especially with interpreting boxplots. They also did not demonstrate a good understanding of important design principles, or of important concepts related to probability, sampling variability, and inferential statistics.¹⁶³⁸

DelMas, et al. report that the CAOS test is now available for research and evaluation studies in statistics education, and collaborative efforts are currently underway in the U.S. to gather large amounts of test data (including CAOS) online from many institutions in order to promote future research on teaching and learning statistics at the college level.

Instruments such as the SRA, the QRQ, the CAOS, as well as the Statistical Anxiety Rating Scale (STARS) discussed earlier, should therefore also be explored for use as sources for potential measures of statistical literacy in Canada.

¹⁶³⁷ Ibid. p.7.

¹⁶³⁸ Ibid. p. 35.

27.7 Outreach programs

Lifelong learning programs for adult learners occur in adult basic education centres, adult literacy programs, workplace learning programs, union-based programs, community study circles, and continuing education programs at community colleges and universities. Gal recommends that these programs recognize the need for and incorporate statistical literacy into their curricula for adult learners.¹⁶³⁹ Various governmental and nongovernmental organizations have developed outreach programs to assist in learning and developing statistical literacy among students in formal education settings as well as in the general populace.

Scott Murray, of Statistics Canada, and Gal stress that statistical organizations need to be sensitive to the various abilities and needs of diverse target audiences such as the general public; policy makers, senior officials, and politicians; business, educational, and other administrators; journalists; and researchers.¹⁶⁴⁰ This presents challenges to these organizations to prepare different types of communication products that will be useful to these various needs and abilities, and to assume roles as statistics educators as well as providers of information. Murray and Gal suggest general guidelines, that can apply to information in all the literacies discussed in this section and to all the key areas that the public needs to know to improve its wellbeing, that are valuable to use in communications with all user groups. These guidelines could again contribute to a framework for indicators of statistical literacy and provide a basis for evaluation in this area:

Users should be able to find out (in a report, in a related product, on an Internet site) what is being analyzed, why it is being analyzed, how it is being analyzed, what is the underlying conceptual framework, the fitness of the study to inform various uses, what inferences can safely be drawn from the analyses, what social, economic, or other import the analyses hold, and what are the limitations imposed by the data-gathering process on the quality of the data and on the possible conclusions. ‘Value added’ analytic products require making specific choices about what data or patterns to show, what findings to interpret, what implications to discuss, but also what to bypass, ignore, or downplay.¹⁶⁴¹

Statistics Canada has taken a number of initiatives to increase statistical literacy among the general public. It works closely with the news media, and has programs in place to train its staff in journalistic methods, such as writing in the “inverted pyramid style,” which places key news items in the lead paragraph followed by items in order of importance. These methods also show analysts how:

... to extract newsworthy and relevant information from new data sets; identify important contextual information that should be presented in the news release;

¹⁶³⁹ Gal. "Adults' Statistical Literacy: Meanings, Components, and Responsibilities."

¹⁶⁴⁰ Murray, and Gal. "Preparing for Diversity in Statistics Literacy: Institutional and Educational Implications."

¹⁶⁴¹ Ibid. p. 7.

develop story lines, leads and strong subheads; and present tables, charts and graphs effectively.¹⁶⁴²

The Daily is Statistics Canada's regular web-based publication that provides news releases on current social and economic issues, and announcements of all new products. The target audience is the news media and journalists; however, it is also accessible to the general public. Statistics Canada is interested in knowing the extent to which the news media uses its information and in the accuracy with which the information is used. To that end, it maintains an extensive electronic clipping service that tracks all news items that contain or cite information from *The Daily*.¹⁶⁴³ When Statistics Canada discovers misinterpretations or other errors, its policy is to request that the error be corrected. Podehl, from Statistics Canada, reports that a "thumbnail analysis" conducted in 2001 found that approximately 50% of these letters sent to media outlets were published.¹⁶⁴⁴

The Education Outreach Program at Statistics Canada works to develop statistical literacy in grade K-12 students and teachers, as well as in the post-secondary education community. Its website offers information, learning tools, and resources, and a network of five educational representatives work in regional offices to provide training, knowledge, and support at the grassroots level.¹⁶⁴⁵ Students have access to Statistics Canada web resources through their schools, and Statistics Canada's E-Stat series, which is designed specifically for educational use, is offered free of charge to all schools that register for it. Through Industry Canada's SchoolNet program, all of Canada's 16,500 schools have computers and access to the Internet, and so have the ability to access Statistics Canada's educational resources and other materials.¹⁶⁴⁶

Learning resources in Statistics Canada's Education Outreach Program include unlimited use of and access to Statistic Canada's Cansim II social and economic data and Census data. Townsend notes: "It is estimated that one would have to click for 42 years, day and night, to get through the massive amounts of data contained in the Cansim and Census databases."¹⁶⁴⁷ Access is also provided to over 500 articles from Statistics Canada publications. Statistics: Power from Data! is an online learning program consisting of 16 modules that cover all aspects of survey design, administration, and use, from collection, measuring, and interpretation, to analysis.

¹⁶⁴² Smith, Wayne. "Statistics and the Media." Paper presented at the IASE Satellite Conference on "Statistics Education and the Communication of Statistics", Sydney, AU, April 4-5, 2005; accessed December 2005; available from <http://www.stat.auckland.ac.nz/~iase/publications/14/smith.pdf>, p. 5.

¹⁶⁴³ Podehl, W. Martin. "Statistical Literacy and the Media." Paper presented at the Sixth International Conference on Teaching Statistics: Developing a Statistically Literate Society, Cape Town, South Africa, July 7-12, 2002; accessed December 2005; available from http://www.stat.auckland.ac.nz/~iase/publications/1/8fl_pode.pdf.

¹⁶⁴⁴ Ibid.

¹⁶⁴⁵ Townsend. *Symposium 2003: Challenges in Survey Taking for the Next Decade: Developing Statistical Literacy in Youth*, accessed.

¹⁶⁴⁶ Industry Canada. *Canada's Schoolnet Website*, accessed December 2005; available from <http://www.schoolnet.ca>.

¹⁶⁴⁷ Townsend. *Symposium 2003: Challenges in Survey Taking for the Next Decade: Developing Statistical Literacy in Youth*, accessed. p. 4.

In addition, Statistics Canada's Education Outreach program is leading the Canadian component of the *Census at School* project, which is an international statistical literacy project that originated in the United Kingdom in 2000, and is designed to support mathematic curricula.¹⁶⁴⁸ In addition to the U.K. and Canada, the project now includes Australia, New Zealand, and South Africa. The *Census at School* project, which began in Canada in 2003, introduces statistical concepts to school age children in grades 4–12 by showing them how to gather and analyze relevant information from their lives, and how to apply these data to practical situations.

In the 2004–2005 school year, approximately 17,000 elementary students in grades 4 to 8, and 5,600 secondary students in grades 9 to 12 filled out one of two questionnaires, relevant to either elementary or secondary students.¹⁶⁴⁹ Among the questions asked, was one about student reading habits. The elementary school children were asked if they had or had not read in the last two weeks, and secondary students were asked how much time they had spent reading in the last week, with response possibilities ranging from 0 hours to 10 or more hours. Elementary students were classified as readers or non-readers, while secondary students were classified as non-readers (0 hours in the last week), moderate readers (1–6 hours in the last week), or avid readers (7 or more hours in the last week).¹⁶⁵⁰ Results showed that 29% of the more than 22,000 students who answered the questionnaire said that they had not read in the last week, despite the fact that they were all full-time students. Also almost two thirds of the non-readers were male, and the proportion of students who were readers declined with age.¹⁶⁵¹

After looking at the evidence from *Census at School*, the education domain researchers found that the results of this project are not useful for the CIW. Shipley and Harris, of the Centre for Education Statistics at Statistics Canada, note that the program is not an official Statistics Canada survey, student participation is voluntary, the data collected are not representative of the Canadian student population, and the results are reported for the benefit of participating students.¹⁶⁵² More specifically, they note:

It is important to remember that collection of the Census at School data was not done under the Statistics Act as an official Statistics Canada survey. Random selection was not used, nor was the collection based on other statistical concepts such as stratification or population representation. Therefore, the results discussed here are representative only of the students who answered the on-line questionnaires for this international classroom project. These results cannot be applied to the Canadian student population in general.¹⁶⁵³

¹⁶⁴⁸ Townsend, Mary. *Supporting Data-Driven Math in Canadian Schools: Statistics Canada and Census at School*, 2004; accessed January 2007; available from <http://www.stat.auckland.ac.nz/~iase/publications/13/Townsend.pdf>.

¹⁶⁴⁹ Shipley, Lisa, and Shelley Harris. "Census at School: Engaging Students in Statistics," *Education Matters*, vol. 2, no. 5, 2006, Statistics Canada, Catalogue no. 81-004-XIE; accessed January 2007; available from <http://www.statcan.ca/english/freepub/81-004-XIE/2005005/census.htm>.

¹⁶⁵⁰ Ibid.

¹⁶⁵¹ Ibid.

¹⁶⁵² Ibid.

¹⁶⁵³ Ibid. p. 2.

The Statistical Society of Canada also offers education and teaching resources for teaching statistical literacy, and is committed to helping “develop a public awareness of the value of statistical thinking and the importance of statistics and statisticians in Canadian society.”¹⁶⁵⁴

In addition, as noted above, a web-based assessment resource, funded by the National Science Foundation in the United States and developed at the University of Minnesota by delMas, et al. has collected a large database of tools for assessing statistical reasoning and student outcomes.¹⁶⁵⁵

As well, the International Association for Statistical Education (IASE) hosted at the University of Auckland in New Zealand, is the education section of the International Statistical Institute (ISI) in the Netherlands. This is an international umbrella organization working “to promote, support, and improve statistical education at all levels everywhere around the world,” from Primary / Elementary School through Adult Learners.¹⁶⁵⁶

In short, there are major efforts under way, both in Canada and abroad, to improve statistical literacy both among students and the general population. The efforts of all these organizations would benefit from an accepted assessment and evaluation tool designed to report on levels of statistical literacy. It is hoped that indicators of statistical literacy as part of the CIW educated populace domain can eventually make such a contribution. Of all the existing and tested measures examined in this brief literature review, the Comprehensive Assessment of Outcomes in Statistics (CAOS) instrument, which builds on the Statistical Reasoning Assessment (SRA) instrument, presently holds the greatest promise to provide the data needed for such indicators, and it is therefore recommended that this instrument be administered to Canadians in a regular and consistent way.

¹⁶⁵⁴ Statistical Society of Canada. *SSC Mission Statement*, 2005; accessed December 2005; available from http://www.ssc.ca/main/about/mission_e.html.

¹⁶⁵⁵ Garfield, delMas, and Chance. *Assessment Resource Tools for Improving Statistical Thinking (ARTIST)*, accessed.

¹⁶⁵⁶ International Association for Statistical Education. *Website*, University of Auckland, New Zealand, and the International Statistical Institute, accessed December 2005; available from <http://www.stat.auckland.ac.nz/~iase/>.

28. Arts Literacy

The purpose of art is not the release of a momentary ejection of adrenaline but rather the gradual, lifelong construction of a state of wonder and serenity.
Glenn Gould¹⁶⁵⁷

28.1 Arts literacy and lifelong learning

28.1.1 Definitions of arts literacy and the arts literate person

Art has been the subject of conjecture and study for centuries, with the result being a plethora of views and definitions. Dewitt Parker, who notes that the intrinsic value of the arts is “immediately realized in the experience of art,”¹⁶⁵⁸ provides a succinct definition in *The Principles of Aesthetics*:

Art is expression, not of mere things or ideas, but of concrete experience with its values, and for its own sake. It is experience held in a delightful, highly organized sensuous medium, and objectified there for communication and reflection. Its value is in the sympathetic mastery and preservation of life in the mind.¹⁶⁵⁹

Arts literacy is a very broad term that involves learning, understanding, and valuing a broad range of arts—including visual arts, crafts, music, drama and other spoken arts, dance, literature, and film.¹⁶⁶⁰ Therefore, references to the arts in this section refer to this broad range of arts, rather than to visual art alone.¹⁶⁶¹ We are concerned here not with professional artists, but with the extent of arts literacy within the general populace. As such, we are also interested in the level of creativity in the populace, as well as a general sense of the aesthetic experience, as a starting point for arts literacy.

In addition, although we discuss instrumental values of the arts, especially in relation to arts education, we are more concerned with intrinsic values. Instrumental values are secondary social and economic external benefits of the arts—e.g., social cohesion,

¹⁶⁵⁷ Gould, Glenn, cited in Upitis, Rena, and Katharine Smithrim. *Learning through the Arts: National Assessment 1999–2002. Final Report to the Royal Conservatory of Music*, Kingston, Ontario, Arts Matters, Faculty of Education, Queen's University, 2003; accessed September 2005; available from <http://www.lta.ca/discussionzone/press/LTTAjun03-ResearchReport.pdf>, p. 46.

¹⁶⁵⁸ Parker, Dewitt H. *The Principles of Aesthetics*, IndyPublish.com, 2003. Chapter III, p. 1.

¹⁶⁵⁹ Ibid. Chapter 3, p. 8.

¹⁶⁶⁰ Canadian Commission for UNESCO. *Canadian Reflections on Arts and Learning: The Challenge of Systemic Change*, World Conference on Arts Education Lisbon 2006, UNESCO, 2006; accessed January 2007; available from <http://www.unesco.ca/en/interdisciplinary/artsllearning/documents/2006Lisbon-eng.pdf>.

¹⁶⁶¹ Ibid., accessed.

increased academic achievement in other subjects, the economic impact for creative cities, and so forth—which are often cited by arts advocates to increase funding and interest in the arts. Intrinsic values are inherent to the arts themselves, and require no further demonstration of transferability to other areas in order to justify their value.

Arts literacy involves lifelong education and learning, and, as such, we use the terms arts literacy and arts education interchangeably throughout this section, although strictly speaking arts literacy refers to outcomes of arts education / learning. New Zealand analyst Christina Hong notes:

Reference to the notion of literacy in the arts, or more specifically the use of the term aesthetic literacy as it has been developed in the United States, is increasingly prevalent in literature in the field of arts education particularly from the 1980s onwards. The word literacy in relation to the arts and the abilities to which the term refers has also become increasingly and progressively broadened over time. In particular three conceptions are evident: 1. arts literacy as coding and decoding, initially in reference to formally codified [e.g., musical] notation; 2. arts literacy as responding to arts works; and 3. arts literacy as an outcome of making, creating, responding to, and reflecting on the purposes, processes and contexts of art.¹⁶⁶²

According to Hong, arts literacy involves understanding of particular forms of experience that involve sensory symbol systems, which are distinctive to the arts and provide access to aspects of reality that are not captured in other systems.¹⁶⁶³ In a major 1993 study on arts literacy, sponsored by the Social Sciences and Humanities and Research Council and the Canada Council for the Arts, McIntosh, et al. specifically define the arts literate person as one who:

... seeks out and attends to experiences in one or more of the arts; perceives and responds to the qualities of art works where this is an appropriate cultural response; is knowledgeable about the specific code of one or more art forms (tradition, history, canon, vocabulary); has experience with the creative (doing) process in one or more of the arts; and exercises discernment (makes informed choices) in selecting arts experiences.¹⁶⁶⁴

Hong reports that the “notion of the arts contributing to multiliteracies within a multiliterate world is a contemporary conception that is currently in the process of being

¹⁶⁶² Hong, Christina. "Developing Literacies in Postmodern Times: The Role of the Arts in Education." Paper presented at the UNESCO World Conference on the Arts in Education, Lisbon, Portugal, March, 2006, Unitec New Zealand; accessed February 2007; available from http://portal.unesco.org/culture/en/file_download.php/47472850f65e46872ccc81181610c94aChristina+Hong.htm, p. 4.

¹⁶⁶³ Ibid.

¹⁶⁶⁴ McIntosh, D., B. Hanely, P. Verriour, and G. Van Gyn. *The State of the Art: Arts Literacy in Canada*, A report prepared for the Canada Council and the Social Sciences Humanities Research Council. Victoria, B.C.: Beach Home Publishers Ltd., 1993. p. 103, cited in Hong. "Developing Literacies in Postmodern Times: The Role of the Arts in Education." p. 5.

more fully developed and articulated.”¹⁶⁶⁵ She concludes that multiple forms of literacy are important to education in the 21st century:

Each constitutes multimodal pathways that hold the potential to enable students not only to construct meaning but also to diversify and thereby deepen the meanings they construct. In order to do so it is important for students to become skilled in the construction of such meanings within a variety of the forms that are available [... s]ignificantly, this will included the respective disciplines of the arts, each as distinct forms of literacy.¹⁶⁶⁶

As discussed below, we are a long way from developing specific indicators that measure arts literacy in the sense given by Hong and McIntosh, et al. above. There are, however, audience participation and time use data that can act as proxies for arts literacy until more specific measures are developed. Developing such indicators, which would include all aspects of arts literacy, will go a long way towards awakening the public to the importance of the arts in the everyday lives of the general populace.

28.1.2 Importance of lifelong learning in developing arts literacy

In the same 1993 report, McIntosh, et al. express the importance of lifelong learning in developing arts literacy:

It should be evident by now that education of any kind cannot be relegated solely to the schools. Arts education is no exception. It should begin in early childhood in the home and, after formal school years, continue throughout life. It involves the concerted efforts of formal and informal agencies as well as the community-at-large.¹⁶⁶⁷

The Canadian Commission for UNESCO stresses the benefits of formal, nonformal, and informal learning of the arts, both for the individual and society.¹⁶⁶⁸ In a recent report, *Canadian Reflections on Arts and Learning: The Challenge of Systemic Change*, the commission notes that arts are undervalued in Western society and are considered to be only entertainment.¹⁶⁶⁹ Therefore, the process of cultural and artistic expression is “equated with leisure time, seen as unimportant, and often viewed as a waste of time.”¹⁶⁷⁰ However, it also notes that there are important benefits to individuals and society through engagements with the arts:

¹⁶⁶⁵ Hong. "Developing Literacies in Postmodern Times: The Role of the Arts in Education." p. 6.

¹⁶⁶⁶ Ibid. p. 7.

¹⁶⁶⁷ McIntosh, Hanely, Verriour, and Gyn. *The State of the Art: Arts Literacy in Canada*. p. 101, cited in Clover, Darlene E., Odette Laramee, and Kathy Linker. *State of the Field Report: Culture and Adult Education*, University of British Columbia, 2006; accessed January 2007; available from http://www.unb.ca/ALKCSymposium/documents/CultureandAdultEducationreport1_000.pdf. p. 67.

¹⁶⁶⁸ Canadian Commission for UNESCO. *Canadian Reflections on Arts and Learning: The Challenge of Systemic Change*, accessed.

¹⁶⁶⁹ Ibid., accessed.

¹⁶⁷⁰ Ibid., accessed.

The challenges and opportunities presented by the diverse and complex modern world demand innovative, imaginative and generous responses. Through fostering the process of learning to know, learning to do, learning to be and learning to live together, engagement with the arts and cultural expression strengthens the creative process, encourages social and inter-cultural harmony and develops individuals of confidence, imagination and transformative vision.¹⁶⁷¹

This echoes the sentiments of Canadian analyst Glen A. Eyford who, in 1980, pointed out the need for more balanced learning experiences:

It is true of adult education as it is true of all education that our preoccupation is with cognitive learning, with skills of analysis and reasoning. If education is to be balanced, more attention must be given to those learning experiences, which are addressed to man's affective domain, which stimulate his aesthetic sensibilities and which recognize his desire to 'undergo' as well as 'do' art.¹⁶⁷²

Eyford points out that the learning we need today is not just for the individual—it also includes societal learning, which “means that societies, like individuals, can learn and improve.”¹⁶⁷³ Furthermore, he notes, in reference to aesthetic learning: “With special emphasis upon educating the imagination, upon creating new visions of the future, we can begin fashioning a worldview which is appropriate to the global society.”¹⁶⁷⁴

28.1.3 Dimensions of arts literacy

Clover, et al. note in a recent literature review, written for the Canadian Council on Learning and entitled *State of the Field Report: Culture and Adult Education*, that there are two broad areas or dimensions of arts literacy—the first involving arts appreciation, and the second involving using the arts as tools for adult education, through which social and economic issues are addressed through the arts.¹⁶⁷⁵ To this list, others, such as UNESCO, also add creativity, or aesthetic experience, as being important for arts literacy.¹⁶⁷⁶

¹⁶⁷¹ Ibid., accessed. p. 2.

¹⁶⁷² Eyford, Glen A. *Learning and the Arts*, AERC [Adult Education Research Conference] Proceedings, University of British Columbia, 1980. p. 84, cited in Clover, Laramée, and Linker. *State of the Field Report: Culture and Adult Education*, accessed. p. 60.

¹⁶⁷³ Eyford, Glen A. "Cultural Dimensions of Learning," *International Review of Education*, vol. 36, no. 2, 1990: 195-205. p. 204.

¹⁶⁷⁴ Ibid. p. 204.

¹⁶⁷⁵ Clover, Laramée, and Linker. *State of the Field Report: Culture and Adult Education*, accessed.

¹⁶⁷⁶ United Nations Educational, Scientific, and Cultural Organization (UNESCO). *Road Map for Arts Education. The World Conference on Arts Education: Building Creative Capacities for the 21st Century, Lisbon, 6-9 March 2006*, UNESCO, Links to Education and Art International (LEA), 2006; accessed February 2007; available from http://portal.unesco.org/culture/en/ev.php-URL_ID=30335&URL_DO=DO_TOPIC&URL_SECTION=201.html.

Distinctions in arts education, which refer to adult learning as well as that of children and youth, are made between learning *in* the arts, learning *about* the arts, and learning *through* the arts. As identified by the Canadian Commission for UNESCO:

- Learning *in* the arts refers to learning the specific knowledge and skills of a particular art form.
- Learning *about* the arts is generally an integral part of the arts program and allows the student to understand and appreciate works of art as well as the function and history of a particular art form.
- Learning *through* the arts involves using art lessons to teach concepts that are being studied in other subjects of the curriculum (geometric forms in a visual arts lesson to help with mathematics) or a skill (for example conflict resolution through drama). This approach is also called integration. The arts are used in this way to teach other subjects or are integrated into other subjects.¹⁶⁷⁷

UNESCO identifies these three dimensions of arts education as: direct contact with artistic works—whether in other subjects or with artistic works such as concerts, exhibitions, books, and films; engagement in arts practices; and the study of artistic works.¹⁶⁷⁸ All of these dimensions are important in arts literacy. Below, we look briefly at these three dimensions, as they relate to arts literacy in the general populace: appreciation—as developed through direct contact with artistic works; creativity and the aesthetic experience—as experienced through engagement with arts practices; and arts education in the formal public school system—as the study of artistic works. Of course, these areas are interdependent and not easily distinguished. For example, arts taught in the public school system include all of the dimensions: learning in, about, and through the arts.

The second type of arts literacy identified by Clover, et al.—that involving using the arts as tools for adult education, for socio-economic benefits not intrinsic to the arts—is not discussed here, since these dimensions are addressed above in Chapter 25 on multicultural literacy. Clover, et al. refer to this area as “individual and collective empowerment through creative and engaged practices.”¹⁶⁷⁹ This instrumental area, which, as noted, uses the arts as a tool for socio-political adult learning, most often addresses the relationship between the arts and the cultural, social, and economic development of people and communities. Clover, et al explain:

At times the arts are used as tools of adult education to build community, celebrate cultural identities or community achievements, address issues of isolation and loneliness, or promote inter-generational creative learning. At others, the arts are used to creatively and critically engage community in processes that address social issues such as racism and homophobia, development

¹⁶⁷⁷ Canadian Commission for UNESCO. *Canadian Reflections on Arts and Learning: The Challenge of Systemic Change*, accessed. p. 6.

¹⁶⁷⁸ United Nations Educational. *Road Map for Arts Education. The World Conference on Arts Education: Building Creative Capacities for the 21st Century*, Lisbon, 6-9 March 2006, accessed.

¹⁶⁷⁹ Clover, Laramee, and Linker. *State of the Field Report: Culture and Adult Education*, accessed. p. 4.

and environmental degradation, sexual and domestic violence, and poverty and homelessness to name but a few.¹⁶⁸⁰

We have discussed these issues elsewhere in this review. Here we are more concerned with the intrinsic benefits of the arts, and whether or not the populace values and engages with the arts as an aesthetic experience. Although we look briefly at arts education in Canadian schools, this review is focused on learning outcomes, rather than the inputs and determinants of arts education, such as funding and teacher training, per se, although these issues are important. In addition, because of time limitations, we do not discuss professional arts training or the role of the professional artist in society, although a broader review of arts literacy would benefit from this inclusion. As well, cultural policies, community arts education programs, government and private foundation funding, and the work of cultural organizations are all important as determinants of arts literacy, and would also be important to include in a broader discussion of arts literacy than is possible here.

Of course, the outcomes of the experience of arts learning are intangible, subjective, and, as such, very difficult to measure. The conceptual discussion below is necessary as a first step in order to understand what needs to be indicated, and to discover whether we can develop proxies to measure the creative or qualitative experiences. A recent paper commissioned by UNESCO, and written by Larry O'Farrell and Margaret Meban of Queen's University, recommends the development of such indicators:

While studies to date have generally employed standardized tests of mathematics and literacy as indicators of the impact of the arts on learning, it is strongly recommended that other measures be developed that more adequately capture the nature of understandings and skills gained through arts experiences. The research reviewed in this paper indicate that the arts have the capacity to cultivate habits of mind such as persistence, focused perception, and divergent thinking, and personal and social capacities such as empathy for others, collaboration, self-esteem, and positive-risk taking. While these arts outcomes may be more difficult to assess, they are more authentic indicators of the cognitive, social, and personal skills and capacities that rich arts experiences may cultivate than outcomes measured on standardized tests. Standardized tests do not lend themselves to creative solutions, alternative means of expression, and the affective dimensions that the arts engender.¹⁶⁸¹

It is hoped that the Canadian Index of Wellbeing can contribute to the development of such indicators, which can lead to further appreciation of the value of the arts for the quality of life in a sustainable society.

¹⁶⁸⁰ Ibid., accessed. p. 5.

¹⁶⁸¹ O'Farrell, Larry, and Margaret Meban. *Arts Education and Instrumental Outcomes: An Introduction to Research, Methods and Indicators*, Kingston, Ontario, A paper commissioned by UNESCO under contract with the Faculty of Education at Queen's University, 2003; accessed January 2007; available from http://portal.unesco.org/culture/en/file_download.php/2eac5b856768a57a277e90f4614e34b8ofarrell_meban.pdf. p. 32.

28.2 Value and appreciation of the arts

28.2.1 Identifying the intrinsic value of the arts

McIntosh defines arts literacy as “a level of awareness, understanding and valuing in one or more of the arts.”¹⁶⁸² This mainly refers to the first dimension of arts literacy identified above—appreciation as seen in direct contact with artistic works, such as concerts or exhibitions, and focusses on the enjoyment of arts as a common experience to all people. This type of arts literacy involves developing arts appreciation through lifelong learning, maintaining cultural institutions, and training and supporting professional artists in their work. In the context of appreciation, arts literacy is usually indicated through data on public participation in cultural activities, and through survey questions designed to measure awareness of the value of the arts in society.

We discussed this type of participation, which includes experiencing the arts through institutions such as museums, libraries, and art galleries, and through performance companies such as dance, theatre and concerts, in Chapter 9 (informal learning in cultural environments) in connection with these cultural venues as environments for lifelong learning. Indeed, as seen in focus groups conducted for Canadian Heritage, when asked why the arts are important to them, respondents often said: “To learn something.”¹⁶⁸³

In 1996, the Canadian Conference on the Arts initiated the Arts in Transition project to increase the relevance and integration of the arts in society.¹⁶⁸⁴ As part of this project, in 1997, it invited 60 governmental and nongovernmental arts representatives to discuss major issues. In the final report, the representatives outlined their common perspectives, which included the following view on active public participation in the arts:

Underlying our work are the following assumptions:

- that greater active public involvement and participation in the arts will benefit both the public and the arts—these benefits can include the growth of self-confidence, creativity, and self-determination in communities, an increased sense of common ownership and pride in artistic and cultural activity, and more dynamic participation by people as audiences, volunteers, and supporters of the arts
- that a public more deeply and widely interested in the arts can have a positive impact on the support for the arts provided by governments, the private sector,

¹⁶⁸² McIntosh, Hanely, Verriour, and Gyn. *The State of the Art: Arts Literacy in Canada*. cited in Clover, Laramée, and Linker. *State of the Field Report: Culture and Adult Education*, accessed. p. 4.

¹⁶⁸³ Decima Research Inc. *The Arts in Canada: Access and Availability*, Canadian Heritage, 2002; accessed March 2007; available from http://www.pch.gc.ca/progs/arts/pubs/etude-report/arts_access.pdf.

¹⁶⁸⁴ Canadian Conference on the Arts (CCA). *Art in Transition Project: Toward a Culture of Shared Resources: Building an Environment for the Long-Term Sustainability of the Arts in Canada*, CCA, 1997; accessed September 2005; available from <http://ccm.uwaterloo.ca/documents/ait/index.html>.

employers, community groups, etc.¹⁶⁸⁵

In a recent report, Kevin McCarthy, et al. reviewed the literature on the instrumental and intrinsic benefits of the arts for the RAND Corporation in order to “influence the way in which the benefits of the arts are understood and discussed, and to improve the way in which policies to promote these benefits are designed.”¹⁶⁸⁶ McCarthy, et al. found the emphasis in the literature to be on the instrumental benefits, rather than intrinsic benefits, although it is often difficult to distinguish the two since there is a great deal of overlap and interconnection. However, they note the importance of intrinsic benefits, the effects inherent in the arts experience, to add value not only to individuals’ lives, but also to society as a whole:

People are drawn to the arts not for their instrumental effects, but because the arts can provide them with meaning and with a distinctive type of pleasure and emotional stimulation. We contend not only that these intrinsic effects are satisfying in themselves, but that many of them can lead to the development of individual capacities and community cohesiveness that are of benefit to the public sphere. [...] Unlike most communication, which takes place through discourse, art communicates through felt experience, and it is the personal, subjective response to a work of art that imparts intrinsic benefits.¹⁶⁸⁷

The RAND report makes a distinction between private, private-to-public, and mainly public intrinsic value. These values are distinguished as follows:

Private value:

- *Captivation.* The initial response of rapt absorption, or captivation, to a work of art can briefly but powerfully move the individual away from habitual, everyday reality and into a state of focused attention. This reaction to a work of art can connect people more deeply to the world and open them to new ways of seeing and experiencing the world.
- *Pleasure.* The artist provides individuals with an imaginative experience that is often a more intense, revealing, and meaningful version of actual experience. Such an experience can produce pleasure in the sense of deep satisfaction, a category that includes the satisfaction associated with works of art the individual finds deeply unsettling, disorienting, or tragic.

Private-to-public value has to do with the individual’s capacity to perceive, feel, and interpret the world. The result of recurrent experiences, these benefits spill

¹⁶⁸⁵ Ibid., accessed.

¹⁶⁸⁶ McCarthy, Kevin F., Elizabeth H. Ondaatje, Laura Zakaras, and Arthur Brooks. *Gifts of the Muse: Reframing the Debate About the Benefits of the Arts*, RAND Corporation, 2004; accessed March 2007; available from http://www.rand.org/pubs/monographs/2005/RAND_MG218.pdf. p. 5.

¹⁶⁸⁷ Ibid., accessed. pp. xv–xvi.

over into the public realm in the form of individuals who are more empathetic and more discriminating in their judgments of the world around them:

- *Expanded capacity for empathy.* The arts expand individuals' capacities for empathy by drawing them into the experiences of people vastly different from them and cultures vastly different from their own. These experiences give individuals new references that can make them more receptive to unfamiliar people, attitudes, and cultures.
- *Cognitive growth.* The intrinsic benefits described above all have cognitive dimensions. When individuals focus their attention on a work of art, they are 'invited' to make sense of what is before them. Because meanings are embedded in the experience rather than explicitly stated, the individual can gain an entirely new perspective on the world and how he or she perceives it.

Public value. In this case, the benefits to the public arise from the collective effects that the arts have on individuals:

- *Creation of social bonds.* When people share the experience of works of art, either by discussing them or by communally experiencing them, one of the intrinsic benefits is the social bonds that are created. This benefit is different from the instrumental social benefits that the arts offer.
- *Expression of communal meanings.* Intrinsic benefits accrue to the public sphere when works of art convey what whole communities of people yearn to express. Examples of what can produce these benefits are art that commemorates events significant to a nation's history or a community's identity, art that provides a voice to communities the culture at large has largely ignored, and art that critiques the culture for the express purpose of changing people's views.¹⁶⁸⁸

The RAND report also focuses on the arts experience as a key to understanding the value of the arts. It suggested that benefits gained from involvement with the arts are only gained through sustained involvement, and involve emotional and mental engagement of the individual in the experience. It identifies three factors to explain how individuals become involved in the arts:

- *Gateway experiences:* Although these initial experiences can occur at any age, they appear to be the most conducive to future arts involvement if they happen when people are young (that is, of school age, particularly pre-teen).
- *Quality of the arts experience:* Individuals whose experiences are fully engaging—emotionally, mentally, and sometimes socially—are the ones who

¹⁶⁸⁸ Ibid., accessed. pp. xv-xvi.

continue to be involved in the arts. Continued involvement develops the competencies that change individual tastes and enrich subsequent arts experience.

- *Intrinsic worth of the arts experience to the individual*: This is the key difference between individuals who participate frequently in the arts and those who do so only occasionally. [...] Those who continue to be involved seek arts experiences because they find them stimulating, uplifting, challenging—that is, intrinsically worthwhile—whereas those who participate in the arts infrequently tend to participate for extrinsic reasons (such as accompanying someone to an arts event).¹⁶⁸⁹

John Holden, of the U.K. independent think tank, Demos, argues that audience participation numbers alone give a poor picture of the enriching quality of culture.¹⁶⁹⁰ Finding a growing trend in the governmental and cultural sectors to value culture for its economic and social “side effects,” he is particularly concerned that the intrinsic value of the arts are not adequately recognized, especially by funders and policy makers, who have avoided the more difficult issues of what the arts do in and of themselves. He argues that talk about intrinsic value is often dismissed as “art for art’s sake,” and “as old-fashioned obfuscation, and just not hard-headed enough.”¹⁶⁹¹

Holden suggests that a framework identifying public value could provide a yardstick for assessing cultural activities in general, and the arts in particular. He defines public value as the “difference between what citizens give to and what they receive from public bodies.” In the case of culture: “[O]n the input side of this equation there would appear direct financial contributions, including buying tickets and making donations, as well as a willingness to see tax revenues spent on supporting the sector.”¹⁶⁹² Also, the identification of public value would include the commitment of time and energy by the public:

Hours spent visiting, using, enjoying and travelling to and from cultural activities demonstrate that the public values them. [...] So, public willingness to give something up—to spend money and / or time—is a crucial determinant of whether they value something. [...] Engagement with culture is a way of ‘voting with your feet’. The very fact that people go to theatres and galleries, visit country houses and museums, make music and write poetry is proof enough that they value culture. In this sense culture does not simply produce value, it *embodies* value. [...] This] is to understand that value creation is essentially a subjective phenomenon (albeit a collective one) rather than an objective one. In other words, a community cannot be *told* that it is benefiting from an increase in value, rather that value only exists when it is experienced broadly within the community.

¹⁶⁸⁹ Ibid., accessed. pp. xvii.

¹⁶⁹⁰ Holden, John *Capturing Cultural Value*, London, U.K., Demos, 2004; accessed February 2007; available from http://www.maltwood.uvic.ca/cam/publications/other_publications/capturing_cultural_value.pdf.

¹⁶⁹¹ Ibid., accessed. p. 22.

¹⁶⁹² Ibid., accessed. p. 42.

Attempts at capturing, recording and feeding back the recognition of Cultural Value must therefore be based on what the public themselves perceive.¹⁶⁹³

Holden acknowledges that recognizing public cultural value may replicate existing ways of measuring performance, such as using participation rates. However, what is different is that casting performance measures within a value framework both changes and clarifies *why* the measurement is taking place, and opens the framework to the idea that “systemic processes themselves create value, rather than [see] value as a product.”¹⁶⁹⁴ In addition, this approach can include the “historical, social, symbolic, aesthetic and spiritual values that lie at the heart of culture but which bureaucracies and organisations find hardest of all to articulate and defend.”¹⁶⁹⁵

Research analyst Christopher Madden of the International Federation of Arts Councils and Culture Agencies (IFACCA) in Australia notes that not all values, such as public art and non-use values, are observable in economic market transactions, and are therefore not captured in market valuations. Non-use values, which must be measured subjectively through surveys, include:

- *existence value*: people value the existence of a cultural facility or heritage item regardless of whether they wish to take part in it or use it themselves
- *option value*: people want to keep open the possibility of using or enjoying something in the future, even though they don’t use it today
- *bequest value*: people value leaving something to future generations¹⁶⁹⁶

According to Madden, non-use values are extremely important for the sustainability and funding of culture:

These non-use values are highly significant for the funding of culture, given that so much cultural value rests on the preservation of assets, practices, knowledge or locations through which it can or could be created in the future. Non-use values provide one set of reasons for supporting forms of culture that do not command instant, widespread popularity or commercial return.¹⁶⁹⁷

In sum, recognizing the public value of the arts as shown in participation rates, also indicates public appreciation expressed through direct contact with the arts. However, as the RAND report noted, the arts experience is a key to understanding the value of the

¹⁶⁹³ Ibid., accessed. p. 42, 49, 52.

¹⁶⁹⁴ Ibid., accessed. p. 56.

¹⁶⁹⁵ Ibid., accessed. p. 57.

¹⁶⁹⁶ Ibid., accessed. p. 32.

¹⁶⁹⁷ Ibid., accessed. p. 33.

arts.¹⁶⁹⁸ Understanding and finding indicators of the arts experience is a challenge in the development of arts literacy indicators.

28.2.2 Limitations of arts participation indicators

Madden notes that much of the cultural indicator literature presents data on outputs such as participation rates, rather than data on outcomes, such as artistic experiences, or social impacts.¹⁶⁹⁹ He asks: “Developers need to be clear about what it is they want to measure: audience numbers, or artistic experiences?”¹⁷⁰⁰ Madden argues that, as a subset of culture, arts indicators should be included within cultural policy indicators:

But this is not always the case, especially when culture is viewed as primarily a social phenomenon (as in sociological and anthropological concepts of culture), where the more personal and individual aspects of artistic activity, such as the exploring of emotions and the enjoyment of aesthetic experience, can be overlooked.¹⁷⁰¹

As an example, Madden cites the cultural indicators used by UNESCO, which focus on broad cultural phenomena, as not being suitable to serve as a set of indicators for arts literacy, especially since they do not measure artistic experiences. However, according to Madden, UNESCO does recommend that cultural indicators should not be dependent on market performance, as are GDP data. Madden also finds that data on cultural attendance, such as attendances at an art gallery, are not sufficient:

Art gallery attendance is not an indicator until attendance rates per head of population is calculated and some appropriate comparison population found (eg. previous attendances, attendances in other countries, attendances at other venues). The practical issues can, however, become exceedingly complex. Take the last example above of attendances at art galleries. Assume that data indicate an increase in attendance rates. From simple door counts alone, there is often no way of telling who these people are, how long they stayed at the gallery, what they did there, how satisfying their gallery experience was, or how their experience impacted on their lives. A measured increase in art gallery attendances per population may simply represent the same people attending more often (ie. audience diversity has remained the same). Or these same people may even be spending less time at each visit, so the total time that they are experiencing art remains the same (ie. cultural ‘consumption’ remains constant). And if, on the

¹⁶⁹⁸ McCarthy, Ondaatje, Zakaras, and Brooks. *Gifts of the Muse: Reframing the Debate About the Benefits of the Arts*, accessed. p. xvi.

¹⁶⁹⁹ Madden, Christopher. *Statistical Indicators for Arts Policy: Discussion Paper*, International Federation of Arts Councils and Culture Agencies (IFACCA), 2004; accessed September 2005; available from <http://www.ifacca.org/FILES/StatisticalIndicatorsArtsPolicy.pdf>.

¹⁷⁰⁰ Ibid., accessed. p. 30.

¹⁷⁰¹ Ibid., accessed. p. 23.

other hand, gallery attendance rates are declining, why are people not going? Indicators based on door counts do not answer this question.¹⁷⁰²

U.K. researcher Colin Mercer expresses the same criticisms of participation measures, and adds that we also need to know how the populace is using these cultural forms:

What we need to know most about access, participation and consumption are not just the aggregate numbers, watchers, listeners, consumers, participants, (crucial as these are) but also how people are *using* these cultural forms to various ends of, for example, identity affirmation, personal development, social distinction and demarcation, etc. and how these various uses are articulated to socio-economic and other demographic variables.¹⁷⁰³

However, Madden suggests that arts participation rates can indicate whether or not the populace appreciates the arts: "Arts participation is a proxy for arts appreciation, as the more people appreciate the arts, the more they are likely to participate in the arts."¹⁷⁰⁴ He also suggests that a working definition of an indicator could be: "Number of people participating in the arts at least once in the previous 12 months as percent of total population—compared with rates from previous years."¹⁷⁰⁵ A rate higher than that of previous years, all things considered, would imply an increase in appreciation, and vice versa. Madden notes that participation rates can be broken into creating arts and viewing or listening to arts. However, Madden also reviews other limitations of this indicator:

[The] indicator does not measure changes in quality of arts participation, experience, or the frequency of participation (an increase in frequency would imply greater appreciation). [...] Other indicators in the suite that the indicator should be interpreted in conjunction with [are] frequency of participation [and] satisfaction with arts participation.¹⁷⁰⁶

Finally, as noted in Chapter 9, Gilles Pronovost of the Université du Québec à Trois Rivières criticizes participation data, arguing that it often reflects a cultural bias—measuring "elite" activities such as attendance at classical music concerts and theatre performances.¹⁷⁰⁷ He notes that museums are mentioned on a regular basis on surveys, but activities that may have similar impacts, such as the contemplation of nature (which he remarks does have policy implications,) are not included. He also notes that people

¹⁷⁰² Ibid., accessed. p. 30.

¹⁷⁰³ Mercer, Colin. "Cultural Capital and Capabilities: Defining and Measuring the Cultural Field." Paper presented at the Third Global Forum on Human Development: Cultural Identity, Democracy and Global Equity, Paris, 17-19 January, 2005, U.K. Cultural Capital Ltd.; accessed March 2007; available from http://hdr.undp.org/docs/events/global_forum/2005/papers/Colin_Mercer.pdf, p. 23.

¹⁷⁰⁴ Madden. *Statistical Indicators for Arts Policy: Discussion Paper*, accessed. p. 31.

¹⁷⁰⁵ Ibid., accessed. p. 31.

¹⁷⁰⁶ Ibid., accessed. p. 31.

¹⁷⁰⁷ Pronovost, Gilles. "Statistics in the Wake of Challenges Posed by Cultural Diversity in a Global Context: A Review of Surveys on Cultural Participation." Paper presented at the International Symposium on Culture Statistics, Montreal, October 21-23, 2002, UNESCO Institute for Statistics and Observatoire de la culture et des communications du Québec, Institut de la Statistique du Québec; accessed August 2005; available from http://www.colloque2002symposium.gouv.qc.ca/h4v_page.

tend to overestimate attendance at “noble” activities, such as theatre and symphony orchestra performances, and underestimate other “less noble” activities, such as television viewing time.¹⁷⁰⁸

28.2.3 Arts participation indicators

General Social Survey (GSS) on time-use

Although not direct measures of arts literacy, cultural participation could serve as a proxy for the first dimension of arts literacy—appreciation—as developed in direct contact with artistic works. As noted in Chapter 9 of this review, the CCL uses data from the Survey of Household Spending to measure participation in cultural activities as a proxy for learning in two of its sixteen Composite Learning Index (CLI) indicators. In order to indicate “learning to be,” the CCL measures spending on cultural activities by using the percentage of households who report spending on performing arts, and the percentage of households with spending on visiting museums.¹⁷⁰⁹ However, Statistics Canada, in referring to the non-economic, “consumer participation in culture activities and events” module of the General Social Survey (GSS), notes:

This non-economic view of culture consumption is, in one sense, a more accurate reflection of the importance of culture in people’s lives, as not all culture activities require a monetary expenditure. Free outdoor music concerts, free museum or gallery admissions or the use of public libraries are examples.¹⁷¹⁰

To this we might add that measuring household economic expenditure on the arts, although these are relatively easy to measure and the data are collected regularly, excludes those who cannot afford expensive tickets and who might experience the arts through other venues, such as free cultural festivals or free museum admissions, as noted above.

The time-use sections of Statistics Canada’s General Social Surveys conducted in 1992, 1998, and 2005 (Cycles 7, 12, and 19) “form the largest source of data on cultural participation of Canadians”—Canadians 15 years of age and older—based on survey sizes of approximately 10,000 households in all of the provinces (excluding the territories.)¹⁷¹¹ In 2005, the sample size of the time-use section was increased to almost

¹⁷⁰⁸ Ibid.

¹⁷⁰⁹ Canadian Council on Learning (CCL). *Website*, CCL, accessed March 2006; available from <http://www.ccl-cca.ca/>.

¹⁷¹⁰ Statistics Canada. *Canadian Culture in Perspective: A Statistical Overview*, Statistics Canada, Catalogue no. 87-211-XIB, 2000; accessed August 2005; available from <http://dsp-psd.communication.gc.ca/Collection-R/Statcan/87-211-XIB/87-211-XIB-e.html>, p. 55.

¹⁷¹¹ Foote, John A. “Cultural Consumption and Participaton,” *Canadian Journal of Communication*, vol. 27, 2002: 209-220.; and Ogrodnik, Lucie. *Patterns in Culture Consumption and Participation*, Ottawa, Culture Statistics Program, Culture, Tourism and the Centre for Education Statistics, Statistics Canada, 2000; accessed August 2005; available from http://www.canadacouncil.ca/publications_e/statistics/si127235030740937500.htm.

20,000 households. However, in order to include more content in the survey, the sample was split in half, with half of the respondents questioned about cultural and sports activities, and half questioned about social networks and transportation. Questions, for the most part, are the same in all three surveys to allow for the identification of trends. However, some questions were dropped in 2005 because of space limitations.

Section 10A of the 2005 GSS questionnaire included the cultural activities module.¹⁷¹² It asked about participation in a list of cultural activities, including newspaper, magazine, and book reading; library services use; movie attendance, video watching; music listening, and television viewing. In addition, it asked if during the past 12 months the respondent had attended cultural activities outside the home, and after each question, how often (1 to 4 times a year; 5 or more times, but not every month; at least once every month; don't know; refusal).¹⁷¹³ These questions included popular arts and multicultural festivals, in addition to arts such as theatre and classical music performances.

The cultural attendance questions and the results are shown below in Table 21. As of March 2007, Statistics Canada had not publicly released the 2005 data to populate the questions in the cultural activities module, although it did release an overview of the survey based on information reported in the one-day time use diary portion of the survey.¹⁷¹⁴ However, the data are available as a special supplement that is accessible by request, for a fee, and we intend to include the 2005 data in the final report. Here, we include the column in Table 21 for 2005 in order to show which questions were retained and discarded.

In addition, the 2005 survey asked one general question about enjoyment of the activities, which is the only question addressing the respondent's experience of cultural activities:

Now I would like you to rate the following activities using the scale from '1' to '5' where '1' means you dislike the activity a great deal and '5' means you enjoy it a great deal.

How much do you enjoy: going out to movies, plays, sports events?¹⁷¹⁵

Unfortunately, this question is too broad to be useful for our purposes, since it does not distinguish enjoyment between the three venues.

Cycle 2, 1986 GSS also had a time-use component, but this cycle did not include a cultural activities module.

¹⁷¹² Statistics Canada. *General Social Survey 2005: Cycle 19 Time Use. Main Survey Questionnaire*, Social and Aboriginal Statistics Division, 2005; accessed March 2007; available from http://www.statcan.ca/english/sdds/instrument/4503_Q1_V4_E.pdf.

¹⁷¹³ Ibid., accessed.

¹⁷¹⁴ Statistics Canada. *General Social Survey on Time Use: Overview of the Time Use of Canadians 2005*, Catalogue no. 12F0080XIE, 2006; accessed March 2007; available from <http://www.statcan.ca/english/freepub/12F0080XIE/12F0080XIE2006001.pdf>.

¹⁷¹⁵ Statistics Canada. *General Social Survey 2005: Cycle 19 Time Use. Main Survey Questionnaire*, accessed. ENJ_Q200, p. 162.

Table 21. Percentage of Canadian adults, ages 15 and over, participating in particular activities or events, General Social Survey, 1992 and 1998

Activity or event During the past 12 months, did you:	Year of survey		
	1992	1998	2005
attend a concert or performance by professional artists of music, dance, theatre, or opera, excluding cultural festivals?	30	35	
attend a theatrical performance such as a drama, musical theatre, dinner theatre, comedy?	24	20	
attend a popular musical performance such as pop / rock, jazz, blues, folk, country and western?	24	20	
attend a symphonic or classical music performance?	12	8	
attend opera?	4	3	-
attend a choral music performance?	3	7	-
attend a dance performance?	5	7	-
attend a performance for a children's audience?	8	7	-
go to a cultural or artistic festival such as film, fringe, dance, jazz, folk, rock, buskers, or comedy?†	51	23	
go to a performance of cultural / heritage music, theatre or dance (e.g. Aboriginal Peoples, Chinese, Ukrainian)?	12	14	
go to a popular stage performance such as a circus or stand-up comedy?	18	16	-
attend any other kind / type of cultural performance?	-	-	
visit a museum or art gallery?	32	30	-
visit a public art gallery or art museum, including attendance at special art exhibits?	19	22	
visit a commercial art gallery?	8	9	-
visit museums other than public art galleries or art museums?	-	-	
visit a science centre or museum of natural history or natural science?	17	13	-
visit a general, human history, or community museum?	17	11	-

Notes: A hyphen (-) indicates that the question was not asked in that year. As noted in the text, data was not yet available at this time for 2005. It is included here to illustrate which questions were used or excluded, for comparison purposes. †1992 asked: "Did you go to any festivals, fairs or exhibitions?" 1998 and 2005 asked: "Did you go to a cultural or artistic festival (such as film, fringe, dance, jazz, folk, rock, buskers or comedy)?" Therefore 1992 and 1998 / 2005 definitions are different and 1992 was a broader category.

Sources: Statistics Canada. *Canadian Culture in Perspective: A Statistical Overview*, Statistics Canada, Catalogue no. 87-211-XIB, 2000; accessed August 2005; available from <http://dsp-psd.communiquen.gc.ca/Collection-R/Statcan/87-211-XIB/87-211-XIB-e.html>, and Statistics Canada. *General Social Survey 2005: Cycle 19 Time Use. Main Survey Questionnaire*, Social and Aboriginal Statistics Division, 2005; accessed March 2007; available from http://www.statcan.ca/english/sdds/instrument/4503_Q1_V4_E.pdf.

Table 21 shows that when asked the general question concerning attendance at a concert or performance by professional artists of music, dance, theatre, or opera, excluding cultural festivals, between 1992 and 1998, the percentage of those attending rose from 30% to 35% of adults. However, when the venues are disaggregated, with the exceptions of choral music and dance performances, the participation rates declined between 1992 and 1998. However, attendance at cultural / heritage performances and visits to art galleries rose slightly.

The Canada Council for the Arts finds that demographic characteristics, including education, income, and age, are key factors in the participation rates for various cultural activities.¹⁷¹⁶ The General Social Surveys (GSS) in Canada show that higher education and / or income correlate with an increase in participation, no matter what type of cultural activity is included.¹⁷¹⁷ Table 22 shows the demographic characteristics for 1992 and 1998, as well as the rates of change.

Table 22. Percentage of Canadians aged 15 and over that attended performing arts events in the past year, by gender, age, education, household income, and province, General Social Survey, 1992 and 1998

	All performing arts		Changes		Theatre, classical music, and dance		Changes		Popular music		Changes	
			% pt.	%			% pt.	%			% pt.	%
	1992	1998			1992	1998			1992	1998		
Total	42.4	37.6	- 4.8	- 11.4	30.6	27.5	- 3.1	- 10.1	24.0	21.3	- 2.7	- 11.3
Gender												
Male	41.5	36.3	- 5.2	- 12.5								
Female	43.4	38.9	- 4.6	- 10.5								
Age												
15-29	51.6	45.3	- 6.4	- 12.3	30.8	27.5	- 3.4	- 10.9	38.0	32.2	- 5.8	- 15.1
30-44	42.4	36.3	- 6.1	- 14.3	31.1	25.6	- 5.5	- 17.6	24.2	22.1	- 2.1	- 8.8
45-59	44.4	37.6	- 6.8	- 15.2	35.9	31.3	- 4.6	- 12.8	18.7	17.9	- 0.8	- 4.4
60+	27.1	28.7	1.6	6.0	23.9	26.1	2.2	9.2	8.4	8.3	- 0.1	- 1.1
Education												
Less than	25.3	23.3	-	-8.0	15.7	15.8	0.0	0.2	14.8	12.5	-	-

¹⁷¹⁶ Canada Council for the Arts. *Overview of Key Demographic Trends - Possible Impact on Canadian Arts Attendance*, The Canada Council for the Arts, 2002; accessed August 2005; available from <http://www.canadacouncil.ca/NR/rdonlyres/7ABE4A9B-798B-4262-8AFF-FD45E9A5089A/0/demographse.pdf>.

¹⁷¹⁷ Statistics Canada. *Canadian Culture in Perspective: A Statistical Overview*, accessed.

	All performing arts		Changes		Theatre, classical music, and dance		Changes		Popular music		Changes	
			% pt.	%			% pt.	%			% pt.	%
	1992	1998			1992	1998			1992	1998		
high school			2.0								2.3	15.4
High school	40.3	33.2	-7.1	-17.6	26.2	23.8	-2.5	-9.5	23.6	17.3	-6.4	-26.9
College / Technical diploma	46.1	38.1	-8.0	-17.4	34.5	26.6	-7.9	-23.0	25.4	21.2	-4.2	-16.6
Some postsecondary	51.3	44.2	-7.1	-13.9	35.1	31.4	-3.7	-10.6	33.0	27.3	-5.7	-17.1
Bachelors or more	67.5	55.7	-11.8	-17.5	57.6	45.5	-12.1	-21.1	32.4	31.9	-0.5	-1.5
Income												
Less than \$20,000	25.3	23.7	-1.6	-6.5	16.2	16.3	0.1	0.6	14.9	14.8	-0.1	-0.6
\$20,000 to \$40,000	37.9	31.2	-6.7	-17.7	26.4	22.6	-3.8	-14.5	21.6	16.9	-4.6	-21.4
\$40,000 to \$60,000	45.5	37.9	-7.6	-16.7	32.5	27.8	-4.7	-14.5	26.8	22.0	-4.8	-17.9
\$60,000 to \$80,000	58.3	47.1	-11.2	-19.3	42.7	32.6	-10.0	-23.6	30.4	28.1	-2.3	-7.5
\$80,000 and over	69.6	55.0	-14.7	-21.1	58.0	43.3	-14.7	-25.3	34.9	31.5	-3.4	-9.8
Provinces												
Newfoundland	29.6	24.2	-5.4	x	14.8	15.0	0.2	x	21.7	16.5	-5.2	x
Prince Edward Island	33.7	36.0	2.3	x	20.1	28.8	8.7	x	21.9	21.7	-0.2	x
Nova Scotia	38.5	28.8	-9.7	x	23.4	19.7	-3.7	x	26.2	17.0	-9.2	x
New Brunswick	27.3	24.6	-2.7	x	15.3	16.5	1.2	x	16.4	15.5	-0.9	x
Quebec	45.9	39.8	-6.1	x	34.5	29.2	-5.3	x	26.0	22.6	-3.4	x
Ontario	43.1	39.6	-3.5	x	32.3	28.8	-3.5	x	23.0	22.2	-0.8	x
Manitoba	36.5	30.2	-6.3	x	23.4	22.1	-1.3	x	21.8	17.7	-4.1	x
Saskatchewan	33.7	26.5	-7.2	x	19.5	16.0	-3.5	x	21.6	16.8	-4.8	x
Alberta	43.6	38.2	-5.4	x	30.1	27.4	-2.7	x	25.0	22.5	-2.5	x
British Columbia	44.0	38.9	-5.1	x	31.7	31.2	-0.5	x	25.1	20.4	-4.7	x

Note: 'x' means the data were not given.

Source. Hill Strategies Research Inc. *Performing Arts Attendance in Canada and the Provinces*, Canada Council for the Arts, Canadian Heritage, Ontario Arts Council, Ontario Trillium Foundation and Alberta Foundation for the Arts, 2003; accessed March 2007; available from <http://www.canadacouncil.ca/NR/rdonlyres/F0DBF452-7B7B-47E3-8841->

[0A74A26CD3BF/0/perfarts_report.pdf](#) and (tables)
http://www.canadacouncil.ca/NR/rdonlyres/659CBBE0-128B-4A74-9768-CDCC52FD7F39/0/perfarts_tables.pdf.

The data in Table 22 above show that women attend performances more than do men, attendance figures increase with higher levels of education, and Canadians with university degrees had the highest attendance rates for each of the performing arts categories. One exception to this trend was that in 1992 those with a university education had a slightly smaller attendance rate at popular music performances than did those with some university education.

The GSS also shows that the age of Canadians has a direct bearing on cultural participation. The highest attendance rate by age for all performing arts was that of 15 to 29 year olds (51.6% in 1992, and 45.3% in 1998), and the lowest attendance rate was that of those 60 and over (27.1% in 1992, and 28.7% in 1998.) However, for theatre, classical music, and dance, the highest attendance rate was that of 45 to 59 year olds. In 2000, Statistics Canada predicted:

The huge baby boom cohort, now between the ages of 34 and 53 will be moving into this age group this decade. While their habits may not replicate those of the older group, it is likely that participation in less active leisure activities such as reading, doing crafts, going to museums and attending theatre and music concerts will be more popular than participating in sports or other high-energy activities, for example. The influence of age is likely to continue to play a prominent role in lifestyle choices and leisure pursuits.¹⁷¹⁸

Performing arts attendance also increases with household income. Canadians from households earning the highest incomes reported the highest rates of attendance for each of the performing art forms. For example, in 1998, 55% of persons from families earning \$80,000 or more attended the performing arts, which was more than double the attendance rate of persons earning less than \$20,000 (23.7%).¹⁷¹⁹

In terms of the provinces, in 1998, Newfoundland (24.2%) and New Brunswick (24.6%) had the lowest participation rates, while Alberta (43.6%) and British Columbia (44%) had the highest participation rates, although the rates for all provinces, with the exception of Prince Edward Island, declined between 1992 and 1998. This pattern was the same for theatre, classical music, and dance performances. For popular music, in 1998, Alberta, Ontario, and Quebec all had higher attendance rates than did British Columbia. New Brunswick had the lowest rates for popular music in both years.

The Canada Council for the Arts notes that reasons for low attendance rates are not known: “Whether this lower attendance rate is due to lack of interest, lack of arts

¹⁷¹⁸ Ibid., accessed. p. 56.

¹⁷¹⁹ Ogrodnik. *Patterns in Culture Consumption and Participation*, accessed. p. 57.

education, lack of disposable income or lack of leisure time is unclear.”¹⁷²⁰ The council is also concerned that “a serious weakening of arts education in the schools may have an impact on future audience development.”¹⁷²¹ Studies in the U.S. have determined a link between arts education and / or arts participation in childhood and adult participation. Using 1992 U.S. data, a 1996 National Endowment for the Arts report found the following connections between arts education and participation:

- Generally, more arts education or education (hence, arts / education) meant more arts consumption (attending, listening to, watching, or reading) and more arts creating (writing, composing, drawing, painting). Indeed, arts education had a much stronger impact than did overall educational attainment, even after taking personal background and socioeconomic status into account.
- Those who had more arts education were more likely to attend arts performances, a relationship which was about four times stronger than that of any other factor considered.
- More than half the initial differences in attendance associated with SES—one’s ability to pay—were removed by considering differences in arts education.
- Arts education was the strongest predictor of arts creation, reducing the effect of SES substantially.
- For almost every type of arts participation, the more one received of both school- and community-based arts education, the more one participated in the arts as an adult, either through consumption or creation.¹⁷²²

In Canada, the Council notes: “There is no recent definitive information on the impact of the reduction in arts education in the schools and the impact may not be measurable until years into the future.”¹⁷²³ However, it is likely that the above U.S. findings apply to Canada as well.

Canadian Heritage survey

In connection with a series of 12 focus groups, in October, 2001, Decima Research Inc. conducted a telephone survey for Canadian Heritage of 2,603 Canadians ages 15 and over in all provinces and territories.¹⁷²⁴ Results from the focus groups are interesting, although

¹⁷²⁰ Canada Council for the Arts. *Overview of Key Demographic Trends - Possible Impact on Canadian Arts Attendance*, accessed. p. 37.

¹⁷²¹ Canada Council for the Arts. *Research Report on Large Performing Arts Organizations*, 2001; accessed August 2005; available from <http://dsp-psd.pwgsc.gc.ca/Collection/K23-43-2001E.pdf>, p. 11.

¹⁷²² National Endowment for the Arts. *Effects of Arts Education on Participation in the Arts: Executive Summary*, Report 36, 1996; accessed March 2007; available from <http://arts.endow.gov/pub/Researchcharts/Summary36.html>.

¹⁷²³ Canada Council for the Arts. *Research Report on Large Performing Arts Organizations*, accessed. p. 11.

¹⁷²⁴ Decima Research Inc. *The Arts in Canada: Access and Availability*, accessed.

anecdotal. When asked what they perceived to be the reasons the arts are important to them and to Canadians (or what “they get out of” attending arts events and exhibits), participants responded with numerous answers. Some of the most common were:

- **To learn something:** One of the most common benefits derived from attending arts events, exhibits and performances was that they represent an opportunity to learn something. More specifically, the arts allow individuals to obtain insight into something or experience something altogether new.
- **Historical continuum:** In the same vein, participants viewed the arts as an important tool in providing information and perspective on history and culture. The arts were viewed as a way of learning about the past, understanding the present and teaching future generations about today.
- **Entertainment and fun:** Another common benefit of the arts was that they are entertaining and fun, especially among younger generations. Whereas older respondents also acknowledged this as a benefit, they were more likely to consider the arts a “distraction from every day life.”
- **Personal gratification:** [P]articipants indicated that attending arts events and exhibits provided emotional, spiritual and intellectual appeasement or stimulation: “It’s good for the soul.”
- **Means of expression:** Looking at the question from an artist’s perspective, many participants repeated that the arts are a means of expression and communication.¹⁷²⁵

The Canadian Heritage survey asked respondents about attendance at live performance and arts events, art galleries and museums, and cultural festivals. However, it also included a module on attitudes, interest, and expectation for quality of life. The relevant question, which at least points to experience of the arts, was: “To what extent are the arts important in terms of enhancing the quality of your life? (Would you say extremely important, somewhat important, important, not very important, or not at all important?).”¹⁷²⁶ The results are shown in Table 23 below.

¹⁷²⁵ Ibid., accessed. pp. 53-54.

¹⁷²⁶ Ibid., accessed.

Table 23. Percentage of adults that believe the arts are important in terms of enhancing the quality of life, by gender, age, household income, and education, Canadian Heritage survey, 2001

	Extent of importance of the arts					
	Extremely important	Somewhat important	Important	Not very important	Not at all important	Don't know
Total	20	32	22	19	6	1
Gender						
Male	17	32	20	22	9	1
Female	22	33	24	16	5	0.4
Age						
15–20	18	34	24	19	5	1
21–24	20	31	22	21	7	-
25–44	19	33	25	18	5	1
45–64	22	33	21	18	7	-
65+	21	29	17	23	10	1
Education						
Not graduated from high school	10	29	24	26	10	1
High school graduate	12	31	24	24	9	1
College	15	32	27	20	6	0.4
Some university	29	35	18	15	4	-
University graduate	34	35	18	11	2	1
Graduate degree	34	38	14	11	3	-
Income						
Less than \$20,000	23	26	20	22	10	0.3
\$20,000 to \$40,000	19	32	23	20	6	0.2
\$40,000 to \$80,000	18	34	25	17	6	1
\$80,000 to \$100,000	24	36	19	20	1	-
\$100,000 or more	22	37	24	13	4	1

Question: Q10: “To what extent are the arts important in terms of enhancing the quality of your life? Would you say extremely important, somewhat important, important, not very important, or not at all important?”

Source: Decima Research Inc. *The Arts in Canada: Access and Availability*, Canadian Heritage, 2002; accessed March 2007; available from http://www.pch.gc.ca/progs/arts/pubs/etude-report/arts_access.pdf.

Results show that the vast majority of Canadians (84%) express that the arts are important (extremely, somewhat, or important) in terms of enhancing the quality of their lives. More specifically, 20% consider the arts extremely important, 32% consider them somewhat important and another 22% consider the arts important. Of the remaining respondents, 19% believe the arts are not very important in terms of enhancing the quality of their life, and 6% consider them not at all important. In terms of age, the results are similar, with the majority of respondents in each age group thinking the arts are somewhat important. The 45 to 64 age group was most likely to say that the arts were extremely important (22%). However, the 15 to 20 age group was most likely to say that the arts were somewhat important (34%).

Attitudinal differences are seen when considering the other basic demographic factors—gender, education, and household income. The arts were considered to be more important by women than by men—55% of women considered the arts somewhat or extremely important, compared to 49% of men.

The arts were also considered to be extremely important by respondents with a university education, where 34% considered the arts extremely important compared to 10% among those who had not graduated from high school.

Households earning over \$80,000 were more likely to consider the arts as somewhat important (36%), compared to households earning below \$20,000 (26%). However, both of these categories almost equally considered the arts to be extremely important, as reported by 24% of households earning over \$80,000, and 23% of households earning less than \$20,000.¹⁷²⁷

In sum, although the participation data have limitations in terms of indicating arts literacy, especially since they do not indicate the use or experiences of the arts, as noted above, Madden suggests that arts participation rates *can* indicate whether or not the populace appreciates the arts: “Arts participation is a proxy for arts appreciation, as the more people appreciate the arts, the more they are likely to participate in the arts.”¹⁷²⁸ As the above tables show, between 1992 and 1998, the participation rates declined. We will need to examine the 2005 rates to see whether or not this trend is continuing.

¹⁷²⁷ Ibid., accessed.

¹⁷²⁸ Madden. *Statistical Indicators for Arts Policy: Discussion Paper*, accessed. p. 31.

28.3 Creativity and the aesthetic experience

In this section, we look at the second dimension of arts literacy—creativity and the aesthetic experience—in order to identify indicators that might capture this dimension. According to Joli Jensen, of the University of Tulsa: “Our studies of how and why people ‘like the arts’ are mostly instrumental rather than expressive; that is, they are designed to increase arts participation rather than to understand how art is meaningful.”¹⁷²⁹ However, as McCarthy, et al. noted above, the arts experience is a key to understanding the value of the arts and arts literacy.¹⁷³⁰ The aesthetic experience is available to the general populace, rather than only to those who are considered to be “artists.” Of course, measurement of experience is difficult and subjective, and, other than small psychological tests in various research settings, which are not appropriate for large scale indicators such as those needed for the Canadian Index of Wellbeing, we have not found indicators that could properly address the issues in this dimension of arts literacy. The conceptual issues are discussed below, in an effort to understand this dimension. However, we also look at information concerning public engagement with arts practices to use as proxies for aesthetic experience, until such time as a more composite indicator for arts literacy can be developed.

28.3.1 Importance of the aesthetic experience for arts literacy

Maxine Greene, of Columbia University, who is one of the world leaders in aesthetic education and “widely described as the most significant American educational philosopher since John Dewey,”¹⁷³¹ defines the term “aesthetic,” as “the mode of experience brought into being by encounters with works of art.”¹⁷³² She notes that aesthetic education is:

... an intentional undertaking designed to nurture appreciative, reflective, cultural, participatory engagements with the arts by enabling learners to notice what is there to be noticed, and to lend works of art their lives in such a way that they can achieve them as variously meaningful. When this happens, new connections are made in experience: new patterns are formed, new vistas are opened. Persons see differently, resonate differently.¹⁷³³

Discussing the aesthetic experience and the possibilities of opening perspectives, Greene suggests that experience of the arts encourages “wide-awakeness,” which she asserts has

¹⁷²⁹ Jensen, Joli. “Expressive Logic: A New Premise in Arts Advocacy,” *Journal of Arts Management, Law, and Society*, vol. 33, no. 1, 2003: 65-80. p. 78.

¹⁷³⁰ McCarthy, Ondaatje, Zakaras, and Brooks. *Gifts of the Muse: Reframing the Debate About the Benefits of the Arts*, accessed. p. xvi.

¹⁷³¹ Harris, Eileen. “Lessons from the Arts: A Review of *The Arts and the Creation of Mind* by Elliot Eisner,” *Journal of the Canadian Association for Curriculum Studies*, vol. 1, no. 2, 2003: 1-6; accessed February 2007; available from http://www.csse.ca/CACS/JCACS/V1N2/PDF_Content/10_Harris.pdf. p. 2.

¹⁷³² Greene, Maxine. *Variation on a Blue Guitar: The Lincoln Center Institute Lectures on Aesthetic Education*, New York: Teachers College Press, 2001. p. 5.

¹⁷³³ Ibid. p. 6.

a concreteness related to being in the world and the ability to pay “full attention to life.”¹⁷³⁴

Emeritus professor Glen Eyford of the University of Alberta uses John Dewey’s terms from *Art as Experience*,¹⁷³⁵ to define aesthetic experience, and notes that some or all of these elements “must be present if learning is to be considered an aesthetic experience in Dewey’s sense.”¹⁷³⁶

The learning experience must be:

1. Self-rewarding, self-contained and immediate
2. Total, coherent and complete
3. Metaphoric: (oblique and indirect) using myth, metaphor and symbol
4. Involving: learner becomes a creative partner
5. Sacred: involving mystery and delight and enhancing the quality of life
6. Non-discursive: stimulating intuitive awareness rather than logical constructs
7. Vital: creating energy and vitality¹⁷³⁷

German analyst Marcus Düwell explains that the word “aesthetics” comes from the Greek word for sensory perception, and as such, he suggests that aesthetics can be seen as a general theory of sensory perception. He notes that the aesthetic realm is present in our everyday perceptions, and is therefore not limited to the production or experience of works of art, although in that case the aesthetic experience is a starting point for understanding a work of art.¹⁷³⁸ Düwell cites German philosopher Martin Seel, who maintains that there are three elements present in every aesthetic experience, which apply to every object of aesthetic experience, including works of art, natural phenomena, and everyday objects. These three fundamental dimensions are:

1. *Contemplative* aesthetic experience, in which our familiar qualities of experience and sense-making presuppositions of everyday life are suspended. Examples are moments of aesthetic shock and irritations of our perceptual habits.
2. *Corresponsive* aesthetic experience, in which the object of aesthetic experience vividly represents familiar moments of our ‘Life-world’. Fashion and design, as manifest expressions of a particular world view, are paradigm cases.
3. *Imaginative* aesthetic experience, in which new ways of looking at the world and making sense of it are developed and put to test by experiments. This

¹⁷³⁴ Greene, Maxine. "Toward Wide-Awakeness: An Argument for the Arts and Humanities in Education," *Teachers College Record*, vol. 79, no. 1, 1977: 119-125. p. 121.

¹⁷³⁵ Dewey, John. *Art as Experience*, New York: Minton, Balch & Co., 1934.

¹⁷³⁶ Clover, Laramee, and Linker. *State of the Field Report: Culture and Adult Education*, accessed. p. 60.

¹⁷³⁷ Dewey. *Art as Experience*. cited in Eyford. *Learning and the Arts*. pp. 83–84, cited in Clover, Laramee, and Linker. *State of the Field Report: Culture and Adult Education*, accessed. p. 60.

¹⁷³⁸ Düwell, Marcus. "Aesthetic Experience, Medical Practice, and Moral Judgement. Critical Remarks on Possibilities to Understand a Complex Relationship," *Medicine, Health Care and Philosophy*, vol. 2, 1999: 161–168. pp. 161, 167.

dimension of aesthetic experience is for example the source of all the playful violations of our familiar worldview that can be triggered by a work of art.¹⁷³⁹

Hans Gumbrecht discusses the aesthetic experience in three similar ways: as seen in the unexpected interruptions in the flow of the everyday; as emerging from the maximum adaptation of objects to their functions; and as resulting from a switch in situational frames.¹⁷⁴⁰ The first happens when we see something incongruous to our ordinary experience, pause, and see it in a different way—i.e., “when an object that has long been familiar, all of a sudden and without any obvious reason, looks or feels strange.”¹⁷⁴¹

The second is seen in the “fusion of life and art,” as in the Bauhaus, where “the maximum adaptation of an object’s form to its function would produce the highest aesthetic value.”¹⁷⁴² This is a gradual process where, for example, there is a feeling of unity or harmony that is revealed from the ordinary. Gumbrecht notes: “Rather than being events that impose themselves upon our consciousness, rather than interrupting its usual pace, these are ‘slow events’ of transformation, quiet episodes in which the Being of things—quite literally—is ‘growing on us.’”¹⁷⁴³

And the third occurs in moments, where sudden shifts of consciousness happen, “in which what we consider to be a thoroughly normal everyday experience all of a sudden appears in a new, exceptional light, in the light of aesthetic experience,” such as “when we might suddenly begin to appreciate an ‘elegance’ in the solution of a mathematical problem.”¹⁷⁴⁴

All of these moments involve a heightened awareness and nonconceptuality, or what Gumbrecht calls “detachment” from conceptual and material contexts. Gumbrecht also notes four conditions that are present in the aesthetic experience:

- *Content of aesthetic experience*—the intimate feelings, impressions, and images that are produced by our consciousness—and that are inaccessible to us in our historically specific everyday worlds. [...] Contents of aesthetic experience present themselves to us as epiphanic, that is, they appear all of a sudden (like ‘lightening’) and they suddenly and irreversibly disappear, without allowing us to hold on to them or to extend their duration.
- *Objects of aesthetic experience*—things that can trigger such feelings, impressions, and images.
- *Conditions of aesthetic experience*—specific circumstances on which, in each case, the happening of aesthetic experience will rely.

¹⁷³⁹ Seel, M. *Eine Ästhetik Der Natur*, Frankfurt a.M.: Suhrkamp, 1991. cited in Düwell. "Aesthetic Experience, Medical Practice, and Moral Judgement. Critical Remarks on Possibilities to Understand a Complex Relationship." p. 167.

¹⁷⁴⁰ Gumbrecht, Hans Ulrich. "Aesthetic Experience in Everyday Worlds: Reclaiming an Unredeemed Utopian Motif," *New Literary History*, vol. 37, 2006: 299-318.

¹⁷⁴¹ Ibid. p. 308.

¹⁷⁴² Ibid. p. 302.

¹⁷⁴³ Ibid. p. 312.

¹⁷⁴⁴ Ibid. p. 302.

- *Effects of aesthetic experience*—the consequences and transformations produced by aesthetic experience and its contents that remain valid beyond the very moment in which aesthetic experience occurs.¹⁷⁴⁵

Eyford suggests that, although the arts contain rational and intellectual content, the arts appeal more directly to the aesthetic, intuitive, imaginative, and spiritual aspects of our being than do other forms of learning.¹⁷⁴⁶ As such, they connect us “with the primal source of our energy,” and speak to our “deepest beliefs and values.”¹⁷⁴⁷ As Eyford notes: “Art with its various myths, metaphors, symbols and images delves into these hidden wellsprings of human consciousness and stimulates them to life again.”¹⁷⁴⁸ Eyford also stresses the importance of the aesthetic experience for connecting with the source of our energy:

If cultural learning goes beyond knowledge acquisition, perhaps one of the surest approaches to understanding more completely the characteristics of the cultural dimension of learning is through an examination of the aesthetic experience. This can use myths, metaphors and symbols, and to teach and learn by using these can help to unlock the human potential for vision and creativity.¹⁷⁴⁹

In another report cited by Clover, et al., Eyford discusses “the nature of the aesthetic experience from the perceiver’s (or learner’s) point of view and its function in human development”:¹⁷⁵⁰

Like their predecessors, Canadian artists place a high value on the experience of art, recognizing its power to shape perceptions, increase awareness, develop purpose and meaning, create insight, and facilitate communication. The honesty, integrity and authenticity which the artist puts into his work stimulate identical qualities in the mind, heart and soul of the perceiver.¹⁷⁵¹

As cited by Clover, et al., Jack Gray and Andre Fortier stress the arts as an integral part of culture that should be viewed as processes of learning, rather than as commodities.¹⁷⁵² Viewed in this way, arts literacy “would encourage a holistic rather than fragmented view of human nature”¹⁷⁵³ and would be concerned with the “learning to be” element of the

¹⁷⁴⁵ Ibid. p. 305.

¹⁷⁴⁶ Eyford. “Cultural Dimensions of Learning.”

¹⁷⁴⁷ Ibid. p. 202.

¹⁷⁴⁸ Ibid. p. 202.

¹⁷⁴⁹ Ibid. p. 195.

¹⁷⁵⁰ Clover, Laramée, and Linker. *State of the Field Report: Culture and Adult Education*, accessed.

¹⁷⁵¹ Eyford. *Learning and the Arts*. p. 82, cited in Clover, Laramée, and Linker. *State of the Field Report: Culture and Adult Education*, accessed. p. 60.

¹⁷⁵² Gray, Jack, and Andre Fortier. *The Third Strategy: A Canadian Primer of Sensible Proposals for the Solution of Insoluble Problems*, Canadian Conference of the Arts, 1984. p. 6, cited in Clover, Laramée, and Linker. *State of the Field Report: Culture and Adult Education*, accessed. p. 67.

¹⁷⁵³ Gray, and Fortier. *The Third Strategy: A Canadian Primer of Sensible Proposals for the Solution of Insoluble Problems*. p. 6. cited in Clover, Laramée, and Linker. *State of the Field Report: Culture and Adult Education*, accessed. p. 67.

Delors framework.¹⁷⁵⁴ Mark Smith discusses the differences between “being” and “having” in a review of the work of Eric Fromm:

Erich Fromm argues that two ways of existence are competing for ‘the spirit of mankind’—having and being. The having mode looks to things and material possessions and is based on aggression and greed. The being mode is rooted in love and is concerned with shared experience and productive activity. [...] While the having persons rely on what they *have*, the being persons rely on the fact that they *are*, that they are alive and that something new will be born if only they have the courage to let go and respond. They become fully alive in the conversation because they do not stifle themselves by anxious concern with what they have. Their own aliveness is infectious and often helps the other person to transcend his or her egocentricity. Thus the conversation ceases to be an exchange of commodities (information, knowledge, status) and becomes a dialogue in which it does not matter any more who is right. [...] ‘The process of learning has an entirely different quality for students in the being mode. [...] Instead of being passive receptacles of words and ideas, they listen, they *hear*, and most important, they *receive* and *respond* in an active, productive way.’¹⁷⁵⁵

Elliot Eisner, of Stanford University, one of the most influential educators extolling aesthetic education, argues that the arts encourage subtle forms of cognitive development not easily achieved in other disciplines.¹⁷⁵⁶ He suggests that the arts are the products of cognition, that cognition is wider than linguistic forms of thinking, and that the arts expand the common view of cognition to include all of the ways that people come to know.¹⁷⁵⁷

[Eisner] conceives of cognition as a spectrum of abilities and processes, including the ability to feel and work with the abstract. [...] This happens in two ways: through the engagement and development of the imagination and through the stimulation and refinement of sensory development. [...] Seeing as engaging one’s feeling and making sense of the environment is an active experience. As Eisner says, ‘Seeing is an achievement, not merely a task.’ Sensory perceptions provide unique ways of seeing and knowing, which are subtle and complex forms of cognition.¹⁷⁵⁸

Researchers, especially in the psychology fields, have tried to identify features of the aesthetic experience, mainly through efforts to understand the creative personality. However, as O’Farrell and Meban point out, creative personality traits generally do not

¹⁷⁵⁴ Delors, Jacques. *Learning: The Treasure Within. Report to UNESCO of the International Commission on Education for the Twenty-First Century*, Paris: UNESCO, 1996.

¹⁷⁵⁵ Smith, Mark K. *Erich Fromm: Alienation, Being and Education*, The encyclopedia of informal education [sic], 2002; accessed March 2007; available from <http://www.infed.org/thinkers/fromm.htm>. citing Fromm, Erich. *To Have or to Be*. 1979 ed., London: Abacus, 1976. pp. 37–38.

¹⁷⁵⁶ Eisner, Elliot. "Discipline-Based Art Education: Conceptions and Misconceptions," *Educational Theory*, vol. 40, no. 4, 1990: 423-430.

¹⁷⁵⁷ Ibid.

¹⁷⁵⁸ Harris. "Lessons from the Arts: A Review of *The Arts and the Creation of Mind* by Elliot Eisner." p. 2.

show changes in a short period of time, since these traits take time to develop.¹⁷⁵⁹ They argue that efforts to assess creative personality traits are often overlooked in favour of the more cognitive traits. However, they also note: “If we are to assess the instrumental impact of the arts, an assessment of creative personality traits such as independence, risk-taking, persistence, and openness, are critical to understanding the positive impact of the arts.”¹⁷⁶⁰

28.3.2 Arts experience in everyday life

UNESCO notes that the arts in traditional societies were, and in some cases still are, part of everyday life, rather than separated out as being non-essential, and that the arts played “a key role in cultural transmission and in community and individual transformation.”¹⁷⁶¹ The Canadian Commission for UNESCO also contrasts the view of the arts in contemporary society with that of the traditional approach to arts found in Aboriginal and immigrant societies:

The notion of respect and understanding for the arts and arts education can be better appreciated when we consider the traditional arts of Canada’s Aboriginal and immigrant societies. While traditional arts are evolving, and transformations in materials and styles are taking place, the role of the arts in traditional societies is deeply rooted in social practice. They involve not only community members like the dancer, the storyteller, the drummer and the crafts artists, but also the use and preparation of traditional materials. It would be instructive to understand more profoundly the ways in which this integration of creative expression and social life is established and maintained.¹⁷⁶²

The *University Core Curriculum Handbook* from one U.S. university emphasizes experience and provides a succinct explanation of the arts in human life:

The arts contribute significantly both to the experience and to the interpretation of human life. Creativity and aesthetic response criss-cross the boundaries between intellectual ideas, the imagination and actual design. Moreover, the arts are always intimately linked with the material culture of a society—its modes of production and design—as well as with its values and ideas. Thus, the arts can be studied and experienced in a variety of ways; not only as “high culture” for an elite, but also as a means of tracing the history and ideas of particular societies; or

¹⁷⁵⁹ O’Farrell, and Meban. *Arts Education and Instrumental Outcomes: An Introduction to Research, Methods and Indicators*, accessed.

¹⁷⁶⁰ Ibid., accessed. p. 22.

¹⁷⁶¹ United Nations Educational. *Road Map for Arts Education. The World Conference on Arts Education: Building Creative Capacities for the 21st Century, Lisbon, 6-9 March 2006*, accessed. p. 15.

¹⁷⁶² Canadian Commission for UNESCO. *Learning to Live, Living to Learn: Perspectives on Arts Education in Canada*, Preliminary report on consultations conducted by the Canadian Commission for UNESCO, 2006; accessed January 2007; available from http://www.unesco.ca/en/interdisciplinary/artslearning/documents/LearningtoLive_LivingtoLearn.pdf. pp. 13–14.

as an active process of creative design and expression in many different physical forms. The metaphorical and intuitive thought processes that are essential to making and experiencing works of art are woven into many other human cultural and creative activities. Thus, the arts have an important role to play in broadening the sensibilities.¹⁷⁶³

Eliot Eisner considers the experience of the arts to be about joy: “They are about the experience of being moved, of having one’s life enriched, of discovering our capacity to feel. If that was all they did, they would warrant a generous place at our table.”¹⁷⁶⁴ Eisner notes that the arts are not limited to art galleries, concert halls, and theatres. Rather: “Their home can be found wherever humans chose to have attentive and vital intercourse with life itself.”¹⁷⁶⁵ Eisner believes that this is the largest lesson that the arts in education can teach—“the lesson that life itself can be led as a work of art.”¹⁷⁶⁶

Eisner is interested in ways the arts generate awareness. One of the main purposes of arts literacy that he describes is “to enable students to secure aesthetic forms of experience in everyday life.”¹⁷⁶⁷ Reflecting on this principle, Kindler notes:

This principle highlights what many of us have been fortunate to realize: that the ability to experience the world aesthetically is a very precious gift, which significantly adds to the quality of life. Whether visual sensitivity required for such an engagement with the world is ever channeled into art is of only minimal consequence. It is rather the inherent value of moments of delight that experience with the natural and human-made world affords—if approached with an aesthetic frame of mind—that is the ultimate gratification and benefit.¹⁷⁶⁸

Eisner considers artists not necessarily as painters, dancers, poets, or playwrights. Rather, by artist, he means:

... individuals who have developed the ideas, the sensibilities, the skills, and the imagination to create work that is well proportioned, skillfully executed, and imaginative, regardless of the domain in which an individual works. The highest

¹⁷⁶³ University Core Curriculum Committee [Virginia Tech]. *Summary. Core Area 6 Assessment. Creativity and Aesthetic Experience*, University Core Curriculum Handbook, 1999; accessed March 2007; available from http://www.aap.vt.edu/core_curriculum/core6genassess.html.

¹⁷⁶⁴ Eisner, Elliot. *Three Rs Are Essential, but Don't Forget the A--the Arts*, ArtsEdge, 2005; accessed March 2007; available from <http://artsedge.kennedy-center.org/content/3789/>.

¹⁷⁶⁵ Eisner, Elliot W. *The Enlightened Eye: Qualitative Inquiry and the Enhancement of Educational Practice*, Upper Saddle River, N.J.: Merrill, 1998. p. 56.

¹⁷⁶⁶ Ibid. p. 56.

¹⁷⁶⁷ Eisner, Elliot. *The Arts and the Creation of Mind*, New Haven, CT.: Yale University Press, 2002. p. 44, cited in Kindler, Anna M. *Art as a Language for Communication and Critical Awareness (or Not?) - and Some Reflection on the Relevancy of This Question to Art Education*, Vancouver, University of British Columbia, 2006; accessed March 2007; available from http://portal.unesco.org/culture/es/file_download.php/faed20f6d9199469bbd088d52ba26219anna+kindler.pdf. p. 11.

¹⁷⁶⁸ Kindler. *Art as a Language for Communication and Critical Awareness (or Not?) - and Some Reflection on the Relevancy of This Question to Art Education*, accessed. p. 11.

accolade we can confer upon someone is to say that he or she is an artist whether as a carpenter or a surgeon, a cook or an engineer, a physicist or a teacher. The fine arts have no monopoly on the artistic.¹⁷⁶⁹

Furthermore:

What the arts teach is that attention to [details] matter. The arts teach students to act and to judge in the absence of rule, to rely on feel, to pay attention to nuance, to act and appraise the consequences of one's choices and to revise and then to make other choices.¹⁷⁷⁰

According to Dewey, art is an essential part of human experience, but most people are limited in what they appreciate and enjoy, and this is a serious loss.¹⁷⁷¹ For Dewey, art is a form of aesthetic experience, rather than a product, which can deepen and enliven the lives of everyone, and is not just for the talented few, since this experience encompasses everyday life. The aesthetic experience requires patience, careful attending to details, and an enhanced perception. Through this heightened perception, daily experiences can be transformed into meaningful aesthetic experiences that have a strong and often transformative effect on the perceiver. And, as Eisner notes: "This will require activities that slow down perception rather than speed it up."¹⁷⁷²

Philip Jackson, in *John Dewey and the Lessons of Art*, describes one of Dewey's lessons of art:

Our failure to partake of life's richness, to enjoy its qualitative immediacy, leaves us divorced from the here and now, vainly directing our thoughts and aspirations toward an imagined future that never arrives. That condition, Dewey would say, is to be avoided at all costs. Works of art help to instruct us in the how and the why of avoiding it.¹⁷⁷³

By "qualitative immediacy," according to New Zealand educator Christina Hong, Dewey was referring to the "nature of artistic thought as residing in the relational aspects of the elements of art, [which] predates by decades the more recent theories of cognition and consciousness which also emphasise the relational nature of perception."¹⁷⁷⁴ She recalls that Dewey claimed: "To think effectively in terms of relations of qualities is as severe a demand upon thoughts as to think in terms of symbols, verbal or mathematical."¹⁷⁷⁵

¹⁷⁶⁹ Eisner, Elliot. "What Can Education Learn from the Arts About the Practice of Education?," *International Journal of Education & the Arts*, vol. 5, no. 4, 2004: 1-13; accessed March 2007; available from <http://ijea.asu.edu/v5n4/v5n4.pdf>. p. 4.

¹⁷⁷⁰ Ibid. p. 4.

¹⁷⁷¹ Dewey. *Arts as Experience*. cited in Jensen. "Expressive Logic: A New Premise in Arts Advocacy."

¹⁷⁷² Eisner. "What Can Education Learn from the Arts About the Practice of Education?" p. 5.

¹⁷⁷³ Jackson, Philip W. *John Dewey and the Lessons of Art*, New Haven, CT: Yale University Press, 1998. p. 67.

¹⁷⁷⁴ Hong. "Developing Literacies in Postmodern Times: The Role of the Arts in Education." p. 3.

¹⁷⁷⁵ Dewey. *Arts as Experience*. cited in Hong. "Developing Literacies in Postmodern Times: The Role of the Arts in Education." p. 3.

As Jensen notes: "The defined high arts are simply more intense, meaningful, distilled, and portable versions of this widely dispersed aesthetic impulse."¹⁷⁷⁶ She goes on to quote Dewey:

The sources of art in human experience will be learned by him who sees how the tense grace of the ballplayer infects the onlooking crowd; who notes the delight of the housewife in tending her plants, [...] the zest of the spectator in poking the wood burning on the hearth and in watching the darting flames and crumbling coals.¹⁷⁷⁷

In Dewey's view, study of the arts cultivates the imagination, which deepens powers of observation and logic. Dewey distinguishes imagination from fantasy, as explained by Satanovsky:

[In American culture] fantasy, not imagination, is celebrated. American fantasy resides on newsstands, in movie theaters and on store shelves. It saturates public discourse. Much of the social landscape is a Disney haze that finds its way into educational spaces. Such fantasy thrives on illusion while Dewey's imagination thrives on vision and possibility. Such fantasy leads to escape. Dewey's imagination requires immersion in life. Fantasy provides personal band-aids. Dewey's imagination calls for problem-solving and for struggling to realize collective dreams. Fantasy satiates and stymies; imagination keeps us hungry and on the move. American fantasy is for consuming; imagination is for creating.¹⁷⁷⁸

The influential artist and meditation master, Chögyam Trungpa, was also concerned with the power of art as an aesthetic experience in everyday life.¹⁷⁷⁹ Coming from the eastern traditions, he makes a distinction between genuine and artificial art. Genuine art is direct and unselfconscious, and communicates the potential for all people, not just those identified as artists, to live their life as a work of art. Artificial art, according to Trungpa, is aggressive and egotistical, and is more concerned with the self-consciousness of the artist than with genuine perception and experience. Trungpa notes: "In art, as in life generally, we need to study our craft, develop our skills, and absorb the knowledge and insight passed down by tradition."¹⁷⁸⁰ The experience of both the artist and the perceiver of art, who are the same in Trungpa's view, starts with paying attention to reality—to things as they are. This takes time and discipline, and is related to inquisitiveness, or a "heightened interest in the intriguing qualities of things."¹⁷⁸¹

¹⁷⁷⁶ Jensen. "Expressive Logic: A New Premise in Arts Advocacy." p. 76.

¹⁷⁷⁷ Dewey. *Arts as Experience*. p. 5, cited in Jensen. "Expressive Logic: A New Premise in Arts Advocacy." p. 76.

¹⁷⁷⁸ Satanovsky, Lisa. *Imagining Real Life: John Dewey and the Possibilities of Dialogue*, (abstract), Imaginative Education Research Group, 2006; accessed March 2007; available from <http://www.iereg.net/confs/viewabstract.php?id=205&cf=1>, citing Dewey, John. *How We Think*, Lexington, Mass: D.C. Heath, 1910.

¹⁷⁷⁹ Trungpa, Chögyam. *Dharma Art*, ed. Lief, Judith L., Boston: Shambhala Publications, 1996.

¹⁷⁸⁰ Ibid. p. 1.

¹⁷⁸¹ Ibid. p. 15.

It is this general sense of appreciation, which is based on awareness, which Trungpa refers to as artfulness that can be cultivated in everyone. From that point of view, Trungpa defines art as the ability “to be able to see the uniqueness of everyday experience.”¹⁷⁸² For example:

[Art] is a perpetually growing process in which we begin to appreciate our surroundings in life, whatever they may be—it doesn’t necessarily have to be good, beautiful, and pleasurable at all. The definition of art, from this point of view, is to be able to see the uniqueness of everyday experience. Every moment we might be doing the same things—brushing our teeth every day, combing our hair every day, cooking our dinner every day. But that seeming repetitiveness becomes unique every day. A kind of intimacy takes place with the daily habits that you go through and the art involved in it. That’s why it’s called art in everyday life. [...] We are just dealing precisely and directly with how our perception or vision works as we look at an object and how our mind changes by looking at it. [...] You don’t have to be labeled an artistic person, necessarily; anyone can work on that kind of perception.¹⁷⁸³

In that way the arts can enhance individual engagement with the world. As McCarthy, et al. note:

With experience, we become increasingly more capable of noticing and appreciating the details that make up an aesthetic whole. [...] In the best case, this capacity for noting details and considering the relationships among them invigorates our powers of observation in everyday life.¹⁷⁸⁴

In line with Dewey, Jensen argues that, in order to enhance the roles of the arts in local communities and national life, we should focus on what art is rather than on what art does.¹⁷⁸⁵ This “expressive perspective on the arts” is oriented towards understanding and enhancing aesthetic experiences, rather than towards the “instrumentalist perspective” that is predominant in cultural criticism—a perspective that Jensen argues is unsubstantiated.¹⁷⁸⁶ She describes an expressive perspective as “one that sees the arts as experience,” and notes that it is this perspective that describes how and why arts matter.

Jensen argues that an expressive perspective on the arts must necessarily blur the boundary between arts and crafts, as part of everyday life, and the “elitist” view of the arts as being only for the few. She does not necessarily think that support for “classic fine arts, avant-garde risk taking, quests for artistic excellence, or institutionalized aesthetic training” should be abandoned.¹⁷⁸⁷ However, she argues that this perspective needs to be

¹⁷⁸² Ibid. p. 27.

¹⁷⁸³ Ibid. pp. 27-28.

¹⁷⁸⁴ McCarthy, Ondaatje, Zakaras, and Brooks. *Gifts of the Muse: Reframing the Debate About the Benefits of the Arts*, accessed. p. 50.

¹⁷⁸⁵ Jensen. "Expressive Logic: A New Premise in Arts Advocacy."

¹⁷⁸⁶ Ibid. p. 65.

¹⁷⁸⁷ Ibid.

broadened to become more inclusive of populace experience. She cites the claim in the 1997 U.S. National Endowment for the Arts (NEA) report, *American Canvas: An Arts Legacy for Our Community*,¹⁷⁸⁸ that the arts should be repositioned as a range of creative work, as an important bridge between “high- and low-brow” artistic experience. According to Jensen:

The [NEA] report argues that the arts are not ‘alien’ but ‘an essential part of the lives of most families’ and that we find ‘art all around us—in the things we make with our words (songs, stories, rhymes, proverbs), and with our hands (quilts, knitting, raw-hide braiding, piecrust designs, dinner table arrangements, garden layouts).’¹⁷⁸⁹

The NEA report cited by Jensen was the result of six 1996 national discussions, concerning the integration of the arts into communities, with arts leaders as well as “representatives of all aspects of civic and social life.”¹⁷⁹⁰ Extending the above discussion, Gary Larson, the author of the NEA report, notes:

Sad to say, many American citizens fail to recognize the direct relevance of art to their lives. The product of an educational system that at best enshrined the arts as the province of elite cultures and at worst ignored the arts altogether, some people understandably view the arts as belonging to someone else. ‘Most ... people,’ as William Wilson of Brigham Young University expressed it in the Salt Lake City forum, ‘if you talk to them about art, they’re going to say, “Art belongs out there. That’s not part of my life.”’ Failing to acknowledge their own expressive activities as part of the full spectrum of the arts, many of these Americans are apt to look with suspicion at an ‘arts world’ that seems alternately intimidating, incomprehensible, expensive, alien, and, thanks to the generally poor job that the mass media have done in covering the arts, often disreputable.¹⁷⁹¹ [...]

Curiously, we tend to draw no such distinctions in the world of athletics, in which a direct connection is made between shooting baskets in the driveway and the professional exploits of a Michael Jordan, between jogging through the park and the world-class competition of the Olympic Games. [...] Shift from athletics to aesthetics, though, and the lines between participant and spectator are attenuated, if not severed altogether. Actually, many more Americans attend arts activities than professional sporting events every year, and considerable numbers participate even more directly—playing classical music (4 percent of the adult population in 1992), painting (10 percent), taking photographs (12 percent), or participating in modern dance (8 percent), creative writing (7 percent), or needlework (25 percent).¹⁷⁹²

¹⁷⁸⁸ Larson, Gary O. *American Canvas: An Arts Legacy for Our Community*, National Endowment for the Arts, 1997; accessed February 2007; available from <http://www.nea.gov/pub/AmCan/AmericanCanvas.pdf>.

¹⁷⁸⁹ Jensen. "Expressive Logic: A New Premise in Arts Advocacy." p. 71, citing Larson. *American Canvas: An Arts Legacy for Our Community*, accessed. p. 36.

¹⁷⁹⁰ Larson. *American Canvas: An Arts Legacy for Our Community*, accessed.

¹⁷⁹¹ Ibid., accessed. p. 13.

¹⁷⁹² Ibid., accessed. p. 61.

The argument is that when people acknowledge that arts affect their own lives, and recognize the artistic merit in their own creations, that they will also “be more sensitive, as ‘creators’ themselves, to the needs of the aesthetic environment, and of the artists and arts organizations.”¹⁷⁹³ In addition, they will also increase their own sense of wellbeing and appreciate the enriching characteristics in their own lives.

In Canada, to celebrate its 50th anniversary in 2007, the Canada Council for the Arts has introduced an initiative challenging Canadians to increase their involvement with the arts as both audience members and active participants in creative activities.¹⁷⁹⁴ The council is interesting in discovering the kinds of arts activities Canadians are participating in, as well as the impact of those activities on individuals and communities.

The council suggests that any activity that stimulates the imagination and creativity can be included, such as reading or writing a poem, learning to paint, singing in a choir, attending a film festival, play, or concert, or looking at a painting.¹⁷⁹⁵ The “50 for 50 Arts Challenge” asks people to participate in 50 arts activities during the year. In a news release, Canada Council Director Robert Sirman noted this may sound like a lot, but: “The arts are all around us: on TV, radio and the Internet, in our local book or record stores, in our schools, community centers and parks as well as in such specialized venues as art galleries, theatres and concert halls.”¹⁷⁹⁶ He also noted: “[T]he vast majority of Canadians are already engaged in the arts in one way or another, even if some people don’t realize it.”¹⁷⁹⁷ In fact, one of the main purposes of the challenge is to show people that the arts are pervasive in their daily lives, as well as to encourage people to expand their horizons by trying new arts experiences.

One response to the 50 for 50 Arts Challenge is that Calgary Arts Development (CAD) has launched its own Creative Calgarians campaign to encourage residents to participate in the challenge.¹⁷⁹⁸ Sirman, who attended the launch, told the audience: “[A] creative city is not just about having top-quality arts organizations and talented artists. It’s also about the way in which ordinary citizens are engaged in the arts in their day-to-day lives.”¹⁷⁹⁹ President and CEO of Calgary Arts Development, Terry Rock, agreed:

We know that Calgarians are engaged in creative activities everyday. Art and artists are everywhere around us. We hope that once people start sharing stories

¹⁷⁹³ Ibid., accessed. p. 62.

¹⁷⁹⁴ Canada Council for the Arts. *News Release: Canada Council’s 50th Anniversary Celebration to Promote Public Engagement in the Arts*, 2006; accessed March 2007; available from <http://www.canadacouncil.ca/news/releases/2006/yz128109259140536891.htm>.

¹⁷⁹⁵ Ibid., accessed.

¹⁷⁹⁶ Ibid., accessed.

¹⁷⁹⁷ Ibid., accessed.

¹⁷⁹⁸ Calgary Arts Development. *News Release: Calling All “Creative Calgarians” ... We Need Your Stories!*, 2007; accessed March 2007; available from <http://www.calgaryartsdevelopment.com/node/411>.

¹⁷⁹⁹ Ibid., accessed.

about how art and other creative activities play a role in their lives, we'll start to understand how the arts impact the lives of all Calgarians.¹⁸⁰⁰

It is hoped that the Canada Council for the Arts will issue report cards on this initiative, which might provide useful to the CIW in indicating arts literacy.

28.3.3 Measures of arts literacy

We know of no large-scale studies to measure arts literacy in the general populace. There are many small psychological studies that examine the creative personality, as well as small-scale studies that attempt to measure the aesthetic experience. For example, researchers at Bowling Green State University in Ohio used a 5-point Likert scale questionnaire to measure the extent to which the respondents had an aesthetic experience while observing art in a computer-based virtual-environment art installation.¹⁸⁰¹

We mention a few measures of creativity below, but none of these studies can provide data to indicate arts literacy or the aesthetic experience, per se. However, one U.S. research group is working to develop measures of the aesthetic experience. Statistics expert Colm O'Muircheartaigh, of the National Opinion Research Center at the University of Chicago, is the principal investigator working on possible methods for quantifying the aesthetic experience in the general populace, and is planning to develop survey methodologies in connection with the Cultural Policy Center at the University of Chicago.¹⁸⁰² O'Muircheartaigh notes: "There is an ever-growing body of research focused on museums and their visitors and on aesthetic development and education. However, there has not been much concentrated effort to tackle the issue of the aesthetic experience per se."¹⁸⁰³ The Cultural Policy Center website presents the rationale for the project:

Underlying the justification for public funding of the arts is the conviction that experiencing art is an intrinsically beneficial activity for the individual. Nevertheless, attempts to capture the nature of this experience in a quantitatively measurable way have been relatively unsuccessful. Many artists and art connoisseurs decry the notion of quantitative measurement of such a qualitative experience, and simply cannot believe that any meaningful measurement is possible. As a result, measurement is often restricted to a simple breakdown of attendance, or personal interviews, the results of which are difficult to generalize. Each of these tools has a place in the public measurement of aesthetic experience, but both fail to bring to bear the potential of social science measurement theories

¹⁸⁰⁰ Ibid., accessed.

¹⁸⁰¹ Eber, Dena, Brian Betz, and Gregory Little. *The Aesthetic Experience, Emotion and an Artistic Virtual Environment*, Bowling Green, Ohio, Bowling Green State University, 2003; accessed March 2007; available from http://www.intelligentagent.com/archive/IA5_1aveeberlittlebetz.pdf.

¹⁸⁰² O'Muircheartaigh, Colm. *Measuring the Aesthetic Experience*, The Cultural Policy Center at the University of Chicago, 2001; accessed March 2007; available from <http://culturalpolicy.uchicago.edu/projects/aesthetic.html>.

¹⁸⁰³ Ibid., accessed. p. 1.

and methods. This project aims to improve the measurement of aesthetic appreciation by combining the insights of artists and art experts with the theoretical constructs of psychology and philosophy using the measurement methodologies of quantitative social science.¹⁸⁰⁴

The intention is to “ground the study in society rather than simply in the academy or the art world.”¹⁸⁰⁵ O’Muircheartaigh plans to bring together an interdisciplinary team of researchers to develop quantitative measures, based on survey methodology, specific to the aesthetic response. Unfortunately, there was no update on this project provided on the website, but we are trying to obtain updated information from the Cultural Policy Center and will include this in the final report if we are successful.

Creativity is one aspect of arts literacy that has been examined extensively in the psychology literature. According to Carson, et al., the measurement of creativity has taken three main forms: achievement inventories and creative product evaluations, personality tests, and cognitive tests.¹⁸⁰⁶ Romina Proctor and Paul Burnett report that the most widely used psychological tests of creativity measure “divergent thinking,” which is concerned especially with cognitive traits and problem solving.¹⁸⁰⁷ They note that these tests are criticized for measuring trivial forms of creativity that are not correlated with actual experience, and for not being valid or reliable.

Other researchers concentrate on attitude and interest inventories, or personality inventories of creativity.¹⁸⁰⁸ For example, the Guilford-Zimmerman Interest Inventory, developed in the 1960s, asks respondents to indicate their interests from a variety of activities given on the survey, such as, “Think up plots for novels,” or “Invent a new gadget.”¹⁸⁰⁹ Researchers who are interested in personality characteristics, rather than cognitive traits, have used instruments such as the Adjective Check List to ask respondents to identify whether an adjective on the list, such as “clever, complicated, cynical, imaginative, original, reflective, and unconventional,” applies to them.¹⁸¹⁰ The creative person might identify herself as curious and intuitive, rather than as self-confident or remembers well, for example.

Ruth Richards, et al. at Harvard Medical School, developed the Lifetime Creativity Scales as a “broad-based assessment of original activity at work and leisure, without the

¹⁸⁰⁴ O’Muircheartaigh, Colm. *Research: Measuring Aesthetic Responses*, Cultural Policy Center at the University of Chicago, 2001; accessed March 2007; available from <http://culturalpolicy.uchicago.edu/research-other.html> - f.

¹⁸⁰⁵ O’Muircheartaigh. *Measuring the Aesthetic Experience*, accessed. p. 1.

¹⁸⁰⁶ Carson, Shelley H., Jordan B. Peterson, and Daniel M. Higgins. "Reliability, Validity, and Factor Structure of the Creative Achievement Questionnaire," *Creativity Research Journal*, vol. 17, no. 1, 2005: 37–50.

¹⁸⁰⁷ Proctor, Romina M. J., and Paul C. Burnett. "Measuring Cognitive and Dispositional Characteristics of Creativity in Elementary Students," *Creativity Research Journal*, vol. 16, no. 4, 2004: 421-429.

¹⁸⁰⁸ Hecover, Dennis. "Measurement of Creativity: Review and Critique," *Journal of Personality Assessment*, vol. 45, no. 5, 1981: 450-464.

¹⁸⁰⁹ Ibid. p. 451.

¹⁸¹⁰ Ibid. p. 451.

requirement that activities be socially recognized or limited to particular fields of endeavor.”¹⁸¹¹ Although the scales were designed to study everyday creativity in groups of people, unfortunately they are highly dependent on individual raters, and are therefore not suitable, without major adaptations, to a large-scale population survey.

Helen Keenoo, and her colleagues at the Open University in the U.K., designed the Definitions of Creativity Questionnaire to understand concepts of creativity in the general population.¹⁸¹² Keenoo notes that the scale:

... aims to support the hypothesis that creative ability is present within all members of the population on a continuum rather than being divided into the two extremes of individuals being either eminently creative or having only a minimal amount of creative ability as is commonly seen in the academic literature. This study supported the continuum hypothesis with mean scores of self-rated creative behaviour being approximately normally distributed.¹⁸¹³

The questionnaire includes open-ended questions asking respondents what the term “creativity” means to them, and asks respondents to list ten activities they consider to be creative. It also includes closed-ended questions that ask the respondent to identify from a list the most important aspects that make a product creative, and whose opinion is most valuable when deciding whether a product is creative. In addition, it supplies a list of personality traits and asks which of the traits a highly creative individual would have. One question also asked about the self-perception of the respondent’s own creative abilities, by asking people to rate how they and others perceived their creative ability and production (e.g., I am creative; My friends consider me creative; My family considers me to be creative.)¹⁸¹⁴ This survey might inform the development of the proposed Canadian Knowledge Survey of the CIW. However, according to Keenoo, the instrument has only been tested with small groups for validity and reliability, and needs more work with larger populations.

28.3.4 Self-reporting creative activity measures

Dennis Hocevar, of the University of California, notes: “Perhaps the most easily defensible way of identifying creative talent is in terms of self-reporting creative activities and achievements.”¹⁸¹⁵ Furthermore, he argues:

¹⁸¹¹ Richards, Ruth, Dennis K. Kinney, Maria Benet, and Ann P. C. Merzel. "Assessing Everyday Creativity: Characteristics of the Lifetime Creativity Scales and Validation with Three Large Samples," *Journal of Personality & Social Psychology*, vol. 54, no. 3, 1988: 476-485. p. 476.

¹⁸¹² Keenoo, Helen. *The Evolution of Creativity*, The Open University, 2004; accessed March 2007; available from <http://www.britac.ac.uk/events/imagination/resources/keenoo.htm>; and <http://www.open.ac.uk/socialsciences/pc3/pc3subset/pc3infopops/pc3istaff-helenkeenoo-research.html>.

¹⁸¹³ Ibid., accessed.

¹⁸¹⁴ Ibid., accessed.

¹⁸¹⁵ Hocevar. "Measurement of Creativity: Review and Critique." p. 455.

[I]t is asserted here that a useful way to measure creativity is to simply ask the subject. This is not a profound position, but yet the procedure is rarely used. The predominant preference in the field is to identify creativity by indirect methods (i.e., predictors) that essentially have little to do with the real criteria of creativity. [...] On the other hand, the subject himself should have a good idea of his creative ability in a wide variety of areas. Furthermore, when compared to observer ratings and other assessment procedures, self-reports have been found to be superior in the measurement of many psychological traits.¹⁸¹⁶

Hocevar cites studies from the 1960s that found that past activities and achievements were the best predictors of creative achievement in nonacademic accomplishment in six areas—leadership, science, dramatic arts, literature, music and art—when compared with other predictors such as interests, goals, aptitudes, and personality traits.¹⁸¹⁷

Arts survey conducted in Prince George, British Columbia

One self-reporting, creative activities survey was recently conducted in Prince George, British Columbia.¹⁸¹⁸ In 2003, Alex Michalos, of the University of Northern British Columbia, conducted a survey to assess the impact of the arts on the quality of life of adult residents, aged 18 and older, living in Prince George, British Columbia.¹⁸¹⁹ According to Michalos, the impact of the arts on the overall quality of lives is “the most understudied and possibly the most under-rated issue in the field of social indicators research.”¹⁸²⁰ Although the survey was sent to 2,500 random households, only 315 useable questionnaires were returned. This was a low response rate of 13%, which Michalos surmised might be related to “low interest by most residents in things related to the arts.”¹⁸²¹ However, those that did respond seemed to be quite interested in the arts.

Michalos notes that he regards “measures of people’s beliefs and feelings about the arts as cultural indicators, and the latter as a species of subjective social indicators.”¹⁸²² Although the sample was not representative, and therefore it is not possible to generalize the results, the methodology Michalos used is interesting, and might possibly inform a new Canadian Knowledge Survey, recommended by the CIW. Below we look very briefly at aspects of the survey that might be of interest in indicating personal experiences as they relate to arts literacy.

The survey included a list of 66 activities that are related to the arts, which is much broader than most similar surveys. Respondents were asked if they participated in any of the listed activities, and, if so, to give the average amount of time spent on the activity per

¹⁸¹⁶ Ibid. p. 459.

¹⁸¹⁷ Ibid.

¹⁸¹⁸ Michalos, Alex. "Arts and the Quality of Life: An Exploratory Study," *Social Indicators Research*, vol. 71, 2005: 11-59.

¹⁸¹⁹ Ibid. p. 12.

¹⁸²⁰ Ibid. p. 12.

¹⁸²¹ Ibid. p. 22.

¹⁸²² Ibid. p. 13.

week, if the activity was frequent, and the number of times per year they had participated in the activity, if the activity was infrequent. They were then asked to rate their average level of satisfaction with the particular activity in which they engaged on a 7-point scale, where 1 = very dissatisfied and 7 = very satisfied.

One extremely interesting aspect of the survey was that many of the 66 activities listed were not only audience participation activities. Rather, they also included activities that involved creative actions on the part of the respondents. The survey also included crafts as well as fine arts. These activities had fairly high satisfaction levels. The activities with the highest levels of satisfaction (7.0 on the 7-point scale) were: weaving baskets and acting with amateur theatre group. By contrast, the activities that involved teaching often had lower satisfaction levels. The activities with the lowest levels of satisfaction were: teaching people to play an instrument (4.47), and teaching painting or drawing (4.85). Selected creative and audience activities, and corresponding satisfaction levels, are shown in Table 24 below.

Table 24. Average satisfaction levels with creative activities and audience activities, based on a 7-point scale, Prince George survey, 2003

Creative activity	Average satisfaction level	Audience activity	Average satisfaction level
Playing a musical instrument	5.40	Reading novels, short stories, plays, or poetry	6.19
Writing music	5.25	Going to concerts	5.96
Painting or drawing	5.62	Going to professional live theatre	6.18
Singing alone	5.30	Going to movies	5.45
Singing in a group	5.67	Watching movies on video	5.40
Creating pottery or ceramics	5.50	Going to art museums / galleries	5.59
Creating sculptures (e.g., clay, stone, wood)	6.06	Going to other museums	5.67
Designing clothes	5.60	Watching art shows on TV	5.50
Making clothes	5.70	Watching live theatre on TV	5.89
Making quilts	6.39	Watching concerts on TV	5.65
Writing novels, short stories, plays, or poetry	5.97	Watching opera on TV	5.77
Dancing	5.78	Attending community festivals	5.53
Weaving textiles	6.67		
Weaving baskets	7.00		
Knitting or crocheting	6.11		
Embroidery, needlepoint, or cross-stitch	6.15		
Acting with professional	6.67		

Creative activity	Average satisfaction level	Audience activity	Average satisfaction level
live theatre group			
Acting with amateur theatre group	7.00		
Artistic photography	5.89		
Designing a garden	6.00		
Arranging flowers	6.00		
Creating jewelry	5.86		
Decorating a home	5.73		
Figure skating	5.48		
Gourmet cooking	5.94		
Making artistic videos or movies	6.17		
Graphic designing	6.0		
Designing and / or crafting furniture	6.29		

Source: Adapted from: Michalos, Alex. "Arts and the Quality of Life: An Exploratory Study," *Social Indicators Research*, vol. 71, 2005: 11-59.

Table 24 shows that creative activities give at least as much or more satisfaction as do activities that only involve audience activities. Among the 12 audience activities listed, only two have a satisfaction level over 6.0. Among the 28 creative activities listed, there are 12 with satisfaction levels over 6.0—almost half.

Michalos did not find any correlation between the average amount of time spent on an activity and the average level of satisfaction spent on it. The highest rated arts-related activities, in terms of number of participants and frequency of participation, were—with one exception—all activities that take place in the home: (listed in order of number of participants) listening to music; reading novels, stories, plays; watching movies on video; singing alone; reading to others; telling stories; gourmet cooking; watching art shows on TV; designing a garden; and visiting a public library. Michalos notes that “‘visiting a public library’ is at best a borderline case of an arts-related activity, but it was included as relevant.”¹⁸²³

The highest rated activities that had infrequent participation were: (listed in order of number of participants) going to the movies; visiting historic sites; going to concerts; visiting a public library; attending community festivals; going to amateur live theatre; going to art museums, galleries; watching concerts on TV; going to professional theatre; and decorating a home. These activities, with the exception of two, took place at sites other than the home.

¹⁸²³ Ibid. p. 23.

The survey also asked where the respondents first learned about the activity, such as in school, watching television, listening to a friend, and how old they were at the time. Table 25 shows the most often cited sources where respondents first learned about their most important arts-related activity, with some respondents citing more than one source. The largest percentage (48%) first learned about their most important activity at school, which underscores the importance of the arts in the public education system.

Table 25. Top 10 most frequently cited sources where respondents first learned about their most important arts-related activity, by percentage of respondents, Prince George, B.C., 2003

Source	Percentage of respondents
In school	47.9
Listening to the radio	28.4
Listening to a parent	26.6
Watching television	25.5
In a newspaper	21.6
Listening to a friend	21.3
Attending live theatre performance	14.5
In an art gallery	12.4
In a concert	12.1
In a public library	11.0

Note: Some respondents cited more than one venue. n=115

Source: Michalos, Alex. "Arts and the Quality of Life: An Exploratory Study," *Social Indicators Research*, vol. 71, 2005: 11-59.

The survey also listed 43 statements "culled from the literature describing people's beliefs and feelings about the arts," and respondents were asked to indicate their level of agreement on a 5-point scale, where 1 = strongly disagree, and 5 = strongly agree.¹⁸²⁴ They were then asked to choose one statement from the listed 43 statements describing

¹⁸²⁴ Ibid. p. 20.

people's beliefs and feelings about the arts that were most important to them in indicating their feeling about arts-related activity. The ten statements chosen most often and percentages of those choosing the statements are shown in Table 26. Most of these statements are related to experiences that arise in working with the arts.

Table 26. Most frequently cited beliefs or feeling about the most important arts-related activities, by percentage of respondents, Prince George, B.C., 2003

Beliefs and feelings	Number of respondents choosing the statement	Percentage of respondents choosing the statement
F24: My artistic activities contribute to my overall well-being	28	12.7
F17: My artistic activities help me to relax	20	9.1
F6: Generally my artistic activities have a positive effect upon my life	15	6.8
F40: Artistic activity strengthens a community	15	6.8
F8: My artistic activities increase my knowledge about things around me	12	5.5
F25: My artistic activities contribute to my self-esteem	12	5.5
F27: My artistic activities help me develop my creativity	11	5.0
F19: My artistic activities contribute to my emotional well-being	9	4.1
F3: My artistic activities give me a sense of accomplishment	8	3.6
F43: Artistic activity has contributed a lot to our family development	8	3.6

Note: n=220

Source: Michalos, Alex. "Arts and the Quality of Life: An Exploratory Study," *Social Indicators Research*, vol. 71, 2005: 11-59.

It is interesting that only one of the top 10 responses deals with the artistic experience, per se—"My artistic activities help me develop my creativity." The rest are more concerned with health and wellbeing, than with a specific quality associated with artistic experience. The entire 43-item list was not provided in the report, so we cannot tell from which statements the respondents were choosing. However, based on the ten statements Michalos does provide from the 43-item list, as well as his introductory remarks, and statement of results quoted below, it appears that Michalos was more interested in testing instrumental claims of arts benefits, than in testing intrinsic claims—although there is often an overlap between the two, making distinctions difficult.

Michalos developed three indexes from the responses to the 43 items describing feelings about the arts to measure the effects of the arts on quality of life. The indexes measure feelings about the arts in relation to health-enhancing functions, self-developing functions, and community-building functions.

The Index of Arts as Self-Health Enhancers reveals [that] 88% agreed or strongly agreed that their artistic activities helped them ‘to relax’ and 87% thought such activities had ‘a positive effect on their lives. The Index of Arts as Self-Developing Activities shows that 77% of respondents thought their artistic activities provided ‘opportunities to try new things’ and 75% thought such activities gave them ‘a sense of accomplishment’. The Index of Arts as Community Builders shows that 76% thought that ‘artistic activity strengthens a community’ and 68% thought such activity helped them ‘accept differences among people’. These percentages indicate some support (coming from a group of respondents who are generally supportive of the arts) for the instrumentalist view of the arts.¹⁸²⁵

Examining correlations, Michalos found that playing a musical instrument was positively associated with general health, while singing alone was negatively associated with general health. The strongest positive correlations between life satisfaction and the satisfactions gained from the activities was found with gourmet cooking and embroidery, needlepoint, or cross-stitching. However, when Michalos examined multivariate relations, he found that satisfaction in other domains of life, such as self-esteem satisfaction, friendship satisfaction, health, and financial security actually had a higher impact on quality of life than did the arts, which had a very small impact. In summary, Michalos notes: “Even in absolute terms, arts-related activities could only explain from 5% to 11% of the variance in four plausible measures of the self-perceived quality of respondents’ lives.”¹⁸²⁶

It would be interesting to replicate this survey with a larger, representative sample. Of particular interest for this review is the variety of creative activity with which the general populace participates.

General Social Survey (GSS) on time-use

We have discussed the General Social Survey (GSS) cultural activities module in section 28.2.3 in connection with the cultural participation of Canadians. The 1992 and 1998 GSS surveys also contained questions related to a limited number of creative activities in which the respondents might be engaged, which also could be relevant to arts literacy indicators. As noted, although not direct measures of arts literacy, cultural participation could serve as a proxy for the first dimension of arts literacy—appreciation, as developed in direct contact with artistic works, and creative activities could serve as a proxy for the second dimension of arts literacy—creativity and the aesthetic experience, as experienced through engagement with arts practices.

¹⁸²⁵ Ibid. p. 34.

¹⁸²⁶ Ibid. p. 52.

Unfortunately, questions asking about specific creative activities on the part of the respondent, included in 1992 (4 questions) and 1998 (8 questions), were eliminated in 2005, and therefore no comparisons can be made with 2005 data. There may be similar ad hoc surveys that ask about creative activities. However, because we have not been able to find these survey or more direct measures anywhere, we have included the data that are available for 1992 and 1998 below.

Table 27 shows the results, for 1992 and 1998, for the percentage of respondents participating in creative activities. The question asked was: “During the past 12 months as a leisure activity including taking courses for pleasure, did you... ”:

- do any visual art activities (including courses)
- do any crafts (including courses)
- play a musical instrument (including courses)
- sing as part of a group, choir
- do any choreography or other dance activity
- do any acting or other theatrical activity
- write poetry, short stories, non-fiction
- take photographs as an artistic composition (including courses)¹⁸²⁷

¹⁸²⁷ Statistics Canada. *General Social Survey, Data Table: Percentage of Respondents Participating in Particular Activities or Events in 1992 and 1998, 1999*; accessed March 2007; available from <http://www.statcan.ca/english/freepub/87-008-GIE/them/tableparticip.pdf>.

Table 27. Percentage of Canadians aged 15 and over who reported practicing various creative arts activities, General Social Survey, 1992 and 1998

Activity or event	Percentages of adults	
	Year of survey	
During the past 12 months as a leisure activity including taking courses for pleasure, did you...	1992	1998
do any visual art activities (including courses)	11	12
do any crafts (including courses)	32	29
play a musical instrument (including courses)	19	17
sing as part of a group, choir, solo*	-	8
do any choreography or other dance activity*	-	6
do any acting or other theatrical activity*	-	3
write poetry, short stories, non-fiction*	-	10
take photographs as an artistic composition (including courses) ⁺	10	8

Notes: A hyphen (-) indicates that the question was not asked in that year.

*In 1992, these questions only included taking courses, while in 1998 respondents were asked about their participation in these activities including taking courses for pleasure. In 2005, none of these questions were not asked.

⁺ 1992 asked: "Did you engage in artistic photography?" 1998 asked: "Did you take any photographs in order to create an artistic composition, rather than strictly to record a person, place or event?" In 2005, neither of these questions was asked.

Sources: Statistics Canada. *Canadian Culture in Perspective: A Statistical Overview*, Statistics Canada, Catalogue no. 87-211-XIB, 2000; accessed August 2005; available from <http://dsp-psd.communication.gc.ca/Collection-R/Statcan/87-211-XIB/87-211-XIB-e.html>, and

Statistics Canada. *General Social Survey 2005: Cycle 19 Time Use. Main Survey Questionnaire*, Social and Aboriginal Statistics Division, 2005; accessed March 2007; available from http://www.statcan.ca/english/sdds/instrument/4503_Q1_V4_E.pdf.

The results in Table 27 show that the percentage of Canadian adults who participated in creative activities declined slightly from 1992 to 1998. However, in both years, almost one-third of respondents reported doing crafts—which take training and skill in order to accomplish, almost 20% play a musical instrument, and over 10% do visual art activities. Of course, there are many more creative areas that are not captured by the above list of activities.

Table 28 disaggregates the percentage of adults who practice creative arts activities by gender, age, education, income and province for 1998. At this time, this is the only year for which we have this information.

Table 28. Percent of Canadians aged 15 and over who reported practicing various creative arts activities, by gender, age, education, household income, and province, General Social Survey, 1998

Percent (%)	Do visual arts	Do crafts	Play musical instrument	Sing	Dance/choreography	Act/theatrical	Write	Artistic photography
Total	12	29	17	8	6	3	10	8
Gender								
Male	9	20	18	7	4	3	9	9
Female	14	38	16	9	7	4	10	8
Age								
15-19	29	30	33	14	15	15	31	12
20-24	19	27	24	8	8	6	16	11
25-34	12	26	17	8	5	3	9	10
35-44	10	31	18	7	5	2	7	7
45-59	9	28	13	8	4	2	6	9
60+	6	32	12	8	4	1	4	5
Educational attainment								
Phd, MA	14	27	28	12	6	x	17	21
BA	13	30	25	11	7	4	11	12
Some postsecondary	15	31	22	8	7	6	14	13
College diploma	17	40	18	9	6	2	9	11
Trade/Technical Diploma	9	30	15	7	4	x	8	7
Elementary / Secondary	10	30	15	8	6	3	8	5
Household income								
Less than \$20,000	10	31	17	10	5	3	12	7
\$20,000 to \$29,999	11	32	17	8	6	3	10	7
\$30,000 to \$39,999	13	32	17	9	5	3	9	8
\$40,000 to \$49,999	12	32	18	9	6	3	9	9
\$50,000 to \$59,999	11	30	18	8	4	3	10	11
\$60,000 to \$79,999	11	34	19	8	6	5	10	12
\$80,000 or more	14	27	21	8	7	4	10	11
Province								
Newfoundland	8	38	16	14	12	x	10	5
Prince Edward Island	10	35	17	14	11	x	8	7
Nova Scotia	15	39	19	16	13	4	12	9

Percent (%)	Do visual arts	Do crafts	Play musical instrument	Sing	Dance/choreography	Act/theatrical	Write	Artistic photography
New Brunswick	10	35	17	14	12	4	10	11
Quebec	11	20	16	8	4	3	8	5
Ontario	12	32	17	7	6	3	10	9
Manitoba	9	32	19	10	5	5	9	8
Saskatchewan	11	35	17	7	6	3	9	7
Alberta	12	32	18	8	5	4	10	8
British Columbia	12	30	17	9	4	4	9	13

Note: 'x' means the data were not given.

Source. Ogrodnik, Lucie. *Patterns in Culture Consumption and Participation*, Ottawa, Culture Statistics Program, Culture, Tourism and the Centre for Education Statistics, Statistics Canada, 2000; accessed August 2005; available from http://www.canadacouncil.ca/publications_e/statistics/si127235030740937500.htm, p. 59.

With the exception of playing a musical instrument and taking artistic photographs, women practice creative activities more often than do men, especially in areas of visual arts, crafts, and dance. Practicing creative activities appears to decline with age since, in almost every category, the 15 to 19 year olds participate more than do the other age groups. The one exception is crafts, in which the 60 and over age group participate the most, followed closely by the 35 to 44 year old age group. In almost every creative activity, those with higher education participate more than do those with less education. The exceptions are with crafts and visual arts, which those individuals with a college diploma participate in more than those with other levels of educational attainment.

Those with incomes over \$60,000 participate in creative activities more than do other income levels, although activities are actually somewhat evenly distributed. For example, of those who practice dance, 5% are in the less than \$20,000 income bracket, and 7% are in the \$80,000 income bracket. Of those who play a musical instrument, the three lowest income brackets each have 17% of adults, the next two income brackets each have 18% of adults, and the highest income brackets have 19% and 21% respectively. The less than \$20,000 income bracket sings and writes more than do those in the other income brackets. Nova Scotia has the highest (or the same in playing musical instruments and acting) percentage of adults participating in creative activities, with the exception of artistic photography, in which British Columbians excel. In six of the categories, Newfoundland and Quebec have the lowest rates. In general, participation in acting has the lowest rates across the provinces, while participation in crafts has the highest rates.

28.4 Arts education in the formal school system

28.4.1 Importance of arts education

In most education systems throughout the world, the arts are marginal, poorly funded, and considered optional and less important than science and math.¹⁸²⁸ Many analysts, however, have documented that arts education, whether in the visual arts, dance, music, theatre, or other disciplines, creates multiple social and economic benefits, in addition to the distinct contributions associated with studying the arts themselves.¹⁸²⁹ In the U.S., Gary Larson, writing for the National Endowment for the Arts, notes:

The cultural legacy that is carried into the next century will count for little if the arts audiences and participants of tomorrow—our children and their children—are ill-prepared to receive, understand, and actively share in that legacy. Serious and systematic arts instruction appears to be the exception rather than the rule for most students. Arts education, in fact, appears to be as imperiled as the arts institutions that need new audiences.¹⁸³⁰

Larson provides a list of key arguments for including the arts into the general curriculum of schools:

- The arts are important as a subject in themselves.
- The arts enhance the study of other areas of the basic curriculum.
- The arts are relevant to the acquisition of vocational skills.
- The arts contribute to family unity and growth.
- The arts offer skills that will be useful as we move further into the Information Age.
- The arts serve those with special needs, including those who are in danger of falling through the cracks of our educational system.¹⁸³¹

O'Farrell and Meban of Queen's University note that there are two general justifications, which are widely accepted by educators in many countries, for including the arts into the

¹⁸²⁸ Amdur Spitz & Associates, eds. *Learning and the Arts: Crossing Boundaries*, Proceedings from an invitational meeting for education, arts and youth funders held January 12–14, 2000, Los Angeles. Organized by Geraldine R. Dodge Foundation, J. Paul Getty Trust and The John D. and Catherine T. MacArthur Foundation, 2000; accessed September 2005; available from http://www.naea-reston.org/Crossing_Boundaries.pdf.

¹⁸²⁹ Canada Council for the Arts. *Advocacy Resource Kit*, 2005; accessed September 2005; available from <http://www.canadacouncil.ca/aboutus/advocacy/ns127300566470312500.htm>; Newman, Tony, Katherine Curtis, and Jo Stephens. *Do Community-Based Arts Projects Result in Social Gains? A Review of Literature*, Barnardo's: Giving children back their future, 2001; accessed September 2005; available from <http://cardiffmarathon.org/resources/researchpublications/community.html>; Ruiz, Janet. *A Literature Review of the Evidence Base for Culture, the Arts and Sport Policy*, Scottish Executive Education Department, 2004; accessed September 2005; available from <http://194.247.95.101/library5/education/lrcas-00.asp>.

¹⁸³⁰ Larson. *American Canvas: An Arts Legacy for Our Community*, accessed. p. 16.

¹⁸³¹ Ibid., accessed. p. 16.

formal school curricula.¹⁸³² Both of these justifications maintain:

[A]n experience of the arts can lead to the social, psychological, and physical development of the child as a total person. It is variously claimed that a child who is exposed to the arts in school has the potential to become a more creative, imaginative, expressive, confident, self-reliant or critically thinking individual.¹⁸³³

The first justification recognizes the importance of the intrinsic nature of the arts—they are important components of human culture, as are history and literature, and as such should be included into a core curriculum. This justification leads to the inclusion of disciplines such as visual art, music, and theatre as academic subjects into schools, as part of the preparation for students becoming “culturally adept adults.”¹⁸³⁴ In addition, this justification focuses on skill development “with a view to training talented youngsters to supply the world with a new generation of professional artists.”¹⁸³⁵ The second justification is instrumental and advocates using the arts in other subjects as a means of achieving educational goals in those subjects.

Researchers find that arts education is important for learning to experience “the joy of creating, developing attention to detail, and learning ways of expressing thoughts, knowledge, and feelings beyond words.”¹⁸³⁶ Csikszentmihalyi also describes a transcendent dimension as “the very real feeling we have after an aesthetic encounter that some kind of growth has taken place, that our being and the cosmos have been realigned in a more harmonious way.”¹⁸³⁷ Walter Pitman, writing for the Arts Education Council of Ontario, observes that the main concern in arts education is that “every child must be brought to a level of arts literacy that will make life joyful and productive.”¹⁸³⁸

The Canadian Commission for UNESCO notes that Howard Gardner’s research on multiple intelligences¹⁸³⁹ is important for understanding why the arts and arts education are important.¹⁸⁴⁰ The research of Gardner and his colleagues at Harvard University’s

¹⁸³² O’Farrell, and Meban. *Arts Education and Instrumental Outcomes: An Introduction to Research, Methods and Indicators*, accessed.

¹⁸³³ Ibid., accessed. p. 5.

¹⁸³⁴ Ibid., accessed. p. 5.

¹⁸³⁵ Ibid., accessed. p. 5.

¹⁸³⁶ Uptis, Rena, and Katharine Smithrim. *Learning through the Arts: National Assessment 1999–2002*, The Royal Conservatory of Music, 2003; accessed September 2005; available from <http://www.artssmarts.ca/fre/html/rapports.html>.

¹⁸³⁷ Csikszentmihalyi, Mihaly. "Assessing Aesthetic Education," *Grantmakers in the Arts*, vol. 8, no. 1, 1997: 22-26. p. 25, cited in: Uptis, and Smithrim. *Learning through the Arts: National Assessment 1999–2002*, accessed. p. 7.

¹⁸³⁸ Pitman, W. *Learning the Arts in an Age of Uncertainty*, Toronto: Arts Education Council of Ontario, 1998. p. 60, cited in: Uptis, and Smithrim. *Learning through the Arts: National Assessment 1999–2002*, accessed. p. 5.

¹⁸³⁹ Gardner, Howard. *Frames of Mind: The Theory of Multiple Intelligences*, New York: Basic Books, 1983.

, _____. *Intelligence Reframed: Multiple Intelligences for the 21st Century*, New York: Basic Books, 1999.

¹⁸⁴⁰ Canadian Commission for UNESCO. *Consultation on Arts and Learning for the UNESCO World Conference on Culture/Art in Education. Final Report, Toronto Meeting, October 21 - 22, 2004*; accessed

Project Zero finds that individuals have different types of interdependent and complementary intelligences, or abilities, which need to be addressed in learning, since students who are not strong in one area, such as science, may be strong in another area, such as the arts. Gardner first identified seven core intelligences:

- verbal-linguistic
- logical-mathematical
- visual-spatial
- bodily-kinesthetic (adept at physical activities such as sports or dance)
- musical
- interpersonal (prefer interaction with others)
- intrapersonal (prefer to work alone)¹⁸⁴¹

Gardner later added an eighth—which is somewhat controversial—the naturalistic intelligence, which involves nature, nurturing, and classification of species. The first two intelligences are currently those most valued in schools. The next three are usually associated with the arts, while the last three (including naturalistic) are considered personal intelligences. In other words, different methodologies and activities, not just those recognizing linguistic and logical-mathematical abilities, are needed to reach all students. The commission notes that all of the intelligences are needed to teach the arts and that: “[t]his represents a powerful argument for inclusion of the arts in the curriculum. This argument is familiar to most teachers but is not commonly known by the general public.”¹⁸⁴²

Eliot Eisner suggests that the arts curriculum in K-12 should have four components: the productive, the critical, the historical, and the aesthetic. Respectively, they ought to:

1. engage youngsters in the making of art
2. help them learn how to see visual qualities in both art and the environment
3. help them understand something about the relationship of art to culture over time
4. engage them in conversations about the nature of art itself¹⁸⁴³

In other words, Eisner believes that arts literacy is learning the four things that people do with art: “they make it, they see it, they understand it, and they discuss its nature.”¹⁸⁴⁴

Howard Cannatella of Coventry University in the U.K. discusses his educational approach to creative activity as reflecting “the notion that creativity only flourishes via a devotion to a particular practice.”¹⁸⁴⁵ This devotion takes the form of immersion into the art form, an extended study of the form, and is involved in “fundamental painstaking

February 2007; available from

http://www.unesco.ca/en/interdisciplinary/artslearning/documents/Report_Toronto_Jan21.pdf.

¹⁸⁴¹ Ibid., accessed.

¹⁸⁴² Ibid., accessed. p. 8.

¹⁸⁴³ Eisner. "Discipline-Based Art Education: Conceptions and Misconceptions." p. 424.

¹⁸⁴⁴ Ibid. p. 425.

¹⁸⁴⁵ Cannatella, Howard. "Embedding Creativity in Teaching and Learning," *Journal of Aesthetic Education*, vol. 38, no. 4, 2004: 59-70. p. 59.

ways with the phenomenological.”¹⁸⁴⁶ Eisner also advocates a “discipline-based” arts education, since the arts are disciplines that take time, practice, and perseverance to master. Harris cites the following from Eisner’s book, *The Arts and the Creation of Mind*:

[L]earning is seldom significant when it is limited to a one-time affair. The teacher who gives students clay one week, water-colors the next, wire sculpture the third week, and linoleum printmaking the next, all in the name of providing a rich art curriculum, does those students no favor. What are needed are sequential opportunities to work on problems with one material, time to get a feel for that material, and time to learn how to cope with problems engendered by the material so that mastery is secured.¹⁸⁴⁷

In a recent paper, Shauna Butterwick, of the University of British Columbia, discusses some of the aesthetic sensibilities of learning when working with art forms.¹⁸⁴⁸ She notes that creativity and imagination, which are addressed in part through arts education, are needed to address issues of contemporary society. Referring to the “narrow perspective” of an education “overtaken by a technically rationalized industrial culture,” she asks (echoing Sir Herbert Reed’s suggestion¹⁸⁴⁹): “What might happen if we shifted our thinking such that the goal of education, including adult education, became the preparation of an artist?”¹⁸⁵⁰

Ellen Winner and Lois Hetland, writing for the Canadian Reviewing Education and the Arts Project (REAP), emphasized the importance of the arts in education since the arts are “time-honoured ways of learning, knowing, and expressing”¹⁸⁵¹:

Of course, we do not know for sure what is the best education for children to ensure that they will grow up to lead productive and happy lives. But the arts have been around longer than the sciences; cultures are judged on the basis of their arts; and most cultures and most historical eras have not doubted the importance of studying the arts. Let’s assume, then, that the arts should be a part of every child’s education and treat the arts as seriously as we treat mathematics or reading or history or biology. Let’s remember why societies have always included the arts in every child’s education. The reason is simple. The arts are a fundamentally important part of culture, and an education without them is an impoverished education leading to an impoverished society. Studying the arts should not have to be justified in terms

¹⁸⁴⁶ Ibid. p. 60.

¹⁸⁴⁷ Eisner. *The Arts and the Creation of Mind*. p. 96, cited in Harris. “Lessons from the Arts: A Review of *The Arts and the Creation of Mind* by Elliot Eisner.” p. 3.

¹⁸⁴⁸ Butterwick, Shauna. “Learning to Live Together: The Contribution of the Arts to Adult Learning.” Paper presented at the Annual Conference of the Comparative and International Education Society (CIES - West), Sept 29-Oct 1, 2005, University of British Columbia; accessed October 2005; available from <http://www.edst.educ.ubc.ca/CIES/Abstracts.htm - Papers>.

¹⁸⁴⁹ Reed, Sir Herbert. *Education through Art*, New York: Pantheon Books, 1944.

¹⁸⁵⁰ Butterwick. “Learning to Live Together: The Contribution of the Arts to Adult Learning.”

¹⁸⁵¹ Winner, Ellen, and Lois Hetland. *The Arts and Academic Achievement: What the Evidence Shows. Executive Summary*, Reviewing Education and the Arts Project (REAP), 2000; accessed September 2005; available from <http://www.artssmarts.ca/docs/pdfs/theartsachievement.htm>.

of anything else. The arts are as important as the sciences: they are time-honored ways of learning, knowing, and expressing.¹⁸⁵²

The UNESCO World Conference on Arts Education: Building Creative Capacities for the 21st Century, was held in Lisbon, Portugal from March 6 to 9, 2006.¹⁸⁵³ Over 1,200 participants from 97 member states attended, including governmental and nongovernmental representatives from Canada. The key themes discussed included: advocacy and implementation of arts education at a policy and governmental level; the impact of arts education on cultural, social, and academic areas, including the benefits of arts education and need for research; strategies for promoting arts education policies and partnerships; and the quality of education relating to teacher training and pedagogical practices.¹⁸⁵⁴ One outcome of the conference has been the preparation of a Road Map proposal to provide a framework for arts education, with an emphasis on the strategies to “promote arts education in the learning environment.”¹⁸⁵⁵ One of the main priorities is to “develop a consensus on the importance of arts education for building a creative and culturally aware society.”¹⁸⁵⁶ Among the recommendations that refer to arts literacy in the general public, which were made following the conference were to:

- Raise public awareness and promote the value and social impact of Arts Education
- Give priority to the need to generate better understanding and deeper recognition among the public of the essential contributions made by Arts Education to individuals and society
- Take research into account when making funding and programme decisions and articulate new norms of assessment of the impact of Arts Education
- Encourage communication media to support the objectives of Arts Education and to promote aesthetic sensitivity and foster artistic values in the general public
- Promote ongoing evaluation of the emotional, social, cultural, cognitive and creative impacts of Arts Education¹⁸⁵⁷

¹⁸⁵² Ibid., accessed. p. 5.

¹⁸⁵³ Mbuyamba, Lupwishi. *Closing Session of the World Conference on Arts Education: Building Creative Capacities for the 21st Century*, United Nations Educational, Scientific and Cultural Organization, 2006; accessed February 2007; available from http://portal.unesco.org/culture/en/ev.php-URL_ID=30497&URL_DO=DO_TOPIC&URL_SECTION=201.html.

¹⁸⁵⁴ Ibid., accessed.

¹⁸⁵⁵ United Nations Educational. *Road Map for Arts Education. The World Conference on Arts Education: Building Creative Capacities for the 21st Century, Lisbon, 6-9 March 2006*, accessed. p. 3.

¹⁸⁵⁶ Ibid., accessed. p. 3.

¹⁸⁵⁷ Ibid., accessed. pp. 17–20.

28.4.2 Instrumental benefits of the arts

Researchers consistently find that learners attain higher levels of academic achievement through their work with the arts, whether in or out of school, than do learners without this experience.¹⁸⁵⁸ However, some arts advocates warn against linking arts education exclusively to an increase in academic achievement as its chief justification, noting that this type of correlation puts arts education in a vulnerable position if academic improvement does not result.¹⁸⁵⁹ Winner and Hetland argue that the arts are the only subjects that are consistently challenged to demonstrate transferability to another subject to justify their use in education. They feel the arts need to be evaluated based on what is inherently valuable about the arts themselves, even when secondary benefits are seen.

Despite this wide-spread criticism, other arts advocates find that, given the marginal environment of arts education, showing a correlation between work with the arts and higher academic achievement overall is a useful start towards appreciation of arts education in general. In the Reviewing Education and the Arts Project (REAP) cited above, Winner and Hetland conducted a search for all studies in English from 1950–1999 that tested the hypothesis that arts education leads to academic improvement.¹⁸⁶⁰ They weeded out irrelevant reports, advocacy pieces, and programs lacking an empirical test from the 11,467 studies they found, and were left with 188 reports. They then conducted a set of 10 meta-analyses and a series of statistical analyses and found three areas with clear causal links between education in an art form and achievement in non-art academic areas. These were: listening to music and spatial-temporal reasoning; learning to play music and spatial reasoning; and classroom drama and verbal skills. In other cases, causal links were found but were not strong enough to be generalizable, or the research lacked validity for other reasons such as small sample size.¹⁸⁶¹

A three-year Canadian study, commissioned by the Royal Conservatory of Music on the effects of learning through the arts, sampled 6,675 students from grades 1–6 from six schools. Four of these six schools used an experimental model developed to increase arts education in public schools across the country by having professional artists work with the children, called the Learning Through the Arts model (LTTA), and the other two schools were control schools without the LTTA program. The study used a variety of quantitative and qualitative instruments, such as standardized achievement tests (e.g., the Canadian Achievement Tests), holistically-scored writing samples, attitude and practices surveys designed specifically for the study, individual interviews, and focus groups. It used these to collect data from students, parents, artists, teachers, and administrators. Results showed marked benefits for the children across all socioeconomic backgrounds,

¹⁸⁵⁸ Fiske, Edward B. (ed.). *Champions of Change: The Impact of the Arts on Learning*, Washington, D.C., The Arts Education Partnership and the President's Committee on the Arts and the Humanities, 1999; accessed September 2005; available from <http://artsedge.kennedy-center.org/champions/pdfs/ChampsReport.pdf>.

¹⁸⁵⁹ Winner, and Hetland. *The Arts and Academic Achievement: What the Evidence Shows. Executive Summary*, accessed.

¹⁸⁶⁰ Ibid., accessed.

¹⁸⁶¹ Ibid., accessed.

particularly in math and language achievement, reading for pleasure, motivation to learn, and decreased leisure time playing video games.¹⁸⁶²

The U.S. *Champions of Change* research project, which involved seven teams of researchers in the U.S., also found that participation in the arts promoted learning in other disciplines.¹⁸⁶³ In particular, sustained involvement with music and theatre was highly correlated with reading and mathematics achievement. These researchers report that the arts engage multiple skills and abilities and multiple ways of learning; promote meaningful, holistic, learning experiences that engage the mind, hearts, and bodies of students; and positively affect cognitive, creative, social, and personal competencies, especially in reading proficiency, self-concept and motivation, and higher levels of empathy and tolerance for others. The arts have also been shown to be important in the study of diverse cultures by increasing empathy and cultural understanding.¹⁸⁶⁴

The Learning In and Through the Arts study undertaken by the Center for Arts Education Research at Columbia University studied over 2,000 public school students in grades 4–8 over a two-year period.¹⁸⁶⁵ In addition to interviewing students, teachers, and administrators, and observing classrooms, the study used a number of different tests.¹⁸⁶⁶ The results of the study showed a negative correlation between schools with low arts education and all of the cognitive and personal dimensions of the study. The Columbia University report concludes:

The results of our study offer empirical evidence that learning in arts-rich schools is complex and that it is most successful when supported by a rich, continuous, and sequenced curriculum. We also have clear empirical evidence that children, in what we have called the low-arts schools, are less able to extend their thinking. It appears that a narrowly conceived curriculum, in which the arts are either not offered or are offered in limited and sporadic amounts, exerts a negative effect on

¹⁸⁶² Uptis, and Smithrim. *Learning through the Arts: National Assessment 1999–2002*, accessed.

¹⁸⁶³ Fiske. *Champions of Change: The Impact of the Arts on Learning*, accessed.

¹⁸⁶⁴ National Symposium on Arts Education (NSAE). *Sharing the Vision: A National Framework for Arts Education in Canadian Schools*, Calgary, AB, Coalition for Arts Education in Canada, 2001; accessed September 2005; available from http://www.artsed.ca/Sharing_the_Vision.PDF.

¹⁸⁶⁵ Burton, Judith, Robert Horowitz, and Hal Abeles. "Learning in and through the Arts: Curriculum Implications," in *Champions of Change: The Impact of the Arts on Learning*, ed. Fiske, Edward B., 35-45. Washington, D.C.: The Arts Education Partnership and the President's Committee on the Arts and the Humanities, 1999, accessed September 2005; available from <http://artsedge.kennedy-center.org/champions/pdfs/ChampsReport.pdf>.

¹⁸⁶⁶ These tests included the Self-Description Questionnaire, which measures self-concept; the School-Level Environment Questionnaire, which measures factors of school climate such as teachers and pupils interactions; the Teacher Perception Scale, developed by the research team, which measures teachers' judgements about qualities such as risk-taking, expression, co-operative learning, and creativity-imagination; the Classroom Teacher Arts Inventory, which assesses teachers' practices and attitudes about the arts and whether they integrate the arts with other subjects; and the Students Arts Background Questionnaire, which assesses how much in-school experience children had with the arts. In addition, the study used the Torrence Test of Creative Thinking, which, according to Burton, et al., is the most widely used measure of the creative impact of arts learning since, in part, it is easy to administer and is normed for different age groups. It has been criticized, however, for "overly emphasizing fluency and not considering the intrinsic, personal meaning and value of creative thought." Ibid. accessed. p. 37.

the development of critical cognitive competencies and personal dispositions [...]. As part of [the] extended time for learning, pupils need to be able to use cultural institutions—art, science, and natural history museums, botanical gardens, concert halls, and so forth—much as they would use a library for research purposes.¹⁸⁶⁷

Researchers also argue that another instrumental benefit of participation in arts education is that it “levels the playing field” for disadvantaged students. Catterall, et al. examined the U.S. National Educational Longitudinal Survey, a panel study that followed 25,000 students in secondary schools for 10 years. They found that students involved in arts activities or taking arts-related classes in or out of school had more favourable outcomes such as higher achievement, staying in school, and more positive attitudes about school and community, as well as less television viewing, than students not involved in the arts. These “substantial and significant differences” in achievement and attitudes were true despite the student’s socioeconomic status, which is usually the most significant predictor of academic performance. In this study, Catterall, et al. found that for students from low socioeconomic backgrounds, 43.8% who were highly involved in the arts scored in the highest two quartiles in reading, compared with 28.6% who had no arts involvement. However, they also found that students with high socioeconomic status were twice as likely to be highly involved in the arts as those from a low socioeconomic background.¹⁸⁶⁸

Robin Wright and other researchers from McGill and McMaster Universities recently reported on the National Arts and Youth Demonstration Project (NAYDP), which evaluated community-based after-school arts programs (combination of theatre, visual, and media arts) targeted to a low-income population.¹⁸⁶⁹ The program, which was implemented in five low-income communities across Canada,¹⁸⁷⁰ was designed to nurture the strengths of the youth and to engage them in productive and life-enriching activities, rather than to correct problems. During the 2002 / 2003 school year, a total of 183 youths, ages 9 to 15, took part in the free programs that were offered in three terms as ninety-minute sessions, twice-weekly for a total of 37 weeks. Free transportation to and from the program and snacks were also provided. The first term included an exploration of several arts, e.g., improvisation, painting, mask making, music, script writing, and filming. The second term the youth could chose the medium they wanted to work with, and in the final term the youth staged a theatrical performance or showcased a video production in their community.

¹⁸⁶⁷ Burton, Horowitz, and Abeles. "Learning in and through the Arts: Curriculum Implications." accessed. p. 44.

¹⁸⁶⁸ Catterall, James S., Richard Chapleau, and John Iwanaga. "General Involvement and Intensive Involvement in Music and Theatre Arts," in *Champions of Change: The Impact of the Arts on Learning*, ed. Fiske, Edward B., 1-18. Washington, D.C.: The Arts Education Partnership and the President's Committee on the Arts and the Humanities, 1999, accessed September 2005; available from <http://artsedge.kennedy-center.org/champions/pdfs/ChampsReport.pdf>.

¹⁸⁶⁹ Wright, Robin, Lindsay John, Stephen Ellenbogen, David R. Offord, Eric K. Duku, and William Rowe. "Effect of a Structured Arts Program on the Psychosocial Functioning of Youth from Low-Income Communities: Findings from a Canadian Longitudinal Study," *The Journal of Early Adolescence*, vol. 26, no. 2, 2006: 186-205.

¹⁸⁷⁰ These communities were located in Montreal, Quebec; Toronto and a rural town in Ontario; Winnipeg, Manitoba; and Vancouver, British Columbia.

Assessment of the youth by facilitators included the following measures: joyful participation in activities; social skills development, which included observations of the youths' self-control, communication, respect, co-operation, and problem-solving skills; arts skills development, measuring ability to meet goals and improvement; task completion, which included listening skills and work habits; and self-reported behavioural outcome measures.¹⁸⁷¹ According to Wright, et al., the high attendance and low drop out rates suggest:

[Y]outh from low-income communities can commit to an intensive arts program once obstacles such as cost and lack of transportation are removed. Moreover, the NAYDP youth have shown a significant improvement from baseline to final assessment in the joyful participation observational measure.¹⁸⁷²

The study also found that the arts programs had an impact on the participants' psychosocial functioning, and the results indicated that emotional problems were significantly decreased. However, the participants in the NAYDP were not especially "at risk"—there were twice as many girls in the program as there were boys, and children with behavioural problems were not targeting for the study.

One of the objectives of the study concerned the development of the youth with respect to artistic and social skills. Wright, et al. note that this objective was met:

The significant improvements on all observational measures from baseline to final assessment indicate that structured arts programs provide an opportunity for youth to develop important communication, cooperation, conflict resolution, and teamwork skills. These findings corroborate the assertion that every child can be brought to a certain level of arts literacy.¹⁸⁷³

28.4.3 Arts education in Canada

In Canada, culture is both a federal and provincial responsibility, and education is mainly a provincial responsibility. As one report from the Department of Canadian Heritage notes: "This separation may have had the unwanted impact of placing certain limits on government spending in culture and retarding the emergence of a consensus on standardized curricula for the arts, history, literature and culture in Canada."¹⁸⁷⁴ Most cultural sector training and arts education programs in Canada are located in community

¹⁸⁷¹ Wright, John, Ellenbogen, Offord, Duku, and Rowe. "Effect of a Structured Arts Program on the Psychosocial Functioning of Youth from Low-Income Communities: Findings from a Canadian Longitudinal Study."

¹⁸⁷² Ibid. p. 201.

¹⁸⁷³ Ibid. p. 201.

¹⁸⁷⁴ Council of Europe, and ERICarts. *Compendium: Cultural Policies in Europe. Cultural Policy Headlines - Canada*, 2005; accessed October 2005; available from <http://www.culturalpolicies.net/>. section 4.2.8.

colleges, fine arts schools, universities, and the Collège d'enseignement général et professionnel (CEGEP), which are all under provincial jurisdiction.

Between 1996 and 2003, according to Statistics Canada, the number of students earning degrees in the visual and performing arts increased by nearly 35.3%, with women earning about twice as many of the university degrees and certificates in these fields in all years as did men.¹⁸⁷⁵ However, between 1996 and 2003 general enrolment increased and 13.2% more students earned degree in 2003 than in 1998. In both 1998 and 2003, degrees in the visual and performing arts only represented three percent of the degrees earned in all areas.¹⁸⁷⁶

All three levels of government as well as non-governmental organizations fund more specialized institutions. For example, the National Ballet, Theatre, and Circus schools provide professional training of an internationally recognized standard to Canadian and international students and receive funding, in part, from the Canada Council for the Arts and the Department of Canadian Heritage.¹⁸⁷⁷

Throughout Canada, arts education programs in visual arts, dance, drama, and music are offered at elementary and secondary levels, although currently there is a shortage of qualified arts teachers, and in the secondary schools, arts are generally not required, but are offered as electives.¹⁸⁷⁸

In 2005, Betty Hanley, Eric Favaro, and Harold Pearse prepared a brief overview of arts education in Canada for the Coalition for Arts Education in Canada.¹⁸⁷⁹ This report was also used for the Canadian Commission for UNESCO Consultation on Arts and Learning. Hanley, et al. report that there is very little research that examines the whole field of arts education in Canada, or that looks at substantial policy issues in this area.¹⁸⁸⁰ They note that a 1994 book, *Assessment in the Arts: A Cross-Canada Study*,¹⁸⁸¹ and "Learning Through the Arts: National Assessment Final Report,"¹⁸⁸² which we reviewed above, are exceptions, although the latter does not look at learning *in* the arts.¹⁸⁸³

¹⁸⁷⁵ Statistics Canada. "University Degrees, Diplomas and Certificates, 2003." *The Daily*, October 11, 2005, accessed March 2007; available from <http://www.statcan.ca/Daily/English/051011/d051011d.htm>.

¹⁸⁷⁶ Ibid.

¹⁸⁷⁷ Canada Council for the Arts. *Artstats: Selected Statistics on the Arts and Culture in Canada*, Ottawa, The Canada Council. Culture link network, 1997; accessed August 2005; available from <http://www.culturelink.org/culpol/canada.html>. p. 8.

¹⁸⁷⁸ Hanley, Betty, Eric Favaro, and Harold Pearse. *Report on Arts Education for the Canadian Commission for UNESCO Consultation on Arts and Learning*, Coalition for Arts Education in Canada (CAEC), 2005, June; accessed September 2005; available from <http://www.artsed.ca/celebrate.html>.

¹⁸⁷⁹ Hanley, Betty, Eric Favaro, and Harold Pearse. *Report on Arts Education for the Canadian Commission for UNESCO Consultation on Arts and Learning*, Coalition for Arts Education in Canada (CAEC), 2005; accessed September 2005; available from <http://www.artsed.ca/celebrate.html>.

¹⁸⁸⁰ Hanley, Favaro, and Pearse. *Report on Arts Education for the Canadian Commission for UNESCO Consultation on Arts and Learning*, accessed.

¹⁸⁸¹ MacGregor, R. N., S. Lemerise, M. Potts, and B. A. Roberts. *Assessment in the Arts: A Cross-Canada Study*, Vancouver: Visual & Performing Arts, University of British Columbia, 1994.

¹⁸⁸² Uptis, and Smithrim. *Learning through the Arts: National Assessment 1999–2002*, accessed.

¹⁸⁸³ Hanley, Favaro, and Pearse. *Report on Arts Education for the Canadian Commission for UNESCO Consultation on Arts and Learning*, accessed. p. 8.

According to Hanley, et al., the aim of arts education in Canada is that:

[U]nder the guidance of qualified teachers who have, ideally, a deep understanding of the art form, students are provided with learning experiences in which they develop the knowledge, skills, and understanding that will generate a life-long desire to be involved in art, dance, drama, and music—as makers or supporters. [...] The premise of arts education is that all children and youth should have access to opportunities to engage in the arts because (a) the arts are personally rewarding, (b) they improve general learning skills, attitudes, and habits, and (c) such experiences are not available to all children in their daily lives.¹⁸⁸⁴

According to Hanley, et al., the Atlantic provinces are in the forefront of arts education in Canada.¹⁸⁸⁵ The Atlantic Provinces Education Foundation (since April 2004 called the Council of Atlantic Ministers of Education and Training—CAMET) describes the purposes and principles of art education in its foundation document:

Art education serves the goals of society by fostering the growth of creativity, the production of culture, the advancement of knowledge and understanding of the world and ourselves. Arts education programs take into consideration and reflect values and concerns of society such as human rights, democratic principles, cultural identity, cultural integrity, peaceful coexistence, preservation of the environment, and the well-being of all individuals.¹⁸⁸⁶

In 2001, the four Atlantic provinces developed a 75-page framework for arts education, titled the “Foundation for the Atlantic Canada Framework for the Arts Education Curriculum,” which is shaped by a vision of “enabling and encouraging students to engage in the creative, expressive, and responsive processes of the arts throughout their lives.”¹⁸⁸⁷

This vision statement, which includes a commitment to encourage lifelong learning in the arts, reflects the national trend to view learning *in* the arts, by working directly with creating art, as more beneficial than learning *about* the arts.¹⁸⁸⁸ The Atlantic Canada Foundation document emphasizes the personal, social, and cultural contexts of learning, and describes both general expected outcomes for the four main arts (dance, drama, music, and visual arts), and also expected key-stage curriculum outcomes in each of these

¹⁸⁸⁴ Ibid., accessed. p. 1.

¹⁸⁸⁵ Hanley, Favaro, and Pearse. *Report on Arts Education for the Canadian Commission for UNESCO Consultation on Arts and Learning*, accessed.

¹⁸⁸⁶ Atlantic Provinces Education Foundation (APEF). *Foundation for the Atlantic Canada Framework for the Arts Education Curriculum*, Halifax, APEF, 2001; accessed September 2005; available from http://www.gov.pe.ca/photos/original/ed_arts_found.pdf p. 48. In April 2004, APEF was renamed the Council of Atlantic Ministers of Education and Training (CAMET).

¹⁸⁸⁷ Ibid., accessed. p. v.

¹⁸⁸⁸ Hanley, Favaro, and Pearse. *Report on Arts Education for the Canadian Commission for UNESCO Consultation on Arts and Learning*, accessed.

four fields for grades 3, 6, 9, and 12. The general expected curriculum outcomes include three main areas and eight outcomes, as seen in Table 29.

Table 29. General expected curriculum outcomes in arts education for the Atlantic Provinces

Creating, making, and presenting	Understanding and connecting contexts of time, place, and community	Perceiving, reflecting, and responding
Students will be expected to:	Students will be expected to:	Students will be expected to:
explore, challenge, develop, and express ideas, using the skills, language, techniques, and processes of the arts	demonstrate critical awareness of and value for the role of the arts in creating and reflecting culture	apply critical thinking and problem-solving strategies to reflect on and respond to their own and others' expressive work
create and / or present, collaboratively and independently, expressive products in the arts for a range of audience and purposes	respect the contributions to the arts of individuals and cultural groups in local and global contexts, and value the arts as a record of human experience and expression	understand the role of technologies in creating and responding to expressive works
	examine the relationship among the arts, societies, and environments	analyse the relationship between artistic intent and the expressive work

Source: Atlantic Provinces Education Foundation (APEF). *Foundation for the Atlantic Canada Framework for the Arts Education Curriculum*. APEF, 2001, accessed September 2005; available from http://www.gov.pe.ca/photos/original/ed_arts_found.pdf, p. 14.

The general foundation document of *The Atlantic Canada Framework for Essential Graduation Learnings in Schools* lists Aesthetic Expression outcomes for high school graduates.¹⁸⁸⁹ Specifically:

Graduates will be able to respond with critical awareness to various forms of the arts and be able to express themselves through the arts. Graduates will be able, for example, to:

- use various art forms as a means of formulating and expressing ideas, perceptions and feelings
- demonstrate understanding of the contribution of the arts to daily life, cultural identity and diversity, and the economy
- demonstrate understanding of the ideas, perceptions and feelings of others as expressed in various art forms

¹⁸⁸⁹ Atlantic Provinces Education Foundation (APEF). *Foundation for the Atlantic Canada Framework for the Arts Education Curriculum*, accessed. p. 8.

- demonstrate understanding of the significance of cultural resources such as theatres, museums and galleries

It is not clear the extent to which Canadian schools actually incorporate their goals successfully into the curriculum, since there are no regular national or provincial assessments of arts education. We discuss the needs for provincial assessment below.

28.4.4 Canadian arts education initiatives

There are many individual initiatives and partnerships among Canadian schools, artists, and communities, which “provide innovative opportunities to teach both the arts and other curricular subjects through the arts.”¹⁸⁹⁰ Some of these programs include: Learning Through the Arts (Royal Conservatory of Music), Arts Infusion (Nova Scotia Arts Council, now the Nova Scotia Cultural Action Network—CAN), ArtsSmarts (The JW McConnell Family Foundation), DAREarts, CAPES (Calgary Arts Partners in Education Society), the Arts Network for Children and Youth, and National Symposium on Arts Education, to mention just a few.¹⁸⁹¹

The Canada Council for the Arts calls the ArtsSmarts program “the largest education initiative in the country to improve the lives and learning capacity of children by injecting arts into academic programs.”¹⁸⁹² ArtsSmarts is an example of learning *through* the arts. Since 1998, funded by the J.W. McConnell Family Foundation and managed by the Canadian Education Association, it has provided seed money to locally initiated arts programs in schools and communities across Canada. In the program, the arts are used in an interdisciplinary fashion to study other core subjects. For example, history is studied through drama, math through dance, and science through music.¹⁸⁹³ The results, according to the Council, are encouraging:

[N]early 70 per cent of educators see behavioural changes in students, as well as increased student engagement in schools. More than half of the students see the arts as a new way of learning, and over 90 per cent of students, 85 percent of educators and over 80 per cent of artists expressed interest in future arts experiences. The benefits include: improved critical thinking and research skills, cooperative approaches to work, creative expression and community awareness and appreciation.¹⁸⁹⁴

¹⁸⁹⁰ National Symposium on Arts Education (NSAE). *Sharing the Vision: A National Framework for Arts Education in Canadian Schools*, Calgary, AB, Coalition for Arts Education in Canada, 2001; accessed September 2005; available from http://www.artsed.ca/Sharing_the_Vision.PDF. p. 7.

¹⁸⁹¹ National Symposium on Arts Education (NSAE). *Sharing the Vision: A National Framework for Arts Education in Canadian Schools*, accessed. p. 7.

¹⁸⁹² Canada Council for the Arts. *Making a Case for the Arts: Education and Engaging Canada's Youth*, 2006; accessed March 2007; available from <http://www.canadacouncil.ca>.

¹⁸⁹³ ArtsSmarts. *Website: Investing in a Creative Canada*, Canadian Education Association, 2007; accessed March 2007; available from <http://www.artssmarts.ca/eng/>.

¹⁸⁹⁴ Canada Council for the Arts. *Making a Case for the Arts: Education and Engaging Canada's Youth*, accessed.

In addition, the Government of Canada partners in arts education programs with arts organizations and other governments, through programs such as SchoolNet (Industry Canada), National Arts and Youth Demonstration Project, Canada Online, EducAction (a six-volume series of teaching materials on Canada including a volume on Arts Education), the National Arts Centre, the Canada Council for the Arts, the National Film Board promotion of cultural learning, the Book Publishing Industry Development Programme in the Department of Canadian Heritage, and two national training programs in the arts and film.¹⁸⁹⁵

There is considerable interest in Canada in strengthening arts education. For example, the Canadian Society for Education through Art (CSEA) is the main nongovernmental organization providing national leadership in this field. It brings together arts educators and others with similar interests from all levels of education including elementary, secondary, college / university, ministries of education, art galleries / museums, and community education.¹⁸⁹⁶ In 2004, it published a new art teacher education text, which is now being used in university courses.¹⁸⁹⁷

The National Symposium on Arts Education (NSAE) was created in 1997 after the Council of Ministers of Education, Canada (CMEC) completed the Pan-Canadian Science Project, in the hopes that CMEC would turn its attention to the arts.¹⁸⁹⁸ The NSAE has worked to create arts education support and guidelines, including “learning in, through, and about the arts, for all Canadians.”¹⁸⁹⁹ Participants at the first National Symposium on Arts Education, which took place in Cape Breton, N.S. in 1997, adopted the following Resolution:

Given the value of the arts for learning;
Given the ability of education in the arts to nurture qualities necessary in the workplace of the 21st century;
Given the rapidly growing work opportunities in the cultural sector;
Given the need for creative uses of and content for new technologies, which artists provide;
Given the central role of the arts in the well being of communities;
Given the ability of the arts to respond to and embrace the movement of globalization, both affirming distinct cultures and understanding others;

¹⁸⁹⁵ Council of Europe, and ERICarts. *Compendium: Cultural Policies in Europe. Cultural Policy Headlines - Canada*, accessed.

¹⁸⁹⁶ Canadian Society for Education through Art (CSEA). *Website*, Toronto, accessed September 2005; available from <http://www.csea-scea.ca/aboutUs.htm>.

¹⁸⁹⁷ National Symposium on Arts Education (NSAE). *Policy Guideline for Arts Education in Canadian Schools*, 2004; accessed September 2005; available from <http://www.artstarts.com/pdf/aepolicyguides.pdf>; Grauer, Kit, and Rita Irwin, eds. *stARTing with...* Kingston, ON, Canadian Society for Education through Art, 2004.

¹⁸⁹⁸ National Symposium on Arts Education (NSAE). *Policy Guideline for Arts Education in Canadian Schools*, accessed. p. 7.

¹⁸⁹⁹ National Symposium on Arts Education (NSAE). *Sharing the Vision: A National Framework for Arts Education in Canadian Schools*, accessed.

The participants of the National Symposium on Arts Education '97, including artists, educators, arts administrators and education administrators from across Canada, urge the Ministers of Education, through the Council of Ministers of Education, to take steps to ensure that the arts are a fundamental and sustained part of the Canadian school system for all students and in all schools, by developing a vision and common outcomes for arts education in Canada.¹⁹⁰⁰

The 5th National Symposium on Arts Education (NSAE) in 2001 ratified another document elaborating a national vision for arts education in Canada, which was the first of its kind in Canada.¹⁹⁰¹ The document, "Sharing the Vision: A National Framework for Arts Education in Canadian Schools," developed a framework for what children need in order to maximize their potential in and through the arts. This framework includes:

- A commitment by parents, the community, schools, business, and government to support arts education in the schools
- Equitable access to arts programs from K–12
- Developmental and continuous arts curriculum K–12
- Qualified arts education teachers
- Access to visual arts exhibitions and live artistic performances
- Contact with artists in all disciplines
- The time, space, and resources to deliver arts education¹⁹⁰²

Based on its vision statement, the NSAE developed long-term outcomes, which were to:

- Build awareness of impact of arts infused learning
- Identify / recruit 'champions'
- Build [interest in] projects and persuade skeptics
- Raise funds
- Embed arts infused learning in provincial curriculum
- See to it that the provincial arts curriculum is implemented in the schools
- Embed arts infused learning in teacher education¹⁹⁰³

Finally, the NSAE developed policy guidelines to address the need for support and direction for arts education on a national level. These guidelines were presented at its 2003 conference in Halifax. The NSAE has also identified two indicators of whether its efforts have succeeded:

We will know we have succeeded when every child in Canada has:

¹⁹⁰⁰ Ibid., accessed. p. 6.

¹⁹⁰¹ National Symposium on Arts Education (NSAE). *Making the Vision Happen: The National Framework for Arts Education in Canadian Schools*, Calgary, Coalition for Arts Education in Canada, 2002; accessed September 2005; available from <http://www.artsed.ca/makingthevision.html>.

¹⁹⁰² National Symposium on Arts Education (NSAE). *Sharing the Vision: A National Framework for Arts Education in Canadian Schools*, accessed. p. 6.

¹⁹⁰³ National Symposium on Arts Education (NSAE). *Making the Vision Happen: The National Framework for Arts Education in Canadian Schools*, accessed. p. 9.

1. equitable access to comprehensive, developmental arts programs delivered by qualified teachers
2. educationally appropriate opportunities to work with and enjoy professional arts and artists throughout the school system¹⁹⁰⁴

NSAE's framework, criteria, policy guidelines, and proposed indicators may potentially inform the development of indicators in this field for the CIW educated populace domain. In order to assess the degree of response to and uptake of the NSAE initiatives, and to populate potential indicators in this field, a more detailed exploration of trends in government support and funding for arts education will be necessary than is possible in this brief review.

The NSAE work has been positively received, and the CMEC is now working in partnership with the Canadian Commission for UNESCO, the Canada Council for the Arts, the Canadian Conference of the Arts, and the Department of Canadian Heritage "to promote a greater awareness of the benefits of arts and creativity with the Canadian schools and the broader community."¹⁹⁰⁵ In November, 2004, after two years of discussions, the Canadian Conference of the Arts (CCA), the Canada Council for the Arts, and the Canadian Commission for UNESCO, in partnership with the Coalition for Arts Education in Canada, Canadian Public Arts Funders, and the Council of Ministers of Education Canada jointly initiated a program titled *Arts and Learning: A Call to Action*.¹⁹⁰⁶ According to the CCA, the initiative is intended "to create a greater awareness of the benefits of arts and creativity as a learning strategy in Canadian schools and communities," and to ensure that learning about the arts and culture becomes "a fundamental element of learning in Canada."¹⁹⁰⁷ The goals of the initiative also are:

... to enlist the arts and creativity as learning strategies in Canada's schools and communities, as well as to ensure a permanent understanding of the importance of this principle in public policy. To accomplish this, the project will undertake a campaign to raise awareness amongst stakeholders of the advantages of arts as a teaching tool in the classroom, and the role of the arts in lifelong learning. The project will also include research on the arts and learning in Canada, and will establish partnerships with those active in this area in at various levels of government, the arts and the community. In doing this, Canada will put itself in

¹⁹⁰⁴ National Symposium on Arts Education (NSAE). *Policy Guideline for Arts Education in Canadian Schools*, accessed. p. 1.

¹⁹⁰⁵ Canadian Commission for UNESCO (United Nations Educational, Scientific, and Cultural Organization). *Arts and Learning*, United Nations Educational, Scientific, and Cultural Organization (UNESCO), 2006; accessed February 2007; available from <http://www.unesco.ca/en/interdisciplinary/artslearning/default.aspx>.

¹⁹⁰⁶ Arts News Canada. *Arts and Learning: A Call to Action Officially Launched*, Canadian Conference of the Arts (CCA), 2005; accessed February 2007; available from <http://www.artsnews.ca/LinkedFiles/CCAArtsLearning.html>.

¹⁹⁰⁷ Canadian Conference of the Arts. *Arts and Learning: A Call to Action*, Canadian Conference of the Arts, Canada Council for the Arts, and the Canadian Commission for UNESCO, in partnership with Coalition for Arts Education in Canada, Canadian Public Arts Funders, and the Council of Ministers of Education Canada, 2005; accessed November 2006; available from <http://www.artsed.ca/calltoaction.html>.

step with countries such as the United States, Australia and the United Kingdom, which have studied the benefits of learning the arts and learning through the arts.¹⁹⁰⁸

In preparation for the 2006 UNESCO World Conference on Arts Education: Building Creative Capacities for the 21st Century noted above, the Canadian Commission for UNESCO, with collaboration and support of the CMEC, held a series of six regional consultations with, in total, 180 specialists in the field of arts and learning between October 21, 2004 and December 15, 2005. According to the final report on these consultations, *Canadian Reflections on Arts and Learning: The Challenge of Systemic Change*, the subjects discussed were: arts education and creativity, accessibility, quality in arts education, challenges in arts education and strengthening the role of arts and learning.¹⁹⁰⁹ The Commission notes that the discussions presented an arts education in Canada that is “complex, rich, and varied,” but that there are many challenges “to be overcome before Canadians have a more satisfying arts education afforded to them.”¹⁹¹⁰

28.4.5 Assessments of arts education

Eisner argues that artistic development can be evaluated and that “it is professionally irresponsible to claim that the evaluation of curricula, teaching, or learning in art, or anywhere else, is incapable of a defensible form of evaluation.”¹⁹¹¹ By evaluation, Eisner means: “Evaluation refers to the making of value judgments about the educational worth of what is taught, how teaching occurs, and what is learned as a result.”¹⁹¹²

According to the Atlantic Provinces Education Foundation (APEF), teachers across Canada are responsible for the general assessments and evaluations of students in arts education. Whether or not province-wide external evaluations of learning outcomes are administered is the decision of each province.¹⁹¹³ This review, however, has not found evidence of such large-scale art education evaluations.

The APEF clearly envisions that large-scale province-wide evaluations of learning outcomes in arts education are possible and conceivable, so it is not a major stretch to imagine that province-wide evaluations could be conducted in a comparable way nationwide, as has been done in the U.S. as described below. For that reason, the expected general curriculum and aesthetic expression outcomes have been listed above because they could potentially form the basis for a comparable nationwide evaluation framework to assess effective learning in the field of arts education. Such an assessment instrument could then, in turn, provide data for comparable provincial indicators of

¹⁹⁰⁸ Arts News Canada. *Arts and Learning: A Call to Action Officially Launched*, accessed.

¹⁹⁰⁹ Canadian Commission for UNESCO. *Canadian Reflections on Arts and Learning: The Challenge of Systemic Change*, accessed. p. 4.

¹⁹¹⁰ Ibid., accessed. p. 18.

¹⁹¹¹ Eisner. “Discipline-Based Art Education: Conceptions and Misconceptions.” p. 424.

¹⁹¹² Ibid. p. 424.

¹⁹¹³ Atlantic Provinces Education Foundation (APEF). *Foundation for the Atlantic Canada Framework for the Arts Education Curriculum*, accessed.

effective arts education in Canada, based on a set of agreed, expected outcomes like those listed by the APEF. This is what is needed to provide indicators in this area for the CIW educated populace domain.

A 2002 compendium on learning in the arts that collected 62 U.S. and international studies particularly notes the lack of assessment studies in the field.¹⁹¹⁴ Contributors Horowitz and Webb-Dempsey note that most arts education assessments “measure participation in arts classes as a surrogate for assessing arts learning,” and call for valid and reliable assessments to identify and measure the outcomes of arts education that reflect “the rich nature of arts learning experiences and the complexities of arts learning outcomes.”¹⁹¹⁵ However, in the same compendium, Blen Winner also suggests that the arts “contribute unique and often difficult-to-measure learning outcomes,” and should not be “accountable for the same outcomes of learning as mathematics and language arts.”¹⁹¹⁶

Key policy issues in the field of arts education were summarized in a 2000 international thematic study, which included Canada, published as part of the International Review of Curriculum and Assessment Frameworks project (INCA), carried out by the National Foundation for Educational Research in England and Wales (NFER) on behalf of the Qualifications and Curriculum Authority (QCA) in England.¹⁹¹⁷ The key aims cited were to:

- investigate the apparent contradiction between the support for the arts at the policy level and the perceived low status given to arts in schools
- find ways to raise the profile of the arts in schools
- explore the implications of the different curriculum models
- identify methods of assessment that are practical, reliable and sympathetic to the arts, creativity and cultural education.¹⁹¹⁸

Again, these issues and recommendations echo the findings of this chapter of our own literature review. They also succinctly point to the key dimensions of the issue and the

¹⁹¹⁴ Deasy, Richard J. (ed.). *Critical Links: Learning in the Arts and Student Academic and Social Development*, Washington, DC, Arts Education Partnership, 2002; accessed September 2005; available from

<http://aep-arts.org/Publications.htm> - CriticalLinks.

¹⁹¹⁵ Horowitz, Rob, and Jaci Webb-Dempsey. "Promising Signs of Positive Effects: Lessons from the Multi-Arts Studies," in *Critical Links: Learning in the Arts and Student Academic and Social Development*, ed. Deasy, Richard J., 98-100. Washington, D.C.: Arts Education Partnership, 2002, accessed January 2007; available from <http://aep-arts.org/files/publications/CriticalLinks.pdf>. p. 99.

¹⁹¹⁶ Winner, Blen. "Review Of: 'Mute Those Claims: No Evidence (yet) for a Causal Link between Arts Study and Academic Achievement' by Ellen Winner and Monica Cooper," in *Critical Links: Learning in the Arts and Student Academic and Social Development*, ed. Deasy, Richard J., 92-93. Washington, D.C.: Arts Education Partnership, 2002, accessed January 2007; available from <http://aep-arts.org/files/publications/CriticalLinks.pdf>. p. 93.

¹⁹¹⁷ Sharp, Caroline, and Joanna Le Métails. *The Arts, Creativity and Cultural Education: An International Perspective*, International Review of Curriculum and Assessment Frameworks project, London, U.K., National Foundation for Educational Research in England and Wales (NFER), Qualifications and Curriculum Authority (QCA), 2000; accessed September 2005; available from <http://www.inca.org.uk/pdf/finalreport.pdf>.

¹⁹¹⁸ Ibid., accessed.

steps needed to develop a suitable framework for reliable and consistent indicators for the CIW educated populace domain. Thus, the NFER study above clearly points to three key indicator areas in this field—all of which have been touched on in this chapter:

1. concrete support for arts education that goes beyond policy statements (e.g., funding)
2. levels of participation in arts education (including the degree to which such participation is required as part of curricula)
3. learning outcomes in arts education

As a follow-up to this work, NFER conducted an international survey in 2004, which included 21 countries or states / provinces.¹⁹¹⁹ In Canada, only Alberta, Saskatchewan, and Ontario participated in the study. Written by Geoff Taggart, et al. in the U.K., the final report notes that teacher assessment is the most common approach to assessment, and that “[n]one of the 21 states / countries have comprehensive assessment schemes for personal and social / cultural development, although some touch on these aspects.”¹⁹²⁰

In the NFER survey, Taggart, et al. found that the largest national assessment of achievement in the arts has been carried out in the U.S.¹⁹²¹ The National Assessment of Educational Progress (NAEP) takes place annually in different subjects. In 1997, a NAEP in the arts was conducted that focused on visual arts, music and theatre. It assessed approximately 6,480 13- to 14-year-old students in grade 8, using an arts education assessment framework that was developed in lengthy consultations with arts educators and others. An assessment was also developed for dance, but this was only administered to students in grade 12, due to the lack of a suitable national sample. The assessment used exercises that required students to write responses and answer multiple-choice questions in order “to explore students’ abilities to analyse, describe and interpret works of art.”¹⁹²² In addition, it used more complex performance tasks to assess students’ abilities to create and perform works of art. The next arts education assessments are scheduled for 2008 and 2016. An example of the types of exercises used in the 1997 assessment is shown in Table 30 below.

¹⁹¹⁹ Taggart, Geoff, Karen Whitby, and Caroline Sharp. *Curriculum and Progression in the Arts: An International Study*, International Review of Curriculum and Assessment Frameworks project, Slough, Berkshire, U.K., Qualifications and Curriculum Authority, National Foundation for Educational Research, 2004; accessed September 2005; available from http://www.inca.org.uk/pdf/final_report_amended_12.8.pdf.

¹⁹²⁰ Ibid., accessed. p. 21.

¹⁹²¹ Ibid., accessed.

¹⁹²² Ibid., accessed. pp. 26–27.

Table 30. Example of exercises used to assess arts learning outcomes in the U.S. National Assessment of Educational Progress (NAEP) 1997 Arts Assessment

Arts subjects	Kinds of exercises	
	<i>Creating and / or performing: assessed with performance tasks</i>	<i>Responding: assessed with written exercises and multiple-choice questions</i>
Music	Create and perform a rock-and-roll improvisation on a MIDI keyboard.	Listen to pieces of music and then analyze, interpret, critique, and place the pieces in historical context.
Theatre	Work in a group to create and perform an improvisation about a camping trip.	Listen to a radio play and then do a series of written exercises about staging the play for young children.
Visual arts	Create a package designed to hold a whisper or a scream using markers and a cardboard box.	Study artworks and then do exercises exploring aesthetic properties and expressive aspects of the works.
Dance	Work with a partner to create and perform a dance based on the idea of metamorphosis.	Watch ethnic folk dances on videotape and then analyze and place the dances in historical context.

Source: National Center for Education Statistics (NAEP). *The NAEP 1997 Arts Report Card: Eighth Grade Findings from the National Assessment of Educational Progress*, Office of Educational Research and Improvement, U.S. Department of Education, 1999; accessed March 2007; available from <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=1999486>.

We do not present detailed results of this assessment here, since at this time, they are not relevant to Canada. Interested persons can consult the above NAEP source for a detailed report of the outcomes. Basically, students did well on the responding aspect of the assessment, but showed limited abilities in the creating and performing sections.¹⁹²³

Following this assessment, the Arts Education Partnership produced a process guide for assessing arts education for school districts and states, which describes the development of standards, features of effective large-scale assessment design, and guides for planning, developing, and implementing the assessments.¹⁹²⁴ This guide could provide a useful tool

¹⁹²³ National Center for Education Statistics (NAEP). *The NAEP 1997 Arts Report Card: Eighth Grade Findings from the National Assessment of Educational Progress*, Office of Educational Research and Improvement, U.S. Department of Education, 1999; accessed March 2007; available from <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=1999486>.

¹⁹²⁴ Pistone, Nancy, and Debra Brzoska. *Envisioning Arts Assessment: A Process Guide for Assessing Arts Education in School Districts and States*, Washington, D.C., Arts Education Partnership and the Council of Chief State School Officers, 2002; accessed January 2007; available from <http://aep-arts.org/files/publications/EnvArtsAssess.pdf>.

for Canadian assessments.

A 2006 research and policy brief from the Arts Education Partnership in the U. S., written by Sandra Ruppert and Andrew Nelson, notes that “the data-free climate of policy and decision making for the arts in education is starting to change.”¹⁹²⁵ The brief reviews experiences of five U.S. states that have conducted comprehensive arts education surveys. For example, Ruppert and Nelson point out new initiatives in New Jersey:

In many cases, the data gathered through a statewide survey of the arts in education can be supplemented with information drawn from other sources. Part of the plan in New Jersey, for example, is to mesh survey results with existing educational and census databases to create the New Jersey Arts Education Information and Research Center. Using specially designed technology, the system will have the capacity to sort information according to what people want to know, generate individual reports, compare schools and districts, and geographically display the levels of arts education across the state.¹⁹²⁶

The brief also provides a list of indicators that are commonly used to assess the status of arts education, including:

- Time / frequency provided for arts instruction within school schedules
- Number and range of arts course offerings
- Percent of students participating in arts courses
- Number of credits in the arts required for high school graduation
- Percent of certified or licensed teachers to teach arts education
- Availability of professional development workshops and teacher planning time
- Frequency of arts-based field trips, residencies and extra curricular activities
- Presence of designated arts classrooms and use of technology in arts learning
- Evidence of alignment of arts instruction with state standards
- Presence of documented arts curricula
- Type of assessment tools for measuring student arts performance
- Amount of school and outside funding for arts programs¹⁹²⁷

Canada could definitely benefit from a similar survey. However, it is interesting that learning outcomes are not among the commonly used indicators.

In the U.S., the National Center for Education Statistics (NCES) conducts such periodic surveys of elementary and secondary schools through its Fast Response Survey System (FRSS).¹⁹²⁸ The most recent survey report is from 1999–2000, although the NCES has

¹⁹²⁵ Ruppert, Sandra S., and Andrew L. Nelson. *From Anecdote to Evidence: Assessing the Status and Condition of Arts Education at the State Level*, Washington, D.C., Research and Policy Brief, Arts Education Partnership, 2006; accessed March 2007; available from <http://aep-arts.org/files/publications/From Anecdote to Evidence.pdf>, p. 1.

¹⁹²⁶ Ibid., accessed. p. 6.

¹⁹²⁷ Ibid., accessed. p. 4.

¹⁹²⁸ Burns, Shelley. *Case Study Three: USA: Arts Education in Public Elementary and Secondary Schools*, U.S. Department of Education, UNESCO, 2004; accessed March 2007; available from

scheduled a new report to be released in 2007.¹⁹²⁹ Shelley Burns of the NCES notes: “These surveys are the only comprehensive and reliable data on the conditions of arts education in American public schools.”¹⁹³⁰ The survey reviews the availability and characteristics of arts education programs, as well as funding, administrative support, supplemental arts activities, status of arts specialists, voluntary national standards, and graduation requirements, but also does not include information on learning outcomes.¹⁹³¹

The Canadian Commission to UNESCO, which, as noted earlier, recently held consultations with experts in arts literacy and other interested parties, notes that more Canadian research in arts education is needed, and especially mentions the need for assessments:

Participants suggested research that pools our collective resources and identifies our specific needs. Most art associations and organizations expressed a need for a large data base of programs, resources, names of groups and individuals who are active in all of the arts. More specifically, research is necessary that: examines and articulates what children are learning in arts education; provides arguments for a holistic approach to education which includes the arts; validates the economic argument in support of the arts; deals with the creative process and how to teach creatively; [...] deals specifically with evaluation and assessment in arts education; [...] develop[s] national standard for assessment and evaluation in arts education.¹⁹³²

Despite the challenges, we echo the recommendation for the development of valid and reliable assessments to identify and measure the outcomes of arts education. Such assessments are essential to provide data that could potentially populate indicators in this field as part of the CIW educated populace domain in the future. It is our hope, aspiration, and recommendation that future updates of the CIW educated populace domain will eventually have the data required for indicators in arts literacy.

http://portal.unesco.org/culture/en/file_download.php/1cc566f1d19992a8cbb1d4bedb33146eCase+study+3_USABurns.pdf.

¹⁹²⁹ Ibid., accessed.

¹⁹³⁰ Ibid., accessed. p. 1.

¹⁹³¹ Carey, Nancy, Brian Kleiner, Rebecca Porch, Elizabeth Farris, and Shelley Burns. *Arts Education in Public Elementary and Secondary Schools: 1999–2000*, Washington, D.C., Fast Response Survey System (FRSS), Office of Educational Research and Improvement, U.S. Department of Education, 2002; accessed March 2007; available from <http://nces.ed.gov/pubs2002/2002131.pdf>.

¹⁹³² Canadian Commission for UNESCO. *Learning to Live, Living to Learn: Perspectives on Arts Education in Canada*, accessed. pp. 16–17.

PART V

CONTEXT 2:

FORMAL EDUCATION: STRUCTURAL ELEMENTS

29. Early Childhood Education

Childhood is the time to be a child; children are not miniature adults, valued exclusively for their potential as future workers.

Jalongo, et al.¹⁹³³

Emotional intelligence sums up what early life is all about: a time for exploring emotions in a safe setting, learning about feelings and how to express them. Those who feel loved are most able to learn and to show compassion for others. Emotional management builds character and is more important to later success than IQ. Cooperation, play, and creativity all foster the 'EQ' needed for a joyful life.

Raffi Cavoukian^{1934, 1935}

In 2002, Industry Canada launched an “innovation strategy” with the release of two companion documents highlighting national goals and needs concerning skills, the knowledge economy, and innovation.^{1936, 1937} In both documents, life-long learning, beginning with early childhood education, was a central element of the strategy. According to *Knowledge Matters*, the new realities of the job market mean that people have to be ready and willing to “adapt” and learn new skills, as the labour market requires: “[o]ur learning system must be strengthened if we are to meet the skills and labour force demands of the next decades.”¹⁹³⁸ In this precarious world of work, the role of the education system is therefore to help create a skilled workforce, and this process is seen as beginning with early childhood education.

Quite clearly, this view, with its focus and emphasis on the increase in sold commodities / profit per unit of private cost, runs counter to the two quotations cited at the start of this chapter, both of which point to a model of early childhood education in which children and childhood are valued intrinsically and for their own sake. It also runs counter to over 40-years of research in the field of child development and early education, which

¹⁹³³ Jalongo, Mary Renck, Beatrice S. Fennimore, Jyotsna Pattnaik, DeAnna M. Laverick, Jeffrey Brewster, and Moses Mutuku, "Blended Perspectives: A Global Vision for High-Quality Early Childhood Education," *Early Childhood Education Journal*, vol. 32, no. 3, 2004: 143 -155. p. 145.

¹⁹³⁴ Cavoukian, Raffi, *A Covenant for Child Honouring*, Troubadour Foundation, 2004, accessed March 2005; available from <http://www.raffinews.com/>.

¹⁹³⁵ In a review of this chapter by John McMurtry, he points out that “emotional intelligence” does not include “sensuous intelligence,” which he says is the “the other half of the felt side of being that is primary to childhood.” McMurtry, John, Professor of Philosophy, University of Guelph, personal communication with Linda Pannozzo, reviewer comments, email correspondence, September 25, 2006 and January 5, 2007

¹⁹³⁶ Industry Canada, *Achieving Excellence: Investing in People, Knowledge and Opportunity*, Industry Canada, 2002, accessed May 24 2005; available from <http://www.innovationstrategy.gc.ca/gol/innovation/site.nsf/en/in04135.html>.

¹⁹³⁷ Industry Canada, *Knowledge Matters: Skills and Learning for Canadians*, Industry Canada, 2002, accessed May 24 2005; available from <http://www.innovationstrategy.gc.ca/gol/innovation/site.nsf/en/in04135.html>.

¹⁹³⁸ Ibid.

according to a number of experts in the field tells us that children should be educated as whole human beings and not as a collection of cognitive skills and that children learn best in “playful environments rich with opportunities for exploration.”¹⁹³⁹

According to Sharna Olfman, clinical psychologist and associate professor of psychology in the Department of Humanities at Point Park University (Pittsburgh), and author of several books on early childhood development, the research indicates that what “most powerfully grows children’s brains, and helps them to become powerful learners and creative thinkers in the early years, are ‘secure attachments’ and play based early childhood education.”¹⁹⁴⁰

In her anthology *No Child Left Different*, Olfman argues that parental care, loving attachments and community support are crucial for the child to become a “fully intact human being.”¹⁹⁴¹

The central psychological challenge of infancy is the acquisition of trust. Securely attached infants whose caregivers consistently respond to their needs in a loving and timely fashion, come to approach life with optimism. Children who are imbued with trust, find it easier to acquire autonomy in toddlerhood. Toddlers have a burgeoning sense of self that is ushered in by an explosion of new intellectual, linguistic and motor skills. Suddenly, they are walking, talking, climbing and exploring.... During the preschool years, children need time for unstructured imaginative play in natural settings in order to develop *initiative*. Psychologically healthy school-age children feel a natural desire to develop the capacity for *industry*. When children find their passion, whether it be tennis, literature, or woodworking, they will work with great diligence towards mastery when parents and teachers facilitate their efforts as mentors and guides.¹⁹⁴²

Olfman also argues that in order for parents to be able to nurture healthy psychological and neurological development in their children, they must also be supported by their own communities and “wider culture” so that they can have the “time, resources and physical and emotional health to parent their children.”¹⁹⁴³

The research in the field of early childhood development indicates that environmental influences (including teaching and learning) have an influence on child brain

¹⁹³⁹ Quote taken from Berk, Laura E., Dorothy G. Singer, Kathy Hirsh-Pasek, and Roberta Michnick Golinkoff, "All Work and No Play: A Call for Evidence-Based Preschool Education," 2005.; Additional references supporting the importance of play-based curricula: Olfman, Sharna, "The Building Blocks of Children's Mental Health: Care and Community," in *No Child Left Different*, ed. Olfman, Sharna, Westport: Praeger Press, 2006.; Olfman, Sharna, ed., *All Work and No Play: How Educational Reforms Are Harming Our Preschoolers*, Edited by Olfman, Sharna, Childhood in America, Westport, Praeger Press, 2003.; Olfman, Sharna, ed., *Childhood Lost: How American Culture Is Failing Our Kids*, Westport, Praeger Press, 2005.

¹⁹⁴⁰ Olfman, Sharna, personal communication with Pannozzo, Linda, April 16, 2007,

¹⁹⁴¹ Olfman, Sharna, ed., *No Child Left Different*, Edited by Olfman, Sharna, Children in America, Westport, Praeger, 2006.

¹⁹⁴² Ibid.

¹⁹⁴³ Ibid.

development and that a child's brain can be "significantly changed as genes interact with the child's experiences."¹⁹⁴⁴ According to Jane Healy, an educational psychologist and author of several books in the field, the question of "nature *or* nurture" is outdated and that "the notion of 'nature *via* nurture' captures much better the dynamic, self-organizing dance of human development, and why the variables in each child's environment are so instrumental in determining how—or even whether—his or her genes express themselves."¹⁹⁴⁵ Therefore, as Olfman argues, growing healthy brains in children depends in part on the quality of parenting and the quality of early childhood education programs.

According to her book *Childhood Lost: How American Culture is Failing our Kids*, Olfman argues that many early childhood education programs in the U.S. in particular do not recognize the importance of play-based curricula. She says that children are being rushed into formal education and are not being given the time they need for creative play and make-believe play. Citing a British House of Commons Education Select Committee report, Olfman points out that there is no conclusive evidence that children gain from being taught the 3Rs before age six. Instead, creative play and small class size were deemed essential in ECE, according to the British study.¹⁹⁴⁶

The Select Committee report states:

The current focus on targets for older children in reading and writing inevitably tends to limit the vision and confidence of early childhood educators. Such downward pressure risks undermining children's motivation and their disposition to learn, thus lowering rather than raising levels of achievement in the long term. [...] Inappropriate formalized assessment of children at an early age currently results in too many children being labeled as failures, when the failure in fact, lies with the system.¹⁹⁴⁷

Olfman points out that in the U.S., there is a move toward formally educating children at younger and younger ages, while at the same time it is moving "further away from the approach of [European countries] whose academic achievements it strives to emulate, and in a manner that ignores decades of child development research."¹⁹⁴⁸

According to Olfman, one irony is that in a recent highly regarded international comparison of literacy among high school students, Finland, which begins reading at age 7, came first "because of its research based commitment to preserving play in early childhood."¹⁹⁴⁹

¹⁹⁴⁴ Healy, Jane M., "How Environment Impacts Brain Development and Genetic Expression," in *No Child Left Different*, ed. Olfman, Sharna, Westport: Praeger Press, 2005.

¹⁹⁴⁵ Ibid.

¹⁹⁴⁶ Olfman, ed., *All Work and No Play: How Educational Reforms Are Harming Our Preschoolers*.

¹⁹⁴⁷ British House of Commons Education Select Committee report, 2000, cited in Ibid.

¹⁹⁴⁸ Ibid.

¹⁹⁴⁹ Olfman, personal communication. Olfman's research into these international comparisons can be found in Olfman, Sharna, "Where Do the Children Play," in *Childhood Lost. How American Culture Is Failing Our Kids*, ed. Olfman, Sharna, Childhood in America Series, Westport: Praeger Press, 2005.

In addition to the importance of loving parental attachments and playful learning environments for healthy brain development in children, “children need to be protected from toxic exposures that undermine neurological and endocrine system development.”¹⁹⁵⁰

In a recent review that appeared in *The Lancet*, P. Grandjean and P.J. Landrigan point out that there are a number of very common and costly childhood neurodevelopmental disorders such as autism, attention deficit disorder, mental retardation, and cerebral palsy, which currently have unknown causes. However, the authors go on to list a number of known neurotoxins, including lead, methylmercury, polychlorinated biphenyls (PCBs), arsenic, and toluene. They note there are more than 200 chemicals known to cause neurotoxic effects in adults, but that little is known of their effects on children:

Exposure to these chemicals during early fetal development can cause brain injury at doses much lower than those affecting adult brain function. [...] The toxic effects of such chemicals in the developing human brain are not known and they are not regulated to protect children. The two main impediments to prevention of neurodevelopmental deficits of chemical origin are the great gaps in testing chemicals for developmental neurotoxicity and the high level of proof required for regulation. New, precautionary approaches that recognize the unique vulnerability of the developing brain are needed for testing and control of chemicals.¹⁹⁵¹

The authors of *The Lancet* article stress that children’s brains are “inherently much more susceptible to injury caused by toxic agents than is the brain of an adult,” and that this vulnerability begins in the womb where “windows of unique susceptibility to toxic interference arise that have no counterpart in the mature brain, or in any other organ. If a developmental process in the brain is halted or inhibited, there is little potential for later repair, and the consequences can therefore be permanent. [...] The human brain continues to develop postnatally, and the period of heightened vulnerability therefore extends over many months, through infancy and into early childhood.”¹⁹⁵²

Grandjean and Landrigan explain that the susceptibility of children to industrial chemicals is “further enhanced by their increased exposures, augmented absorption rates, and diminished ability to detoxify many exogenous compounds, relative to that of adults.”¹⁹⁵³

Therefore, if we truly are concerned about the development of children’s brains in order to prepare them for a “global economy,” then we must first ensure they are being protected from toxic exposures.

¹⁹⁵⁰ Olfman, personal communication

¹⁹⁵¹ Grandjean, P. and P.J. Landrigan, "Review: Developmental Neurotoxicity of Industrial Chemicals," *The Lancet*, vol. 368, 2006; November 8,.

¹⁹⁵² Ibid. p. 2.

¹⁹⁵³ Ibid. p. 2.

In a landmark study entitled *Early Years Study: Reversing the Real Brain Drain*, Margaret McCain and Fraser Mustard found that the period of early child development is just as or, in some cases, more important for the quality of the next generation than the time spent in postsecondary education.

We know that development of the brain in the early years of life, particularly the first three years, sets the base of competence and coping skills for the later stages of life. Improving the prospects for the next generation of Ontarians—with respect to school performance, health and quality of life, and success in the labour market—will improve the future for all of us.¹⁹⁵⁴

According to McCain and Mustard, early childhood development programs that involve parents or other primary caregivers of young children can:

... influence how they relate to and care for children in the home and can vastly improve outcomes for children's behaviour, learning and health in later life. [...] These programs can benefit children and families from all socioeconomic groups in society.¹⁹⁵⁵

There is currently a great deal of support in society for early childhood education (ECE), particularly in terms of quality, universal, accessible, accountable “early learning programs” that provide a seamless connection to kindergarten, which is currently the start of formal education for most children. Proponents of ECE, such as the Child Care Advocacy Association of Canada, argue that children benefit from such learning programs in terms of “strengthening children’s dispositions to be lifelong learners and productive participants in society.”¹⁹⁵⁶ In addition, the child care advocacy group points out that the economic benefit of early childhood education and childcare outweighs the cost. “Economic models demonstrate that every \$1 spent on child care produces \$2 return through reduced social service costs and increased tax revenue as more parents join the workforce.”¹⁹⁵⁷

According to Jalongo, et al:

As many nations who have such policies already in place can attest, comprehensive services that begin during the prenatal stage and include health services, child care and education, parent education and training programs, family literacy projects to increase literacy levels, maternity leaves with job protection, leaves for families when children are ill, and a wide array of social services are the key to exemplary early childhood care and education. The support and

¹⁹⁵⁴ McCain, Honourable Margaret Norrie and J. Fraser Mustard, *Early Years Study: Reversing the Real Brain Drain*, Government of Ontario, 1999, accessed July 5 2005; available from <http://www.voices4children.org/pdf> p. 7.

¹⁹⁵⁵ Ibid.

¹⁹⁵⁶ Child Care Advocacy Association of Canada, *From Patchwork to Framework. A Child Care Strategy for Canada*, Child Care Advocacy Association of Canada, 2004, accessed May 23 2005; available from <http://www.childcareadvocacy.ca/> p. 7.

¹⁹⁵⁷ Ibid.

protection of each generation of preschool children, which will ensure the ongoing viability and wholeness of the nation, should be a major goal of every country in the world.¹⁹⁵⁸

According to Jalongo, et al., preschool programs should be developmentally appropriate and founded upon:

... an abiding respect for early childhood as a developmental period that has value in its own right rather than replicate the curriculum and pedagogy that characterizes later academic experiences. A quality preschool program is not perceived as a race in which children are pressured to perform tasks beyond their understanding in order to please adults and prepare them for a competitive, test-driven culture that awaits.¹⁹⁵⁹

According to some advocates, literacy is a key goal of quality childcare because it provides "access to future learning, equips the learner with an essential communication tool, and gives learners access to economic and civic participation in the society."¹⁹⁶⁰ For this reason many child care advocates believe that child care should be viewed as a social service to which all families and children should be entitled.¹⁹⁶¹

Currently there is general consensus that literacy is fundamental to the economic and social development of a country. However, advances in technology have led to higher expectations for literacy attainment and increased work-related literacy demands.¹⁹⁶² Research in the field of family literacy has found that the foundation of literacy begins in the home, and that "rather than a set of skills, literacy is a way of thinking, learned through communication in families."¹⁹⁶³

Studies have indicated that the family's influence on children's school achievement is at least as strong as school influences. In fact, the 1996 results of the National Longitudinal Survey of Children and Youth (NLSCY) confirmed that family income is one of the key influences affecting children's wellbeing, including literacy skills. For instance, the survey found that 25% of children from low-income families were verbally delayed, compared to 17% of children from middle-income families.¹⁹⁶⁴ Thus, support for family literacy intervention could help to lessen the negative effects of child poverty, just as social interventions to reduce poverty can have positive literacy outcomes.

¹⁹⁵⁸ Jalongo, Fennimore, Pattnaik, Laverick, Brewster, and Mutuku, "Blended Perspectives: A Global Vision for High-Quality Early Childhood Education." p. 144.

¹⁹⁵⁹ Ibid. p. 145.

¹⁹⁶⁰ Ibid.

¹⁹⁶¹ Mahon, Rianne, "Early Childhood Learning and Care in Canada: Who Rules? Who Should Rule? Discussion Paper", Paper presented at the Child Care in Canada Conference, Winnipeg, 2004, Canadian Council on Social Development. p. 10.

¹⁹⁶² Thomas, Adele and Sharon Skage, "Overview of Perspectives on Family Literacy: Research and Practice," in *Family Literacy in Canada: Profiles of Effective Practices*, ed. Thomas, Adele, Weland, Ontario: Soleil Publishing, 1998. pp. 5-25.

¹⁹⁶³ Ibid.

¹⁹⁶⁴ Ibid.

These findings were echoed in a recent review of Canadian literature on the subject of the social consequences of economic inequality among children. The Canadian Council on Learning (CCL) concluded that there was “a strong relationship between low income and / or socio-economic status and deleterious social outcomes” among children. However, they also found that “the effects of economic inequality are clearly mitigated and mediated by other variables, and act differently on different populations.”¹⁹⁶⁵ For example, the literature review cited a number of studies that concluded that young children from economically disadvantaged backgrounds benefit in a number of ways from early childhood education programs.¹⁹⁶⁶ In one study cited (Dooley and Stewart, 2004) the authors conclude that providing early childhood education may be a more effective use of public funds than using direct cash transfers as a way of improving cognitive outcomes among low-income children.¹⁹⁶⁷

In terms of literacy, Olfman laments the “sad irony” that make-believe play, which contributes substantially to language development, is not seen as being as important in ECE as early reading:

The building blocks of literacy are so much more than letter recognition and phonics. Children must also acquire a rich vocabulary, the ability to understand and follow a narrative, the capacity to empathize with the characters they encounter—to imagine themselves into the circumstances of their lives, diverse experiences that help them relate to what they are reading, the ability to ‘see’ the characters in their minds eye, and the patience and desire to read.¹⁹⁶⁸

In the absence of this approach a child may not develop a deep sense of empathy, which Olfman argues has significant consequences for our natural world:

In the absence of a deep empathy for and understanding of our place in nature, we feel no qualms about using science and technological discoveries as vehicles for dominating, and mining nature for resources, destroying ecosystems and our health in the process.¹⁹⁶⁹

Instead, she argues, there is currently too much pressure being put on very young children to read and process, store, and download information in much the same way a computer does:

Within this framework, fact sheets, computer drills, and multiple choice tests are eminently reasonable vehicles for learning and for testing what has been learned.

¹⁹⁶⁵ Canadian Council on Learning, *The Social Consequences of Economic Inequality for Canadian Children*, Ottawa: CCL, 2006. The literature review was prepared by the CCL for the First Call BC Child and Youth Advocacy Coalition.

¹⁹⁶⁶ Ibid. pp. 17, 18, 43.

¹⁹⁶⁷ Ibid. p. 17.

¹⁹⁶⁸ Olfman, ed., *All Work and No Play: How Educational Reforms Are Harming Our Preschoolers*.

¹⁹⁶⁹ Horgen, Katherine Battle, "The Obesity Epidemic," in *Childhood Lost. How American Culture Is Failing Our Kids*, ed. Olfman, Sharna, Westport: Praeger Press, 2005.

[...] Play, direct experience, and mentoring do not have a valued place in this worldview. [...] A child is motivated to learn by the desire to be grounded in her family, in her community, and the natural order, and yet, at the same time to express herself and place her own personal stamp on the world. Her thinking is infused with emotion, sensory and bodily-kinesthetic experience, artistry, imagination and soulfulness. And it is through this uniquely *human* prism, in the service of uniquely *human* needs, that she “processes information.” Children throughout the world are deeply affected by problems such as poverty, lack of social or political regard for their well-being, and the inability of their families to cope with increasing social and economic demands.¹⁹⁷⁰

In this sense, caregivers and educators take on some responsibility for the “educational, social, and civic climate of the nation.” It becomes the obligation of the preschool or early childhood program to support families in a variety of ways, including connecting them with needed services and supporting parenting strategies.

The Child Care Advocacy Association of Canada notes that the “most stubborn poverty trap, particularly for single parents, is the lack of child care to allow them to participate in training and employment. In this case, child care provides a double benefit. It allows parents to work or upgrade their skills, while compensating children at-risk due to their families’ social and / or economic circumstances.”¹⁹⁷¹

Indeed, in the precarious, insecure, and ever-changing world of work, it is often financially difficult for parents to step away from their jobs to raise children. In some instances, particularly in the case of lone mothers, the lack of affordable child care could mean poverty. Thus, advocates often argue that child care can enable participation in the workforce:

Family life has been affected by profound changes taking place in the labour market. The changing economy creates new jobs, but it also generates precarious employment for more part-time, casual and self-employed workers. Women are most likely to be in these employment categories. Furthermore, paid work is more likely to be characterized by longer and more non-traditional hours. This phenomenon contributes to families that are smaller and more financially insecure. Today’s families are also more likely to experience separation and divorce, resulting in growing numbers of children primarily raised by lone mothers. The changing workplace and the situation of single parent families presuppose new ways of carrying out parental responsibilities, one that acknowledges the primary role of parents and the supporting role of governments in promoting healthy child development.¹⁹⁷²

¹⁹⁷⁰ Jalongo, Fennimore, Pattnaik, Laverick, Brewster, and Mutuku, "Blended Perspectives: A Global Vision for High-Quality Early Childhood Education."

¹⁹⁷¹ Child Care Advocacy Association of Canada, *From Patchwork to Framework. A Child Care Strategy for Canada*. p. 8.

¹⁹⁷² Ibid. p. 24.

In addition, families in general are experiencing higher levels of stress and time pressure than ever before. As a result, many children in all socioeconomic groups are “not developing as they should,” according to McCain and Mustard. They attribute some of this to the lack of “parenting engagement and to the availability of quality care outside the home”:¹⁹⁷³ “Since women are now an important part of the paid labour force, it is important for employers (public and private) to develop policies for early child development that are sensitive and relevant to our changing socioeconomic circumstances.”¹⁹⁷⁴

GPIAtlantic’s Work Hours report documented dramatic changes in the nature of work over the last half-century and the major consequences that these changes have had on the ways in which we configure our lives, including the way we raise and educate children. The 1990s, for example, saw an increased polarization of hours and the decline of the standard workweek. Larger numbers of Canadians worked longer hours and larger numbers were unable to get the hours they needed to make ends meet. Overtime is on the rise, more people work multiple jobs, the rate of part-time work is on the rise—it has more than quadrupled over a 48-year period—and more and more people find themselves in temporary, contingent, insecure jobs. In particular, the sharp increase in women’s labour force participation in the last half century, and the resulting dramatic increase in dual-earner households, has considerably increased work hours for these households, brought new pressures to bear on the “struggle to juggle” work and family responsibilities, and made paid child care one of the fastest growing industries in Canada.¹⁹⁷⁵

The reasons behind these monumental changes in the nature of work are complex and beyond the scope of this literature review. However, the GPIAtlantic Work Hours report explored a number of trends which provide a larger and longer-term backdrop to these changes, such as the growth of the “consumer society” and what Juliet Schor has labelled the “work and spend” cycle. As well, the shift from a society that produces goods to a society that produces services in recent decades is largely due to the replacement of human workers with machines (including computers). Job losses due to automation have been particularly significant in primary goods sectors like forestry, fishing, and farming. In farming alone there was a 70% drop in the numbers of farmers between 1939 and 1995. Such long-term changes have produced a dramatic shift in the structure of the labour force that in turn has affected the structure of households.^{1976, 1977}

¹⁹⁷³ McCain and Mustard, *Early Years Study: Reversing the Real Brain Drain*. pp. 63–64.

¹⁹⁷⁴ Ibid.

¹⁹⁷⁵ Pannozzo, Linda and Ronald Colman, *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, Genuine Progress Index Atlantic (GPI Atlantic), 2004, accessed April 2004; available from <http://www.gpiatlantic.org/>. pp. 4–48.

¹⁹⁷⁶ Ibid. p. 23.

¹⁹⁷⁷ In his review of this chapter, John McMurtry notes that such statistics also reveal that human vocations themselves are being eliminated. He writes, “developed activities that express human capacities to produce life good for others, as opposed to instrumentalizable detail functions for private profit,” are being eliminated. “The central object of education is itself being abolished.” McMurtry, Professor of Philosophy, University of Guelph, personal communication

The higher productivity that often results from technological changes may increase economic activity without creating better employment opportunities for many people. In fact, a portion of this new productivity takes the form of “jobless economic growth”—where technology boosts production and profits and reduces labour costs while jobs are being shed.¹⁹⁷⁸

Insecure and contingent work is also a feature of the new global economy where Canadian workers are now competing with cheap labour abroad. What has emerged is two separate work forces—a “core” work force of highly educated and highly skilled employees, and a “contingent” work force of mostly unskilled, less educated workers who can be laid off in response to market conditions and fluctuations in demand.¹⁹⁷⁹

From the holistic perspective of the Canadian Index of Wellbeing that links social, economic, and environmental realities, these long-term economic trends and structural changes are highly relevant to the issues explored in this chapter, and may constitute root causes of the increased demand for paid child care. Thus, if the world of work is producing higher levels of time stress, pressure, and insecurity, then many parents may feel they have no choice but to place their children in child care facilities while they work for pay, regardless of educational and emotional consequences. For example, in 2001, 62% of Canadian mothers with infants aged 0–2 had paid jobs, up from just 27.7% in 1976—an increase of 124%, and the sharpest increase among all categories of women joining the labour force.¹⁹⁸⁰ If these mothers have qualms about transferring infant care responsibilities to strangers, then it is essential to address underlying economic, historical, and structural reasons rather than simply to facilitate, support, or enable this shift through justifying the value of early childhood education.

GPIAtlantic’s 1998 report on the *Economic Value of Unpaid Housework and Child-care in Nova Scotia* explored some of the fundamental changes in the structure of both the market and household economies over the last half century. It noted that while women doubled their labour force participation during this period, workplace arrangements have not accommodated this new reality. Yet the increasing time stress of balancing home and job responsibilities is still, for the most part, seen as a personal, domestic problem, rather than as a public policy issue.

The GPI study recognized that unpaid household work and child care are essential to economic survival, wellbeing, and quality of life. Without it, social costs would rise and workplace productivity would decline. However, this vital contribution remains invisible in our current accounting measures:

Marry your housekeeper and the GDP goes down. Cook your own meals and look after your own children, and it has no value in our measures of progress. In other

¹⁹⁷⁸ Pannozzo and Colman, *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, p. 24.

¹⁹⁷⁹ Ibid. pp. 25–26.

¹⁹⁸⁰ Statistics Canada, *Women in Canada: Work Chapter Updates*, catalogue no. 89F0133-XIE, pp. 6, 12, Table 5, Statistics Canada, 2002. p. 49.

words, shifts from the household economy to the market economy count, misleadingly, as economic growth, even though no additional production may be taking place.¹⁹⁸¹

The study noted that if household work is measured and valued as *bona fida* work of economic value to society, then social supports like family services, child tax benefits, and subsidized child care will be seen as essential social infrastructure for the household economy. If effective child-rearing is viewed as a direct investment in human and social capital, then such services are analogous to taxpayer support for business investment and job creation in the market economy.¹⁹⁸² In sum, from this perspective, it is essential to recognize that early childhood education is conditioned by larger, long-term economic, historical, and labour force realities.

McCain and Mustard argue that a population-based assessment of whether early childhood development programs are working is valuable in terms of estimating brain development, which in turn influences subsequent learning, behaviour, and health for the population overall. They propose a “readiness to learn” measure which assesses physical health and wellbeing, social competence, emotional maturity, language richness, and general knowledge and cognitive skills.

Used as a population-based assessment, it will show regions or communities where early child development is not as good as it should be. [...] It is in many ways similar to our universal measure of birthweight. Since early child development has important effects on health risks in later life, this measurement is as much a health measure as an education or learning measure. This measure could also be called a human development index.¹⁹⁸³

McCain and Mustard warn, however, that the development and use of outcome measures for early childhood learning can potentially lead to issues of labelling children that are counter-productive and even harmful. The authors argue categorically: “Readiness to learn measures must not be used to label children who enter the school system in relation to their peers. These measures are not meant for individual score-keeping.”¹⁹⁸⁴ Instead, they are meant to tell communities how well they are supporting parenting and early child development from a population perspective.

In line with McCain and Mustard’s “readiness to learn” measure, a population-based measure was developed by researchers at the Offord Centre for Child Studies at McMaster University and is largely based on the NLSCY as well as on several tests.¹⁹⁸⁵ The Early Development Instrument (EDI) is essentially a questionnaire completed by kindergarten teachers intended to measure readiness to learn at school in five domains:

¹⁹⁸¹ Colman, Ronald, *The Economic Value of Unpaid Housework and Child Care in Nova Scotia*, Genuine Progress Index Atlantic (GPI Atlantic), 1998, accessed December 2005; available from <http://www.gpiatlantic.org/>. p. 3.

¹⁹⁸² Ibid. p. 6.

¹⁹⁸³ McCain and Mustard, *Early Years Study: Reversing the Real Brain Drain*. p. 101.

¹⁹⁸⁴ Ibid. p. 102.

¹⁹⁸⁵ Dr. Dan Offord and Dr. Magdalena Janus developed the EDI.

physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge. More information regarding this measure is presented below in section 29.1.

Since the mid-1960s, in the U.S., two federally funded preschool programs called *Head Start* and *Early Head Start* have provided early childhood programs for children (from birth to age 5) whose families have incomes below the national poverty line. The overall goal of the programs is to increase the school readiness of young children with disadvantaged backgrounds.¹⁹⁸⁶

In 2003, more than 500,000 four- and five-year olds in the *Head Start* programs began getting tested twice a year, at a cost in excess of \$US16 million / year. According to the Head Start Bureau, the purpose of the test is to:

1. enhance local aggregation of child outcome data and local program self-assessment efforts
2. enable government offices to plan training and technical assistance efforts
3. incorporate child outcome information into the future Head Start monitoring reviews

Essentially, the testing is being used for quality assurance of the Head Start program.¹⁹⁸⁷

Critics of the testing argue that quality cannot be assessed by standard outcome measures alone, because these do not take into account differences among children and programs. In addition, critics argue, “the idea that a narrow test of young children’s skills in literacy and math can represent a quality indicator of a holistic program like Head Start shows a stunning lack of appreciation for the comprehensive goals of the 38-year old program.”¹⁹⁸⁸ Critics also point out that the backgrounds of children eligible for the Head Start program are very diverse in terms of ethnicity, languages spoken at home, parental education, and so forth. Various research bodies in the U.S., including the National Education Goals Panel and the National Research Council of the National Academies, have urged that children below the age of eight not be administered the kind of test being used by the Head Start Bureau. Even the No Child Left Behind Act does not mandate testing until grade three.¹⁹⁸⁹

Critics also argue that the tests tell very little about young children’s preschool skills:

It provides no authentic literacy evaluation and little information about math skills. Entire areas of development, such as socio-emotional growth, physical

¹⁹⁸⁶ U.S. Department of Health and Human Services, *Head Start*, Head Start Bureau, 2004, accessed May 26 2005; available from <http://www.acf.hhs.gov/programs/hsb/about/index.htm>.

¹⁹⁸⁷ Meisels, Samuel J. and Sally Atkins-Burnett, *The Head Start National Reporting System. A Critique*, The National Association for the Education of Young Children, 2004, accessed May 23 2005; available from <http://www.journal.naeyc.org/btj/200401/meisels.asp>.

¹⁹⁸⁸ Ibid.

¹⁹⁸⁹ Ibid.

development, science, social studies, the arts, and most literacy and even phonemic awareness, are omitted. [...]

Because the [test] will be used in making decisions about the continuation of Head Start, it is an example of a test in which indicators of learning can overwhelm learning itself, since potentially successful programs may be classified as failures based on an invalid and poorly constructed test. After all the experience this nation has had regarding the impact of measurement-driven instruction in the K-12 arena, it is baffling that a test like this would be visited on young children from poor households.¹⁹⁹⁰

The *No Child Left Behind Act* in the U.S., requires states, districts and schools to report annual test results for all racial and ethnic groups, and to show annual improvements for each, and “impose sanctions on schools that do not meet the rising targets.”¹⁹⁹¹ According to the *New York Times*, overall the law has not worked to close the test-gap scores between minority and white students, and that schools continue to be “a significant source of disadvantage for minority students.”¹⁹⁹²

Olfman agrees that the standardized testing path of young children in the U.S. is “failing.” She writes, in a review of this chapter, that “in many cases [*No Child Left Behind*] is achieving the opposite of its intentions: greater divide between test scores for children of privilege and minorities and / or poor children, significantly higher drop out rates in the older grades, and weaker performance in international comparisons.”¹⁹⁹³

Olfman writes:

[E]thically, our focus should not be exclusively on children’s role in the economy, but rather on their well-being, and on actualizing their human potential—however, the two go hand in hand—what is good for children’s development and in the here and now (loving families, sensitive mentoring, opportunity for play in natural settings, clean air, soil and water) ALSO make them smarter, and more creative—and it is creative thinking rather than merely technical acumen that the 21st century global economy needs.¹⁹⁹⁴

According to the Canadian Council on Social Development (CCSD), a national child care strategy in Canada should mirror the recommendations set forth by the Romanow Commission on the Future of Health Care in Canada. In terms of health, says CCSD, the Romanow Commission recognized that the only way to ascertain that the principles of universality, equity, responsiveness, and accountability were being achieved was through the development of a common set of indicators to measure and track performance, and to

¹⁹⁹⁰ Ibid.

¹⁹⁹¹ Dillon, Sam, "Schools Slow in Closing Gaps between Races," *New York Times*, 2006; available from <http://www.nytimes.com/2006/11/20/education/20gap.html?ex=1321678800&en=35afe63193f79bf7&ei=5090&partner=rssuserland&emc=rss>.

¹⁹⁹² Ibid.

¹⁹⁹³ Olfman, personal communication

¹⁹⁹⁴ Ibid., personal communication

report the results to Canadians. Thus, the Commission proposed the creation of an independent and impartial body—now called the Health Council of Canada—that would analyse key data, monitor progress, and report back to Canadians. According to CCSD, child care in Canada should follow in the “spirit” of these Romanow Commission recommendations for health care, so that there would also be a nonpartisan, independent body called the Early Child Learning and Care Covenant Council, which would collect and analyse data on performance, and provide advice and analysis to federal, provincial, and territorial ministers and deputy ministers. Like Romanow’s proposed health council, this council would actively engage the public.¹⁹⁹⁵

¹⁹⁹⁵ Mahon, "Early Childhood Learning and Care in Canada: Who Rules? Who Should Rule? Discussion Paper". p. 14.

29.1 Measuring early childhood development

29.1.1 Statistics Canada's National Longitudinal Survey of Children and Youth (NLSCY)

This is a long-term Statistics Canada study of Canadian children that follows their development and wellbeing from birth to early adulthood. The study is designed to collect information about factors influencing a child's social, emotional, and behavioural development, and to monitor the impact of these factors on the child's development over time. It is currently the only pan-Canadian source of data on early childhood development. It is biennial, and its information is obtained from parents.

29.1.2 Early Development Instrument (EDI)

EDI is a questionnaire filled out by all of the teachers of every kindergarten-aged child who participates in the assessment. It consists of 222 variables organized around five areas or domains that are designed to identify "patterns of children's vulnerability." As noted above, these five domains are:

- 1 Communication skills and general knowledge
- 2 Emotional maturity
- 3 Language and cognitive development
- 4 Physical health and wellbeing
- 5 Social competence

Essentially, the EDI is a "tool for measuring children's readiness to participate in and benefit from school activities." Specifically, the mapping project helps measure readiness to learn in children, assess effectiveness of early childhood interventions, and predict how children will do in elementary school.¹⁹⁹⁶ In accordance with McCain and Mustard's admonition, the EDI is a population-based measure and therefore it cannot be used as a diagnostic tool. Results are consequently not reported on an individual level—only on a group level. The results are intended to help communities assess how well they are supporting young children and their families.¹⁹⁹⁷

The "readiness to learn" information collected by the Early Development Instrument (EDI) is presented in three categories:

1. Average scores for groups of children in five domains / 16 subdomains
2. Percentages of children who are vulnerable for each domain / overall

¹⁹⁹⁶ Edudata Canada, *Early Development Instrument (EDI)*, Edudata Canada, University of British Columbia, 2004, accessed May 23 2005; available from http://www.edudata.educ.ubc.ca/Data_Pages/EDIsplash.htm.

¹⁹⁹⁷ Winnipeg School Division, *Early Development Instrument*, 2004, accessed December 2006; available from <http://www.wsd1.org/ueywinnipeg/edi.htm>.

3. Percentage of children with multiple challenges [as assessed by the Multiple Challenge Index (MCI)]¹⁹⁹⁸

For example, in 1999–2000, EDI and NLSCY data indicate that nearly 32% of kindergarten children aged 4 to 5 years from very poor families were vulnerable overall, compared to 29% of kindergarten children from poor families, 23% from families who were not poor, and only 14% from well-off families. Thus, there is a clear gradient of vulnerability to low readiness to learn levels according to family income.¹⁹⁹⁹

29.1.3 Canadian Council on Learning (CCL)

The CCL is an initiative funded by Human Resources and Social Development Canada (HRSDC) to promote life long learning, beginning with early childhood education.

The CCL's Early Childhood Learning Knowledge Centre aims to:

- Bring together the best scientific knowledge about the conditions that foster learning in young children up to the age five years
- Identify the work that Canadian researchers could carry out to improve scientific knowledge about the conditions that foster learning in young Canadian children up to the age of five years
- Identify the best ways of monitoring the progress of learning outcomes for young Canadian children in order to inform Canadians
- Transfer this knowledge to the general Canadian public and particularly to Canadians who are likely to improve the conditions that foster learning in young children²⁰⁰⁰

The CCL has created a Composite Learning Index (CLI), which it describes as “a basket of 15 indicators to measure the state of lifelong learning in Canada.”²⁰⁰¹ There are currently no indicators for early childhood development being used to create the CLI. The CCL notes that it has “identified a few possible early childhood development (ECD) indicators derived from the NLSCY, which is the only pan-Canadian source of information at this moment.” However, CCL has concluded that, after consultation with experts in its Early Childhood Learning Knowledge Centre, the proposed indicators are not sufficient to adequately measure the contribution of ECD in the CLI model.²⁰⁰²

¹⁹⁹⁸ Janus, Magdalena, "Measuring the Well-Being of Children at School Entry: International Perspectives", Paper presented at the Medchild International Conference, Rome, 2006, Offord Centre for Child Studies.

¹⁹⁹⁹ Ibid.

²⁰⁰⁰ Canadian Council on Learning (CCL), *Website*, CCL, accessed March 2006; available from <http://www.ccl-cca.ca/>.

²⁰⁰¹ Ibid.

²⁰⁰² Ibid.

29.1.4 Pan-Canadian Education Indicators Program (PCEIP)

The PCEIP, a joint venture of Statistics Canada and the Council of Ministers of Education (CMEC), Canada, reported on education indicators in Canada in 1996, 1999, and most recently in 2003.²⁰⁰³ In terms of early childhood development and learning, the PCEIP reported on four indicators:

1. Health status among 4- and 5-year olds
2. Participation in structured out-of-school activities among 4- and 5-year olds
3. Exposure to reading and books among 4- and 5-year olds
4. Peabody Picture Vocabulary Test scores for 4- and 5-year olds²⁰⁰⁴

The PCEIP data are from Statistics Canada's NLSCY.

²⁰⁰³ After the 1996 report was published, a new set of indicators was designed. This new set of indicators was the basis of the PCEIPs 1999 report. In 2003, most of the indicators reported on in 1999 were updated, and several additional indicators were reported on.

²⁰⁰⁴ Council of Ministers of Education Canada (CMEC), *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program, 2003*, CMEC and Statistics Canada, Catalogue no. 81-582-XIE, 2003, accessed January 2006; available from <http://www.statcan.ca/english/freepub/81-582-XIE/2003001/pdf/81-582-XIE03001.pdf>. pp. 55–59.

30. Holistic and Transformative Learning Approaches

In this section, we briefly explore the basic discourse around generic holistic learning, which is also sometimes referred to in the literature as “transformative learning,” although each of these terms actually has a slightly different focus.

One of the most frequently cited educators in the holistic and transformative learning field, and founder of the journal *Holistic Education Review*,²⁰⁰⁵ Ron Miller echoes the view of many other highly regarded scientists, educators, and other analysts in observing: “We are entering a historic period of transition from one dominant worldview to another [...] and] the new, emerging culture is going to be radically different [...] but, ultimately a postmodern civilization is going to be born.”²⁰⁰⁶ For this to happen, however, Miller notes that we need to engage in critical thinking about the current realities of society, including its violence, poverty, and pollution. Miller remarks that there are many educators who recommend various new educational techniques, but fundamentally, holistic learning should be seen not just as a technique or method. Rather, it should be seen as a new paradigm with assumptions and principles that express an awakening to the ecological interconnectedness of life.

Holistic learning, as OISE (Ontario Institute for Studies in Education) educator John P. Miller notes, seeks to integrate the personal and social, linear thinking and intuition, mind and body, expert and lay knowledge, and the economy and the environment.²⁰⁰⁷ It includes a sense of the sacred in the world and the need that humans have for transcending narrow and overly specialized boundaries.

It is common for holistic education to critique the almost purely cognitive approach of conventional schooling, and for the definition instead to recognize the interconnections of body, mind, emotions, and spirit.²⁰⁰⁸ This interconnection, however, is broader than the personal dimension.

Holistic education is based on the premise that each person finds identity, meaning, and purpose in life through connections to the community, to the natural

²⁰⁰⁵ The title of the *Holistic Education Review* has since been changed to *Encounter: Education for Meaning and Social Justice*.

²⁰⁰⁶ Miller, Ron. “Holistic Education for an Emerging Culture,” in *The Heart of Learning: Spirituality in Education*, ed. Glazer, Steven, 189-201. New York: Jeremy P. Tarcher/Putnam, 1999. pp. 189–190. Many authors, educators, and scientists hold this view including Alfred North Whitehead, William James, Gregory Bateson, David Bohm, Rupert Sheldrake, Barbara McClintock, David Ray Griffin, Theodore Rozak, Jeremy Rifkin, Fritjof Capra, Ken Wilber, Charlene Spretnak, Riane Eisler, David Orr, J.P. Miller, C.A. Bowers, and John Taylor Gatto, among others.

²⁰⁰⁷ Miller, John P. *The Holistic Curriculum*, Toronto: OISE Press, 1996.

²⁰⁰⁸ Ontario Institute for Studies in Education (OISE). *Holistic Learning: Breaking New Ground International Conference*, University of Toronto, 2005; accessed January 2006; available from <http://leo.oise.utoronto.ca/~skarsten/holistic/newground2005.html>.

world, and to spiritual values such as compassion and peace. Holistic education aims to call forth from young people an intrinsic reverence for life and a passionate love of learning.²⁰⁰⁹

David Sable defines transformational learning as learning that:

... relates to education of the whole person and includes the development of insight as much as knowledge. It is based on personal experience, but it can draw inspiration and guidance from many quarters, including ancient wisdom traditions, philosophy, social sciences, and the arts.²⁰¹⁰

Robin Martin comments that what distinguishes holistic from other forms of education is “its goals, its attention to experiential learning, and the significance that it places on relationships and primary human values within the learning environment.”²⁰¹¹

Robert Thurman discusses holistic education in a speech to the working group of The Center for Contemplative Mind in Society:

We want people to contemplate disidentification, detachment and contentment, to cheer themselves up by becoming less greedy and needy. We want them to contemplate tolerance, patience, nonviolence, and compassion, to unstress themselves by feeling less angry, irritated and paranoid. We want them to develop more wisdom, more freedom, more capacity for responsibility and creativity, by seeing through the constructed realities in which the materialist culture has us enmeshed.²⁰¹²

Robert Thurman argues that in the university:

... what we do is try to liberate critical intellect, emotional stability, aesthetic sensitivity, and moral decency [...]. [However,] people are informed and certified but not properly prepared to exercise the responsibilities humanism imposes on the individual.²⁰¹³

He declares that we need an education that cultivates real wisdom. As an example, Thurman notes that wisdom in the Asian Buddhist tradition has traditionally been cultivated at three levels: learning, critical reflection, and “contemplative penetration”:

²⁰⁰⁹ Miller, Ron. *Holistic Education: An Introduction*, Foundation for Educational Renewal, 1999; accessed January 2006; available from <http://www.pathsoflearning.net/library/holistic-educ-intro.cfm>.

²⁰¹⁰ Sable, David. *Transformational Learning in Higher Education*, Halifax: Atlantic Association of Universities (AAU) Teaching Showcase, Saint Mary's University, 2003.

²⁰¹¹ Martin, Robin Ann. *What Is Holistic Education*, Paths of Learning Education Clearinghouse, 2003; accessed January 2006; available from <http://www.pathsoflearning.org/research/field.cfm>.

²⁰¹² Thurman, Robert A. F. *Meditation and Education: Buddhist India, Tibet and Modern America*, Pocantico, NY, Meeting of the Working Group, The Contemplative Mind in Society, 1994; accessed January 2006; available from <http://www.contemplativemind.org/programs/academic/thurman.pdf>. p. 2.

²⁰¹³ Ibid., accessed., p. 7.

First, one learned the Dharma [the doctrine taught by the Buddha], one moved away from one's inherited deluded mind and into the Buddha mind by engaging with the enlightened speech recorded in the Sutras [Buddhist literature] and their elucidations. Having understood the teachings at the surface level, one then had to pit one's instinctively deluded mind against the new, inferential and relatively delicate understanding of the verbal Dharma, and struggle back and forth, cultivating doubt intensely through critical reflection that seeks to delve below the surface to find the deeper meaning. When this process is pursued with great energy and determination, critical reflection becomes penetrative concentration upon the cultivated, doubt-deepened understanding. This concentration draws energy away from instinctual misknowledge and pours it into the liberating insight of transcending wisdom, until wisdom's realistic understanding becomes intuitive and instinctual. Wisdom becoming intuitive, the self-realizing its selflessness, and the person enjoying liberation all happen at the same time.²⁰¹⁴

In other words, one first applies discipline in order to study the words and surface meanings of a different and wise way of being. Once this basic content is mastered, one then applies critical reflection in order to test experientially what one has learned cognitively, thereby going deeper into the meaning. And finally, one uses contemplative penetration (actually a form of meditation) to penetrate to the heart of the teachings and discover the wisdom deep within oneself. The result is a selfless experience of wisdom that leads to concern for the larger world and compassionate action. Transformative learning, then, leads both to greater self-awareness and to community awareness, as well as to moral action to protect the larger ecosystem.

According to Sable, this process of learning is valid for any discipline, and does not apply just to those that are spiritually oriented. Indeed, transformative learning can enhance reflective awareness in multiple areas of study.²⁰¹⁵ Sable makes the distinction between spirituality and religion through a quote from W. Teasdale's *The Mystic Heart*:

Being religious connotes belonging to and practicing a religious tradition. Being spiritual suggests a personal commitment to a process of inner development that engages us in our totality. Religion, of course, is one way many people are spiritual. Often, when authentic faith embodies an individual's spirituality the religious and spiritual will coincide. Still, not every religious person is spiritual (although they ought to be) and not every spiritual person is religious. Spirituality is a way of life that affects and includes every moment of existence. It is at once a contemplative attitude, a disposition to a life of depth, and the search for ultimate meaning, direction, and belonging. The spiritual person is committed to growth as an essential ongoing life goal. To be spiritual requires us to stand on our own two feet while being nurtured and supported by our tradition, if we are fortunate enough to have one.²⁰¹⁶

²⁰¹⁴ Ibid., accessed., p. 6.

²⁰¹⁵ Sable. *Transformative Learning in Higher Education*.

²⁰¹⁶ Teasdale, W. *The Mystic Heart*, Novato, California: New World Library, 1999. pp. 17–18, cited in Sable. *Transformative Learning in Higher Education*. p. 3.

As Sable argues, experience-based learning is a common element in all types of holistic and transformative learning.²⁰¹⁷ Yet this experience goes farther than learning through doing, in John Dewey's sense of learning through active discovery. It is an experience that leads to new levels of awareness and understanding.

²⁰¹⁷ Sable. *Transformative Learning in Higher Education*.

30.1 Interest in the educational community concerning transformative and holistic learning

Miller notes that there is a great deal of interest in the educational community concerning transformative and holistic learning. However, it is generally approached by individual teachers within classrooms, rather than in a department or institution as a whole.²⁰¹⁸

While few public schools are entirely committed to holistic principles, many teachers try hard to put many of these ideas into practice. By fostering collaboration rather than competition in classrooms, teachers help young people feel connected. By using real-life experiences, current events, the dramatic arts and other lively sources of knowledge in place of textbook information, teachers can kindle the love of learning. By encouraging reflection and questioning rather than passive memorization of 'facts,' teachers keep alive the 'flame of intelligence' that is so much more than abstract problem-solving skill. By accommodating differences and refusing to label children as 'learning disabled' or 'hyperactive,' teachers bring out the unique gifts contained within each child's spirit.²⁰¹⁹

There also are many private schools, mostly rooted in the humanistic-progressive philosophical tradition, that are working with holistic structures. These include Montessori, Waldorf, Partnership, and Reggio Emilia schools, among many others.²⁰²⁰

Naropa University in Boulder, Colorado, has taken a holistic / contemplative approach to higher education since its beginnings in the mid 1970's. According to the University website, its mission is to:

- offer educational programs that cultivate awareness of the present moment through intellectual, artistic, and meditative disciplines
- foster a learning community (composed of students, faculty, staff, trustees, and alumni) that uncovers wisdom and heart
- cultivate openness and communication, sharpen critical intellect, enhance resourcefulness, and develop effective action in all disciplines
- exemplify the principles grounded in Naropa University's Buddhist educational heritage
- encourage the integration of world wisdom traditions with modern culture
- be nonsectarian and open to all²⁰²¹

The Ontario Institute for Studies in Education (OISE) at the University of Toronto offers Holistic Education as a discipline in graduate studies in the Department of Curriculum,

²⁰¹⁸ Miller. *Holistic Education: An Introduction*, accessed.

²⁰¹⁹ Ibid., accessed. p. 1.

²⁰²⁰ Koetzsch, Ronald E. *The Parents' Guide to Alternatives in Education*, Boston: Shambhala Publications, 1997.

²⁰²¹ Naropa University. *Mission Statement*, Website, 2005; accessed January 2006; available from <http://www.naropa.edu/mission.html>.

Teaching and Learning. At OISE, holistic learning is seen

... as an experiential, organic process; making connections is seen as central to curriculum processes. An aesthetic perspective and the process of building knowledge through inquiry are seen as integral to all forms of education and life itself.²⁰²²

In addition, OISE hosts an annual conference on holistic learning. The *Fifth International Conference on Holistic Learning: Breaking New Ground* took place in Toronto, October 28–30, 2005, with the theme of “Journey of the Spirit.” The theme of the 2004 conference was “Nurturing Spirit in a Sustainable World.”²⁰²³ Two of the most renowned educators in holistic education are professors at OISE: John (Jack) P. Miller and Edmund O’Sullivan. John Miller has worked in the field of holistic education for over 30 years and is currently director of the Centre for Teacher Development. In addition, Miller is coordinator of the annual Holistic Learning Conferences. Sullivan is director of The Transformative Learning Centre at OISE.

Sable mentions a survey first presented at a conference at Amherst College, Massachusetts, which was designed to document programs in universities that include transformative and / or spiritual elements of learning.²⁰²⁴ The survey also asked about kinds of teaching methodologies in these programs, and about the evaluation methods used. Entitled *Survey of Transformative and Spiritual Dimensions of Higher Education*, the survey was prepared for the Fetzer Institute by a team of researchers with the Center for Contemplative Mind in Society (CCMS), based in Northampton, Massachusetts.²⁰²⁵ Transformational learning in the study “emphasized reflective learning, the intuitive and imaginative process, and the ethical, spiritual, and / or contemplative dimensions of education.”²⁰²⁶ The survey included a questionnaire that was scored quantitatively, which we have included in Appendix 20, and a series of interviews in which the respondents were asked what connection they saw between transformative and contemplative learning, and the development of love and forgiveness. In answering the survey questions, Tobin Hart of the State University of West Georgia, where the psychology department has committed itself to transformative and spiritual learning, responded:

So many of the wisdom traditions talk about the most important knowing as coming not from the head, but from the heart. Contemplative and transformative practices often engage the heart. And, an approach that seeks wisdom instead of information naturally seeks the living current of love and compassion,

²⁰²² Ontario Institute for Studies in Education (OISE). *Holistic and Aesthetic Education Graduate Studies Website*, Department of Curriculum, Teaching and Learning, OISE/ University of Toronto, accessed January 2006; available from <http://leo.oise.utoronto.ca/~skarsten/holistic/HAE.html>.

²⁰²³ Ontario Institute for Studies in Education (OISE). *Holistic Learning: Breaking New Ground International Conference*, accessed.

²⁰²⁴ Sable. *Transformative Learning in Higher Education*.

²⁰²⁵ Zajonc, Arthur. *Survey of Transformative and Spiritual Dimensions in Higher Education*, Center for Contemplative Mind in Society for the Fetzer Institute, 2003; accessed January 2006; available from http://www.contemplativemind.org/programs/academic/fetzer_report.pdf.

²⁰²⁶ Ibid., accessed.

forgiveness, and inspiration. What this does is actually develop a transformative epistemology. Rather than seeing the world through an ‘I / it’ relationship, it opens to an ‘I / thou’ relationship, as Martin Buber talked about. And this particular way of knowing, called empathy, is arguably the heart of moral development. So love and forgiveness are naturally a consequence of not just what we know, but of how we know.²⁰²⁷

The survey was available online, and, from November 2002 to January 2003, a total of 152 questionnaire responses, mainly from professors, were submitted to the researchers. Respondents from 33 states in the U.S., as well as eight respondents from Canada, one from Malaysia, and one from Botswana, Africa, filled out the questionnaire. Of these responses, 117 reported using transformative and spiritual elements either in their classrooms or throughout their academic programs. Completed surveys from Canada were submitted by educators from the University of British Columbia, St. Mary’s University (Halifax, Nova Scotia), St. Thomas Aquinas Catholic Secondary School (Brampton, Ontario, Canada),²⁰²⁸ and three from the University of Toronto’s Ontario Institute for Studies in Education.²⁰²⁹ The arts and humanities, education, the social sciences, and a small number of professional schools were the main disciplines represented in the survey responses as a whole. Only five respondents among the 152 came from the physical sciences. The researchers also reported:

Thirty percent of the total listed transformational learning as the academic focus of their program. Half (51% percent) indicated that the contemplative and spiritual dimensions of learning were very important, while 91% indicated them to be either important or very important.²⁰³⁰

Robin Martin, from Holistic Education, Inc. / Paths of Learning reports that the limited research that exists concerning holistic education seems to fall into three general categories:

1. research about the past works of others, or what can be called ‘historic and meta research’
2. research that uses predominantly qualitative methods to examine issues in the field on a case by case basis, or particular practices within the field
3. evaluations or non-structured investigations that summarize new programs and their development²⁰³¹

²⁰²⁷ Ibid., accessed., p. 7.

²⁰²⁸ The report by Zajonc stated “St. Thomas Aquinas (Ontario, Canada).” The only school with a similar name in Ontario is St. Thomas Aquinas Catholic Secondary School in Brampton, Ontario.

²⁰²⁹ Although the report states that 8 questionnaires were returned from Canada, we only saw 6 specific Canadian responses listed (and four universities).

²⁰³⁰ Zajonc. *Survey of Transformative and Spiritual Dimensions in Higher Education*, accessed. p. 31.

²⁰³¹ Martin, Robin Ann. *Holistic Education: Research That Is Beginning to Delineate the Field*, American Education Research Association Annual Meeting, 2004; accessed January 2006; available from <http://www.pathsoflearning.com/research/SurveyResults.pdf>.

Martin believes that, theoretically, it should be possible to collect quantitative data concerning holistic education, such as

... the socioeconomic status of parents who enroll their children in holistic schools, the average class size for different types of holistic schools, the number of years in which students stay within holistic schools, an analysis of how time is segmented within holistic classrooms, [and] the statistical correlation between academic success and various holistic elements found within schools.²⁰³²

However, she found no evidence that such quantitative research exists. Martin feels that research on holistic education is scarce for a number of reasons, including that it is marginalized by mainstream education; it is complex; and its “radical stance [...] implicitly questions the social order.”²⁰³³

In 2002, the Paths of Learning Education Clearinghouse collected information from educators and researchers about research they had conducted concerning holistic or transformational learning. The initial survey of the Clearinghouse was funded by the Foundation for Educational Renewal, and the projects reported were proposed, ongoing, or completed. Since that time, Paths of Learning has continued to collect information informally through various networks, and accumulated information is available on the Clearinghouse website.²⁰³⁴ Martin summarizes 15 research projects in a report entitled, “Holistic Education: Research That is Beginning to Delineate the Field.” For each research project, the report notes the:

- Title of Research Project
- Type of Research (i.e., ethnography, discourse analysis, action research, survey, etc.)
- Purpose of Research
- Outcomes / Results
- Relevance (In what way(s) do you consider this to be research about or within Holistic Education?)
- Length of Study (Across what time frame does this project span?)
- Sample Size (e.g., 20 students? 3 teachers? 2 classrooms? 6 authors? 4 schools? 1 program? 100 surveys? If uncertain, please state why.)
- Publications of Work (List any journals or books, if any, where you have published a summary, description, or results of this research project.)
- Supporting and / or Funding Organizations

Martin notes that *what* is being studied may be less important than *why* it is being studied:

If implications can be drawn from such a wide assortment of research that is claimed to be about ‘holistic education,’ it may be that what is being studied is of

²⁰³² Ibid., accessed.

²⁰³³ Martin. *Holistic Education: Research That Is Beginning to Delineate the Field*, accessed.

²⁰³⁴ Ibid., accessed.

less significance in defining it as ‘holistic education’ than why it is being studied and the underlying qualities that point to a type of education that relates with various qualities within human development (such as caring relationships, motivation, psychological wellness, compassion, the integration of learning and development).²⁰³⁵

As well, there are certainly forms of holistic education that do not use that term, but which ascribe fully to its principles. Many Indigenous cultures, for example, are very familiar with the integrative principles of holistic education. Thus, in Canada, the Royal Commission of Aboriginal Peoples has commented that:

... lifelong learning and learning aimed to balance all dimensions of the person are intermeshed. At each stage of life, learning should develop the whole being. Intellectual, spiritual, emotional, and physical learning depends upon the success of development at previous stages.²⁰³⁶

In its final report the commission argues:

As we wrestle with issues in the education of the child, the youth, the adult, and the elder in turn, we will be reminded that the problems encountered by adults today are rooted in education processes in the past. We will see that educational innovation at each stage of the life cycle gives us the opportunity—and indeed the responsibility—to bring about profound and significant changes in the lives of generations to come.²⁰³⁷

²⁰³⁵ Ibid., accessed. p. 25.

²⁰³⁶ Royal Commission on Aboriginal Peoples. *Report of the Royal Commission of Aboriginal Peoples*. 5 vols., Ottawa: Canada Communication Group, 1996. Vol. 3, Chapter 5, Section 2.

²⁰³⁷ Ibid.

30.2 Mindfulness meditation as a holistic learning tool

Mindfulness meditation is beginning to be used as a holistic learning tool in both formal and informal education. The practice of mindfulness meditation, which works with breathing, and was at first associated with Eastern religions and the 1960s counterculture, is now receiving attention and praise from political and medical establishments, primarily as a way to reduce stress and heart disease, but also as a means to slow down and increase awareness.²⁰³⁸ It is also increasingly perceived as a learning tool capable of sharpening perception and expanding understanding.

This again points to the importance of developing indicators of educational attainment that focus at least as much on the method of knowledge transmission as on educational content and credentials. Research on the connection between meditation and medical benefits has been growing since the 1970s, with some analyses pointing to improved learning, alertness, and awareness of body and mind as the mediator between the meditation technique and the positive health outcomes with which it is associated. A cursory search of “meditation” on MEDLINE found 1164 articles, of which approximately 14 articles were published between 1950 and 1969; approximately 230 were published in the 1970s, approximately 470 were published between 1980 and 1999, and approximately 450 were published between 2000 and 2005 alone.

In November 2005, Meditate DC was organized as a week-long event in Washington, D.C. to coincide with a visit to that city by the exiled Tibetan Buddhist leader, the Dalai Lama, who is also the winner of the 1989 Nobel Peace Prize.²⁰³⁹ This was a “high-profile exploration of Eastern meditation’s benefits,” which a *Washington Post* reporter, writing prior to the event, suggested illustrates “how widely accepted meditation has become in the United States.”²⁰⁴⁰

Sponsors for individual events during the week included such institutions as the Washington National Cathedral, Georgetown University Hospital, and Johns Hopkins University School of Medicine. Free meditation sessions were offered at workplaces as diverse as the World Bank and the Humane Society. In addition, the government’s D.C. Council passed a resolution urging “all District residents to learn the practice of meditation.” The *Post* article also noted that: “The ancient Buddhist spiritual practice is now a habit among millions of Americans of almost every faith who say it has helped them achieve physical relaxation, emotional balance and spiritual growth.”²⁰⁴¹

A September 2005 article in the *Los Angeles Times* reports that in the U.S. meditation is slowly being incorporated into schools and programs for children across the country.²⁰⁴²

²⁰³⁸ Murphy, Caryle. "For a Week, D.C. Focuses on Meditation." *Washington Post*, Washington, D.C., Sunday, November 6, 2005, C 1.

²⁰³⁹ Ibid.

²⁰⁴⁰ Ibid.

²⁰⁴¹ Ibid.

²⁰⁴² Conis, Elena. "It's Cool to Be Calm." *Los Angeles Times*, Los Angeles, California, September 5, 2005, Health.

Anecdotal reports of its success have become common, with parents and teachers contending that it can calm kids down, level out their moods and help them focus. Some proponents say it can even manage serious conditions, such as anxiety and attention deficit disorder.²⁰⁴³

One teacher who used meditation and quiet nature walks to deal with a particularly unruly elementary school class said that at the end of the year, “it was like night and day.” A teacher in an inner-city school in New Haven, Connecticut, started an after-school relaxation program to practice mediation, yoga, and related activities with five participants five years ago. The program now has a waiting list for children wanting to join.²⁰⁴⁴

Researchers are only just beginning to look at the effects of mindfulness meditation on children. The nonprofit Inner Kids Foundation in Los Angeles, for example, teaches mindfulness meditation in schools and is working with researchers at the University of California to study the effects of meditation on children’s pain, mood, and attention span. Researchers at the New York State Psychiatric Institute taught mindfulness meditation to 25 9–12 year old children who all were having reading difficulties, and some of whom were considered to have anxiety and attention deficit disorders. Research scientist Randye Semple said that over the course of 12 weeks, the program had “amazing results,” and “the mindfulness practices helped the children to stop making snap judgments. They were also less anxious and depressed and more able to focus—results that ultimately helped improve their reading skills, too.”²⁰⁴⁵ And a professor of psychiatry and biobehavioural sciences at UCLA, Susan Smalley, is beginning a pilot study in the fall of 2005 to examine the effects of mindfulness meditation on fifth-grade students with attention deficit disorder.

Jon Kabat-Zinn, founder and former Executive Director of the Center for Mindfulness in Medicine, Health Care, and Society (CFM) at the University of Massachusetts Medical School, has been working with mindfulness meditation and stress reduction in adults since 1979. According to the CFM website, CFM is “dedicated to furthering the practice and integration of mindfulness in the lives of individuals, institutions, and society through a wide range of clinical, research, education, and outreach initiatives in the public and private sector.”²⁰⁴⁶ The website argues that mindfulness:

... goes far beyond what is commonly thought of as ‘stress reduction’ and may be best described as tapping directly into the dimensions of human experience commonly described with words such as *heart, spirit, soul*, [...] and *dharma*. In this way, [mindfulness meditation] can be thought of as a consciousness discipline: a profound spiritual discipline, aimed at deep self-reflection, self-

²⁰⁴³ Ibid.

²⁰⁴⁴ Ibid.

²⁰⁴⁵ Ibid.

²⁰⁴⁶ Center for Mindfulness in Medicine, Health Care, and Society (CFM). *Website*, University of Massachusetts Medical School, accessed December 2005; available from <http://www.umassmed.edu/cfm/>.

knowledge, and liberation from confining views of self, others, and the world. Our articulation of the meditative principles and practices involved in [meditation] attempts to tap the universal dimensions of such disciplines and their applicability in modern society, and is independent of the ideological and cultural belief systems and religious frameworks out of which these meditative practices emerged, although it honors what is deepest and best in all the meditative traditions and attempts to embody the wisdom and compassion that underlie them.²⁰⁴⁷

The self-reflection, self-knowledge, and consciousness discipline described by Kabat-Zinn are key elements of the learning and educational process. Kabat-Zinn, in his 1993 book entitled *Mindfulness Meditation: Health Benefits of an Ancient Buddhist Practice*, gives a brief description of mindfulness meditation, which he distinguishes from relaxation meditation techniques such as transcendental meditation (TM):

In the practice of mindfulness, you begin by utilizing one-pointed attention to cultivate calmness and stability, but then you move beyond that by introducing a wider scope to the observing, as well as an element of inquiry. When thoughts or feelings come up in your mind, you don't ignore them or suppress them, nor do you analyze or judge their content. Rather, you simply note any thoughts as they occur as best you can and observe them intentionally but non-judgmentally, moment by moment, as the events come in the field of your awareness.

Paradoxically, this inclusive noting of thoughts that come and go in your mind can lead you to feel less caught up in them and give you a deeper perspective on your reaction to everyday stress and pressures [...]. The key to mindfulness is not so much what you choose to focus on but the quality of the awareness that you bring to each moment. It is very important that it be nonjudgmental—more of a silent witnessing, a dispassionate observing, than a running commentary on your inner experience [...].

It is this investigative, discerning observation of whatever comes up in the present moment that is the hallmark of mindfulness and differentiates it most from other forms of meditation. The goal of mindfulness is for you to be more aware, more in touch with life and with whatever is happening in your own body and mind at the time it is happening—that is, in the present moment [...].

One way to envision how mindfulness works is to think of the mind as the surface of a lake or ocean. There are always waves, sometimes big, sometimes small. Many people think the goal of meditation is to stop the waves so that the water will be flat, peaceful, and tranquil—but that is not so. The true spirit of mindfulness practice is illustrated by a poster someone once described to me of a 70-ish yogi, Swami Satchidananda, in full white beard and flowing robes, atop a

²⁰⁴⁷ Ibid., accessed.

surfboard and riding the waves off a Hawaiian beach. The caption read: 'You can't stop the waves, but you can learn to surf.'²⁰⁴⁸

In essence, Kabat-Zinn is describing a process of "knowing." He speaks of inquiry, observation, perspective, investigation, discernment, and awareness—all key elements of one of Delors' four pillars of learning—"learning to know." If mindfulness meditation can help accomplish this key pillar of learning in the way Kabat-Zinn describes, then it is not surprising that the schools that have adopted a form of this method in Los Angeles, New Haven, and elsewhere, have achieved such positive results.

Prior to the Meditate DC conference, the *Washington Post* reported that scientists were ready to "explain the results of clinical trials and research studies suggesting that meditation not only relieves stress but may also produce long-term changes in the workings of the brain."²⁰⁴⁹ One panellist was neuroscientist Richard J. Davidson, who has published findings from his ongoing study in the *Proceedings of the National Academy of Sciences*.²⁰⁵⁰ As reported by the *Washington Post* in January 2005, Davidson and his colleagues at the new \$10 million W.M. Keck Laboratory for Functional Brain Imaging and Behavior at the University of Wisconsin discovered, through working with Tibetan monks who were long-time meditation practitioners, that mental training through meditation can indeed change brain circuitry.²⁰⁵¹

The monks produced "gamma wave activity more powerful than any previously reported in a healthy person" as measured by electroencephalograph (EEG) testing and brain scanning.²⁰⁵² This study adds to the evidence discovered in the past decade that the brain continues to develop and change in adulthood. Prior to this, scientists thought "connections among brain nerve cells were fixed early in life and did not change in adulthood." Davidson noted, "What we found is that the longtime practitioners showed brain activation on a scale we have never seen before." The *Post* article reported:

In previous studies, mental activities such as focus, memory, learning and consciousness were associated with the kind of enhanced neural coordination found in the monks. The intense gamma waves found in the monks have also been associated with knitting together disparate brain circuits, and so are connected to higher mental activity and heightened awareness, as well [...]. 'What we found is that the trained mind, or brain, is physically different from the untrained one,' [Davidson] said. In time, 'we'll be able to better understand the potential

²⁰⁴⁸ Kabat-Zinn, Jon. "Mindfulness Meditation: Health Benefits of an Ancient Buddhist Practice," in *Mind/Body Medicine*, ed. Goleman, D. and J. Gurin. Yonkers, NY: Consumer Reports Books, 1993. cited in Kabat-Zinn, Jon. *Mindfulness Meditation, Success over Stress: Live for Life*, Duke University, 1993; accessed December 2005; available from <http://www.hr.duke.edu/sos/mindfulmed.html>.

²⁰⁴⁹ Murphy. "For a Week, D.C. Focuses on Meditation."

²⁰⁵⁰ Lutz, A., L. L. Greischar, N. B. Rawlings, M. Ricard, and R. J. Davidson. "Long-Term Meditators Self-Induce High-Amplitude Gamma Synchrony During Mental Practice," *Proceedings of the National Academy of Sciences*, vol. 101, 2004: 16369-16373.

²⁰⁵¹ Kaufman, Marc. "Meditation Gives Brain a Charge, Study Finds." *Washington Post*, Washington D.C., Monday, January 3, 2005 A-05.

²⁰⁵² Ibid.

importance of this kind of mental training and increase the likelihood that it will be taken seriously.²⁰⁵³

Harvard and Princeton university researchers presently are testing some of the same monks on different aspects of their meditation practice. A study published in *Stroke: Journal of the American Heart Association* in 2000 found evidence that transcendental meditation reduced heart disease risk factors for atherosclerosis, and lowered both blood pressure and blood-levels of stress-related biochemicals such as adrenaline, compared with an increase in both factors in the control group that changed diet and exercise through health education programs.²⁰⁵⁴ The study also found a small but significant decrease of fatty deposits in arteries, as measured by ultrasound, which translated to an 11 percent decrease in the risk of myocardial infarction and a 7.7 percent to 15 percent decrease in the risk of stroke.²⁰⁵⁵ If meditation can also improve health, then it has significance for the “learning to be” dimension of Delors’ four learning pillars, as well as for the “learning to know” dimension described above.

Researchers from the Harvard Medical School, Massachusetts General Hospital, Massachusetts Institute of Technology (MIT), Yale University, and the Mind / Body Institute published results of a recent study relevant to this issue in the November 2005 issue of *NeuroReport*.²⁰⁵⁶ In studying changes in the brain’s physical structure associated with mindfulness meditation practice, the researchers noted:

These data provide the first structural evidence for experience dependent cortical plasticity associated with meditation practice [...]. Our data indicate that regular practice of meditation is associated with increased thickness in a subset of cortical regions related to somatosensory, auditory, visual and interoceptive processing [...]. Additional studies suggest that relaxation facilitates the learning-based process that underlies such cortical plasticity [...]. The differential thickness between groups in this region is consistent with increased capacity for awareness of internal states by meditators [...]. It has been hypothesized that by becoming increasingly more aware of sensory stimuli during formal practice, the meditation practitioner is gradually able to use this self-awareness to more successfully navigate through potentially stressful encounters that arise throughout the day [...]. Our initial results suggest that meditation may be associated with structural changes in areas of the brain that are important for sensory, cognitive and

²⁰⁵³ Ibid.

²⁰⁵⁴ Castillo-Richmond, Amparo, Robert H. Schneider, Charles N. Alexander, Robert Cook, Hector Myers, Sanford Nidich, Chinelo Haney, Maxwell Rainforth, and John Salerno. "Effects of Stress Reduction on Carotid Atherosclerosis in Hypertensive African Americans," *Stroke: Journal of the American Heart Association*, vol. 31, 2000: 568-573.

²⁰⁵⁵ Ibid.

²⁰⁵⁶ Lazar, Sara W., Catherine E. Kerr, Rachel H. Wasserman, Jeremy R. Gray, Douglas N. Greve, Michael T. Treadway, Mettae McGarvey, Brian T. Quinn, Jeffery A. Dusek, Herbert Benson, Scott L. Rauch, Christopher Moore, and Bruce Fischl. "Meditation Experience Is Associated with Increased Cortical Thickness," *NeuroReport*, vol. 16, no. 17, 2005: 1893-1897.

emotional processing. The data further suggest that meditation may impact age-related declines in cortical structure.²⁰⁵⁷

As the researchers note, this is literally “the first structural evidence” (in Western scientific investigation) of the potential impact of meditation on such sensory, cognitive, and emotional functioning. It is clearly too early to develop indicators in this area, as the appropriate assessment tools have not yet been developed in a way that can be widely administered. However, even this early evidence points to a major potential shift in what is considered important in assessing educational attainment.

In a recent book reporting conversations between the Dalai Lama and scientists, the Dalai Lama is cited as remarking:

There is a saying, ‘The true mark of being learned is humility and mental discipline; the true mark of a meditator is that he has disciplined his mind by freeing it from negative emotions.’ We think along those lines—not in terms of performing some feats or miracles [...]. Through training the mind people can become more calm.”²⁰⁵⁸

A group of scientists that spent five days visiting with the Dalai Lama in 2001 asked him what they believed were five of the most important questions to be considered as we move into the new millennium. The five questions were:

1. How do we address the widening gap between rich and poor?
2. How do we protect the earth?
3. How do we educate our children?
4. How do we help Tibet and other oppressed countries and peoples of the world?
5. How do we bring spirituality (deep caring for one another) through all disciplines of life?

The Dalai Lama answered that all five questions fall under the last one. If we have true compassion in our hearts, our children will be educated wisely, we will care for the earth, and those who “have not” will be cared for.²⁰⁵⁹

All this evidence again points to the vital importance of focussing attention on the *process* of learning and education rather than only on content, results, and credentials, as assessed in the vast majority of standard indicators of educational attainment. Needless to say, it is far more difficult to assess how well the mind is “trained,” in the sense described by Davidson, than to assess literacy, numeracy, and performance on standardized tests. The good news is that Davidson’s studies do point to the possibility of quantifying such “mental training,” “higher mental activity,” and “heightened awareness,” to use Davidson’s words. In light of the importance of these findings for assessments of

²⁰⁵⁷ Ibid., pp. 1893, 1895–97.

²⁰⁵⁸ Goleman, Daniel, ed. *Destructive Emotions: How Can We Overcome Them? A Scientific Dialogue with the Dalai Lama*. New York, Bantam Dell, 2003. p. 26.

²⁰⁵⁹ Ibid.

accomplishment in the “learning to know” dimension, it is the aspiration of the Canadian Index of Wellbeing’s educated populace domain eventually to include measures such as those indicated by Davidson in its indicator suite.

31. Student Satisfaction

Student satisfaction is used by a few conventional indicator programs—notably in Saskatchewan and Atlantic Canada—as an outcome measure of the relevance and quality of education systems.^{2060, 2061} Questions regarding student satisfaction were also asked in the 2001 student questionnaire that accompanied the School Achievement Indicators Program’s (SAIP) Mathematics Assessment.²⁰⁶² However, despite its importance, most indicator programs seldom use this indicator.

In Atlantic Canada, a survey of Grade 8 students was conducted in 1995 to rate the “quality of their school lives,” and “to gather information about the attitudes of students toward their schooling experience.” Students were asked to rate the extent to which they agreed or disagreed with a provided statement. It was not possible to assess any trends in student satisfaction over time in Atlantic Canada, since the responsibility for any follow-up surveys or reporting of that nature was left to each province’s department of education.²⁰⁶³ The following are some of the statements and results of the APEF survey. It is important to note the low 39% figure showing a lack of “excitement” about learning and the also low 61% figure showing “genuine interest” or engagement in learning.

²⁰⁶⁰ Saskatchewan Learning. *Saskatchewan Education Indicators Kindergarten to Grade 12*, Ministry of Education, 2002; accessed March 10 2005; available from http://www.learning.gov.sk.ca/admin/pub_press.shtml.

²⁰⁶¹ Atlantic Provinces Education Foundation. *Education Indicators for Atlantic Canada*, Halifax: Atlantic Provinces Education Foundation, 1996. In 2004, the Atlantic Provinces Education Foundation was renamed the Council of Atlantic Ministers of Education and Training (CAMET).

²⁰⁶² Some of these Canadian data were reported for comparison purposes in the Saskatchewan Education Indicators report (2002), but were referenced as being “unpublished.”

²⁰⁶³ Poirier, Rheal, Secretary, Council of Atlantic Ministers of Education and Training, personal communication with Linda Pannozzo, Telephone conversation, August 14, 2006.

Table 31. Quality of School-Life Survey results for grade 8 students in Atlantic Canada, Atlantic average, 1995–1996

School is a place where:	Atlantic average agree (%)
I like to be	62
I really like to go	42
There is nothing exciting to do	39
I feel good about my work	75
The work I do is important to me	74
I like to learn new things	85
I am genuinely interested in my work	61
I learn to get along with other people	86
I can get along with most of the students even though they may not be my friends	83
I know that people think a lot of me	62
People think I can do a lot of things	68
Teachers treat me fairly in class	77
Teachers help me do my best	78
I feel safe from personal harm	69
Students pick on each other all the time	55

Source: Atlantic Provinces Education Foundation. *Education Indicators for Atlantic Canada*. Halifax: Atlantic Provinces Education Foundation, 1996.

In Saskatchewan, a program of indicators was developed in 2002 for K-12 that included some indicators that tried to measure at least a degree of student satisfaction.²⁰⁶⁴ These included:

- What are Saskatchewan students' attitudes toward school?
- What are Saskatchewan students' attitudes toward selected areas of study?
- Is there a relationship between students' attitudes and their academic performance?

Almost all Saskatchewan students reported that they like to learn new things—93% of 13-years olds and 96% of 16-year olds. About 75% of students reported feeling good about school and their school work, although only half the students indicated they were genuinely interested in their school work. About 60 % said they enjoyed school. These general attitudes about school and school work were very similar in Saskatchewan and Canada.²⁰⁶⁵

²⁰⁶⁴ Saskatchewan Learning. *Saskatchewan Education Indicators Kindergarten to Grade 12*, accessed.

²⁰⁶⁵ Ibid., accessed. p. 65. Canadian data were from the Council of Ministers of Education, Canada. (2001). 2001 School Achievement Indicators Program: Mathematics Assessment Student Questionnaire Unpublished Data.

There are also some indicators in the Saskatchewan system that relate to the public's satisfaction with the education system:

- What is the public's perception of elementary and secondary education in Saskatchewan?
- What is the public's perception of how the quality of the education system compares to the past and to the rest of Canada?

In 2002, 88 % of people felt that elementary education is adequate or better, and 85% believed secondary education is adequate or better. Of those with decided opinion, 59% thought elementary education is excellent or good, and 55% thought secondary education is excellent or good. These percentages represent a slight increase since 1997.²⁰⁶⁶

When people were asked to compare the quality of current students' education to their own, 55% said that it is better and about 25% said it was worse.²⁰⁶⁷

²⁰⁶⁶ Ibid., accessed. p. 127.

²⁰⁶⁷ Ibid., accessed. p. 128.

32. Student Achievement

32.1 Student achievement measured by standardized tests

Most conventional indicator programs include student achievement as either a key “output” or a key “outcome” indicator of performance. (See earlier discussion on the distinction between output and outcome indicators.) On international, national and provincial levels, achievement is typically measured using standardized testing in the areas of mathematics, reading, and science, mostly for the purpose of cross-national or cross-provincial comparisons. In essence, educational achievement measurement has become synonymous with examinations.

Below is a summary of the international and national tests administered to elementary and secondary school students in Canada, some of which have been covered earlier in this review.^{2068, 2069}

1. PIRLS: Progress in International Reading Literacy Study
Administered to 9 and 10-year-olds by the International Association for the Evaluation of Educational Achievement. Canadian participants are Statistics Canada and CMEC. The PIRLS test assesses reading and comprehension for literary and informal reading. Thirty-five countries participate in the study, allowing extensive cross-national comparisons.
(<http://www.timss.bc.edu/pirls2001.html>)
2. PISA: Programme for International Student Assessment
Administered to 15-year-olds in mathematics, reading and science. Sponsored by the OECD, and launched in 2000. Canadian participants include HRDC, CMEC, and Provincial Ministries and Departments of Labour and Education. Test aims to assess literacy in math, reading, and science. Test takes place every three years and focuses on one subject, but includes all three subject areas. In addition to the test, students and principals answer a survey about themselves. “PISA aims to assess to what degree students approaching the end of their compulsory education have acquired some of the knowledge and skills that are essential for full participation in society.”²⁰⁷⁰ Forty-one countries participated in the assessment in 2003.
(<http://www.pisa.oecd.org/index.htm>)

²⁰⁶⁸ Moll, Marita. *Passing the Test. The False Promise of Standardized Testing*, Ottawa: Canadian Centre for Policy Alternatives, 2004. pp. 20–32.

²⁰⁶⁹ In Nova Scotia, the various international and national assessments are coordinated by an assessment program through the Nova Scotia Department of Education called PLANS—Program of Learning Assessment for Nova Scotia.

²⁰⁷⁰ Government of Canada. *Programme for International Student Assessment (PISA)*, accessed.

3. TIMSS: Third International Mathematics and Science Study
TIMSS was first administered in 1995 to a sample of students in third, fourth, seventh, and eighth grades, as well as the last year of secondary school. Statistics Canada chose a representative sample of Canadian schools for the purposes of this assessment. In total approximately 50 countries and 500,000 students participated. A second round of tests was administered in 1999 to Grade 8 students, and a third round in 2003 to Grade 8 students. Future rounds are intended to provide follow-up data on those students who participated in the first round in 1995. Sponsored by the International Agency for the Evaluation of Educational Achievement. Canadian participants are Statistics Canada and CMEC.
(<http://timss.bc.edu/>)
4. PCAP: Pan-Canadian Assessment Program
Proposed to replace SAIP (below) in 2007.
This program is still in the development stages, but testing will assess reading and writing, math, and science, and other subjects can be added as the need arises. It is sponsored by CMEC and will replace the SAIP, which started in 1993. According to the CMEC, “the beauty of PCAP is that it enables us to assess the performance of our educational systems here in Canada but also dovetails with the important international assessments we are doing through OECD. By integrating existing testing programs, PCAP greatly eases the testing burden on schools.”²⁰⁷¹
(<http://www.cmec.ca/releases/2003-04-02.en.asp>)
5. SAIP: Student Achievement Indicators Program
Developed by the Council of Ministers of Education (CMEC) in 1993.
Administered to 13 and 16-year-olds in subjects of math, reading, writing and science. SAIP assessments compare achievement results across provinces to “determine whether students across Canada reach similar levels of performance at about the same age.” SAIP also tried to answer the following: “How well are our schools preparing students for a global economy and for lifelong learning?”²⁰⁷²
Sponsored and funded by CMEC and HRDC. To be replaced by the Pan-Canadian Assessment Program (PCAP) in 2007.
(<http://www.cmec.ca/saip/indexe.stm>)
6. Province-wide examinations and assessments
These vary depending on the province, and were last comprehensively surveyed by the Canadian Education Association in a 1994 publication titled *Standardized Testing in Canada: A Survey of Standardized Achievement Testing by Ministries of Education and School Boards*.²⁰⁷³

²⁰⁷¹ Council of Ministers of Education Canada (CMEC). *Press Release: Improved Learning Focus of New Pan-Canadian Assessment Program*, April 2, 2003; accessed January 6 2006; available from <http://www.cmec.ca/releases/2003-04-02.en.asp>.

²⁰⁷² Council of Ministers of Education Canada (CMEC). *The School Achievement Indicators Program (SAIP)*, 2005; accessed May 4 2005; available from <http://www.cmec.ca/saip/indexe.stm>.

²⁰⁷³ For more information on provincial examinations and assessments please refer to Traub, Ross. *Standardized Testing in Canada: A Survey of Standardized Achievement Testing by Ministries of Education*

Canada's performance in these various assessments is not a key subject of this literature review, although some summary results are reported in the accompanying indicator report. There is a great deal of data available regarding where Canadian students have ranked, by subject, by age, by gender, and by province, and these can be obtained relatively easily from Statistics Canada, CMEC, or from any of the websites provided above. However, for the purposes of the CIW, what is significant to explore in this section of the literature review is the question of how meaningful these data are in terms of measuring student achievement and of assessing how educated the Canadian populace is. Do the results of these standardized tests tell us what they purport to tell? For example, do they effectively measure student learning and competence, and even more ambitiously, as in the PISA claim, the degree to which students "have acquired some of the knowledge and skills that are essential for full participation in society."²⁰⁷⁴ Or, do they actually measure something else?

The use of performance indicators in the field of education was largely a product of the late 1970s and early 1980s. Around that time, publicly funded institutions were increasingly being scrutinized, particularly in Britain and in the U.S. Like many other institutions funded by the public purse, educational institutions were being asked to justify and account for their use of resources in terms of effective outputs and outcomes. This led to the development of performance indicators designed largely to assess productivity "relative to the public investment made in it," as opposed to "an evaluation of educational outcomes relative to instructional processes."²⁰⁷⁵ According to one analysis, education was seen as serving economic imperatives, meeting the needs of the changing workplace, and helping countries compete in a global economy.²⁰⁷⁶ Student assessment programs were therefore designed in large part as a reaction to these "external calls for accountability" rather than as an attempt to "appraise the student as an entire educated human being."²⁰⁷⁷

Seen against this backdrop, standardized tests—as the primary and sometimes sole measure of student achievement—have become an instrument of accountability based at least in part on criteria related to economic productivity. There are numerous problems associated with this. For one, such standardized testing often changes the behaviour of teachers. "In high-stakes testing environments, educational practitioners are likely to distort their behaviour in order to meet the demands of the indicator, usually to the

and School Boards, Toronto: Canadian Education Association, 1994. Also Moll. *Passing the Test. The False Promise of Standardized Testing*.

²⁰⁷⁴ Government of Canada. *Programme for International Student Assessment (PISA)*, accessed.

²⁰⁷⁵ Gaither, Gerald H., ed. *Assessing Performance in an Age of Accountability: Case Studies*. San Francisco, Jossey-Bass, 1995.

²⁰⁷⁶ Rowe, Kenneth J. *Assessment, Performance Indicators, 'League Tables', 'Value-Added' Measures and School Effectiveness? Consider the Issues and 'Let's Get Real'!*, Melbourne: Centre for Applied Educational Research, University of Melbourne, 1999.

²⁰⁷⁷ Sims, Serbrenia J. *Student Outcomes Assessment. A Historical Review and Guide to Program Development*, New York: Greenwood Press, 1992.

detriment of their real job.”²⁰⁷⁸ Thus, a teacher who genuinely wants to encourage students to open their minds in new and creative ways may be discouraged from doing so if this activity is not the subject of standardized testing, and if such activity is seen as being undertaken at the expense of drill in the reading, writing, and math exercises that will be tested.

Assessment also affects students.

In today’s schools, assessment is a main influence on how pupils learn and how teachers teach. Whether assessment is in the form of examinations and tests, or marks and grades for coursework, its influence is pervasive. Often it distorts the process of learning through teaching to the test, cramming, short-term memorizing, anxiety and stress—to the extent that learning to cope with assessment has become almost as important as the genuine learning, which such assessments are supposed to measure. For many young people, assessment dominates education.²⁰⁷⁹

The use of standardized tests as an instrument of accountability is also problematic because they are often used to either “document the need for change,” or are seen as “critical agents of reform” whether or not such reform supports the development of knowledge and wisdom as described in this literature review.²⁰⁸⁰ In these cases, test results are used as a measure of educational quality. “One of the uses of educational assessment results that has long appealed to policymakers seeking educational reform is the demonstration of shortcomings in education.”²⁰⁸¹ Linn documents several U.S. examples where test scores from standardized tests have been manipulated or misused to support the need for sometimes questionable reform.²⁰⁸²

The possibly obvious point is that considerable caution is needed in using achievement test results to draw inferences about the quality of education. Despite the pitfalls, however, policymakers attempting to provide support for current practice, as well as those trying to undermine it, continue to rely heavily on test results to make their case.²⁰⁸³

In Canada, examples of this use of standardized test scores also exist. In 1996, in Ontario, grade 3 students were required, for the first time, to take a ten-day test put together by the Education Quality Accountability Office. Students were not allowed to ask clarifying questions, and the test content was based on curriculum some of the students hadn’t yet covered. In fact, some of the content was suitable for students in grade 6 or 9. In any case, the provincial government used the test results to justify what critics called a heavy-

²⁰⁷⁸ Rowe. *Assessment, Performance Indicators, 'League Tables', 'Value-Added' Measures and School Effectiveness? Consider the Issues and 'Let's Get Real'!*

²⁰⁷⁹ Ibid.

²⁰⁸⁰ Linn, Robert L. "Educational Assessment: Expanded Expectations and Challenges," *Educational Evaluation and Policy Analysis*, vol. 15, no. 1, 1993: 1-16. p. 1.

²⁰⁸¹ Ibid.

²⁰⁸² Ibid.

²⁰⁸³ Ibid.

handed approach to the province's teachers, and to introduce the controversial new education act, Bill 160. However, in addition to the problems with the testing cited above, the numbers the government reported were further skewed downward, creating a misleading picture of the actual test results. In other words, the government reported that the students did poorly and that the educational system was to blame, when in fact, most students did very well.²⁰⁸⁴

In another example, PISA results in 2003 showed Nova Scotia and the rest of Atlantic Canada performing worse than the rest of Canada. Alberta had the highest scores in the country. According to a professor at Acadia University's School of Education, this had more to do with Alberta's "rigid regime of high-stakes assessments," than it had to do with Nova Scotia's poor performance.²⁰⁸⁵ Mike Corbett explains that Alberta graduates significantly fewer of its students. Based on 2003 data provided by CMEC, Alberta's graduation rate was approximately 10% below that of Nova Scotia. The difference between Nova Scotia's PISA scores and those of Alberta was just under 10%. According to Corbett:

By having a more exclusive high school system Alberta adjusts underperforming students out of the school door and into the workforce. As it happens, Alberta has an economy that can absorb a considerable amount of educational underachievement. Here in Nova Scotia, we do not have that luxury.²⁰⁸⁶

In short, the results may have more to do with structural differences in the economies of different provinces than with actual educational performance.

In the same PISA assessments, Ontario also did very well. However, Corbett notes that 47% of the Ontario schools selected by the PISA project declined to participate in the assessment. It is unclear why those schools refused to participate and the degree to which this selective participation affected the test outcomes. Participation rates in other Canadian provinces ranged from 93% to 100%. For instance, nearly 100% of Atlantic Canadian schools participated. At the international level, 42% of schools selected in the U.S. did not participate. In the U.K. the non-compliance rate was 33%. Corbett notes that the high non-compliance rate in the U.K. meant that the U.K. PISA results were not considered by the OECD to be comparable to other results. For reasons that are not explained, the non-compliance rate in the U.S., which was higher than that of the U.K., did not result in the same non-comparability. According to Corbett, these questions were not addressed in the PISA report. Corbett suggests that Ontario, the U.S., and the U.K. may have manipulated the sample of schools by removing the poor performing schools so as to improve their overall scores.²⁰⁸⁷

²⁰⁸⁴ Griffin, Brit. "Making the Grade. The Politics of the Grade 3 Test." *High Grader Magazine*, January/February, 1998, 20-23.

²⁰⁸⁵ Corbett, Mike. *The Learning Tower of PISA*, Canadian Centre for Policy Alternatives, Nova Scotia Office, 2004; accessed January 4 2006; available from <http://www.policyalternatives.ca/index.cfm?act=news&do=Article&call=995&pA=AE5DAA5F&type=2>.

²⁰⁸⁶ Ibid., accessed.

²⁰⁸⁷ Ibid., accessed.

In 2000, the OECD released a book on the PISA 2000 results titled *School Factors Related to Quality and Equity*. It argued:

The results show that the school students attend is strongly predictive of their performance. Furthermore, the socio-economic composition of schools explains far more of the differences in student performance between schools than do other school factors that are more easily amenable to policy makers, such as school resources and school policies. There is some evidence of an inequitable distribution of inputs—that schools with a more advantaged intake often have better educational resources. A positive school climate, in particular a strong disciplinary climate, is associated with better student performance and is a factor over which policy makers and schools have considerable control.²⁰⁸⁸

Corbett argues the PISA test scores tell us more about the impact of school funding and family incomes on educational attainment than about educational quality and student achievement.

I expect the provinces with the lowest incomes, the highest percentage of adults who have not completed high school, and the lowest levels of school funding (Nova Scotia is at the bottom in Canada) [to be at the bottom of the statistical heap]. This is indeed the way it works out. And who should we expect at the top? We find what we should expect to find: the provinces with the highest average and family incomes, the lowest percentage of adults who have no postsecondary education, and the provinces that invest the most in education. Once again we are treated to no surprises in the PISA results.²⁰⁸⁹

In its book *Passing the Test: The False Promises of Standardized Testing*, the Canadian Centre for Policy Alternatives lists a number of variables, which help to explain the link between socio-economic status and student achievement, as measured by test scores:

- Parents in higher socio-economic groups spend more time with students and are more supportive of school achievement.
- School personnel may reinforce the high aspirations of parents in high socio-economic groups.
- Neighbours and members of peer groups may also reinforce parental attitudes.
- The value system of children from families with high socio-economic status and their communities may stress education as relevant and important, while children from families with low socio-economic status may be exposed to the opposite set of values, especially when high unemployment rates limit opportunities.²⁰⁹⁰

Perhaps the most common form of abuse of test score statistics occurs when the original purpose of the test is disregarded. According to the CCPA critique:

²⁰⁸⁸ Organisation for Economic Co-operation and Development (OECD). *School Factors Related to Quality and Equity. Results from PISA 2000*, Paris: OECD, 2005.

²⁰⁸⁹ Corbett. *The Learning Tower of PISA*, accessed.

²⁰⁹⁰ Moll. *Passing the Test. The False Promise of Standardized Testing*.

Tests were never designed as an instrument for a precise analysis of the merits of a school program: a test given once a year (or in some instances every few years) is hardly an accurate way to evaluate learning. The prevailing use of standardized tests creates a false impression that test performance can be used to rank students, schools, and boards even though sampled learning may correlate poorly with the curriculum.²⁰⁹¹

Test results have also been used to compare the performances of schools. According to Rowe, several studies have shown that “there are serious and inherent limitations to the usefulness of [examination results] in providing reliable judgements about educational institutions.”²⁰⁹² These limitations include:

- It is not possible to provide simple summaries that capture all of the important features of schools.
- By the time test results from a particular school are analyzed, often several years have passed, so that their usefulness for future students and their families making judgements about the school itself are dubious.
- Even if contributing factors—students’ background characteristics and prior achievement—are taken into account, the resulting estimates have too much uncertainty attached to them to produce reliable rankings.

The use of standardized tests to measure student competence has long been the focus of intense debate among those in the educational field and in the public arena. Many argue that standardized tests “fail to measure meaningful forms of human competence.” According to Rowe, “the majority of such tests assess skills in terms of generalized academic abilities and enduring cognitive traits rather than specific learning outcomes arising from classroom instruction.”²⁰⁹³ In other words, instead of measuring a student’s actual ability to read and comprehend, the test measures technical reading skills. In math, they measure whether a student can perform a mathematical procedure, not whether the student understands the underlying mathematical concepts.

Perhaps surprisingly, questions that appear in standardized tests may not have been covered in the student’s classroom instruction. Critics argue that if tests are to measure what students have learned or achieved, then they should be based on what they have had the opportunity to learn. Many critics see this “decoupling” as a major weakness of standardized testing systems. In addition, Linn notes that if it is to be argued that such tests motivate students to learn and do well in school, then “examinations’ content must be closely tied to the curriculum frameworks that are used to teach students.”²⁰⁹⁴

²⁰⁹¹ Ibid.

²⁰⁹² Rowe. *Assessment, Performance Indicators, 'League Tables', 'Value-Added' Measures and School Effectiveness? Consider the Issues and 'Let's Get Real'!*

²⁰⁹³ Ibid.

²⁰⁹⁴ Linn. "Educational Assessment: Expanded Expectations and Challenges."

For example, in 2004, the Nova Scotia Department of Education administered a province-wide math exam to Grade 12 students. When the results were tallied, 63% of the students who took the exam failed. By comparison, only 37% of those who took the school math course failed the course. In the Halifax Regional School Board, 82% of students passed the math course, but only 41%—exactly half—passed the exam. As a result, teachers were blamed for “not teaching the curriculum” and students were blamed “for taking a course that’s too hard for them,”²⁰⁹⁵ though neither conclusion was justified by the results.

Fairness must also be considered when judging whether a particular assessment or the interpretation of its results is appropriate, particularly when test results are used for sorting or ranking students. According to Linn:

It would be a serious mistake to assume that performance-based assessments are somehow immune to problems of bias or adverse impact. Because there are large between-group differences in educational opportunity, there are also likely to be differences in results on performance-based assessments, at least in the short run [...]. [T]he real issue of bias [...] is differential access to opportunities to learn [...]. The resulting disparate impact on minority students will not only undermine the system but also demonstrate a failure to achieve the goal of providing better education for all students.²⁰⁹⁶

The CCPA critique refers to studies that have shown that “children from disadvantaged backgrounds, special needs students, and children for whom linguistic factors are an issue are likely to fare poorly on standardized tests.”²⁰⁹⁷

The Pan-Canadian Education Indicators Program (PCEIP) acknowledges that there are “achievement gaps between various sub-groups of students” but suggests that these can be eliminated at the same time that schools are aiming for high achievement levels in standardized tests.²⁰⁹⁸ However, based on the literature, it is not at all clear whether this is possible, since standardized testing has been shown to reflect and even reinforce inequities. Instead, the evidence indicates that a reduction in socio-economic inequities may be a prerequisite to reducing gaps in standardized test results. In light of this evidence and the critiques noted above, it is inappropriate to put too much credence in standardized test results without considering and addressing the underlying equity issues that may play a significant role in explaining and determining the results.

In addition to the considerations above, critics have also pointed out that the areas in which student achievement is measured are too narrow. In the report “Educating Canadians for the New Economy,” LeBlanc concludes that “we can only evaluate the

²⁰⁹⁵ Nicoll, Cathy. “Stats: Students Passed Courses yet Failed Provincial Math Exam.” *The Daily News*, Halifax, June 1, 2004, Local news 3. p. 3.

²⁰⁹⁶ Linn. “Educational Assessment: Expanded Expectations and Challenges.”

²⁰⁹⁷ Moll. *Passing the Test. The False Promise of Standardized Testing*.

²⁰⁹⁸ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, accessed.

performance of the education systems intelligently and usefully when we are willing to state its specific goals and some means of measuring them as outcomes.”²⁰⁹⁹ He points out, however, that when some outcomes are more difficult to measure than others, “the latter may end up being the only ones tested, thus assuming disproportionate importance and distorting the system.”²¹⁰⁰

For example, in Canada, the Council of Ministers of Education implemented the School Achievement Indicators Program (SAIP), which is thought of as a comprehensive indicator program. However, as it is currently configured, SAIP only assesses the performance of 13- and 16-year olds in the areas of mathematics, science, and reading and writing.²¹⁰¹

As has been previously noted, both in the context of education indicators specifically and in the need for a Canadian Index of Wellbeing altogether, the problem with measuring achievement in only a few academic subject areas, as in focussing exclusively on economic performance indicators to assess societal progress, is that we begin to value only what is measured. In the case of SAIP, for instance, mathematics, reading, writing, and science have assumed greater general importance than music, art, history, and foreign languages.

This is not to say there is no merit in achievement testing. However, the critiques noted here indicate that existing results tell only a limited and possibly partial story, and that there must be more rigorous guidelines in place to ensure the accuracy and quality of the data. In order to move in this direction, Rowe suggests a set of principles that could be used to govern the publication or communication of student achievement results.²¹⁰²

In spite of these problems, accountability pressures on governments are not likely to abate in the foreseeable future; nor is the demand for published educational performance indicators based on students’ test and examination results obtained from large-scale monitoring programs likely to diminish. Given this ‘reality,’ it is very much in the interests of those wishing to publish such information to consider carefully the need to provide proper guidelines for their publication, if for no other reason than to minimise the risk of widespread public distrust in the face of manifestly poor and misleading information, and to avoid a possible wholesale rejection of all information about schools and schooling—both good and bad.²¹⁰³

Rowe suggests a set of basic principles developed by Goldstein and Myers, which provides a *code of ethics* for performance indicators. According to Goldstein and Myers,

²⁰⁹⁹ LeBlanc, J. Clarence. *Educating Canadians for the New Economy*, Moncton: Canadian Institute for Research and Regional Development. University of Moncton, 1994.

²¹⁰⁰ Ibid.

²¹⁰¹ Council of Ministers of Education Canada (CMEC). *The School Achievement Indicators Program (SAIP)*, accessed.

²¹⁰² Rowe. *Assessment, Performance Indicators, 'League Tables', 'Value-Added' Measures and School Effectiveness? Consider the Issues and 'Let's Get Real'!*

²¹⁰³ Ibid.

all users of performance indicator information (i.e., parents, students, policy makers) have a shared interest in its accuracy and quality and that these two factors “motivate two basic principles:”

1. The principle of unwarranted harm. The fundamental guiding principle is that the publication or communication of the performance indicator information should cause no unwarranted harm to those who are identified. The term unwarranted is used since there will clearly be legitimate circumstances when it is in the public interest for genuinely poor performance to be made known. The principle is that innocents be protected from misleading insinuations: for example, implying that a ranking of schools by test or examination scores is also a ranking of educational quality or merit.
2. The principle of the right to information. Given that the information available is believed to be accurate and relevant, it should be made public, but modified by the first principle where necessary.²¹⁰⁴

In addition to these two principles, Goldstein and Myers also provide the following points, which are intended to provide practical guidance in applying the principles to performance indicator information:²¹⁰⁵

- **Contextualization:** Indicators should provide information that allow for fair comparisons. Indicators that are strongly affected by extrinsic / contextual factors (such as student intake characteristics) should not be used unless adjustments have been made for those characteristics. For example, school rankings based solely on raw examination or test results should not be published. All adjustments for contextual factors should be described carefully and displayed prominently.
- **Presentation of uncertainty:** All performance indicators should be accompanied by estimates of statistical uncertainty. These should reflect sampling variability, and where possible, the uncertainty due to choice of measurement, statistical techniques used, and so on. The presentation of uncertainty intervals shall be as prominent as those for the indicator values themselves
- **Multiple indicators:** Where possible, multiple indicators relevant to each institution should be presented, rather than a single or summary one. This should be done to avoid undue concentration on any one aspect of performance.
- **Institutional response:** Any institution for which there is a set of published indicators shall have the right to question the accuracy of information about it. Compilers of indicators shall be obliged to make data available in a format which allows for re-analysis of those data by a responsible and competent third party, subject to appropriate confidentiality constraints and guided by principle 1.
- **Agency responsibilities:** Agencies responsible for providing public performance indicators shall assume a responsibility for disseminating accurate and informative material about the underlying procedures used for compilation. They

²¹⁰⁴ Goldstein and Myers cited by Ibid. Original reference: Goldstein, H. and Myers, K. 1996. Freedom of Information: Towards a code of ethics for performance indicators. University of London Institute of Education.

²¹⁰⁵ Guiding principles provided by Goldstein and Myers taken directly from Ibid.

should make relevant technical information accessible, including details of the sampling and statistical methods of analysis used. There is also a responsibility for secondary providers, such as the media, to inform the public of the strengths and limitations of the indicators.

- **Enforcement:** If necessary, the appointment of an educational ombudsperson could provide a means of appropriate redress for aggrieved persons and / or institutions (schools).

32.2 Class size

The debate over what size class is most beneficial for students has raged for decades, and the issue is often taken as a key indicator of and proxy for effective schooling. According to the CCL:

Parents seeking the best conditions for their children are typically ardent supporters of small class sizes. So, too, are teachers for whom class sizes are a workload issue and a factor affecting student learning. School principals are less sanguine. The reaction from school board officials, trustees, and policy-makers conscious of the costs of reducing class sizes ranges from skeptical to hostile. The debate has raged for more than a half century and has provoked bitter divisions between proponents and opponents.²¹⁰⁶

In a broad examination of research into class size, educational researchers Bruce Biddle and David Berliner concluded that:²¹⁰⁷

- When it is planned thoughtfully and funded adequately, long-term exposure to small classes in the early grades generates substantial advantages for students in American schools, and those extra gains are greater the longer students are exposed to those classes.
- Extra gains from small classes in the early grades are larger when class size is reduced to less than 20 students.
- Extra gains from small classes in the early grades are found for various academic topics and for both traditional measures of student achievement and other indicators of student success.
- Extra gains from small classes in the early grades are retained when students are returned to standard-size classrooms, and these gains are still present in the upper grades and the middle and high school years.
- Although extra gains from small classes in the early grades appear for all types of students (and seem to apply equally to boys and girls), they are greater for students who have traditionally been educationally disadvantaged.
- [Initial results indicate that] the greater gains associated with small classes in the early grades for students who have traditionally been educationally disadvantaged are also carried forward into the upper grades and beyond.
- Evidence for the possible advantages of small classes in the upper grades and high school is so far inconclusive.²¹⁰⁸

John Ralston Saul points out that most class size statistics are “gerrymandered” in that the calculation for student-teacher ratio often includes teachers and / or administrators who never enter the classroom (principals, vice-principals, counsellors, etc.): “Official

²¹⁰⁶ Canadian Council on Learning. *Lessons in Learning: The Class Size Debate*, Ottawa, CCL, 2005; accessed February 2006; available from <http://www.ccl-cca.ca/CCL/Reports/LessonsInLearning/LiL-14sep2005.htm>.

²¹⁰⁷ Biddle and Berliner’s work was cited in Ibid., accessed.

²¹⁰⁸ Ibid.

statistics talk of 25 or 30 students per class, when parents—this is citizens—know that their children are in classes of thirty-five.”²¹⁰⁹ Saul’s observation is most important, as the class size indicator is very often phrased in terms of student–teacher ratios, when in fact the latter is not really an indicator of actual class size at all. Though the two are often taken as synonymous and interchangeable, they are actually separate indicators.

According to the 2003 report of the Pan-Canadian Indicators Program (PCEIP), the average pupil-educator ratio in public schools in Canada rose from 16 students per educator at the beginning of the 1990s to 17 in 1996–1997. In 1999–2000, it was 16.3.²¹¹⁰ As noted, however, average pupil-educator ratio is not synonymous with average class size. Average class size is greater than the pupil-educator ratio because the latter includes all educators, as Saul points out above, not just classroom teachers. In Saskatchewan, for instance, student–educator ratio and average class size are both reported by the Ministry of Education. In 2001–2002, the average student-educator ratio was 15.9 while the average class size for the same year was 21.^{2111, 2112}

²¹⁰⁹ Saul, John Ralston. *In Defence of Public Education*, Speech given to the Canadian Teachers' Federation, Whitehorse, Yukon, 2001; accessed October 13 2005; available from <http://www.gg.ca/media/doc.asp?lang=e&DocID=1366>.

²¹¹⁰ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, accessed. p. 65.

²¹¹¹ Saskatchewan Learning. *Saskatchewan Education Indicators Kindergarten to Grade 12*, accessed.

²¹¹² For more information on the subject of class sizes and useful related links to research in the field please refer to the CCL document: Canadian Council on Learning. *Lessons in Learning: The Class Size Debate*, accessed.

32.3 Graduation rates and high-school leaver rates

According to the Pan-Canadian Education Indicator Program (PCEIP), high school graduation rates have historically been used as a basic indicator of educational outcomes: “The trend in these rates over time is seen as an indicator of access to education and, more indirectly, as a measure of achievement.”²¹¹³

As previously noted, the broader perspective of the Canadian Index of Wellbeing requires that we go well beyond conventional output indicators like graduation rates and high-school drop out rates, which tell us almost nothing about the quality of education and very little about real educational attainment, let alone whether Canadians, as a society, are becoming wiser or more knowledgeable.

Nevertheless, because such output measures are so widely used to assess performance, some basic data regarding these indicators are presented here: According to the PCEIP, the Canadian graduation rate in 2000 was 78%, just above the OECD average but well below graduation rates in Japan, Germany, and France. Between 1995 and 2000, graduation rates across Canada increased. The PCEIP report attributes these increases to “improved performance of school systems.” However, it is not clear how the PCEIP came to this conclusion, since its report notes that it does not examine the factors that contribute to the change in graduation rate.²¹¹⁴

From the CIW perspective, the PCEIP conclusion is even more questionable, as the “performance” criteria take no account of what is taught or how. The “improved performance” includes no assessment, for example, of whether more important and relevant materials are being taught, such as those recommended by the United Nations Decade of Education for Sustainable Development, or whether subject matter is being taught in a way that more effectively nurtures students’ critical and analytical capacities. However, the PCEIP conclusion, unsupported by any substantive evidence, is indicative of the degree to which graduation rates have come to be associated, almost intuitively and unquestioningly, with educational performance.

Indeed, this lack of analytical specificity is indicative of the caution required in assessing the relevance of graduation rates. If we do not know why graduation rates are increasing or decreasing, then how do we know what this indicator is supposed to indicate? For example, the PCEIP report does point out that graduation rates are also influenced by labour market conditions: “A strong labour market with plentiful job opportunities may attract youth prior to high school completion. In a weak labour market, youth may be more inclined to complete secondary school as they anticipate difficulties in finding a job.”²¹¹⁵ In other words, if the graduation rate can fluctuate depending on labour market

²¹¹³ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, Ottawa, CMEC and Statistics Canada, Catalogue no. 81-582-XIE, 2003; accessed January 2006; available from <http://www.statcan.ca/english/freepub/81-582-XIE/2003001/pdf/81-582-XIE03001.pdf> p. 99.

²¹¹⁴ Ibid., accessed.

²¹¹⁵ Ibid., accessed.

conditions, then a rise in the graduation rate could indicate a lack of work opportunities for youth, rather than the better performance of school systems.²¹¹⁶

In terms of high school leavers (also referred to as high school dropouts), the rate dropped in the 1990s from 18% of 20-year olds in 1991 to 12% in 1999. According to more recent data provided by Statistics Canada, the dropout rate has declined further to 9.8% in 2004–2005.²¹¹⁷ Again, the PCEIP report attributes the decrease to “progress by school systems.”²¹¹⁸ However, it is again not clear how the PCEIP came to this conclusion, and the nature, type, and quality of this apparent “progress” is again not described or specified. Based on the PCEIP’s own analysis of the relevance of labour market conditions, for example, it would seem quite plausible that youth opted to stay in school due to a lack of work opportunities.

David Livingstone has also provided strong empirical evidence of a gradual but very marked ratcheting up of credential requirements without a corresponding increase in actual skills required on the job. Jobs that once required only a high school education now require applicants to have a college degree, and jobs that did not require high school graduation now do.²¹¹⁹ According to this evidence, staying in school longer may simply reflect changed labour market requirements—and possibly even a corrosion in the value attached to graduation—rather than “progress” or improved school performance.

The PCEIP report also summarized the findings of the 2002 Youth in Transition Survey (YITS).²¹²⁰

- 32% of high school leavers, compared with 16% of graduates, lived with one parent.
- 57% of high school graduates had at least one parent who had completed some type of postsecondary education, compared with 28% of high school leavers.
- The proportion of leavers with parents who had not completed high school was three times that of graduates (27% versus 9%).
- 32% of leavers, compared to 16% of graduates, lived with one parent.
- 48% of school leavers reported a ‘B’ grade average or better in their last year of school; 35% reported a ‘C’; 18% reported a ‘D’ or under. This indicates that poor student performance is by no means the only reason for dropping out of high school, but there is no exploration of alternative causes including dissatisfaction with the school system and school system failures.
- High school leavers are less involved in school assignments and school activities than graduates: 48% of leavers reported completing their homework most or all of

²¹¹⁶ Ibid., accessed.

²¹¹⁷ Statistics Canada. "Trends in Dropout Rates among Provinces." *The Daily*, December 16, 2005, accessed January 2006; available from <http://www.statcan.ca/Daily/English/051216/d051216c.htm>.

²¹¹⁸ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, accessed.

²¹¹⁹ Livingstone, David W. *The Education-Jobs Gap: Underemployment or Economic Democracy*, (2nd Ed.), Toronto: Garamond Press, 2004.

²¹²⁰ The PCEIP cites the data source as *At a Crossroads: First Results for the 18- to 20-year old Cohort of the Youth in Transition Survey, 2002*. Human Resources Development Canada. Ottawa.

- the time, compared to 80% of graduates; leavers spend less time on homework; leavers participate less in school-based extracurricular activities.
- Six out of ten students worked for pay in their last year of school. Those who worked the most hours (more than 30 hours/week) were most likely to leave school without graduating and those who worked between 1–19 hours/week were least likely to leave school.
 - 28% of female leavers between 18–20 years old had dependent children. The rate was much lower for female graduates (3%), male leavers (5%), and male graduates (1%).²¹²¹

Again, these statistics raise more questions than they answer, and cast further doubt on the PCEIP's attribution of higher graduation rates and declining drop-out rates to improved school performance. The YITS statistics do indicate a clear link between the competing demands of paid work and school, but further exploration is required to understand deeper links to socio-economic status and demographic shifts. Trends in poverty (particularly child poverty), economic insecurity (including the erosion of the social safety net in the 1990s as documented in the CIW Living Standards report), labour market conditions, family size, teenage pregnancy, and other factors may be driving graduation and drop-out rates rather than school performance.

Capacity to complete or spend time on homework, for example, is more likely to be a dependent variable related to paid work, income, or family demands than an assessment of student capability. As well, the increased application of user fees to extra-curricular activities as a result of budget cuts may exclude students from lower-income families and contribute to many students' need to work long hours for pay while studying—factors which may contribute to the correlation between drop-out rates and lower rates of participation in extra-curricular activities. In sum, the YITS results must be carefully examined within a larger socio-economic, socio-demographic, fiscal, and policy context before trends in drop-out rates and the correlations observed above can be meaningfully interpreted.

²¹²¹ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, accessed.

33. University Research and Development Indicators

In the following section we will provide a summary of the main conventional indicators currently in use that relate to university research. In some cases these indicators also provide information on privately funded research. There are currently no mainstream indicators in use that relate to corporate funding of public elementary or secondary education. The key indicators of university research currently in use in Canada, and their respective sources, are as follows:

1. The 2003 report of the Pan-Canadian Education Indicators Program (PCEIP), a joint venture of Statistics Canada and the Council of Ministers of Education, Canada.

Increasingly, policy makers, academic institutions, and the public are interested in the outputs of university R&D activities and their economic and social impacts. Because methods for accurately conceptualizing and capturing the impact of R&D are still being developed, the output section of this indicator is limited to describing some of the outputs of university R&D, namely intellectual property that can be further developed into products and processes with public and commercial applicability.²¹²²

The PCEIP Research and Development indicators cover the following areas:

- Context
- R&D as a sector and within universities
- R&D contributed by universities
- Sources of funds for university R&D
- R&D contributed by universities by field of study
- Outputs of university R&D: patents, commercialization, spin-offs
- Federal funding for R&D in community colleges and related institution

2. Research Infosource: Top 50 Research Universities annual report.

In 2005, McMaster University was classified as Research University of the Year, because it ranked first in a list of research universities in *Research Infosource's* annual Top 50 Research Universities report.²¹²³ Based on both input and output data from Statistics Canada, the report looked at factors such as:

- Total sponsored research income

²¹²² Ibid., accessed.

²¹²³ Bugailiskis, John. "McMaster: Research University of the Year," *McMaster Times*, no. Winter, 2005; accessed December 2005; available from <http://www.mcmaster.ca/ua/opr/times/winter05/ruoty.htm>.

- Faculty and graduate student research intensity (e.g., research income per full-time faculty position)
- The number of publications in 5,000 of the world's leading natural, life / health, and social sciences journals

3. Statistics Canada: Summary of Meeting on Commercialization Measurement, Indicators, Gaps and Frameworks, Ottawa.²¹²⁴

In 1999, Statistics Canada's Science, Innovation and Electronic Information Division established the Science and Innovation Information Program to "develop useful indicators of science and technology activity in Canada." As it relates to the higher education sector, the indicators of this activity fall into two key categories, as follows:

- Indicators of the commercialization of intellectual property: number of licenses, number of patents, number of spin-offs, revenues and sources of funding
- Research and Development indicators: expenditures, number of researchers, and sources of research funds

4. Atlantic Canada Opportunities Agency and Industry Canada: University Research Activity, Private Sector Collaboration, and the Commercialization of Research in an Academic Environment.²¹²⁵

This study used Memorial University in Newfoundland as a case study to examine, through the use of a survey, the factors that influence the ability of researchers to conduct research, to access research funding, and to collaborate with the private sector and commercialize their research. The report did not specifically provide indicators, but several were implied by the survey questions and results, including:

- Sources of external research funding
- Number of private-sector collaborations
- Commercialization of university research (i.e., patents, spin-offs)
- Research output and the number of publications (i.e., books, articles, contract reports, etc.)

5. OECD Indicators: Education at a Glance²¹²⁶

The OECD's education indicators include:

²¹²⁴ Earl, Louise, Fred Gault, and Michael Bordt. *Summary: Meeting on Commercialization Measurement, Indicators, Gaps and Frameworks*, Catalogue no. 88F0006X1E7, Ottawa: Science, Innovation and Electronic Information Division, Statistics Canada, 2004.

²¹²⁵ Locke, Wade, Scott Lynch, and Barbara Girard. *University Research Activity, Private Sector Collaboration and the Commercialization of Research in an Academic Environment: Memorial University of Newfoundland as a Case Study*, Ottawa: Atlantic Canada Opportunities Agency and Industry Canada, 2002.

²¹²⁶ Organisation for Economic Co-operation and Development (OECD). *Education at a Glance. OECD Indicators*, 2004, Paris: OECD, 2004.

- Expenditures on research and development in post-secondary and tertiary levels as percentage of GDP

6. *Maclean's* 2006 Guide to Canadian Universities: University Rankings²¹²⁷

On an annual basis, *Maclean's* magazine releases the results of a survey which tries to measure the performance of universities in Canada based on 22–24 indicators, depending on what type of university is being assessed (i.e., primarily undergraduate, comprehensive, or medical-doctoral universities). There is no specific category for university research in the *Maclean's* indicators, but there is a measure of the university's success at “winning national awards and peer-adjudicated grants” from federal granting agencies. Relevant indicators used by *Maclean's* to rank Canadian universities are:

- Faculty with Ph.D.s
- Faculty awards
- Average size and number of SSHRC grants
- Average size and number of NSERC grants
- Average size and number of CIHR grants

There has been some vigorous criticism of the *Maclean's* ranking system because it is largely about the measurement of inputs, with little if any mention of outcomes. According to the Canadian Policy Research Networks (CPRN), while there is nothing “wrong” with parents and students choosing a university based on its wealth or the amount of resources available per student (inputs), “it is quite wrong from an empirical point of view to conclude that institutions with more resources are necessarily better.”²¹²⁸

The CPRN report, further described below, notes that the *Maclean's* rankings make little mention of outcomes:

There is neither a real linking of inputs to learning outcomes or final outcomes nor anything in the way of a proper statistical exercise which attempts to identify the parameters which would be of most interest to us; including, perhaps most importantly, the true quality of education offered at different institutions.²¹²⁹

²¹²⁷ Keller, Tony, ed. *Maclean's 2006 Guide to Canadian Universities*. Toronto, Rogers Publishing Ltd., (Maclean's magazine), 2006.

²¹²⁸ Finnie, Ross, and Alex Usher. *Measuring the Quality of Post-Secondary Education: Concepts, Current Practices and a Strategic Plan*, Canadian Policy Research Networks, 2005; accessed January 2005; available from http://www.cprn.com/documents/35998_en.pdf. p. 9.

²¹²⁹ Ibid., accessed. p. 27.

7. Government of Canada: Department of Finance Working Paper: “Methods of Evaluating University Research around the World,”²¹³⁰

This 2005 working paper looks at the growing trend worldwide to evaluate the quantity and quality of university research output. The following indicators are referenced:

- Number of highly cited papers
- Highly cited papers as a percentage of total number scientific publications (used as a proxy of the importance of research)
- Percentage of researchers in the workplace
- Expenditure on higher education R&D as a percentage of GDP
- Commercialization: patents and license revenue

8. Canadian Policy Research Networks: “Measuring the Quality of Post-Secondary Education: Concepts, Current Practices and a Strategic Plan.”²¹³¹

This CPRN report addresses the issue of how to measure “quality” in post-secondary education. Using the basic input-processes-output model, the report came up with a conceptual framework for measuring quality which includes beginning characteristics of learners; learning inputs, which include financial inputs, material inputs, and how these inputs are organized; learning outputs, which represent skills including critical thinking, technical knowledge, and ability to work with others; and final outcomes, which include employment rates and incomes, as well as job satisfaction and lifelong learning.

The specific measurement of university research quality does not fall within the scope of the CPRN study. The report authors do, however, conduct a literature review on the subject, and find that there are five sets of indicators that are used most frequently:

- Public research dollars received, which could be expressed as dollars per faculty member or dollars per student
- Private research dollars received, which can be expressed as raw dollars or dollars per faculty member, or as a percentage of public research dollars
- Publications, based on bibliometric analysis²¹³²

²¹³⁰ Iorwerth, Aled ab. *Methods of Evaluating University Research around the World*, Ottawa: Government of Canada. Economic Studies and Policy Analysis Division, Department of Finance, 2005.

²¹³¹ Finnie, and Usher. *Measuring the Quality of Post-Secondary Education: Concepts, Current Practices and a Strategic Plan*, accessed. pp. 39–40.

²¹³² Finnie and Usher point out that there are numerous problems associated with the use of bibliometrics to measure research quality: 1. Bibliometric measures have certain inherent biases towards the sciences: for example, the sciences have certain “gold standard” publications that the social sciences lack, while the social sciences and humanities have “spawned a profusion of journals that are of highly uneven quality.” 2. Book-writing is more common among social scientists than among scientists, but the contribution of these longer monographs is missed in bibliometric measurements. 3. Non-English speakers are at a competitive

- Faculty awards: the number of prominent awards received by faculty
- Technology transfer: numbers of patent applications or patent awards, number of inventions, number of spin-offs, and revenues from royalties, licenses, and spin-offs.

disadvantage when bibliometrics are used, because the language of most journals, particularly in the field of science, is English.

33.1 Indicators of the knowledge economy

Although there are many models and no internationally agreed consensus for measuring the knowledge economy, there are common elements among the frameworks. At least four main elements generally form the basis of indicators for knowledge production and use:

- Information and communications technology (ICT)
- Research and Development (R&D)
- Media and communications
- Information services²¹³³

However, as Canadian researchers from the Canadian Science and Innovation Indicators Consortium (CSIIC) point out, most of the efforts toward indicator development in this sphere are concerned with economic impact and include little information on social impact.²¹³⁴ Indicators mostly reflect economic growth, productivity, profits, job creation, and market share. As well, the indicators focus on the processes of making new things in new ways rather than on the outcomes of innovation.

The CSIIC has used the following definition for innovation:

Innovation refers to the complex set of social and economic processes that produce knowledge and convert it into wealth and other forms of social value [...]. Innovation is about learning to do things in new or different or better ways.²¹³⁵

The CSIIC describes the importance of innovation to society mainly in terms of the rapid creation and obsolescence of knowledge:

Although every human society has had some innovative capability, constant innovation based on science and technology is relatively new in human experience. In the first place, the rate of global knowledge production is so rapid that knowledge obsolesces quickly. Most scientific knowledge has a half-life of less than five years. Most technological knowledge in areas of rapid technological change has a half-life of less than three years. Detailed market knowledge that is enabled by IT-based interactivity has a half-life of days or hours.²¹³⁶

²¹³³ Quah, D. "A Weightless Economy," *UNESCO Courier*, vol. December, 1998: 18-21. UNESCO *Courier*, December (1998); Machlup, F. *The Production and Distribution of Knowledge in the U.S.*, Princeton, N.J.: Princeton University Press, 1962.

²¹³⁴ Godin, Benoît, and Christian Doré. *Measuring the Impacts of Science: Beyond the Economic Dimension*, Montreal, Canadian Science and Innovation Indicators Consortium (CSIIC), 2003; accessed April 2005; available from http://www.csiic.ca/PDF/Godin_Dore_Impacts.pdf.

²¹³⁵ Locke, Wade, Charles Davis, Ron Freedman, Benoît Godin, and Adam Holbrook. *Indicators for Benchmarking Innovation in Atlantic Canada*, Montreal, Prepared for Industry Canada and Atlantic Canada Opportunities Agency, Canadian Science and Innovation Indicators Consortium, 2004; accessed April 2005; available from http://www.csiic.ca/PDF/Industry_Canada_Atlantic_Indicators.pdf p. 1.

²¹³⁶ Ibid., accessed.

Godin and Doré argue that what are needed are “measures of the impact of science on human lives and health, on organizational capacities of firms, institutional and group behaviour, [and] on the environment”:

[M]uch remains to be done to extend the range of indicators to real social dimensions [...]. Systematic measurements and indicators on impact on the social, cultural, political, and organizational dimensions are almost totally absent from the literature.²¹³⁷

The following list of indicators from the Technical Research Centre in Finland is generally used to measure knowledge societies. It incorporates social and environmental impacts:

- Basic education and schooling such as literacy in reading, math, and science.
- General skills and knowledge including adult literacy rates and participation in lifelong learning.
- Investment in R&D including both public and private expenditures.
- Science and technology capabilities such as numbers of researchers, employment in medium and high-tech enterprises, participation of women in science and technology enterprises.
- Applications of information and communication technologies (ICT) such as e-commerce.
- Science and technology productivity including numbers of patents and labour productivity.
- Entrepreneurship such as business startups and volume of early venture capital investment.
- Innovative procedures such as share of public R&D funding going to small and medium-sized enterprises and numbers of such enterprises innovating in-house or involved in innovative co-operation with others.
- Innovative networks such as openness to international trade and co-operation in international R&D activities.
- Societal values including life expectancy, gender equity, and expenditures on social protection.
- Environmental responsibility including climate change and private sector responsiveness to environmental factors.
- Environmental systems such as quality of air and water, and biodiversity.²¹³⁸

²¹³⁷ Godin, and Doré. *Measuring the Impacts of Science: Beyond the Economic Dimension*, accessed.

²¹³⁸ Technical Research Center of Finland. "Measuring Knowledge Societies," *Futurist*, vol. 38, no. 3, 2004: 10.

33.2 OECD Indicators

The OECD contends that the innovation indicators currently in use such as R&D expenditures, patents, publications, citation counts, and the number of graduates do not describe the dynamics of knowledge development and acquisition or knowledge distribution between key institutions. Foray notes:

A system of innovation cannot only be assessed by comparing some absolute input measures such as R&D expenditures, with output indicators, such as patents or high-tech products. Instead innovation systems must be assessed by reference to some measures of the use of that knowledge.²¹³⁹

The OECD publishes a scorecard every two years.²¹⁴⁰ In 2003, the latest edition, 66 indicators are grouped under four dimensions: creation and diffusion of knowledge, information economy, global integration of economic activity, and economic structure and productivity. This indicator set can be found in Appendix 7.

²¹³⁹ David, P., and D. Foray. "Assessing and Expanding the Science and Technology Knowledge Base," *STI Review*, vol. 16, 1995.

²¹⁴⁰ Organisation for Economic Co-operation and Development (OECD). *OECD Science, Technology and Industry Scoreboard 2003*, OECD, 2003; accessed April 2005; available from http://www.oecd.org/document/8/0,2340,en_2825_497105_23654472_1_1_1_1,00.html.

33.3 Canadian indicators

The OECD, the OECD's Working Party on Indicators for the Information Society (WPIIS), as well as Statistics Canada, collects a large amount of data relevant to this domain, including statistics on innovation and R&D, biotechnology and nanotechnology, human resources in science and technology, patents, and other areas such as technology- and knowledge-intensive industries.²¹⁴¹ In fact, Canada collects data for over 100 different indicators to assess science and technology alone.²¹⁴²

Also on the provincial level, British Columbia, Alberta, Ontario, Quebec, and Atlantic Canada all have scoreboards of S&T indicators.²¹⁴³ Each province uses a different system. The Atlantic Provinces, for example, use 40 indicators following the OECD framework, but include somewhat different indicators.²¹⁴⁴ Generally, data are focused on inputs such as financial investments in R&D and human resources in R&D (researchers), Gross Domestic Expenditures on Research and Development (GERD), and GERD as a percentage of the GDP.²¹⁴⁵ Typical R&D indicators for Canada including those for education and knowledge are located in Appendix 9.

²¹⁴¹ Organisation for Economic Co-operation and Development (OECD). *Science and Technology Statistical Compendium 2004*, OECD, 2004; accessed April 2005; available from http://www.oecd.org/document/8/0,2340,en_2825_497105_23654472_1_1_1_1,00.html.

²¹⁴² Godin, Benoît. *Canadian Scoreboards on S&T and Its Further Developments*, Montreal, QU, Canadian Science and Innovation Indicators Consortium (CSIIC), 2004; accessed March 2005; available from <http://www.csiic.ca/Scoreboard.html>.

²¹⁴³ Ibid., accessed.

²¹⁴⁴ Locke, Davis, Freedman, Godin, and Holbrook. *Indicators for Benchmarking Innovation in Atlantic Canada*, accessed.

²¹⁴⁵ Godin. *Canadian Scoreboards on S&T and Its Further Developments*, accessed.

34. Access and Barriers to Education

Caught between a rapid increase in tuition fees, dwindling government support and stagnant growth in incomes, tens of thousands of qualified Canadians from modest- and middle-income families are in danger of being denied access to a university or college education. Without immediate action, the resulting loss in human talent and potential will have serious consequences for the country's future social and economic development.

Canadian Association of University Teachers²¹⁴⁶

The past decade has been a period of tremendous change for postsecondary institutions in Canada. Tuition fees have risen steeply, as have non-educational costs of attending college or university [...]. Having a postsecondary system that is accessible to Canadians has been an important policy goal as governments have recognized the value of having a highly educated, skilled workforce.

Statistics Canada²¹⁴⁷

Enrolment in universities and colleges is at record levels. In 2002–2003, more than one-third of all 18 to 21 year olds in Canada were attending a college or university. Much of the growth in postsecondary enrolment is due to the growing participation of women. Female students accounted for 75% of the growth in full-time university enrolment during the 1980s and 1990s, increasing their share of the entire university population from 45% to 55%.²¹⁴⁸

However, simply counting the total numbers who are participating in postsecondary education is not an adequate indicator of access. It is also essential to look at the particular barriers that still prohibit some Canadians from attending postsecondary institutions in the first place. While progress has clearly been made in dismantling gender barriers, as indicated by the trends noted above, financial barriers, due in large part to rising tuition fees and student debt levels, are increasingly responsible for keeping those from less privileged economic backgrounds out of postsecondary educational institutions.

In 2000, about 270,000 students graduated from public college and university programs in Canada. Half of these graduates had completed bachelor degrees, 37% received college

²¹⁴⁶ Canadian Association of University Teachers (CAUT). "Access Denied. The Affordability of Postsecondary Education in Canada, 1857-2002," *Education Review*, vol. 4, no. 1, 2004: 1-8, accessed June 2005; available from <http://www.caut.ca/en/publications/educationreview/educationreview2004-2001.pdf>, p. 1.

²¹⁴⁷ Statistics Canada. *Paying for Higher Education*, Statistics Canada, Catalogue no. 81-004-X1E, 2004; accessed January 28 2005; available from <http://www.statcan.ca/english/freepub/81-004-X1E/200409/peps.htm>.

²¹⁴⁸ Junor, Sean, and Alex Usher. "The Price of Knowledge," *Policy Options*, no. December 2004-January 2005; accessed August 2006; available from <http://www.irpp.org/indexe.htm>. Junor and Usher do not provide the corresponding years for these percentages.

diplomas and 12% received graduate degrees (Master and Doctorate). At the time of graduation in 2000, nearly half of all college and bachelor graduates in Canada were in debt to government student loan programs. On average, university graduates who had only government debt owed nearly \$20,000. However, the 11% of university graduates who owed money to both government and non-government sources had an average combined debt of \$32,000. The average combined debt of college graduates with student loans in 2000 was \$20,000.²¹⁴⁹

According to Statistics Canada, while the percentage of graduates with government debt did not change much in the 1990s, the amount owing has. The university graduating class of 2000 owed about 30% more than the class of 1995, and 76% more than the class of 1990 (in 2000 constant dollars). College graduates with student loans owed 21% more than their counterparts in 1995 and 76% more than in 1990.²¹⁵⁰

One-quarter of all borrowers reported having difficulty repaying their debt, while one in five borrowers paid off their debt within two years. According to Statistics Canada, graduates who managed to do so had higher incomes upon graduation and smaller debts to begin with than those graduates who still owed money.²¹⁵¹

The increase in student debt throughout the 1990s is mirrored by the simultaneous rise in tuition fees. Between 1990–1991 and 2005–2006, average undergraduate tuition fees in Canada more than doubled from \$2,000 to \$4,214 (\$2005 dollars).²¹⁵² Since 1990/91, tuition fees have increased at an annual average rate of 7.3%, with particularly large annual increases in 1990/91 and 1991/92 of 15.2% and 16.5% respectively. Since 2000, the annual increases have slowed to an average annual increase of 4.1%.²¹⁵³

In some provinces, the rise in tuition fees exceeded the Canadian average. For instance, average undergraduate tuition at Nova Scotia universities jumped dramatically between 1990/91 and 2005/06 from \$2,654 to \$6,281 (\$2005 dollars), so that the highest fees in the country are in Nova Scotia.

Tuition in professional graduate programs has increased sharply between 2000/01 and 2005/06. In particular, fees in law, medicine and dentistry have jumped by 67.4%, 59.4%, and 53.6% respectively. In dentistry and medicine, average tuition fees in 2005/06 were \$12,942 and \$10,349 respectively.²¹⁵⁴

²¹⁴⁹ Statistics Canada. *Class of 2000: How Are They Faring Two Years Later?*, Statistics Canada, 2004; accessed August 2006; available from <http://www.statcan.ca/english/freepub/81-004-XIE/200406/ngs.htm>. These figures exclude graduates who have pursued Masters or Doctorate degrees.

²¹⁵⁰ Ibid., accessed.

²¹⁵¹ Ibid., accessed.

²¹⁵² Statistics Canada. "University Tuition Fees, 2005-2006." *The Daily*, September 1, 2005, accessed October 4, 2005; available from <http://www.statcan.ca/Daily/English/050901/d050901a.htm>. Tuition fees have been converted to \$2005 constant dollars for comparison purposes.

²¹⁵³ Ibid.

²¹⁵⁴ Ibid.

According to a Statistics Canada study that looked at access to professional programs amid the deregulation of tuition fees between 1995 and 2002, the large increases in tuition were associated with “substantial changes in the likelihood that students from different socio-economic backgrounds would enroll in medicine, law or dentistry programs.”²¹⁵⁵ The study found evidence that enrolment among Ontario university students from the most highly educated parents rose considerably in these programs following the rise in fees.²¹⁵⁶ Prior to the increase in fees, 2.4% of university graduates from well-educated families (with graduate or professional degrees) pursued a professional degree in one of these three fields, compared to 5.2% after the fee increase. Interestingly, the study also showed increased enrolment among students from less educated parents—likely a result of increased student aid. Their likelihood of enrolment in these professional graduate programs increased from 0.5% of university graduates from less well-educated families to 1.2% between 1995 and 2002. The study found a decline in enrolment among students from middle-educated parents (those with a postsecondary degree below graduate level) from 2% to 1%, likely due to the inability to pay the higher fee, coupled with the inability to qualify for a student loan.²¹⁵⁷

In 1996, an Advisory Panel on Future Directions for Postsecondary Education recommended to the Ontario Ministry of Education “to correct the current serious inadequacies in total financial resources available to postsecondary education.”²¹⁵⁸ The panel concluded that reductions in government grants to colleges and universities in Ontario had resulted in long-term declines in real expenditures per student and that the resulting increases in tuition fees threatened access.

[P]ublic financial support for postsecondary education in Ontario is seriously inadequate—indeed it has become so low that the sector’s competitive position in North America is dangerously at risk. Much time, effort, and resources have been devoted to building the structure of colleges and universities that Ontario needs. It would be extraordinarily short-sighted to let it crumble now.²¹⁵⁹

According to the 2003 Report of the Pan-Canadian Indicators Program, in almost all provinces, postsecondary graduates took longer to pay off their debts in 1995 than in 1990.²¹⁶⁰

²¹⁵⁵ Large increases in tuition fees for professional programs is largely due to trends in Ontario, where fees in professional programs were deregulated in 1998.

²¹⁵⁶ Statistics Canada. "Access to Professional Programs Amid the Deregulation of Tuition Fees." *The Daily*, September 27, 2005, accessed September 2005; available from <http://www.statcan.ca/Daily/English/050927/d050927a.htm>.

²¹⁵⁷ Ibid.

²¹⁵⁸ Advisory Panel on Future Directions for Postsecondary Education. *Excellence, Accessibility, Responsibility. Report of the Advisory Panel on Future Directions for Postsecondary Education*, Ontario Ministry of Education, 1996; accessed July 5 2005; available from <http://www.edu.gov.on.ca/eng/document/reports/futuree.html>.

²¹⁵⁹ Ibid., accessed.

²¹⁶⁰ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program*, 2003, accessed. pp. 45–47.

Rising student debt levels among the postsecondary graduates, together with a significant gap in participation between people from low- versus middle-to-high income backgrounds raise concerns about access to postsecondary education, especially at the university level.²¹⁶¹

Statistics Canada studies have found that the proportion of youth who enroll in postsecondary education is correlated with family earnings. In 2001, young people from high-income families were more than twice as likely to attend university than those from low-income families. 46% of youth between 18 and 24 from families with annual incomes of \$100,000 or more had completed or were enrolled in university, compared with 20% of youth from families with incomes below \$25,000. According to Statistics Canada, this “participation gap” remained constant over the 1990s.²¹⁶² In other words, even with the sharp increases in tuition fees and student debt, the gap in university participation rates between youths from high-income families and those from modest or low-income families did not increase from 1993 to 2001.

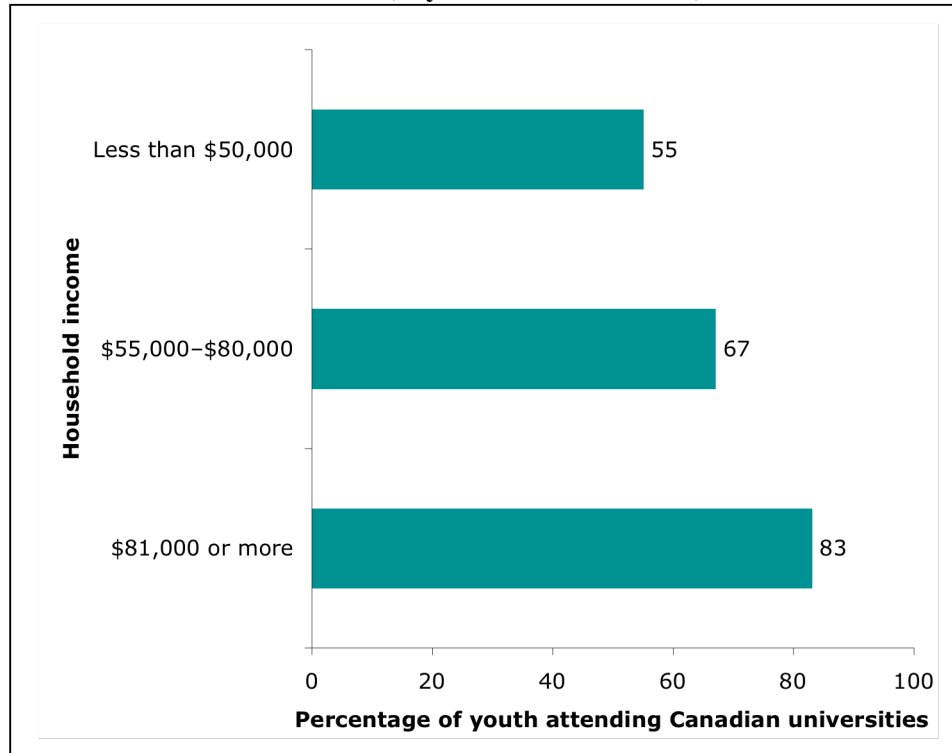
As of March 2002, about 83% of youth (aged 18 to 24 years) whose estimated family earnings exceeded \$80,000 had undertaken some postsecondary education. Two-thirds (67%) of youth with family earnings between \$55,000 and \$80,000 had enrolled in postsecondary education, and 55% of youth participated when family earnings were less than \$55,000 (See Figure 16 below).²¹⁶³

²¹⁶¹ Ibid., accessed. p. 45.

²¹⁶² Statistics Canada. "Participation in Post-Secondary Education, 1993-2001." *The Daily*, February 16, 2005, accessed February 2005; available from <http://www.statcan.ca/Daily/English/050216/d050216b.htm>.

²¹⁶³ Statistics Canada. "Postsecondary Education Participation Survey." *The Daily*, September 10, 2003, accessed December 2004; available from <http://www.statcan.ca/Daily/English/030910/d030910b.htm>.

Figure 16: The “participation gap”: percentage of Canadians aged 18–24 who attend Canadian universities, by household income, 2002



Source: Statistics Canada. "Postsecondary Education Participation Survey." *The Daily*, September 10, 2003; accessed December 2004; available from <http://www.statcan.ca/Daily/English/030910/d030910b.htm>.

In a more recent Statistics Canada study that looked at data from the Survey of Labour Income and Dynamics, a variety of family background factors were found to influence whether youth participate in postsecondary education. The study found that:

- Youth whose parents had a postsecondary education were more likely to attend a postsecondary institution, particularly university.
- Youth in the lowest family income quartile are less likely to participate in postsecondary education than those who are better off.
- Youth from two-parent families are more likely to attend a postsecondary institution than youth from single-parent families.²¹⁶⁴

In 2004, the Canadian Association of University Teachers (CAUT) explored the issue of access and the long-term historical trends in university tuition and incidental fees between 1857 and 2002. Among its main findings:

²¹⁶⁴ Rahman, Atiq, Jerry Situ, and Vicki Jimmo. *Participation in Postsecondary Education: Evidence from the Survey of Labour and Income Dynamics*, Catalogue no. 81-595-MIE36, Statistics Canada, 2005.

- In the entire period since 1857, the most rapid and consistent rise in tuition fees during a century and a half took place in the 1990s.
- Tuition and incidental fees (adjusted for inflation) at a typical university in Canada are now at the highest recorded historical levels—more than six times what they were in 1914 in real dollars.
- It takes more hours of work to pay for today's tuition fees than at any point in the post-war period—and more than double that required in 1920.
- By almost every measure, university education is less affordable for middle-income households today than at any other time in the past sixty years.²¹⁶⁵

CAUT concluded that tuition hikes coupled with slow wage growth have left low- and middle-income Canadian households “struggling to finance the cost of higher education.” It warns that “universities are in danger of returning to their elitist roots as costs continue to spiral out of control.”²¹⁶⁶

While there seems to be little disagreement in the literature regarding the existence of a participation gap based on socio-economic status, there is some difference of opinion as to why the gap exists. Not everyone agrees that income is the sole culprit.

As noted earlier, a 2005 Statistics Canada study based on data collected between 1993 and 2001, reported that university participation was also “strongly related” to parents’ education. The study found that in 2001, only 17% of youth whose parents had a high school education or less attended university while one-half of youth whose parents had a university degree attended university themselves. According to Statistics Canada: “The gap in participation rates between youth with highly-educated parents versus low-educated parents remained constant between 1993 and 2001.” Interestingly, the study also found that when both parental education and parental income were taken into account, participation was more strongly associated with parental education than with parental income.²¹⁶⁷

In addition to parental education, Statistics Canada reports there are a “wide variety” of factors which influence participation in university and college: earnings, expectations and education of parents; savings set aside by youth for education; and high school marks. Essentially, participation rates in university increase as parental income, expectations, and education increase. Students with better marks in high school were also more likely to attend than those whose grades were lower. If students have savings set aside for university they are also more likely to attend. However, Statistics Canada found that “no one factor fully accounted for who went on and who did not.”^{2168, 2169}

²¹⁶⁵ Canadian Association of University Teachers (CAUT). “Access Denied. The Affordability of Postsecondary Education in Canada, 1857-2002.” p. 1.

²¹⁶⁶ Ibid.

²¹⁶⁷ Drolet, Marie. *Participation in Post-Secondary Education in Canada: Has the Role of Parental Income and Education Changed over the 1990s?*, Catalogue no. 11F0019MIE243, Ottawa: Statistics Canada, 2005.

²¹⁶⁸ Statistics Canada. “Postsecondary Education Participation Survey.”

²¹⁶⁹ Statistics Canada. *Paying for Higher Education*, accessed.

The Canadian Association of University Teachers agrees there are many inter-related factors that affect participation in postsecondary education; however, in a 2004 report, the CAUT argued that financial ability is “ultimately the largest and most difficult barrier to overcome.”²¹⁷⁰ This view is supported more strongly by U.S. data than by Canadian data. According to a recent report by the U.S. Department of Education's Advisory Committee on Student Assistance:

There is no evidence that [the educational attainment of parents] has an effect on college enrolment independent of family income and financial aid for college qualified high school students. In fact, if financial aid is adequate, low-income high school graduates will enrol in a four-year college at extremely high rates, regardless of parents' education.^{2171, 2172}

The U.S. Advisory Committee found that in 2002 nearly one half of all college-qualified, low- and moderate-income high school graduates in the United States were unable to attend a four-year college due to record-high financial barriers.

Over this decade, 4.4 million of these high school graduates will not attend four-year colleges and two million will attend no college at all. For these students the promise of a college education is an empty one. For the nation, the loss of human capital will exact a serious economic and social toll for much of this century.²¹⁷³

A 2005 Statistics Canada study that compared post-secondary access in Canada with the U.S. concluded:

[T]wo groups of students are disadvantaged in going on to university in the U.S. compared to Canada. These include students from lower-income families, as well as members of a visible minority group [...]. Students in the bottom income quartile in the U.S. are considerably less likely to go to university than their Canadian counterparts. In Canada, 24% of these students go on to university compared to only 15% in the U.S.²¹⁷⁴

While students from a visible minority in the U.S. were at a disadvantage in attending university compared to their Canadian counterparts, neither group was at a disadvantage within each country once adjustments were made for income and other socio-economic factors. In the U.S., once differences in socio-economic characteristics were taken into account, students from minority groups were as likely as other students to go on to university. By contrast, in Canada, students from visible minority groups were actually

²¹⁷⁰ Canadian Association of University Teachers (CAUT). "Access Denied. The Affordability of Postsecondary Education in Canada, 1857-2002." p. 6.

²¹⁷¹ Ibid.

²¹⁷² Advisory Committee on Student Financial Assistance. *Empty Promises: The Myth of College Access in America*, U.S. Department of Education, 2002; accessed June 6 2005; available from <http://www.ed.gov/about/bdscomm/list/acsfa/edlite-access.html>.

²¹⁷³ Ibid., accessed. p. v.

²¹⁷⁴ Frenette, Marc. *Is Post-Secondary Access More Equitable in Canada or the United States?*, Catalogue no. 11F0019M1E244, Ottawa: Analytical Studies Branch Research Paper Series, Statistics Canada, 2005.

far more likely to go on to university than other students, once income and other characteristics are taken into account.²¹⁷⁵ This does not mean that discrimination does not exist, but rather that it likely occurs in areas related to contextual socio-economic factors than in access to higher education per se.

The Statistics Canada study attributed the lower enrolment among lower-income youth to the much higher costs of attending university in the United States. The higher costs are associated with the presence of private universities, a lower level of local access to public universities, and the higher costs of public university tuition.²¹⁷⁶

²¹⁷⁵ Ibid.

²¹⁷⁶ Ibid.

35. Postsecondary Graduation Rates and Field of Study

The Pan-Canadian Education Indicators Program (PCEIP) includes postsecondary completions and graduation rates in different broad fields of study in its list of indicators, arguing that this information offers “insights into the response of the Canadian education systems to changes in the demand for skills in the labour market.”²¹⁷⁷ The report also notes that international comparisons of graduation rates in different fields “provide information on Canada’s position in an increasingly global economy.”²¹⁷⁸

From the perspective of the Canadian Index of Wellbeing, as noted earlier, graduation rates are only minimally useful in assessing whether the Canadian populace is actually becoming more educated, knowledgeable, and wise, since this indicator does not assess either the substance and quality of what is taught or its utility in improving wellbeing for both present and future generations. Even at the most basic level, for example, it is likely that longer student work hours resulting from rising tuition and debt levels are reducing student reading and study time. For example, in 1976, the employment rate for full-time students in Canada was 26%. By 2001 it had increased to 38%.²¹⁷⁹ The fact that more students graduate than ever before does not mean that a degree has the same value or represents the same level of educational attainment as previously. Nevertheless, because graduation rates are one of the most widely used conventional education indicators, the PCEIP results are reported here, with the caveat that they are not to be considered as a core indicator of the CIW educated populace domain for the reasons noted here and earlier.

According to the PCEIP results, graduation rates from bachelors and first professional degree programs rose sharply in the 1970s and 1980s. In 1976, the graduation rate for Canada overall (defined as number of graduates divided by the Canadian population at the typical age of graduation) was 18%. By 1991, it had risen to 28%. In 1995, the rate reached 32% and then dropped slightly to 30% in 1998.²¹⁸⁰

Table 32 below shows graduation rates by field of study between 1988 and 1998. Graduation rates from the field of physical, natural and applied sciences increased by 1.5 percentage points while graduation rates in the field of humanities and social sciences increased by 5.3 percentage points. Commerce, management and administration

²¹⁷⁷ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, accessed.

²¹⁷⁸ Ibid., accessed.

²¹⁷⁹ Pannozzo, Linda, and Ronald Colman. *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, Halifax, Genuine Progress Index Atlantic (GPI Atlantic), 2004; accessed April 2004; available from <http://www.gpiatlantic.org/>. Data are from Statistics Canada. 2002. *Labour Force Historical Review 2001*. Catalogue no. 71F0004XCB.

²¹⁸⁰ PCEIP data are from Statistics Canada. It calculates graduation rates by dividing the number of graduates by the population at the “typical” age of graduation. This rate should not be confused with a graduation rate showing graduates as a proportion of enrolment.

graduation rates increased by 0.7 percentage points, and graduation rates in the health professions and related occupations increased by 0.5 percentage points.

Table 32. Canadian university Bachelor's and first professional degree graduation rates, by field of study and gender, 1988 and 1998

Field of study	1988 (%)	1998 (%)	Percentile change
Physical, natural, and applied sciences	5.0	6.5	1.5
Agriculture and biological sciences	1.6	2.5	0.9
Engineering and applied sciences	1.8	2.3	0.5
Mathematics and physical sciences	1.6	1.8	0.2
Humanities and social sciences	16.5	21.9	5.4
Education	3.6	4.7	1.1
Fine and applied arts	0.8	1.0	0.2
Arts and sciences	0.7	0.9	0.2
Humanities and related	2.8	3.6	0.8
Social sciences balance	8.7	11.6	2.9
Commerce, management, and administration	2.8	3.5	0.7
Health professions and occupations	1.6	2.1	0.5

Note: Statistics Canada calculated graduation rates by dividing the number of graduates by the population at the typical age of graduation.

Source: CMEC, Canada. 2003. Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program. Table D5.7.

The method used by the PCEIP for calculating graduation does not tell us about what proportion of all university students graduate from a particular field of study. In other words, the PCEIP results cannot be used to assess changes over time in the overall proportions of students graduating from the various fields of study, though these figures would help reveal shifts in social and economic priorities.

Statistics Canada data on university enrolment by field of study are more helpful in this regard and show more dramatic fluctuations than revealed by the PCEIP results. For example, between 1992–1993 and 2001–2002, enrolment in humanities decreased by 14.2% and enrolment in education decreased by 19.1%. At the same time, enrolment in architecture, engineering, and related technologies increased by 18.4%, and in mathematics, computer, and information sciences it increased by 44%.²¹⁸¹

²¹⁸¹ Statistics Canada. "University Enrolment." *The Daily*, July 30, 2004, accessed December 2004; available from <http://www.statcan.ca/Daily/English/040730/d040730b.htm>.

According to census data collected by Statistics Canada, increasing numbers of students chose technology and business fields during the 1990s. Of the 1.2 million Canadian students who graduated from university between 1991 and 2001, about 12% studied in the fields of business and commerce and another 11% studied engineering.²¹⁸²

More detailed data on graduation rates by field of study are available from Statistics Canada and other sources. But, because graduation rates are not a core CIW indicator, only summary information is presented here.

²¹⁸² Statistics Canada. *2001 Census: Analysis Series: Education in Canada: Raising the Standard*, Catalogue no. 96F0030X1E2001012, Ottawa: Statistics Canada, 2003.

PART VI

SOCIAL OUTCOMES

36. Social Outcomes in the Canadian Index of Wellbeing Domains

As we get richer, we accelerate our consumption of the world's resources, as well as the pollution that consumption causes. Twenty percent of the richest people on this planet, living largely in North America and Europe, are currently consuming 80% of all its goods, food, water, metals and fuel production, and there is little sign yet of that imbalance being reduced.

David Suzuki and Holly Dressel²¹⁸³

We may reasonably surmise that, on average, those whose lifetime earnings are enhanced by degrees do more damage to the planet than those less encumbered.

David W. Orr²¹⁸⁴

We began this literature review by explaining that we were using the sustainability lens, which is a cross-cutting theme of the Canadian Index of Wellbeing, to guide our approach to the CIW educated populace domain. Wellbeing in the CIW is explicitly defined to include the welfare of future generations of Canadians as well as that of the present generation, and to be highly correlated with certain key conditions—physical and mental health, decent living standards, a healthy physical environment, strong and safe communities, vibrant culture, good government, and the ability to balance the often competing demands of paid and unpaid work with ample free time. The inter-generational dimension is intrinsic to the CIW in the recognition that present wellbeing is enhanced if Canadians have confidence in their children's future and it is diminished if they feel anxious that their children's health, living standards, environment, culture, and communities are imperilled. From that perspective, an educated populace is one that has the requisite knowledge to strengthen these conditions of wellbeing and thereby to enhance both its own opportunities for wellbeing and those of its children.

Throughout the literature we found very many observers who are increasingly concerned with the relationship between education and the state of the world, and with the key role that education systems can play in either strengthening or undermining the environmental, social, and economic conditions of wellbeing. Indeed, the entire United Nations Decade of Education for Sustainable Development is based on this concern. In particular, some writers have focused on the contribution of learning systems to a consumer-oriented society and strategy of untrammelled economic growth that may be unsustainable and destructive of global ecosystems. For example, Chapters 12 and 13 provided evidence of the increasing commercialization of education and research, and of

²¹⁸³ Suzuki, David, and Holly Dressel. *Good News for a Change. Hope for a Troubled Planet*, Toronto: Stoddart, 2002. p. 325.

²¹⁸⁴ Orr, David. W. *Ecological Literacy. Education and the Transition to a Postmodern World*, Albany: State University of New York Press, 1992. p. 9

the use of school, university, and life-long learning systems to further commercial opportunities and train workers for the needs of the economy. According to Ron Miller, for example, the use of the term *intellectual capital* suggests, “that the minds of our children are raw material for the economy.”²¹⁸⁵ Miller argues that educational systems are actually contributing to widespread social malaise with their emphasis on individual competition rather than social co-operation and cohesion, and that new learning systems are needed based on equity and a compassionate concern for the planet and all its inhabitants.

As noted in earlier chapters, authors who take this view often suggest that key changes must start with the worldview and values underlying our educational systems, in contrast to mainstream reforms that focus on modifications to existing structures and do not attempt to alter the system itself. This is not a new observation. Thomas Berry, in 1988, argued that public education plays a role in *sustaining the problem* and that, for education to become a force in the healthy sustainability of the planet and the wellbeing of its peoples, the basic pattern itself must be profoundly altered:

Thus the question of meliorism appears, the tendency to constantly modify an existing system without changing the basic pattern of its functioning. What is needed is a profound alteration of the pattern itself, not some modification of the pattern. To achieve this the basic principle of every significant revolution needs to be asserted: rejection of partial solutions. The tension of the existing situation must be deliberately intensified so that the root cause of the destructive situation may become evident, for only when the cause becomes painfully clear will decisive change take place. The pain to be endured from the change must be experienced as a lesser pain to that of continuing the present course.²¹⁸⁶

Similarly, we cited John Ralston Saul’s remark that society needs to change the discourse.²¹⁸⁷ To that end, this literature review has gone beyond conventional education indicators that fail to ask basic questions about the substance and quality of education and its contribution to wellbeing. Instead it has sought to explore new ways of measuring progress in this area by exploring alternative discourses, including, for example, ascribing value to Indigenous knowledge, non-cognitive learning, and the learning that occurs in informal and non-formal systems. Some critics cited in this review have noted that

²¹⁸⁵ Miller, Ron. "Holistic Education for an Emerging Culture," in *The Heart of Learning: Spirituality in Education*, ed. Glazer, Steven, 189-201. New York: Jeremy P. Tarcher/Putnam, 1999. p. 191.

²¹⁸⁶ Berry, Thomas. *The Dream of the Earth*, San Francisco: Sierra Club Books, 1988. pp. 158–159, cited in a Ph.D thesis from OISE (Ontario Institute for Studies in Education): Babiuk, Gary Eugene. "Holistic Changes in School Structure and Organization," Ph.D. thesis, Department of Curriculum, Teaching and Learning, Ontario Institute for Studies in Education, University of Toronto, 2000. Babiuk’s research is a case study of the staff of a junior high school, which “embarks on a transformational journey toward creating a holistic school structure and classroom organization.” Unfortunately, we were not able to review this thesis.

²¹⁸⁷ Saul, John Ralston. "Good Governance as the Key to Gross National Happiness." Paper presented at the Second International Conference on Gross National Happiness: Rethinking Development: Local Pathways to Global Wellbeing, Antigonish, Nova Scotia, June 20- 24, 2005; accessed December 2005; available from <http://gpiatlantic.org/conference/proceedings/saul.htm>.

learning and education systems can play a key role in changing public values, from reductionism to holism, so that students can learn to see the interconnected nature of reality, including the interconnections of body, mind, emotions, and spirit. These writers see a more holistic approach to learning creating the foundation for a new and more meaningful public discourse.

36.1 The Canadian Index of Wellbeing domains

The Canadian Index of Wellbeing is composed of seven domains or areas of interest. In addition to the educated populace domain, these areas include living standards, time use, healthy population, community vitality, governance, and ecological footprint domains. The educated populace domain is seen as a main connection between all of the domains. In this view, the indication of whether or not individuals and society are learning what they need to know to create a sustainable and wise society can be seen in the outcomes of all the domains in the CIW.

Since these outcomes are being developed in the six other domains, the educated populace domain has not emphasized this section of its framework. However, to complete the framework we are using, we have included brief summaries here of education and the ecological footprint, healthy populations, living standards (here focussing on work), and community vitality (here focussing on crime) domains. In addition, we have also included a brief section on the educational attainment of the working age population, since this is the variable used most often in studies that identify correlations between education and other social and economic factors.

There is a very strong emphasis in the CIW on the inter-relatedness of the various components of the index itself. For example, long work hours may lead to higher incomes, but they are also associated with increased levels of stress and the loss of leisure time, which could be used for civic activity or child care. In addition, chronic stress has been linked to poor health and a higher incidence of chronic disease. In terms of natural resource health, the depletion and deterioration of ecosystems also has a profound impact on human health and living standards, as well as implications for the viability of communities and the health of the economy. In turn, fear of unemployment and joblessness has been associated with stress and illness.

Thus, the relationships between the components in the CIW are crucial. While simple-minded uni-directional analyses generally equate higher education levels with higher incomes and progress, the introduction of an environmental perspective casts doubt on that equation. As indicated in the Suzuki, Dressel, and Orr citations above, the higher incomes that generally go with higher education may well accelerate environmental degradation.

A key goal of the CIW, therefore, is to demonstrate the complex interaction between social, economic, environmental, and health indicators and variables, and the potential impact of those relationships on the wellbeing of both current and future generations. In order to assess whether educational structures today are contributing to wellbeing or not, it is necessary first to review some of the key findings from wellbeing indicator research that pertain to education.

36.2 Educational attainment of the working-age population

Canadians are better educated today than at any other time in history, when number of years in education is used as the benchmark for educational attainment. In 1951, 2% of the Canadian population aged 15 and over had education beyond high school. Since the Second World War there has been unprecedented growth in the number of Canadians with a postsecondary education. In 2001, more than 50% of the Canadian population aged 15 and over had university qualifications, a college diploma, or other trade credentials.²¹⁸⁸

According to the Pan-Canadian Education Indicators Program (PCEIP), educational attainment, or the highest level of education completed, is one way to measure human capital. The conventional definition of human capital defines it as the “knowledge and skills that the working-age population (or more narrowly the labour force) accumulates through formal educational attainment, training, and experience.”²¹⁸⁹ Trends in attainment rates may also give us information about access and barriers to the education system.

Using Statistics Canada 2001 Census data, the PCEIP found:

- The 2001 Census marked the first time that a majority of the working-age population had postsecondary credentials.
- 23% of the population aged 25–64 had a university education, up from 17% a decade earlier.
- In 2001, 54% of men aged 25–64 had qualifications above a high school level, up from 47% in 1991.
- In 2001, 53% of women aged 25–64 had postsecondary qualifications, up from 41% in 1991.
- The number of people aged 25–64 with higher degrees (masters, doctorates and other qualifications) above the bachelor’s level increased by 50% between 1991 and 2001.
- In 2001, 61% of the population aged 25–34 had postsecondary credentials.
- In 2001, 62% of working-age immigrants who arrived in the 1990s had postsecondary credentials, compared to 48% of immigrants in the 1970s and 1980s.²¹⁹⁰

The Centre for the Study of Living Standards proposed that average educational attainment of the working-age population be adopted as the NRTEE’s first summary indicator of the sustainability of human capital in terms of education, particularly because of its close link to income-earning power, which in turn makes it comparatively easy to monetize. According to the CSLS: “Additional years of education normally produce more

²¹⁸⁸ Statistics Canada. *2001 Census: Analysis Series: Education in Canada: Raising the Standard*.

²¹⁸⁹ Sharpe, Andrew. *The Development of Indicators for Human Capital Sustainability*, Ottawa: Centre for the Study of Living Standards, 2001.

²¹⁹⁰ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, accessed.

knowledgeable and skilled workers; a situation where educational attainment is declining is not consistent with the sustainability of human capital.”²¹⁹¹

However, the CSLS also points out that the disadvantage of using average educational attainment as an indicator of human capital sustainability is the “possibility of declining quality of educational credentials. A high school diploma in 2001 may or may not represent the acquisition of as much knowledge as it did 50 years ago.”²¹⁹² In addition, it might be asked: what is the quality of the knowledge being transferred, and is it accurate?

Furthermore, since level of income is associated with educational attainment, and since it has been shown that those with higher incomes consume most of the world’s resources and therefore threaten the ecological sustainability of the planet, one must ask whether there is a lack of basic knowledge in the field of environmental sustainability even among those with high levels of education? Despite these caveats, the NRTEE did accept the recommendation of the CSLS, and has adopted the educational attainment indicator as its human capital measure at least on an interim basis.

According to the NRTEE, the human capital indicator measures the percentage of the population between the ages of 25 and 64 that have achieved at least a university bachelor’s degree, or a diploma or certificate from an educational institution beyond high school. Based on these Statistics Canada data, the NRTEE human capital indicator shows that “human capital” in Canada has steadily increased from roughly 43% in 1990 to nearly 56% in 2000.²¹⁹³

²¹⁹¹ Centre for the Study of Living Standards. *Proposed Framework on Human Capital Indicators*, Document prepared for the National Round Table on the Environment and the Economy Environment and Sustainable Indicators Initiative (ESDI). Ottawa: Centre for the Study of Living Standards, 2001. p. 6.

²¹⁹² Ibid.

²¹⁹³ National Round Table on the Environment and the Economy. *Environment and Sustainable Development Indicators for Canada*, Chapter 4.7, 2003; accessed December 2005; available from http://www.nrtee-trnee.ca/Publications/PDF/Report_Indicators_E.pdf. p. 35.

36.3 Education and the ecological footprint

Our ecological footprint is essentially a “measure of the sustainability of our lifestyle expressed in geographic area of productive land and sea area.”²¹⁹⁴

Our lifestyle and activities need an ecosystem to support them. Every activity can be expressed in the amount of productive land it takes to produce the inputs and assimilate the wastes with prevailing technologies [...]. The Footprint, when compared to the total available productive land of the given area—bioproductivity—indicates the sustainability of the lifestyle in terms of renewable supply versus demand.²¹⁹⁵

According to researchers at the University of British Columbia, every person on the planet today requires an average of 2.8 hectares of land to provide the necessary resources and waste absorption capacity to meet consumption and waste production needs. That is the average “ecological footprint” of every human being on the planet today. But if we set aside 12% of the world’s land mass to protect biodiversity, according to international commitments made by world leaders, then that only leaves us with 1.8 hectares of available bioproductive capacity per person.²¹⁹⁶

But this *average* ecological footprint is misleading since all footprints are not the same size. For instance, a person living in the U.S. has an average footprint of 11.8 hectares while a person living in Africa has an average footprint of 1.3 hectares. The richest one-fifth of the world’s population consumes 45% of all meat and fish, 58% of all energy, and 84% of all paper, and it owns 87% of all cars. The poorest one-fifth consumes just 5% of meat and fish, less than 4% of energy, 1.1% of paper, and less than 1% of all cars.²¹⁹⁷

According to a recent report by the *Worldwatch Institute*, if everyone consumed at the average level of high-income countries, the planet could only sustainably support 1.8 billion people, not the 6.5 billion that currently inhabit it.²¹⁹⁸

The most recent calculations reflecting the sustainability of Canadian lifestyles and consumption patterns were prepared for the Canadian Index of Wellbeing (CIW) by the International Institute for Sustainable Development and the Global Footprint Network. The 2006 national footprint calculations, based on 2002 data, comprise six major bioproductive areas or “land types” including arable land, pasture, forest, fishing grounds, fossil energy land, and built land. The calculations consider the human demand

²¹⁹⁴ International Institute for Sustainable Development, and Global Footprint Network. *Canadian Index of Wellbeing: Ecological Footprint Calculations. Report on the Results of the Pilot Project*, Toronto: Atkinson Charitable Foundation, 2006. p. 5.

²¹⁹⁵ Ibid. p. 5.

²¹⁹⁶ Wilson, Jeff, Ronald Colman, and Anne Monette. *The Nova Scotia Ecological Footprint*, Halifax, Genuine Progress Index Atlantic, 2001; accessed February 2005; available from <http://www.gpiatlantic.org/pdf/ecofoot/ns-ecofoot.pdf>. p. 2.

²¹⁹⁷ Ibid., accessed. p. 7.

²¹⁹⁸ The Worldwatch Institute. *Press Release: Vital Signs, 2006-2007. The Trends That Are Shaping Our Future*, Washington, D.C.: The Worldwatch Institute, 2006.

on each of these land types wherever they are located (see Table 33 below).²¹⁹⁹ In addition, the average Canadian footprint was distributed over five main human activity categories: food, housing, mobility, goods, and services. An analysis of Canadian footprint results showed the contribution of each of these categories to the total footprint (see Table 33).²²⁰⁰

Table 33. Canada's national footprint, by consumption category and land-use type, 2002

Activity area	Percent of total	Land-use type	Percent of total
Food	28.5	Energy total	61
Housing	29.1	Cropland	14
Mobility	19.3	Pasture	5
Goods	13.2	Forest	17
Services	9.9	Built area	1
Unidentified	0	Fishing grounds	2
TOTAL	100	TOTAL	100

Source: International Institute for Sustainable Development and Global Footprint Network. 2006. *Canadian Index of Wellbeing: Ecological Footprint Calculations. Report on the Results of the Pilot Project*. Toronto: Atkinson Charitable Foundation. p. 17.

The CIW Ecological Footprint report shows that the total ecological footprint per Canadian resident is 7.5 global hectares distributed over the land use types.²²⁰¹ In future, the footprint data will be used in conjunction with the other proposed indicators in the CIW in order to break down the results into categories required for policy purposes. For example, in future it will be possible to analyze the footprint data in terms of consumption levels by income or educational level.²²⁰² This kind of analysis was unavailable at the time of writing this literature review. However, it will be included in the ecological literacy chapter of the final Indicator Report.

In 2001, GPIAtlantic analyzed footprint data in Nova Scotia in terms of consumption levels by income and demonstrated that the size of a Nova Scotian's footprint was dependent on income. While the average ecological footprint in Nova Scotia was found to be 8.1 hectares per person, the richest 20% of Nova Scotians have a footprint of 10.7 hectares per person compared to 6.2 hectares for the poorest 20%. This is because the rich consume more resources and produce more waste than the poor.²²⁰³

²¹⁹⁹ International Institute for Sustainable Development, and Global Footprint Network. *Canadian Index of Wellbeing: Ecological Footprint Calculations. Report on the Results of the Pilot Project*. p. 8.

²²⁰⁰ Ibid. p. 19.

²²⁰¹ Ibid. p. 11.

²²⁰² Ibid. p. 6.

²²⁰³ Wilson, Colman, and Monette. *The Nova Scotia Ecological Footprint*, accessed. pp. 2–3.

Since level of income is associated with educational attainment, Ecological Footprint analysis raises some important questions:

- Instead of protecting and conserving valuable natural capital, we are drawing it down and depleting it at a rate faster than it can be replaced. For instance, once a forest is degraded, it is no longer able to provide essential goods and services such as soil formation, habitat, watershed protection, flood control, climate regulation, carbon storage, high quality timber and other services as effectively as a healthy forest. The forest, in this case, is ‘natural capital,’ a stock of natural assets that provide a flow of goods and services.

The depletion and degradation of this stock is invisible in our conventional economic growth statistics, which count the depletion of natural wealth as income and therefore as economic gain. Thus, the more fish we catch and the more trees we cut down, the more the economy grows. But this depletion actually represents a decline in natural wealth, and an economic cost that will affect current and future generations. If our ecological footprints are too big, then we are essentially living in debt, gradually accumulating an ecological deficit. Accounting for our natural wealth in this way casts doubt on the simplistic equation between education and wealth generation, since the accumulation of material wealth may well be offset by a decline in natural wealth.

- Some analysts have tied the growth of consumption, especially among those with higher education and greater incomes, to the ‘work-and-spend’ cycle. In the last 40 years alone, consumption has more than doubled for the average Canadian. Conventionally, consumption is viewed as the path to satisfaction, and the work-and-spend cycle is the syndrome of the affluent—those with enough disposable income to be on the treadmill in the first place. This does not mean those with low incomes are immune from the pressures to consume. ‘The poor are not so much adherents to an alternate (anti-materialist) set of values, as they are unsuccessful at the same game everyone else is playing [...]. If they are not trapped in work and spend, it's more because they can't than they won't.’^{2204, 2205} Research in this area raises the question: Does the notion of ‘wealth’ itself need to be redefined in our society so that the consequences of consumerism for the environment are exposed and ‘people are persuaded to revise their priorities and follow a less materially intensive path?’²²⁰⁶

²²⁰⁴ Pannozzo, and Colman. *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, accessed. pp. 337–342.

²²⁰⁵ Schor, Juliet. *The Overworked American: The Unexpected Decline of Leisure*, New York: HarperCollins, 1991.

²²⁰⁶ Hayden, Anders. *Sharing the Work, Sparing the Planet. Work Time, Consumption and Ecology*, Toronto: Between the Lines, 1999. p. 52.

36.4 Education and health

Educational attainment is positively associated both with health status and with healthy lifestyles. For example, in the 1996–97 National Population Health Survey, only 54% of respondents with less than high school education rated their health as “excellent” or “very good” compared with almost 71% of respondents with postsecondary education.²²⁰⁷ In 2003, the Canadian Community Health Survey (CCHS) data indicate that 49% of respondents with less than high-school education reported their health as “excellent” or “very good” compared with 64% of respondents with postsecondary school education.²²⁰⁸ Self-rated health, in turn, has been shown to be a reliable predictor of health problems, health-care utilization, and longevity. From a health determinants perspective, education is clearly a good investment that can reduce long-term health care costs.^{2209, 2210}

According to a recent study by Statistics Canada, which followed the same individuals over an eight-year period, among both the middle-aged and seniors, better-educated individuals were more likely to remain healthy during the study period. It found that socio-economic characteristics such as education and level of household income were more important determinants of healthy aging than healthy behaviours. The study attributed this to the fact that people with a high level of education tend to be more aware of health risks and use medical services more effectively.²²¹¹

In addition, a growing body of evidence indicates that income distribution is one of the most important determinants of population health and that educational attainment, in turn, is a good indicator of income and earnings. Comparative studies have found that widening the income gap also widens the health gap. According to Statistics Canada, there are two reasons why this is so. Individuals at the bottom of the income ladder may feel greater “anxiety and shame” about their lot in comparison with those on the upper rungs. Over time this negative emotion can lead to chronic stress, which in turn can lead

²²⁰⁷ Gilmore, Jason, Analyst/Project Leader, Statistics Canada; National Population Health Survey (1996–97) data, special tabulation, personal communication with Linda Pannozzo, email correspondence, August, 2006. Postsecondary education is defined as having received a college diploma or university degree. It does not include people who have partially completed postsecondary courses.

²²⁰⁸ In 2000/2001 the National Population Health Survey became longitudinal. The Canadian Community Health Survey took over where the NPHS left off, however some of the categories were changed. For instance, in regards to self-rated health, “excellent” and “very good” were combined. In addition, “total postsecondary school graduation” included university graduates as well as other types of postsecondary education. These differences likely account for the much higher percentages in 2003. The 2003 CCHS data were provided to GPI *Atlantic* by Nikki Melki, Senior Data Management Specialist, at the Canadian Council on Learning (CCL).

²²⁰⁹ Colman, Ronald. *Women's Health in Atlantic Canada. A Statistical Portrait. Volume I*, Genuine Progress Index Atlantic (GPI Atlantic), 2000; accessed December 2005; available from <http://gpiatlantic.org>, p. 20.

²²¹⁰ As of 2000–2001, the National Population Health Survey (NPHS) has become only longitudinal, so that cross-sectional analysis of these data is no longer possible. However, cross-sectional analysis is possible using the Canadian Community Health Survey (CCHS) data.

²²¹¹ Martel, Laurent, Alain Belanger, Jean-Marie Berthelot, and Yves Carriere. *Healthy Today, Healthy Tomorrow? Findings from the National Population Health Survey. Healthy Aging*, Catalogue no. 82-618-MWE2005004, Ottawa: Statistics Canada, 2005. p. 3

to adverse physical health outcomes. The poor also suffer adverse health effects from not having access to the same resources, such as education and health care.²²¹²

This association between inequality and mortality is particularly strong in the U.S., where access to health care and high-quality education is extremely limited for the poor. In Canada, by contrast, basic health care services remain publicly funded and universally available. Examining the comparative U.S. and Canadian data, Statistics Canada finds that in the U.S., an individual's income is a "much stronger determinant of one's life chances, and, in turn, their health chances, than in Canada."²²¹³

According to a GPIAtlantic study, chronic illnesses including heart disease, cancer, diabetes, and lung disease cost the Nova Scotia health care system \$750 million a year in hospital, doctor, and drug costs. Additional private spending on health care and home care costs brings total direct medical expenditures for chronic diseases to \$1.23 billion a year. Since the poor are generally less healthy, suffer higher rates of these chronic illnesses, and use hospitals and doctors more often, poverty accounts for a significant portion of these costs to the health care system.²²¹⁴

According to researchers at Dalhousie University, 17.4% of physician costs in Nova Scotia can be attributed to educational inequality and an additional 11.3% to income inequality. In other words, nearly \$70 million / year would be saved annually in avoided physician services if all Nova Scotians were as healthy as those with university degrees and higher incomes.²²¹⁵

Therefore, the evidence demonstrates that alleviating poverty and reducing inequality by reducing the gap between rich and poor and by increasing levels of literacy would bring savings to the health care system. The Canadian Public Health Association has emphasized the strong connection between wellbeing and income distribution:

The evidence shows conclusively that reducing relative poverty and narrowing income distribution are likely to have a much greater effect on improving wellbeing than increasing aggregate wealth [...]. This redistribution is crucial: we now know that in modern, wealthy societies, wellbeing is associated more with relative income than growth in overall, average wealth.²²¹⁶

Another study by the Central West Health Planning Information Network in Hamilton, Ontario echoed these findings. Exploring the relationship between cardiovascular disease (CVD) and socioeconomic status, the study concluded that living conditions, education, and occupation levels were "key predictors of heart disease." It recommended that:

²²¹² Pannozzo, and Colman. *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, accessed. p. 256.

²²¹³ Ibid., accessed.

²²¹⁴ Colman, Ronald. *The Cost of Chronic Disease in Nova Scotia*, Genuine Progress Index Atlantic (GPI Atlantic), 2002; accessed November 2005; available from <http://gpiatlantic.org>.

²²¹⁵ Ibid.

²²¹⁶ Pannozzo, and Colman. *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, accessed. p. 278.

[I]ncreasing the overall level of education in the population by providing more support for residents to obtain higher education (for example more affordable housing, subsidized day care, and lower tuition fees) may be an important strategy for improving the health of the population. Policies and strategies that address the socioeconomic context in which people live might also decrease the inequalities in CVD risk factors and provide a more physically and mentally healthy community environment.²²¹⁷

The World Health Organization describes a range of factors that strongly affect health, including access to nutritious food, housing, secure employment, and a sense of social belonging. According to Statistics Canada, workers with higher education were more likely to have secure, high-wage, high-benefit jobs. Employees with less than high school education were more likely to have insecure work, low wages and no benefits.²²¹⁸

Thus, poverty and inequality are acknowledged to be the most reliable predictors of poor health outcomes, and these factors in turn are closely linked to low educational attainment and unhealthy lifestyles. Thus, reductions in poverty among high-risk groups, as well as reductions in educational inequality, will likely improve overall population health. Because the Canadian Index of Wellbeing emphasizes the linkages between social, economic, and environmental realities, it sees potential investments in the determinants of health as highly cost-effective means to improve health and wellbeing. Rather than assess the cost only of the final outcomes of illness, as our current health budgets do, the CIW therefore points to the potential economic benefits and costs associated with different health determinants, including education.

GPIAtlantic's Cost of Obesity report found that Canadians with less education are much more likely to be overweight than those with higher education. In fact, rates of overweight decreased with each successive level of education: 36% of Canadians with less than a high school education were found to be overweight compared to 22% of those with a university education.²²¹⁹

The Canadian Institute for Health Information (CIHI) recently reported that in 2004, men and women aged 25–64 with less than secondary education were more likely to be obese than those who completed postsecondary education. It also found that adults with postsecondary education reported eating fruit and vegetables more frequently than those with less than a high school diploma.²²²⁰

In Nova Scotia, comprehensive dietary information surveys were conducted in 1970–72 and in 1990. Both the 1990 Nova Scotia Nutrition Survey and a 1994 National Institute of Nutrition (NIN) survey found that food labels were widely misunderstood and

²²¹⁷ Ibid., accessed. p. 276.

²²¹⁸ Ibid., accessed. p. 176.

²²¹⁹ Colman. *Women's Health in Atlantic Canada. A Statistical Portrait. Volume I*, accessed. p. 9.

²²²⁰ Canadian Institute for Health Information. *Improving the Health of Canadians: Promoting Healthy Weights*, Ottawa: Canadian Institute for Health Information, 2006. p. 7.

misinterpreted, with little comprehension of ingredient lists and nutrition panels, and widespread confusion about the validity of food claims on labels.^{2221, 2222}

As discussed in Chapter 23 of this literature review, the National Institute of Nutrition (NIN) has conducted six nutrition surveys in Canada (1989, 1994, 1997, 2001, 2004, and 2006).^{2223, 2224} The most recent survey (2006), conducted by the Canadian Council of Food and Nutrition (CCFN), indicated that 77% of Canadians report getting nutrition information from product labels. In addition, those who claim to be very knowledgeable about nutrition are more frequent label readers (24% always check product labels).²²²⁵ The 2006 report also argues: "While people with higher levels of education are less likely to never check labels, they are not particularly likely to always check them."²²²⁶

According to the 2006 CCFN survey, 67% of those who read product labels say they can often find the information they need, up from 56% in 2004. Twenty-six percent say that they sometimes can find the information they need, down from 37% in 2004. In general, those who are the most knowledgeable about nutrition or who are more frequent readers of product labels are more likely to say that they often can find the information they need.²²²⁷

In 1997, prior to merging with the Canadian Food Information Council to form the CCFN, the NIN included in its survey a section devoted to assessing whether Canadians understand the information on nutrition labels. In 1997, almost one quarter of Canadians (23%) reported they had difficulty understanding the nutritional information on labels, and 16% of shoppers with a university education had difficulty. Thirty-one percent of those with a high school education claimed they had difficulty understanding labels, and 42% with elementary school educations claimed they had difficulty. Reasons cited were complexity of terms, lack of clarity and difficulty understanding nutrient terminology.²²²⁸

Based on a review of the archived survey material available on the CCFN web site, it appears that the 1997 TNT survey was the last time an attempt was made to assess

²²²¹ Colman, Ronald. *Cost of Obesity in Nova Scotia*, Genuine Progress Index Atlantic (GPI Atlantic), 2000; accessed October 2005; available from <http://www.gpiatlantic.org>. pp. 22–23.

²²²² Statistics Canada's 2004 Canadian Community Health Survey was about nutrition, however it did not collect information on whether or not Canadians understand or make use of nutritional labelling.

²²²³ National Institute of Nutrition, and Canadian Food Information Council. "Tracking Nutrition Trends, 1989-1994-1997-2001," *Rapport*, vol. 17, no. 1, 2002; accessed July 2006; available from <http://www.ccfn.ca/pdfs/rap-vol17-1.pdf>. This NIN newsletter provides highlights from the results of the 1989, 1994, 1997, and 2001 nutrition surveys. In 2004, the National Institute of Nutrition (NIN) merged with the Canadian Food Information Council (CFIC) to form the Canadian Council of Food and Nutrition (CCFN).

²²²⁴ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends V*, 2004; accessed July 2006; available from <http://www.ccfn.ca/pdfs/TNTV-FINAL.pdf>.

²²²⁵ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*, Woodbridge, Ontario: Canadian Council of Food and Nutrition (Previously the National Institute of Nutrition), 2006.

²²²⁶ Ibid.

²²²⁷ Ibid.

²²²⁸ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends, 1989-1994-1997*, Ottawa, National Institute of Nutrition, 1997; accessed July 2006; available from <http://www.ccfn.ca/pdfs/Canadian Nutrition 1997.pdf>.

whether Canadians comprehend the information provided on food labels. For example, the 2001 TNT survey asked questions about self-rated nutrition knowledge—that is, whether Canadians consider themselves to be very, not very, or not at all knowledgeable about nutrition.²²²⁹ Regarding nutrition labels, the 2006 survey asked Canadians about:

- the frequency of reading labels
- their ability to find information on food labels
- the use of information on food labels
- the perceived importance of specific label information²²³⁰

The 2004 and 2006 TNT surveys also addressed food safety concerns. Almost one-quarter of Canadians do not have a food safety issue of concern. The “nothing concerns me” response was less prevalent among women, those with higher levels of education and those who rate their knowledge of nutrition as high. Among the 2006 findings: 23% of Canadians are concerned about the handling and preparation of food; 12% of Canadians are concerned about food content (fat, trans fats, cholesterol, sugar, salt, etc); and 5% are concerned about genetically modified food.²²³¹ It is worth highlighting here that when three of the categories are combined, a total of 32% of Canadians express concern about chemicals in food: 13% are concerned about additives and other chemicals in food; 13% are concerned about pesticides and other chemicals in food; and 6% are concerned about chemicals in food (general).²²³²

Indicators of an educated populace should reflect such knowledge, or lack of it, on basic issues like nutrition and food quality.

Yet nutritional education budgets pale in comparison to food industry advertising budgets—\$30 billion a year in the U.S. alone. Such advertising is a major contributor to the GDP, yet much of it promotes foods that cause obesity, which has been linked to cancer, heart attacks, diabetes, and early death among other chronic diseases.²²³³

A 1996 Consumers International Study found that the fast food industry accounts for one-third of food advertising expenditures in the industrialized countries. When candy and sweetened breakfast cereals are included, the advertising expenditures account for more than half of all food advertising in the U.S., Australia, and eleven European countries. For instance, Kelloggs spends \$40 million a year to promote Frosted Flakes alone. Coca Cola and MacDonalds are two of the top ten advertising spenders in the world. By contrast, nutritional education budgets are insignificant, and register as “costs” that are often first on the chopping block of government budgets in times of fiscal restraint, since they are not seen as directly relevant to basic literacy and math skills.²²³⁴

²²²⁹ National Institute of Nutrition, and Canadian Food Information Council. *Tracking Nutrition Trends IV. An Update on Canadians' Nutrition-Related Attitudes, Knowledge and Actions, 2001*, Ottawa: National Institute of Nutrition, 2002.

²²³⁰ Canadian Council of Food and Nutrition. *Tracking Nutrition Trends VI*.

²²³¹ Ibid.

²²³² Ibid.

²²³³ Colman. *Cost of Obesity in Nova Scotia*, accessed. p. 4.

²²³⁴ Ibid., accessed. pp. 20–21.

While we adhere to these perverse accounting methods to measure our wellbeing as a society, we will continue to ensure that our children get their food education almost exclusively from the fast food industry. The provision of classroom lesson plans on nutrition by the food industry is particularly problematic given the fact that, like tobacco companies, food companies explicitly target children to nurture addictions that will continue into adulthood.²²³⁵ Indeed, the last ten years have seen a massive expansion of tobacco interests like Philip Morris and RJR-Reynolds into the food industry, and it is estimated that one-third of processed and packaged food on supermarket shelves is today marketed by these companies.²²³⁶

In addition, while it is widely known today that low-fat, low-sugar diets with ample whole grains, fruits and vegetables are the basis for a healthy diet, there is still widespread ignorance about the processed and prepared foods that constitute an increasing share of our diets. The confusion applies to quantity as well as quality. For instance, a widespread marketing trend in the U.S. has been to “supersize” helpings of food at fast food establishments on items like French fries and sodas where the ingredients cost little to the purveyor—thereby often doubling the caloric content of a meal of nutrient-poor, fat-rich food.

A society intent on improving population health would have to counter industry advertising with a determined nutritional education campaign no less resourceful than that devoted to countering cigarette smoking.²²³⁷ The fact that television advertising may currently be one of the main sources of consumer knowledge about food illustrates a key issue raised in the last chapter—that significant learning occurs outside school. A genuine assessment of the educational attainment of a population must include consideration both of the level of societal knowledge on key issues like nutrition that affect health and social wellbeing and of the sources of that knowledge and their accuracy.

Given the finding that obesity rates are inversely proportional to educational attainment, a commitment to nutritional literacy can potentially play a major role in reversing the obesity epidemic.

²²³⁵ Centre for Commercial Free Public Education. *What Is Commercialism in Schools?*, Centre for Commercial Free Public Education, 2005; accessed October 17 2005; available from <http://www.ibiblio.org/commercialfree/commercialismtext.html> - problem. For more information on commercialism in schools and corporate design of learning materials, please refer to Chapter 6 of this literature review.

²²³⁶ Colman. *Cost of Obesity in Nova Scotia*, accessed. pp. 20–21

²²³⁷ *Ibid.*, accessed.

36.5 Education and work

Men and women with university degrees are more likely to have work than those who have not completed high school. In 2001, 75.4% of female university graduates in Canada had a job, compared with 79.3% of male graduates. By contrast, women with less than a Grade 9 education are less than half as likely to be employed as their male counterparts—13.6% of women compared to 29.4% of men.²²³⁸

Educational attainment is also linked to earnings. A recent Statistics Canada study found that the gap in earnings between couples who are highly educated and couples with much lower levels of schooling has widened considerably during the past two decades. Couples consisting of two university graduates have seen their employment income increase from 14% to 22% in real (inflation adjusted) terms when compared with their counterparts 20 years earlier. In the same time period, those with a high school education or less have struggled to maintain their standard of living.²²³⁹

A seminal study out of the U.S. (Bluestone and Rose 1997) found that highly educated working couples also increased their work hours significantly more than their less educated counterparts, making the highly educated the most overworked segment of society.²²⁴⁰

“Structural unemployment” exists when there is a mismatch between the skills required by employers and the skills of the unemployed. Thus, a shortage of jobs in the 1990s led some analysts to argue that the cause of unemployment was a shortage of workers with the education and skills required to fill the available positions, particularly in the “knowledge” sector. However, studies show that skill mismatches are not likely the problem. According to one study by Lars Osberg, of Dalhousie University, and Zhengxi Lin, of Statistics Canada, only one percentage point of Canada’s 1998 unemployment rate of 8.3% was due to skill mismatches. Another study by Statistics Canada and Human Resources and Skills Development Canada found that a substantial share of job vacancies in 1999 were not in the high-tech sector, where lack of available skills have been identified by some as a problem. Instead, 40% of job vacancies were in retail trade and consumer services.²²⁴¹

Canadians as a whole, and the young in particular, have more skills, training, and higher levels of education than ever before. Unnoticed is a steady credentials gap, as educational requirements for many jobs have steadily increased beyond the levels of knowledge actually needed to perform the job. A series of Ontario studies found that postsecondary credentials were required for 47% of clerical workers in 1996 compared with 34% in

²²³⁸ Pannozzo, and Colman. *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, accessed. p. 141.

²²³⁹ Statistics Canada. "Earnings of Couples with High and Low Levels of Education, 1980-2000." *The Daily*, October 13, 2004, accessed December 2004; available from <http://www.statcan.ca/Daily/English/041013/d041013a.htm>.

²²⁴⁰ Pannozzo, and Colman. *Working Time and the Future of Work in Canada: A Nova Scotia GPI Case Study*, accessed. pp. 142–143.

²²⁴¹ Ibid., accessed. pp. 206–207.

1990 and 24% in 1984. For unskilled manual workers, 52% were expected to have a high school diploma in 1996 compared to 40% in 1990 and 19% in 1984.²²⁴²

The problem, therefore, does not seem to be a lack of education, skills and training, but rather the opposite—a larger pool of available skilled and educated people seeking work, which allows employers to ratchet up the entry requirements over time. One subtle but highly significant aspect of underemployment, not captured in the market statistics at all, is the growing percentage of over-qualified job entrants unable to find work that adequately uses their talents, skills, and abilities. Until we clearly identify such important relationships between educational requirements and labour market issues as core policy issues, we are likely to continue diverting attention away from fundamental causes and advocating more training as a supposed panacea for marginalized workers.²²⁴³

36.5.1 Labour market outcomes and earnings

It is now well established that there is a close link between educational levels on the one hand and employment and income on the other. Generally, individuals benefit from higher levels of education in terms of earnings, better jobs, and access to additional education and training.

The Pan-Canadian Education Indicators Program (PCEIP) observes that “an important goal of education is the development of responsible citizens who are able to participate as effective workers in a modern knowledge-based economy and society.”²²⁴⁴ The PCEIP examined Statistics Canada data on unemployment rates and earnings for different levels of educational attainment and found that in 2000 the unemployment rate for men and women (all ages) without high school diplomas was 10%, compared to 4% for university graduates and 5% for college and trade graduates.²²⁴⁵

The gap is even more marked for younger workers. In 2000, the unemployment rate for Canadian workers aged 25–29 with less than a high school diploma was more than three times higher than for those with a university education.²²⁴⁶

The PCEIP report also found that educational attainment had a “strong impact on earnings,” and that in fact, for many individuals, the promise of higher earnings is an incentive for pursuing further education. For example, in 1999 in Canada, the mean earnings (before taxes) for university graduates were 62% higher than the earnings for those with only high school diplomas. As well, those who did not complete high school earned 21% less than those who did.²²⁴⁷

²²⁴² Ibid., accessed.

²²⁴³ Ibid., accessed.

²²⁴⁴ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, accessed.

²²⁴⁵ Ibid., accessed.

²²⁴⁶ Ibid., accessed.

²²⁴⁷ Ibid., accessed.

Earnings by level of education and age have been well documented, and the evidence does not need to be repeated in detail here beyond a few basic facts.

According to Statistics Canada, a higher education is a “gateway” to higher earnings. More than 60% of people in the lowest earnings category did not have a high school education in 2000, while more than 60% of those in the top income category had a university degree. However, the census data also indicate that those in older age groups and with more work experience made the most significant gains in earnings over time.²²⁴⁸

According to the Conference Board of Canada, employability skills are just as, if not more, important than formal educational attainment when it comes to economic productivity and success in the labour force. According to the Conference Board, employability skills and attitudes include:²²⁴⁹

- reading text
- document use
- writing
- numeracy
- oral communication
- thinking skills (problem-solving, decision-making, job task planning and organization, significant use of memory and finding information)
- computer use
- being positive, responsible and adaptable
- learning continuously
- working safely
- working with others (teamwork)
- participating in projects and tasks

According to the U.S. Department of Education, education and skills affect worker productivity, mainly because they “expand a worker’s capacity to perform tasks or to use productive technologies.”²²⁵⁰ Also, the Department found, the more educated a worker, the better able she or he is to adapt to changes in the workplace and to work effectively in a team.

One way of measuring the impact of education on worker productivity is by estimating the impact of education on wages, which is, according to one U.S. study, the best available measure of a worker’s productivity. In the U.S., as in Canada, workers with

²²⁴⁸ Statistics Canada. "Census of Population: Earnings, Levels of Schooling, Field of Study and School Attendance." *The Daily*, March 11, 2003, accessed December 2004; available from <http://www.statcan.ca/Daily/English/030311/d030311a.htm>.

²²⁴⁹ Conference Board of Canada. *Performance and Potential 2004-05: How Can Canada Prosper in Tomorrow's World?*, Conference Board of Canada, 2004.

²²⁵⁰ Worker productivity here is defined as output per worker per hour worked. In addition to education, there are other factors that influence productivity: including capital investment, technical innovation, foreign trade, and government regulation.

higher educational attainment are unemployed less and earn more than workers with lower educational attainment.²²⁵¹

According to a study by Statistics Canada, literacy accounts for about one-third of the estimated 'return on education': "Each additional year of education raises the annual earnings by about 8.3%. Of that, about 3.1 percentage points result from the combined influences of education on literacy and, in turn, literacy on earnings."²²⁵²

In another study for Statistics Canada, Lars Osberg showed that for men employed full time and full year, literacy accounts for about 30% of the economic return from education.²²⁵³

According to the Conference Board of Canada, increases in skills stimulate economic growth:

Differences in average literacy and numeracy skills explain 55 per cent of differences in GDP per capita observed in the period 1960–1995. If this relationship holds, a 1 per cent average increase in literacy and numeracy skills would yield a 1.5 per cent permanent increase in GDP per capita. This is three times the return associated with investments in physical capital.²²⁵⁴

36.5.2 Brain drain, brain gain

The topic of brain drain from Canada made headlines in the mid-1990s, after the country experienced an increase in the number of highly educated people—scientists, engineers, technology experts, and medical professionals—leaving Canada for the United States and other countries. While out-migration was not new for Canada, this time it raised concerns that losing so many highly educated Canadians would ultimately limit the country's ability to compete successfully in the global economy. A review of the literature on the topic showed that the verdict on brain drain is mixed and that while some researchers argue that brain drain is a significant problem, there are others who do not see it as a problem at all. While a certain number of highly educated people leave the country, the numbers emigrating are relatively small compared to past decades. In addition, Canada gains an even greater number of highly skilled professionals from around the world than it loses.²²⁵⁵ However, there are those who argue that the losses, however small, still have

²²⁵¹ U.S. Department of Education. *Education Indicators and the Economy: An Indicators Report*, Washington, DC: National Centre for Education Statistics, 1997.

²²⁵² Green, David A., and W. Craig Riddell. *Literacy, Numeracy and Labour Market Outcomes in Canada*, Catalogue no. 89F0125XIE, Ottawa: Statistics Canada, 2001.

²²⁵³ Osberg, Lars. *Schooling, Literacy and Individual Earnings*, Catalogue no. 89F0120XIE, Ottawa: Statistics Canada, 2000.

²²⁵⁴ Conference Board of Canada. *Performance and Potential 2004-05: How Can Canada Prosper in Tomorrow's World?*

²²⁵⁵ Torjman, Sherri. *Forum: Brain Drain, Brain Gain Session Proceedings*, Ottawa, Caledon Institute of Social Policy, St. Lawrence Forum, Maytree Foundation, May 25, 2000; accessed August 2005; available from http://www.maytree.com/PDF_Files/BrainDrain.pdf, p. 4-5.

a negative impact on Canada's economy.²²⁵⁶ Much of the literature brings attention to national policy issues by questioning both the success of government settlement programs designed to help newcomers adjust and find economic success, and Canada's international policies related to recruitment practices of highly educated professionals in developing countries.

There were sharp increases in the numbers of temporary U.S. visas issued to Canadians in the mid-1990s, with about 80% of those being work visas under the North American Free Trade Agreement (NAFTA). As the demand for high-tech professionals increased worldwide, many Canadian professionals emigrated to the U.S. and other countries for higher paying jobs and more career opportunities.²²⁵⁷

Budget cuts in Canada's health care industry during this time also led to a large number of physicians, nurses, and other health care professionals leaving Canada for jobs in the United States. Many health care jobs had been eliminated in Canada, leaving some nurses without work and others working for considerably less pay than they could get in the U.S. Canadian nurses could easily find better paid work in the U.S., which had been experiencing a shortage of nurses nationwide for several years, and NAFTA made the process easy. Hospital budget cuts may have had an effect on physicians as well, and many doctors and other medical professionals also opted to leave Canada during these years. According to Gray, some left in protest against the changing national health care policies; others left to take advantage of higher salaries and more opportunities to practice within their medical specialty. In some cases, physicians with incomes above \$150,000 may also have found the U.S. tax situation more appealing.²²⁵⁸ Nevertheless, in even the most affected occupations, such as doctors and nurses, the proportions being lost are relatively small.²²⁵⁹

To find out more about Canadians who left Canada for the U.S., Statistics Canada surveyed Canadian graduates from the class of 1995 who were living in the U.S. The Statistics Canada study showed that most of the recent emigrants were above average academically. The majority had been in the top ten percent of their graduating class, and a large percentage had received scholarships. This fuelled the concern that Canada was losing its "best and brightest" individuals to the U.S. and also that Canada was funding their education.²²⁶⁰

²²⁵⁶ Murray, Scott. *Panelist: Brain Drain, Brain Gain Session Proceedings*, Ottawa, Caledon Institute of Social Policy, St. Lawrence Forum, Maytree Foundation, May 25, 2000; accessed August 2005; available from http://www.maytree.com/PDF_Files/BrainDrain.pdf p. 6-8.

²²⁵⁷ Schwanen, Daniel. *Putting the Brain Drain in Context: Canada and the Global Competition for Scientists and Engineers*, C.D. Howe Institute, Commentary No. 140, 2000; accessed August 2005; available from <http://www.cdhowe.org/english/publications/currentpubs.html>.

²²⁵⁸ Gray, Charlotte. "How Bad Is the Brain Drain," *Canadian Medical Association Journal*, vol. 161, no. 8, 1999: 1028-1029.

²²⁵⁹ Murray. *Panelist: Brain Drain, Brain Gain Session Proceedings*, accessed.

²²⁶⁰ Frank, Jeffery, and Eric Belair. *South of the Border: Graduates from the Class of '95 Who Moved to the United States*, Human Resources Development Canada and Statistics Canada, Catalogue No. 81-587-XIE, 1999; accessed September 2005; available from <http://www.statcan.ca:80/bsolc/english/bsolc?catno=81-587-X>.

John Helliwell and David F. Helliwell, who studied University of British Columbia (UBC) graduates, argue that the movement of highly educated academics is not surprising. Those with Ph.D.s are much more likely to emigrate than graduates with masters or bachelors degrees. Many Ph.D.s often have to travel some distance to pursue careers in their specialty, following the availability of university positions and research grants. But the authors are not convinced that the brain drain from Canada is increasing. Their study reports that UBC graduates with Bachelors degrees who are not living in BC are 61 times more likely to be living elsewhere in Canada than in the U.S., after adjusting for the effects of population, distance, and incomes. They also point to evidence that many Canadians who leave eventually return to Canada. They conclude that, consistent with the data from the U.S. Bureau of the Census, the UBC graduate data show that the past five decades have seen continuing reductions in the shares of UBC graduates living in the United States.²²⁶¹

Serge Nadeau and his colleagues at Industry Canada argue that even though the numbers of Canadians permanently leaving for U.S. jobs is currently small, especially when compared to the 1950s and 1960s, their loss is damaging to the Canadian economy.²²⁶²

While the composition of permanent leavers has been shifting toward the more highly skilled, the size of the outflow remains small—about 0.1 percent of the skilled labour force in 1997. Furthermore, Canada gains four knowledge workers from abroad for every one knowledge worker we lose to the United States. The fact that Canada is a net gainer of skilled workers on balance is important, but we should also be concerned about the gross outflow. While Canada gains many skilled workers from abroad, which represents a societal gain, any emigration out of Canada subtracts from our stock of skilled workers and involves a loss of societal investments in their human capital formation.²²⁶³

Nadeau, et al. point out that since the North American Free Trade Agreement (NAFTA), workers can renew their visas each year and can potentially remain in the U.S. indefinitely. They also point out that only one in five of the graduates surveyed by Statistics Canada in 1995 had returned to Canada by 1999. In addition to issues around the numbers and dollars lost to emigration, there is also fear that Canada is losing talented individuals who could make enormous economic and social contributions in the future. This fear is certainly true for poorer and less developed nations, but also perhaps deserves some consideration by developed nations as well.²²⁶⁴

Gangan Prathap, in “A Soft Mathematical Model for Brain Drain,” suggests that 80% of all major intellectual and social revolutions originate from about 20% of the population, and that a much smaller fraction (less than 1% of a population) accounts for most major

²²⁶¹ Helliwell, John, and David F. Helliwell. "Tracking UBC Graduates: Trends and Explanations," *ISUMA: Canadian Journal of Policy Research*, vol. 1, no. 1, 2000.

²²⁶² Nadeau, Serge, Lori Whewell, and Shane Williamson. "Issue Brief: Beyond the Headlines on the 'Brain Drain'," *ISUMA: Canadian Journal of Policy Research*, vol. 1, no. 1, 2000.

²²⁶³ Ibid.

²²⁶⁴ Ibid.

developments.²²⁶⁵ He suggests that truly brilliant minds, like Thomas Edison and Albert Einstein, for example, are rare. Even with small numbers, therefore, brain drain can be much more serious than just losing a number of highly educated people, especially for developing countries. It can also mean losing highly valuable “intellectual wealth.” Loss of intellectual wealth, in turn, could also mean loss of intangible assets such as ideas, know-how, creativity, and imagination, which are vital assets for a thriving economy.²²⁶⁶

However, the real problem with the debate since the mid-1990s is that “brain drain” is often not discussed in relation to Canada’s “brain gain,” and as a “net” rather than “gross” assessment. While an estimated 8,000 to 10,000 university-educated Canadians leave each year for the U.S. and an equal number go elsewhere in the world, Canada is gaining a huge influx of highly qualified immigrants, many of whom seem to be enjoying considerable economic success. In historical terms, the outflow of Canadians is the smallest it has been since 1851.²²⁶⁷ Between 1990 and 1996, Canada welcomed an average of 122,701 immigrants annually. According to Statistics Canada, the country gains four university-qualified people from around the world for every one lost to the U.S. and for every two going to all other countries including the U.S. According to Murray, the total number of Masters and Doctoral graduates we attract annually exceeds the total number of university-educated lost to the United States.²²⁶⁸

Murray also notes that in the 1990s there has been some deterioration in how successfully immigrants have integrated into the Canadian economy. Statistics Canada reports that 85% of immigrants find work in the occupation that was intended at the time of immigration, and they have lifetime earnings that are actually higher than equally qualified Canadians. On the other hand, there are barriers for some immigrants related to recognition of credentials, lack of labour market information and Canadian work experience.²²⁶⁹ Even with a high influx of highly educated professionals, Canada may not be taking full advantage of the intellectual talent coming into the country.

A report from the right of centre C. D. Howe Institute suggests an imbalance in the exchange between highly educated Canadians emigrating to the U.S. and their highly educated replacements. While Canadian born professionals in the U.S. quickly experience labour market outcomes at least on par with their U.S.-born counterparts, the report says that immigrants to Canada need, on average, ten or more years to match the performance of their Canadian counterparts. As well, the report contends that many new immigrants to Canada require more resources such as language training, and that the government incurs other settlement costs before they can participate fully in the Canadian

²²⁶⁵ Prathap, Gangan. "A Soft Mathematical Model for Brain Drain," *Current Science*, vol. 85, no. 5, 2003: 593-596.

²²⁶⁶ Gertler, Meric S. "Urban Economy and Society in Canada: Flows of People, Capital and Ideas," *ISUMA: Canadian Journal of Policy Research*, vol. 2, no. 3, 2001; accessed September 2005; available from http://www.isuma.net/v02n03/gertler/gertler_e.shtml.

²²⁶⁷ Murray. *Panelist: Brain Drain, Brain Gain Session Proceedings*, accessed. p. 6.

²²⁶⁸ *Ibid.*, accessed. p. 6.

²²⁶⁹ *Ibid.*, accessed. p. 6.

economy.²²⁷⁰ The report seems to conclude that changes to Canada's tax system (i.e., lowering taxes) would "stem the outflow of Canadian talent."²²⁷¹

However, not all agree that "brain drain" has anything to do with Canada's taxation system.

We have seen that the generation, attraction and retention of potentially footloose talent—the most crucial resource in the knowledge-based or learning economy—depend much more on considerations such as local quality of life: the attractiveness and condition of the natural environment and built form, the quality of schools and the richness of cultural amenities. They also depend heavily on the diversity of available opportunities for subsequent career advancement (and related to this, the potential that one's spouse will also be able to find appropriate work in the same local labour market). Also important are social harmony and safety from crime—both arguably the result of social and economic policies that prevent economic disparities from growing to socially destabilizing levels.²²⁷²

Costs associated with out-migration and the reception of people into the country are referred to as "churning costs," and these could amount to millions or even billions of dollars depending on how the assessment is made and which costs are included in the equation. If the costs of past investment in the postsecondary education of emigrants and the loss of tax revenue through their emigration to the U.S. and elsewhere are included in the ratio, along with settlement costs such as language training and skills upgrading for new immigrants, then the net price tag of substituting highly educated new immigrants for equally qualified emigrants could be very high.²²⁷³

Table 34 below shows the immigration figures by province for 2002. According to data from Canadian Citizenship and Immigration, all of Atlantic Canada combined got 1.15% of the total immigrants in 2002, while Toronto got nearly half (112,000) of all immigrants. In addition, as the table illustrates, just two developing countries, China and India, accounted for 27% of all immigrants to Canada in 2002. Furthermore, according to Statistics Canada's 2001 Census data, reported by the Pan-Canadian Education Indicators Program (PCEIP), fully 41% of all working-age immigrants who arrived in Canada during the 1990s were university trained, and an additional 21% had either a college diploma or a trade certificate—totalling 62%. This compares to 48% of immigrants of the 1980s and 1970s.²²⁷⁴

Some worry that the highly publicized debate around the brain drain from Canada has been too narrow, focusing only on the north-south migration from Canada to the U.S. There is a fear, for example, that this narrow approach may threaten to influence

²²⁷⁰ Schwanen. *Putting the Brain Drain in Context: Canada and the Global Competition for Scientists and Engineers*, accessed.

²²⁷¹ *Ibid.*, accessed.

²²⁷² Gertler. "Urban Economy and Society in Canada: Flows of People, Capital and Ideas."

²²⁷³ Torjman. *Forum: Brain Drain, Brain Gain Session Proceedings*, accessed.

²²⁷⁴ Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program, 2003*, accessed. p. 145.

government decision-makers to align Canada's employment, tax, and wage compensation systems more closely with the U.S. Further, this narrow focus has taken attention away from a much bigger global issue that arises from Canada's brain gain from the rest of the world.^{2275, 2276}

The U.S., Canada, Australia, and Western Europe account for 93% of all migratory movement of skilled workers. Their gain in intellectual talent frequently results in a huge loss in intellectual and human capital for developing nations. This, in turn, has a major adverse impact on the economies of many poor nations and on their ability to make headway toward prosperity. Unlike Canada, most of these developing countries do not have the capacity to attract replacements for their highly educated emigrants, which adds to the problem.

The health care industry in poor countries has suffered the most from the emigration of highly skilled and educated professionals. Ian Couper and Paul Worley, discussing the ethics of international recruitment, make several suggestions for alleviating the burden that brain drain puts on developing countries. In addition to training more doctors, they call for governments in the rich countries to put a stop to aggressive recruitment practices such as advertising in developing countries' medical journals, visiting those countries to lure health professionals, and paying large sums of money to local recruiters to identify potential candidates. Further, they suggest that if industrialized nations do recruit from developing countries, they could pay compensation to those countries, a recommendation that was adopted by the 4th World Rural Health Conference in Calgary in 2000. While Couper and Worley do acknowledge that Canada and the United Kingdom have recently increased their medical student numbers in order to reduce their reliance on foreign doctors, they also point out that the South African Medical Journal has an average of ten pages taken up with advertisements for overseas posts, mostly for rural positions in Canada, Australia, and New Zealand.²²⁷⁷

Sherri Torjman, Vice President of Caledon Institute of Social Policy, brings to the brain drain discussion related Canadian policy issues that may need to be addressed. She questions whether or not there is a contradiction between Canada's immigration policies in which Canada actively seeks skilled people from the developing world, and its foreign aid practices of sending money and other assistance to deal with the problems of loss of human capital they have helped to create.²²⁷⁸

The debate on whether or not Canada is losing too many educated people to the U.S. may soon turn out to be a moot point. In an article published by The Conference Board, a nonprofit business and research agency in the United States, titled *America's Best and Brightest are Leaving and Taking the Creative Economy with Them*, Richard Florida

²²⁷⁵ Torjman. *Forum: Brain Drain, Brain Gain Session Proceedings*, accessed.

²²⁷⁶ Gertler. "Urban Economy and Society in Canada: Flows of People, Capital and Ideas."

²²⁷⁷ Couper, Ian, and Paul Worley. *The Ethics of International Recruitment (Editorial)*, Rural and Remote Health, 2002; accessed December 2005; available from http://www.regional.org.au/au/rrh/editorial/ed_14.htm.

²²⁷⁸ Torjman. *Forum: Brain Drain, Brain Gain Session Proceedings*, accessed.

points out that booming urban regions like Brussels, Toronto, Vancouver, Sydney, and Melbourne are fast becoming “creative economies” that now rival and may soon surpass many leading U.S. cities like New York, Los Angeles, Boston, Seattle, and Austin. Many of these new rival cities offer highly attractive inducements such as beautiful waterfronts and countrysides, and great outdoor life. Further, they are safe and not at war. According to Florida, these cities are beginning to draw talent from around the world—even the U.S.²²⁷⁹

As other nations become more attractive, the U.S. may also be losing popularity among the mobile immigrating population. The National Science Board found that the U.S. issued 74,000 visas for immigrants to work in science and technology in 2002, an astonishing 55% drop from the previous year. These declines were due to a drop in applications, not applications refused because of security concerns, a U.S. practice that has seen an increase since September 11, 2001.²²⁸⁰

Florida also cites growing evidence that many current immigrants are becoming increasingly dissatisfied with living in the United States. U.S. immigrants claim they are often hounded by the immigration agencies as potential security threats, and they see the U.S. losing its standing as an open society. This perception may be contributing to the loss of immigrants or may be deterring others from making the U.S. their country of choice. Another contributing factor to immigrant dissatisfaction and potential deterrence of talent, according to Richard Florida, is the political polarization within the U.S.—by ethnic group, sexual preference, economic standing, religious and political affiliations—all of which are making the United States less attractive to foreign talent. If this turns out to be the trend, then Canada and other countries stand to benefit as the U.S. loses its appeal.²²⁸¹

The most recent debate on brain drain or brain gain in Canada has brought new challenges for Canada. Further exploration of the movement of people in and out of the country might help to explain more about why people come to Canada and what keeps them here. Analysis of national policies might also help to identify the improvements that the country can make to ensure the success of newcomers, and point to ways in which Canada can become a true land of opportunity while maintaining its ethical and moral responsibilities within the global community.

²²⁷⁹ Florida, Richard. *America's Best and Brightest Are Leaving and Taking the Creative Economy with Them*, The Conference Board: Across the Board, 2004; accessed October 2005; available from <http://www.conference.board.org/publications>.

²²⁸⁰ Ibid., accessed.

²²⁸¹ Ibid., accessed.

Table 34. Immigration by province and census metropolitan area (principal applicants and dependants), 2002

Province or census metropolitan area	Total number of people
St. John's	266
Other Newfoundland	139
Total Newfoundland	405
Total Prince Edward Island	110
Halifax	1,129
Other Nova Scotia	290
Total Nova Scotia	1,419
Saint John	166
Other New Brunswick	544
Total New Brunswick	710
Québec	1,335
Montréal	32,998
Ottawa–Hull (QC)	657
Other Quebec	2,629
Total Quebec	37,619
Ottawa–Hull (ON)	7,151
Toronto	111,564
Hamilton	3,078
London	1,709
Other Ontario	10,115
Total Ontario	133,617
Winnipeg	3,810
Other Manitoba	811
Total Manitoba	4,621
Regina	553
Saskatoon	709
Other Saskatchewan	403
Total Saskatchewan	1,665
Calgary	9,038
Edmonton	4,225
Other Alberta	1,466
Total Alberta	14,729
Vancouver	29,922
Victoria	754
Other British Columbia	3,324
Total British Columbia	34,000

Province or census metropolitan area	Total number of people
Total Yukon	48
Total Northwest Territories	61
Total Nunavut	12
Not Stated	42
Total	229,058

Source: Canadian Citizenship and Immigration. *The Monitor*, Summer 2004, <http://www.cic.gc.ca/english/monitor/current.html>.

Table 35. Immigration by top ten source countries, 2002

Country	Total number of people
China, People's Republic of	33,231
India	28,811
Philippines	11,000
Pakistan	14,164
Korea, Republic of	7,326
Romania	5,692
United States	5,287
United Kingdom	4,719
Iran	7,742
Sri Lanka	4,958
Total - Top Ten Only	122,930
Total - Other Countries	106,128
Total	229,058

Source: Canadian Citizenship and Immigration. *The Monitor*, Summer 2004, <http://www.cic.gc.ca/english/monitor/current.html>.

Table 36. Levels of educational attainment among immigrants of the 1970s, 1980s and 1990s, Canada, 2001

Immigrants by decade	Percentage of total
Immigrants of the 1970s:	
Less than high school	33
High school	19
Trades	14
College	12
University	22
TOTAL WITH UNIVERSITY, COLLEGE OR TRADE	48
Immigrants of the 1980s:	
Less than high school	27
High school	24
Trades	11
College	13
University	25
TOTAL WITH UNIVERSITY, COLLEGE OR TRADE	48
Immigrants of the 1990s:	
Less than high school	20
High school	19
Trades	8
College	13
Universtiy	41
TOTAL WITH UNIVERSITY, COLLEGE OR TRADE	62

Note: Data includes immigrants aged 25–64 who arrived in the ten years preceding the 1981, 1991, and 2001 censuses, respectively.

Source: Council of Ministers of Education Canada (CMEC). *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program, 2003*, Ottawa, CMEC and Statistics Canada, Catalogue no. 81-582-XIE, 2003; accessed January 2006; available from <http://www.statcan.ca/english/freepub/81-582-XIE/2003001/pdf/81-582-XIE03001.pdf>. Table D6.6.

36.6 Education and crime

As cited in the GPIAtlantic report, *The Cost of Crime in Nova Scotia*, according to Statistics Canada, only 19% of the Canadian population as a whole have less than a grade 10 education. However, a Canadian Centre for Justice Statistics survey of prison inmates found that 36% of all inmates, 34% of provincial inmates, and 46% of federal prisoners, who are the most serious offenders, have less than a grade 10 education. Since offenders given sentences of two years or more serve their time in federal facilities, there appears to be a direct correlation between poor education and propensity to offend / seriousness of offence. By contrast, crime rates appear to go down in direct proportion to level of education. While this certainly does not prove that poor education causes crime, the correlation does indicate that investments in education are likely to produce positive spin-off benefits in reduced crime.²²⁸²

In sum, the evidence on health, work, crime, human impact on the environment, and other issues directly affecting wellbeing, indicates that education and learning have profound effects on a wide range of social, economic, and environmental variables. To a significant extent, therefore, indicators of an educated populace must be related to these broader societal outcomes.

²²⁸² Dodds, Colin, and Ronald Colman. *The Cost of Crime in Nova Scotia*, Genuine Progress Index Atlantic (GPI Atlantic), 1999; accessed December 2005; available from <http://www.gpiatlantic.org/publications/socialcapital.shtml - crime>.

APPENDICES

Appendix 1: Three-Dimensional Wisdom Scale (3D-WS)

Cognitive Dimension of the 3D-WS:

How strongly do you agree or disagree with the following statements?

(1 = strongly agree to 5 = strongly disagree)

1. Ignorance is bliss.
2. It is better not to know too much about things that cannot be changed.
3. In this complicated world of ours, the only way we can know what's going on is to rely on leaders or experts who can be trusted.
1. There is only one right way to do anything.
2. A person either knows the answer to a question or he / she doesn't.
3. You can classify almost all people as either honest or crooked.
4. People are either good or bad.
5. Life is basically the same most of the time.

How much are the following statements true of yourself?

(1 = definitely true of myself to 5 = not true of myself)

6. A problem has little attraction for me if I don't think it has a solution.
7. I try to anticipate and avoid a situation where there is a likely chance I will have to think in depth about something.
8. I prefer just to let things happen rather than try to understand why they turned out that way.
9. Simply knowing the answer rather than understanding the reasons for the answer to a problem is fine with me.
10. I am hesitant about making important decisions after thinking about them.
11. I often do not understand people's behaviour.

Reflective Dimension of the 3D-WS:

How strongly do you agree or disagree with the following statements?

(1 = strongly agree to 5= strongly disagree)

1. Things often go wrong for me by no fault of my own.
2. I would feel much better if my present circumstances changed.

How much are the following statements true of yourself?

(1 = definitely true of myself to 5 = not true of myself)

3. I try to look at everybody's side of a disagreement before I make a decision.
(reversed)
4. When I'm upset at someone, I usually try to "put myself in his or her shoes"
for a while. (reversed)
5. I always try to look at all sides of a problem. (reversed)
6. Before criticizing somebody, I try to imagine how I would feel if I were in
their place. (reversed)
7. I sometimes find it difficult to see things from another person's point of view.
8. When I am confused by a problem, one of the first things I do is survey the
situation and consider all the relevant pieces of information. (reversed)
9. Sometimes I get so charged up emotionally that I am unable to consider many
ways of dealing with my problems.
10. When I look back on what has happened to me, I can't help feeling resentful.
11. When I look back on what's happened to me, I feel cheated.
12. I either get very angry or depressed if things go wrong.

Affective dimension of the 3D-WS:

How strongly do you agree or disagree with the following statements?

(1 = strongly agree to 5 = strongly disagree)

1. I am annoyed by unhappy people who just feel sorry for themselves.
2. People make too much of the feelings and sensitivity of animals.

3. There are some people I know I would never like.
4. I can be comfortable with all kinds of people. (reversed)
5. It's not really my problem if others are in trouble and need help.

How much are the following statements true of yourself?

(1 = definitely true of myself to 5 = not true of myself)

6. Sometimes I don't feel very sorry for other people when they are having problems.
7. Sometimes I feel a real compassion for everyone. (reversed)
8. I often have not comforted another when he or she needed it.
9. I don't like to get involved in listening to another person's troubles.
10. There are certain people whom I dislike so much that I am inwardly pleased when they're caught and punished for something they have done.
11. Sometimes when people are talking to me, I find myself wishing that they would leave.
12. I'm easily irritated by people who argue with me.
13. If I see people in need, I try to help them one way or another. (reversed)

Source: Ardel, Monika. "Empirical Assessment of a Three-Dimensional Wisdom Scale." *Research on Aging*, 25, no. 3 (2003): 275-324. pp. 316-318.

Appendix 2: European Commission “Quality Indicators for Lifelong Learning”

Area A: Skills, Competencies and Attitudes	Definition	Data
1. Literacy	Percentage of students per country at proficiency level 1 or below on the PISA reading literacy scale	youth-PISA; adult-IALS
2. Numeracy	Percentage of students per country below the score of 380 points on the PISA mathematical literacy scale	youth-PISA; adult-IALS
3. New Skills in the Learning Society	Percentage of students per country below the score of 400 points on the PISA scientific literacy scale	Basic competencies in mathematics, science, and technology, scientific literacy, foreign languages, ICT skills and use of technology, learning to learn, social skills, entrepreneurship, general culture
4. Learning-to-Learn Skills	Percentage of students per country in the lower 25% of overall performance on the PISA “elaboration strategies” index	PISA elaboration index
5. Active Citizenship Cultural and Social Skills	Qualitative indicator on civic knowledge, civic engagement and civic attitudes across countries from the IEA study	Civic knowledge, civic engagement, civic attitudes; different sources
Area B: Access and Participation	Definition	Data
6. Access to Lifelong Learning	Tentative indicators: non-traditional students accessing the formal system, linkages and pathways between different learning systems and routes, and the provision of mechanisms for accreditation and certification; non-formal education and training; access to informal learning opportunities;	Data sources unavailable; further work needed

	time series data to perform monitoring over time	
7. Participation in Lifelong Learning	Participation in education and training of those aged 25 to 64	Labour force surveys; early school leavers surveys
Area C: Resources for Lifelong Learning	Definition	Data
8. Investment in Lifelong Learning	Total public expenditure on education as a percentage of GDP	National accounts
9. Educators and Training	Percentage of teachers having received education and training during the previous four weeks	Labour force survey
10. Information and Communication Technology (ICT) in Learning Area	Percentage of households who have Internet access	Household surveys
Area D: Strategies and System Development	Definition	Data
11. National Strategies of Lifelong Learning*	Member States' positions on developing lifelong learning strategies	European Commission: Joint Employment Report, 2001
12. Coherence of Supply	Supply & demand of lifelong / lifewide learning opportunities. Tentative indicators: percentage of elements in strategy plans matched by concrete, available supply; degree of coverage of demand (formal, nonformal informal) by strategy plans	Data sources unavailable; further work needed
13. Counselling and Guidance	Tentative indicators: target group coverage of guidance and counselling; social, economic, and learning benefits from counselling and guidance; qualifications of guidance and counselling practitioners; frequency of in-service training of practitioners.	Data sources unavailable; further work needed
14. Accreditation and Certification	Assessments for prior learning and informal learning	Data sources unavailable; further work needed

15. Quality Assurance	Tentative indicators: p Product level—skills and competencies (Level A); process level—coherence of supply, access, and cost	Data sources unavailable; further work needed Possible examples: national achievement tests and evaluations made by independent governmental or private institutions; evaluations made by independent private or governmental institutions, inspectorates and systematic in-service training of teaching professionals

***Strategies of Lifelong Learning categories** (measured as adequate, partial, insufficient)

Comprehensiveness of strategies

- Compulsory education
- Formal adult education / training
- Workplace / other non-formal / recognized prior learning
- Focus on disadvantaged groups
- Overall investment / funding schemes

Coherence of strategies

- System development (policy needs, planning, targets, implementation, monitoring)
- Partnership working (social partners, public authorities, learning providers, civil society)
- Cross-cutting aspects (advice / guidance services, education / training mobility)

Source: Created from Working Group on Quality Indicators. *European Report on Quality Indicators of Lifelong Learning*. European Commission, 2002; accessed April 2005; available from http://europa.eu.int/comm/education/policies/lil/life/report/quality/report_en.pdf.

Appendix 3: Outcomes and indicators proposed for the United Nations Decade of Education for Sustainable Development (DESD)

Objective	Expected outcomes	Potential indicators	Potential data sources
1. Give an enhanced profile to the central role of education and learning in the common pursuit of sustainable development	Integration of educational components into plans for sustainable development	Education on regular agenda of CSD (Commission for Sustainable Development), regional, national and local sustainable development fora	Frequency of ESD in proceedings, minutes and other meeting outputs
	Assessment of the need for and role of ESD in all development planning	ESD factored into PRSPs (Poverty Reduction Strategy Paper) regional plans, and national planning cycles	Number of PRSPs with ESD component; number of specific ESD sections in development planning documents
2. Facilitate links and networking, exchange and interaction among stakeholders in ESD	Through consultations and fora of all kinds and at all levels: Growing consensus on the strategic importance of ESD	Incorporation of ESD into Education Ministry structures and plans, and into CS (Civil Society) and NGO actions	Numbers of CSOs (Civil Society Organization) and NGOs including specific ESD provision in their programmes
	Growing cooperation and mutual reinforcement among ESD initiatives	Creation of ESD networks and alliances Joint programming between government, CS and NGOs at all levels	Numbers and membership of ESD networks and alliances Numbers of joint initiatives and numbers of bodies participating in them

3. Provide a space and opportunity for refining and promoting the vision of, and transition to sustainable development – through all forms of learning and public awareness	Broad public awareness of the nature and principles of sustainable development	Popular participation in sustainable development events, campaigns, fora Participation in local, practical sustainable development initiatives	Level of unsolicited feedback from the public on sustainable development issues Numbers of initiatives and levels of participation
	Regular and substantial media presence for sustainable development issues	TV, radio and press coverage of sustainable development and ESD	Numbers of reports, editorials and articles on sustainable development
4. Foster increased quality of teaching and learning in education for sustainable development	The thread of sustainable development woven into EFA [Education For All] efforts to raise educational quality	Use of sustainable development themes in basic education Sustainable development a key indicator in EFA monitoring	Numbers of countries with sustainable development in basic education curricula Regular sustainable development monitoring in national and international EFA reports
	ESD-specific approaches increasingly adopted in learning situations of all kinds	Modelling of sustainable development learning processes and in formal and non-formal settings	Number of schools and nonformal programmes modelling sustainable development approaches
5. Develop strategies at every level to strengthen capacity in ESD	ESD as part of educator training	Integration of sustainable development principles into teacher and educator/ facilitator training	Numbers of teacher training courses with integrated sustainable development theme; numbers of NFE educators/facilitators using sustainable development approaches
	High-quality materials and methodologies in ESD	Relevant, stimulating, practical print, electronic, audio-visual materials available in learning situations and in use Learning/teaching methodologies	Numbers of materials, distribution and rates of adoption Numbers of schools adopting sustainable development principles;

		reflecting sustainable development principles and modelling them	number of in-service teacher/ educator training courses
	Adequate management capacity to maintain ESD	ESD integrated into education management training (head teachers, inspectors, administrators, planners, etc)	Numbers of trained managers; numbers of educational institutions where sustainable development approaches are active

Source: Adapted from United Nations Educational, Scientific and Cultural Organization (UNESCO). *U.N. Decade of Education for Sustainable Development 2005-2014. International Implementation Scheme (Draft)*. UNESCO, 2005; accessed April 2005; available from http://portal.unesco.org/education/admin/ev.php?URL_ID=36026&URL_DO=DO_TOPIC&URL_SECTION=201&reload=1099410445, p 42-44.

Appendix 4: Views of Nature of Science questionnaire, Form C (VNOS-C)

1. What, in your view, is science? What makes science (or a scientific discipline such as physics, biology, etc.) different from other disciplines of inquiry (e.g., religion, philosophy)?
2. What is an experiment?
3. Does the development of scientific knowledge require experiments?
 - If yes, explain why. Give an example to defend your position.
 - If no, explain why. Give an example to defend your position.
4. After scientists have developed a scientific theory (e.g., atomic theory, evolution theory), does the theory ever change?
 - If you believe that scientific theories do not change, explain why. Defend your answer with examples.
 - If you believe that scientific theories do change: (a) Explain why theories change; (b) Explain why we bother to learn scientific theories. Defend your answer with examples.
5. Is there a difference between a scientific theory and a scientific law? Illustrate your answer with an example.
6. Science textbooks often represent the atom as a central nucleus composed of protons (positively charged particles) and neutrons (neutral particles) with electrons (negatively charged particles) orbiting the nucleus. How certain are scientists about the structure of the atom? What specific evidence do you think scientists used to determine what an atom looks like?
7. Science textbooks often define a species as a group of organisms that share similar characteristics and can interbreed with one another to produce fertile offspring. How certain are scientists about their characterization of what a species is? What specific evidence do you think scientists used to determine what a species is?
8. It is believed that about 65 million years ago the dinosaurs became extinct. Of the hypothesis formulated by scientists to explain the extinction, two enjoy wide support. The first, formulated by one group of scientists, suggests that a huge meteorite hit the earth 65 million years ago and led to a series of events that caused the extinction. The second hypothesis, formulated by another group of scientists, suggests that massive and violent volcanic eruptions were responsible for the extinction. How are these different conclusions possible if scientists in both groups have access to and use the same set of data to derive their conclusions?
9. Some claim that science is infused with social and cultural values. That is, science reflects the social and political values, philosophical assumptions, and intellectual

norms of the culture in which it is practiced. Others claim that science is universal. That is, science transcends national and cultural boundaries and is not affected by social, political, and philosophical values, and intellectual norms of the culture in which it is practiced.

- If you believe that science reflects social and cultural values, explain why. Defend your answer with examples.
- If you believe that science is universal, explain why. Defend your answer with examples.

10. Scientists perform experiments / investigations when trying to find answers to the questions they put forth. Do scientists use their creativity and imagination during their investigations?

- If yes, then at which stages of the investigations do you believe scientists use their imagination and creativity: planning and design, data collection, after data collection? Please explain why scientists use imagination and creativity. Provide examples if appropriate.
- If you believe that scientists do not use imagination and creativity, please explain why. Provide examples if appropriate.

Source: Lederman, Norm G., Fouad Abd-El-Khalick, Randy L. Bell, and Renee S. Schwartz. "Views of Nature of Science Questionnaire: Toward Valid and Meaningful Assessment of Learners' Conceptions of Nature of Science." *Journal of Research in Science Teaching*, 39, no. 6 (2002): 497-521, p. 509.

Appendix 5: Science learning outcomes expected for grade 12 students in Canada (Council of Ministers of Education, Canada)

LIFE SCIENCE
<i>It is expected that students will...</i>
General learning outcomes:
compare and contrast the reproduction and development of representative organisms
determine how cells use matter and energy to maintain organization necessary for life
demonstrate an understanding of the structure and function of genetic material
analyse the patterns and products of evolution
compare and contrast mechanisms used by organisms to maintain homeostasis
evaluate relationships that affect the biodiversity and sustainability of life within the biosphere

EARTH AND SPACE SCIENCE (examples of expected outcomes)

EARTH SYSTEMS
STSE [Science, technology, society, and the environment]
<i>It is expected that students will...</i>
Nature of science and technology
explain how scientific knowledge evolves as new evidence comes to light and as laws and theories are tested and subsequently restricted, revised, or replaced (e.g., explain how worldwide monitoring of environmental changes such as atmospheric CO₂ or ozone levels has contributed to our understanding of global systems)
Relationships between science and technology
analyse and describe examples where scientific understanding was enhanced or revised as a result of the invention of a technology (e.g., describe how the development of the seismograph has helped determine the internal structure of Earth)
analyse and describe examples where technologies were developed based on scientific understanding (e.g., describe examples such as control techniques for shoreline erosion or the development of weather forecasting instruments)
analyse natural and technological systems to interpret and explain their structure and dynamics (e.g. explain the interactions of the atmosphere and the hydrosphere in the water cycle)
Social and environmental contexts of science and technology
debate the merits of funding specific scientific or technological endeavours and not others (e.g., debate the merits of funding projects such as the Lithoprobe, Deep Sea Drilling, and MOHO projects, which have increased our understanding of the Earth's crust.)

identify and describe science- and technology-based careers related to the science they are studying (e.g., describe examples such as hydrologist and meteorologist)
propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability (e.g., outline a strategy for groundwater protection that takes into account both its vulnerability and its economic importance)
Knowledge
<i>It is expected that students will...</i>
describe theories and evaluate the limits of our understanding of Earth's internal structure
classify rocks according to their structure, chemical composition, and method of formation
classify common minerals according to their physical and chemical characteristics
analyse the interactions between the atmosphere and human activities
describe the composition and structure of the atmosphere
describe the dominant factors that produce seasonal weather phenomena
describe the characteristics of Canada's three oceans
describe interactions of components of the hydrosphere, including the cryosphere
analyse energy and matter transfer in the water cycle
describe major interactions among the hydrosphere, lithosphere, and atmosphere
Illustrative example
Earth contains a variety of complex, yet interconnected systems. The major systems are generally referred to as Earth's spheres: atmosphere, hydrosphere, lithosphere, and biosphere, and within each are other systems or subsystems. It is important that students be introduced to the principal features of the atmosphere, hydrosphere, and lithosphere and how they interact with one another, because the physical setting for the biosphere is important. This illustrative example emphasizes the relationships between science and technology and the unifying concept of systems and interactions.
Application
- For participation in outdoor activities, knowledge of the weather and weather systems is very useful. To become familiar with weather predicting, students develop possible weather scenarios describing some atmospheric conditions. They then challenge other classmates to predict what the effects of those conditions could be on weather for the short term and the long term.

EARTH RESOURCES
STSE [Science, technology, society, and the environment]
<i>It is expected that students will...</i>
Nature of science and technology
identify various constraints that result in tradeoffs during the development and improvement of technologies (e.g., identify the need to minimize the

environmental impact of technologies that are being developed to efficiently extract natural resources)
Relationships between science and technology
describe and evaluate the design of technological solutions and the way they function, using scientific principles (e.g., evaluate the design of the technology used to recover oil or natural gas from the earth)
Social and environmental contexts of science and technology
analyse society's influence on scientific and technological endeavours (e.g. examine the social considerations related to the development of a natural resource near a park, protected area, or Aboriginal land)
provide examples of how science and technology are an integral part of their lives and their community (e.g., provide examples of Earth resources that are used in the community)
analyse from a variety of perspectives the risks and benefits to society and the environment of applying scientific knowledge or introducing a particular technology (e.g., analyse the risks and benefits of offshore oil and gas development)
propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability (e.g., attempt to reach consensus at a simulated town hall meeting called to discuss the potential development of a local natural resource)
Knowledge
<i>It is expected that students will...</i>
describe the importance of minerals and mineral exploration at the local, provincial, national, and global levels
describe the historical evolution of extraction and of the use of several resources obtained from the lithosphere
describe the processes and technologies involved in developing an Earth resource, from exploration to extraction to refining
identify factors involved in responsibly developing Earth's resources
Illustrative example
Many of Earth's resources are nonrenewable. In recent years, humans have become more aware of the need to recover and use resources in a responsible way. Students should develop an understanding and appreciation of the finite nature of Earth's resources and how these resources should be used to meet present needs, taking into account the needs of future generations. This illustrative example emphasizes the social and environmental contexts of science and technology.
Application
- Students role-play as investors and apply their knowledge to the interpretation of a mining company prospectus.

EARTH PROCESSES
STSE [Science, technology, society, and the environment]
<i>It is expected that students will...</i>
Nature of science and technology

describe the importance of peer review in the development of scientific knowledge (e.g., describe how the ideas of different scientists contributed to the evolution of the continental drift theory into the theory of plate tectonics)
compare processes used in science with those used in technology (e.g. compare the processes involved in the development of the seismograph with the use of the seismograph to understand earthquakes)
Relationships between science and technology
analyse and describe examples where technologies were developed based on scientific understanding (e.g., describe examples such as the development of a worldwide tsunami monitoring system)
describe and evaluate the design of technological solutions and the way they function, using scientific principles (e.g., use relevant scientific principles to describe how a seismograph functions)
Social and environmental contexts of science and technology
evaluate the design of a technology and the way it functions on the basis of a variety of criteria that they have identified themselves (e.g., evaluate the design of buildings designed to withstand earthquakes)
Knowledge
<i>It is expected that students will...</i>
describe methods of monitoring and predicting earthquakes, volcanic eruptions, and plate interactions
analyse evidence for plate tectonics theory
relate plate tectonics to the processes that change Earth's surface
Illustrative example
Geophysical studies of Earth have generated evidence that Earth's interior is a dynamic, moving environment that has caused mountains to rise, basins to sink, and entire land masses to move, resulting in continual rearrangement of the surface of the continents and the configuration of the oceans. These processes, which modify the shape of Earth's surface, form the basis of the plate tectonic theory. Students can be provided with an excellent opportunity to develop an understanding of plate tectonic theory by examining various Earth processes. This illustrative example emphasizes the relationships between science and technology.
Application
- Knowledge of earthquakes and information gathered from past experience may be used to create an emergency-response plan for a community located in a geologically active area.
- Devise a set of construction guidelines for public buildings or homes, or guidelines governing the types of housing allowed in a geologically active area.

HISTORICAL GEOLOGY
STSE [Science, technology, society, and the environment]
<i>It is expected that students will...</i>
Nature of science and technology
explain the importance of communicating the results of a scientific or technological endeavour, using appropriate language and conventions

(e.g., explain the importance of specifying absolute and relative dating information when describing a particular fossil)
distinguish between scientific questions and technological problems (e.g., distinguish between questions such as "How and why do the continents move?" and "How do we measure the rate at which they move?")
explain how scientific knowledge evolves as new evidence comes to light and as laws and theories are tested and subsequently restricted, revised, or replaced (e.g. explain how the principle of uniformitarianism was changed with the discovery of evidence for catastrophism)
Relationships between science and technology
analyse and describe examples where scientific understanding was enhanced or revised as a result of the invention of a technology (e.g., describe how radiometric dating techniques allow more accurate dating of rocks and fossils)
analyse and describe examples where technologies were developed based on scientific understanding (e.g., explain that radiometric dating techniques were developed from an understanding of radioactive decay)
Social and environmental contexts of science and technology
analyse the knowledge and skills acquired in their study of science to identify areas of further study related to science and technology (e.g., recognize fossil identification and radiometric data analysis as valuable skills for possible careers in paleontology or archaeology)
construct arguments to support a decision or judgement, using examples and evidence and recognizing various perspectives (e.g., prepare arguments, taking into account various perspectives within and outside the scientific community, to defend a position on the age of Earth)
Knowledge
<i>It is expected that students will...</i>
use appropriate evidence to describe the geologic history of an area
describe the evidence used to determine the age of Earth, and the historical evolution of establishing [earth's chronology]
Earth's chronology
illustrate the geologic time scale and compare to human time scales
compare and contrast the principles of uniformitarianism and of catastrophism in historical geology
explain the appropriate applications of absolute and relative dating
describe geological evidence that suggests life forms, climate, continental positions, and Earth's crust have changed over time
Illustrative example
Recent scientific and technological developments have enhanced our understanding of the history of Earth, but at the same time they have raised more questions. Since the human perception of time deals with relatively short periods, geologic time is a difficult concept for students to understand and appreciate. However, it is a critically important concept if students are to understand such concepts as the formation of planets, the movement of continents, the changing of climates, the evolution of organisms, and the development of mountains. This

illustrative example emphasizes the nature of science and technology.
Application
- Students complete an analysis of a fictional geological cross-section and utilize other data generated by relative dating to identify the age of particular fossils.
ASTRONOMY
STSE [Science, technology, society, and the environment]
<i>It is expected that students will...</i>
Nature of science and technology
explain the roles of evidence, theories, and paradigms in the development of scientific knowledge (e.g., describe the historical development of theories to explain the origin of the universe)
explain how a major scientific milestone revolutionized thinking in the scientific communities (e.g., explain how the discovery of the redshift in the spectra of stars contributed to our understanding of the nature of the universe)
analyse why and how a particular technology was developed and improved over time (e.g., conclude that the evolution of telescopes from the optical to radio to the Hubble was in response to humankind's search for knowledge about the universe, or that the use of constellations in navigation was in response to the need to extend the ability to travel over long distances on Earth)
Relationships between science and technology
describe and evaluate the design of technological solutions and the way they function, using scientific principles (e.g., describe the way a telescope functions using appropriate principles of optics)
Social and environmental contexts of science and technology
analyse why scientific and technological activities take place in a variety of individual and group settings (e.g., analyse the individual and group activities required to study various components of the universe)
analyse examples of Canadian contributions to science and technology (e.g., outline the role of the Canadarm in space exploration)
distinguish between questions that can be answered by science and those that cannot, and between problems that can be solved by technology and those that cannot (e.g., distinguish between questions such as "What information has science provided about the universe?" and "How well does science provide explanations for the origin and composition of the universe?")
Knowledge
<i>It is expected that students will...</i>
compare and contrast a variety of theories for the origin of the universe
describe tools and methods used to observe and measure the universe
identify and compare various components of the universe
compare characteristics of various galaxies
describe the life cycles of stars
compare the composition of stars at different stages of their life cycles
Illustrative example

The stars and other celestial objects have long held a fascination for humans. From the earliest times of recorded history, humans have attempted to explain what is in space. Students should be provided with opportunities to focus on the components of the universe beyond Earth and the solar system. Through various learning activities, students identify and describe the various components of the universe and develop an appreciation of the vast distances between these components. This illustrative example emphasizes the nature of science and technology and the unifying concept of similarity and diversity.

Application

- The study of star formation and evolution may help students understand the chemistry of Earth's rocks, air, water, and life.
- Students speculate about the possibility of life elsewhere in the universe. This could lead to a discussion of the necessary requirements for human life, and of the idea that different life forms may have different requirements

Source: Council of Ministers of Education, Canada. *Common Framework of Science Learning Outcomes, K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum*. Council of Ministers of Education, Canada, 1997; accessed December 2004; available from <http://www.cmec.ca/science/framework>.

Appendix 6: Sample Views of Science–Technology–Society (VOST) questions

40212. Scientists and engineers should be the ones to decide on Canadian air pollution standards (for example, industrial emissions of sulphur dioxide, pollution control gadgets for your car or truck, sour gas emissions from oil wells, etc.) because scientists and engineers are the people who know the facts best.
Your position, basically: (Please read from A to J, and then choose one.)
Scientists and engineers should decide:
A. because they have the training and facts which give them a better understanding of the issue.
B. because they have the knowledge and can make better decisions than government bureaucrats or private companies, both of whom have vested interests.
C. because they have the training and facts which give them a better understanding; BUT the public should be involved—either informed or consulted.
D. The decision should be made equally; viewpoints of scientists and engineers, other specialists, and the informed public should all be considered in decisions which affect our society.
E. The government should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
F. The public should decide because the decision affects everyone; BUT scientists and engineers should give advice.
G. The public should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and thus pay little attention to consequences.
H. I don't understand.
I. I don't know enough about this subject to make a choice.
J. None of these choices fits my basic viewpoint.
40217. Scientists and engineers should be the ones to decide on world food production and food distribution (for example, what crops to plant, where best to plant them, how to transport food efficiently, how to get food to those who need it, etc.) because scientists and engineers are the people who know the facts best.
Your position, basically: (Please read from A to J, and then choose one.)
Scientists and engineers should decide:
A. because they have the training and facts which give them a better understanding of the issue.
B. because they have the knowledge and can make better decisions than government bureaucrats or private companies, both of whom have vested interests.
C. because they have the training and facts which give them a better understanding; BUT the public should be involved — either informed or consulted.
D. The decision should be made equally; viewpoints of scientists and engineers, other specialists, and the informed public should all be considered in decisions which affect our society.
E. The government should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
F. The public should decide because the decision affects everyone; BUT scientists and engineers should give advice.
G. The public should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and

thus pay little attention to consequences.
H. I don't understand.
I. I don't know enough about this subject to make a choice.
J. None of these choices fits my basic viewpoint.
60611. Today in Canada, there are many more male scientists than female scientists. The MAIN reason for this is:
Your position, basically: (Please read from A to K, and then choose one.)
A. males are stronger, faster, brighter, and better at concentrating on their studies.
B. males seem to have more scientific abilities than females, who may excel in other fields.
C. males are just more interested in science than females.
D. the traditional stereotype held by society has been that men are smarter and dominant, while women are weaker and less logical. This prejudice has caused more men to become scientists, even though females are just as capable in science as males.
E. the schools have not done enough to encourage females to take science courses. Females are just as capable in science as males.
F. until recently, science was thought to be a man's vocation. (Women didn't fit television's stereotype image of scientist.) In addition, most women were expected to work in the home or take on traditional jobs. (Thus men have had more encouragement to become scientists.) But today this is changing. Science is becoming a vocation for women, and women are expected to work in science more and more.
G. women have been discouraged, or not allowed, to enter the scientific field. Women are just as interested and just as capable as men; but the established scientists (who are male) tend to discourage or intimidate potential female scientists.
H. There are NO reasons for having more male scientists than female scientists. Both sexes are equally capable of being good scientists, and today the opportunities are equal.
I. I don't understand.
J. I don't know enough about this subject to make a choice.
K. None of these choices fits my basic viewpoint.

Source: Aikenhead, Glen S., Alan G. Ryan, and Reg W. Fleming. *Views on Science-Technology-Society: Form Cdn.Mc.5*. University of Saskatchewan, 1989; accessed March 2005; available from <http://www.usask.ca/education/people/aikenhead/vosts.pdf>.

Appendix 7: Test of basic scientific literacy

<i>Nature of Science Subtest (NSST)</i>	
11031T*	Science assumes that the basic rules about how the universe operates are the same throughout the universe.
12101T	Scientific evidence can be biased (i.e., distorted) in the way that data are interpreted, recorded, reported or selected.
13072F*	Scientific fields such as chemistry and biology have fixed boundaries or borders.
<i>Science Content Knowledge Subtest (SCKST)</i>	
41011F	The Earth is as old as the universe.
42015F*	Compared to the Earth's diameter, a very thick blanket of air surrounds the entire Earth.
45011F*	In the universe, energy appears only in one particular form.
46011T	Nothing in the universe—from atoms to living things to stars—is at rest, but always moving relative to something else.
53051T	The chemical processes in the cell are controlled from both inside and outside the cell.
55021F	Only a small proportion of life on Earth is basically maintained by transformations of energy from the Sun.
55031T*	The elements that make up the molecules of living things are continuously recycled.
56031F	Life on Earth has existed for only a few thousand years.
61011F*	In most biological respects, humans are unlike other living organisms.
61061F*	Technology has been of little use to us in overcoming our biological disadvantages in our day-to-day lives.
65012F	In order to operate normally, the human body does not need replacement of the materials of which it is made.
<i>Impact of Science and Technology on Society Subtest (ISTSSST)</i>	
31091T*	In the short term, engineering affects societies and cultures more directly than scientific research.
32091F*	In spite of the great complexity of modern technological systems, all sideeffects of new technological designs are predictable (i.e., can be forecast).
33011F*	Social and economic forces within a country have little influence on what technologies will be developed within that country.

Note: The code before each question refers to the reference in *Science for All Americans*,²²⁸³ and the asterisk corresponds to benchmark statements in *Benchmarks for Science Literacy*.²²⁸⁴ The 'T' or 'F' at the end of the number denotes whether the item is true or false. (This is not shown on the test version.)

Source: Laugksch, R. C., and P. E. Spargo. "Construction of a Paper-and-Pencil Test of Basic Scientific Literacy Based on Selected Literacy Goals Recommended by the American Association for the Advancement of Science." *Public Understanding of Science*, 5, no. 4 (1996): 331–59, p. 351-352.

²²⁸³ American Association for the Advancement of Science (AAAS). *Science for All Americans*, AAAS, 1989; accessed March 2005; available from <http://www.project2061.org/tools/sfaaol/sfaatoc.htm>.

²²⁸⁴ American Association for the Advancement of Science (AAAS). *Benchmarks for Science Literacy (Project 2061)*, Oxford University Press, 1993; accessed March 2005; available from <http://www.project2061.org/tools/benchol/bolintro.htm>.

Appendix 8: Organisation for Economic Co-operation and Development (OECD), Science–Technology–Industry (STI) Scoreboard, 2003

A. Creation and Diffusion of Knowledge Indicators

Investments in knowledge
Domestic R&D expenditure
R&D financing and performance
Business R&D
Business R&D by industry
R&D in selected ICT industries and ICT patents
Business R&D by size classes of firms
R&D performed by the higher education and government sectors
Biotechnology R&D, venture capital and patents
Health-related R&D
Basic research
Defence R&D in government budgets
Space R&D and innovation
Tax treatment of R&D
Venture capital
Human resources
Flows of university graduates
Employment of tertiary-level graduates
Human resources in science and technology
Researchers
International mobility of human capital
International mobility of PhD students
Patent applications to the European Patent Office (EPO)
Patent families
R&D in non-OECD economies
Human resources in non-OECD economies
Scientific publications

B. Information Economy

Investment in ICT equipment and software
Occupations and skills in the information economy
Telecommunications networks
Internet infrastructure
Internet subscribers and number of secure servers
ICT access by households
Use of Internet by individuals
Internet access and use by enterprise size and industry

Internet and electronic commerce by size of enterprise
Internet and electronic commerce by activity of enterprise
Price of Internet access and use
Size and growth of the ICT sector
Contribution of the ICT sector to employment
Contribution of the ICT sector to international trade

C. Global Integration of Economic Activity

International trade and investment flows
Exposure to international trade competition by industry
Intra-firm trade in total trade
Import content of exports
Foreign direct investment flows
Cross-border mergers and acquisitions
Activity of affiliates under foreign control in manufacturing
Activity of affiliates under foreign control in services
Contribution of multinationals to value added and labour productivity Internationalization of manufacturing R&D
Cross-border ownership of inventions
International co-operation in science and technology
Technology balance of payments

D. Economic Structure and Productivity

Differences in income and productivity
Income and productivity
Labour productivity growth
Growth accounting
Labour productivity growth by industry
Technology and knowledge-intensive industries
Structure of OECD economies
Services sector value added embodied in manufactured goods
International trade by technology intensity
Trade in high and medium-high-technology industries
Revealed comparative advantage by technology intensity
Entry, exit, and survival of firms

Appendix 9: Typical Canadian research & development indicators

R&D

Gross Expenditures on R&D
Gross Domestic Expenditures on R&D as a percent of GDP (GERD / GDP)
Gross Expenditures on R&D per Capita
GERD by Performing Sectors
Government Expenditures on R&D (GOVERD)
Government Expenditures on R&D (GOVERD) as a percent of GDP
Business Expenditures on R&D (BERD)
Business Expenditures on R&D (BERD) as a percent of GDP
Higher Education Expenditures on R&D (HERD)
Higher Education Expenditures on R&D (HERD) as a percent of GDP
Higher Education Expenditures on R&D (HERD) per capita
Percentage of Government R&D (GOVERD) Financed by Industry
Higher Education R&D Expenditures (HERD) Funded by Industry
Percentage of Higher Education R&D (HERD) Financed by Industry
University-Industry Collaboration in R&D
Industrial R&D Personnel by Type
Researchers per capita in the Labour Force
R&D Personnel in Business Enterprise Sector per capita (active workers)
Concentration of Industrial R&D Establishments
Proportion of Firms that are Innovators
Number of Business Enterprises Active in R&D
Percentage of activities related to Innovation by the Firms type
Average Pay per Worker, Selected R&D-intensive Industries
R&D expenditures as a percentage of revenues
Average Sponsored Research Income
Granting Agency Funding
Research Dollars from Granting Agency per HQP Labour Force

Education areas

Investments
Enrolments
Graduates
Performance scores
Lifelong learning

Specific education indicators

Spending on Education (Public and private)
Spending on Education as a percentage of GDP
Bachelor Degrees in Science and Engineering
Bachelor Degrees in Science and Engineering per Capita
University Graduation Rates (Bachelor's degree, Master's and PhD)
University Graduates by Field of Study per capita

Composition of University Graduates by Field of Study

Total graduates

Post-secondary Credentials

Enrolment in Secondary School Science Courses

Enrolment at Universities

Student Performance in Science

Educational Attainment in the Labour Force

Student completion rates (secondary / tertiary)

Scientific and technological culture

Literacy

Awareness and interest in S&T affairs

Coverage of S&T in the press

Knowledge

Scientific papers

Technologies

Innovation (number of firms who innovate)

High technology trade

Patents

Use of advanced technologies

Information and communication technologies (internet, electronic commerce)

Capital investments (machinery and equipment)

Commercialization (of university research)

Spin-off

Licenses

Economic environment

Venture capital

Taxes

Sources: Organisation for Economic Co-operation and Development (OECD). *OECD Science, Technology and Industry Scoreboard 2003*, OECD, 2003; accessed April 2005; available from http://www.oecd.org/document/8/0,2340,en_2825_497105_23654472_1_1_1_1,00.html.

Godin, Benoît. *Canadian Scoreboards on S&T and Its Further Developments*, Montreal, QU, Canadian Science and Innovation Indicators Consortium (CSIIC), 2004; accessed March 2005; available from <http://www.csiic.ca/Scoreboard.html>.

Appendix 10: Examples of knowledge impact indicators

Impact Areas	Indicators
Impact on Science	
Note: The research results (at time 1) have an effect on the subsequent progress of knowledge (at time 2)—theories, methodologies, models and facts, the formation and development of specialties and disciplines, and training. They can also have an effect on the development of research activities themselves: interdisciplinarity, intersectionality, internationalisation.	
<i>Advances in knowledge</i>	
Specialties	1.a) The appearance of a new training program 1.b) The enrolment in this new program The number of new journals and related articles
Theories	2.a) The invention of a new theory 2.b) The use of this theory (citations)
Methodologies	3.a) The conception of a new methodology 3.b) The use of this new methodology (citations)
Facts	4.a) The discovery of a new fact 4.b) The use of this fact (citations)
Models	5.a) The construction of a new model 5.b) The use of this model (citations)
<i>Research Activities</i>	
Contributions to research	6.b) The number of new publications
Type of research	7.a) The intensification or diversification of the type of research done (fundamental / applied / strategic)
Interdisciplinarity	8.b) The growth in the number of publications in interdisciplinary collaboration and citations between disciplines
Intersectoriality	9.b) The growth in the number of publications in intersectorial collaboration
Internationalisation	10.b) The growth in the number of publications in international collaboration
<i>Training of researchers</i>	
Research competence	11.a) The presence of research competence: definition of a research problem, organizing a project, strategies for collecting data, methods of analyzing.
Related competence	12.a) The presence of competences such as writing, communication, computing, management.

Impact Areas	Indicators
Impact on technology	
Note: Product, process, and service innovations, as well as technical know-how, are types of impact that we owe partly to research activities. Beyond patents, however, there are actually very few indicators to properly assess this dimension	
Products and Processes	13.a) Achieving and improving a product or process 13.b) The value of sales The number of patents (requested and issued) The number of licences issued The citations to the scientific literature in patents The number of users and the frequency of use
Impact on the economy	
Note: Refers to the impact on an organization's budgetary situation (operating costs, revenue, profits, the sale price of products), sources of finance (action capital, risk capital, contracts), investments (human capital—hiring and training, physical capital—infrastructure and material, operating and expansion), production activities (types of goods and service products), and the development of markets (diversification and export).	
Investments	
Human capital	23.a) The types of jobs and competencies in the organization (diplomas, degrees, disciplines) 23.b) The investment (\$) in on-going training
Operating and expanding	25.b) The number of new enterprises created (or eliminated) The number of spin-offs (by students, professors, researchers, or graduates)
Impact on culture	
Note: refers to what people frequently call public understanding of science, but above all to the four following types of knowledge: know-what, know-why, know-how, and know-who. More specifically, it refers to the impact on an individual's knowledge and understanding of ideas and reality. It also includes intellectual and practical skills, the attitudes and interests (on science in general, scientific institutions, scientific and technological controversies, scientific news and culture in general) and values and beliefs.	
Knowledge	
The knowledge and understanding of the ideas and reality by the individuals (acquired through formal or informal mechanisms)	29.b) The rate of university, technical and professional graduation in the sciences Academic results in the sciences The level of understanding of scientific concepts

Impact Areas	Indicators
<i>Know-how</i>	
Intellectual skills	30.a) The development of new skills: creativity, critique, analysis and synthesis 30.b) The level of mastery of the new acquired skills (for example 1) the capacity to apply basic mathematical skills; 2) the level of autonomy in order to achieve basic economic transaction such as savings or the preparation of a budget; 3) writing a document judged to be complex
Practical skills	31.a) The ability to identify and solve certain problems of a mechanical or technical nature at work or at home The presence of new technologies at work and at home 31.b) The frequency and duration of use of new technologies at work and at home
<i>Attitudes and interests</i>	
(for science in general, scientific institutions, S & T controversies, scientific news and culture in general)	32.a) The participation in scientific activities 32.b) The number of hours dedicated by an individual listening to or watching scientific programming on the television or radio, to scientific leisure activities (reading, clubs, etc.) The number of hours dedicated to reading newspapers and magazines on science and technology The level of coverage of science news in the media The level of acceptance and innovation of S & T (GMOs, cloning, etc.) The number of visitors to S & T museums
<i>Vision of the world</i>	
Values and beliefs	33.a) Values (moral, intellectual and professional) and beliefs (religions, spiritual, and family)
Impact on social aspects of society	
Note: Social impact refers to the impact knowledge has on welfare, and on the behaviors, practices and activities of people and groups. For people, social impact concerns wellbeing and quality of life. It also concerns the customs and habits of life (consumption, work, sexuality, sports and food). For groups, new knowledge can contribute to changing discourse on and conceptions of society, or help “modernize” their way of doing “business”.	
<i>Individuals</i>	
Wellbeing and quality of life	34.a) Improving the social conditions of

Impact Areas	Indicators
	individuals Improving the economic conditions of individuals Revenues of individuals
Social implication	35.a) Engagement within associations working on scientific questions
Practices	36.b) The number of individuals having modified one or several customs or lifestyle habits (food, sexuality, activities)
Organisation	
Speeches, interventions and actions	37.a) The appearance of new discourses on S & T The appearance of new styles of intervention or the solution to social problems
Impact on policy	
Note: Political impact has to do with the way knowledge influences policy-makers and policies: the interest and attitudes of politicians, administrators and citizens towards a question of public interest involving science and technology, public action (law-jurisprudence-ethics, policies, programs–regulation-norms, standards) and citizen participation in scientific and technological decisions.	
Decision maker	
Alertness, interests, attitudes	38.a) A new interest or attitude towards questions of public interest involving S & T
Public action	
Law / jurisprudence / ethics	39.a) A new jurisprudence
Policies	40.a.) A new law or policy 40.b) The range of the laws (the number of individuals affected, the sanctions)
Programs / regulations / norms	41.a) A new program, regulation or norm 41.b) The range of programs, regulations, or norms
Standards	42.b) One or several new standards (standardization)
Citizens	
Political implication	43.a) The presentation of documents to public commissions or to parliamentary commissions on science and technology The participation in public assemblies or municipal or regional council meetings
Civic responsibility (laws, responsibilities, and duty)	n/a
Impact on organisations	
Note: Organizational impact is impact on the activities of institutions and	

Impact Areas	Indicators
organizations like planning (objectives, administrative organization), the organization of work (sharing and the quality of tasks, automation, computing), administration (management, marketing, distribution, purchasing, accounting), and human resources (the workforce, the qualifications of the employees, work conditions).	
Human resources	
Workforce	51.b) The number of new employees in R & D
Qualifications of employees	52.b) The level of qualification of the workforce (degrees) The disciplines and specialties available The experience and expertise of employees
Work conditions	53.a) Implementing new norms or new equipment related to health and safety Work perspectives 53.b) The rate of employee satisfaction towards general work conditions offered by the organisation The amounts invested in training Salaries
Impact on health	
Note: The health dimension refers to the impact of research on public health (life expectancy, prevention and prevalence of illness) and on the health care system (health care and costs, health care professionals, medical infrastructure and equipment, products—medication, treatment).	
Impact on the environment	
Note: The environmental dimension refers to the impact on managing the environment, notably the management of natural resources (conservation and biodiversity plan) and of environmental pollution (pollution surveillance tools and the sources of pollution). It also refers to the impact of research on climate and meteorology (climatic surveillance methods and climatic and meteorological forecasting models). Indicators on the state of health and the state of the environment already exist in several organizations and countries. The problem is, like economic growth and productivity, linking this impact to research activities and output.	
Management	
Natural resources	61.a) A plan for the conservation, protection and restoration of species and ecosystems A bio-diversity plan A plan for the development of resources in a context of sustainable development
Environment (pollution)	62.a) A surveillance tool for pollution and its causes A method for detection, reduction, or elimination of threats related to pollutants The development of anti-pollution

Impact Areas	Indicators
	norms
Impact on the environment (water, air, soil, forest, fauna and flora, waste)	
Climate and meteorology	63.a) A climatic and meteorologic surveillance method A climatic and meteorologic prediction model
Impact on symbolism	
Note: Symbolic impact is an important impact that was identified by the users of research results that were interviewed. In fact, a company, for example, often gains credibility for conducting R&D or from being associated with university research and academics. For several firms, this is probably an impact as important as the economic one—and has itself probably an economic impact. No attempt seems to have been made, however, to systematically measure such impact.	
Legitimacy / credibility / visibility	64.a) Invitation to lead or participate in diverse forums 64.b) Level of knowledge of X by Y Level of appreciation of X by Y
Notoriety / recognition	65.a) A prize, a title, a promotion, or a nomination 65.b) Market share
Impact on training	
Note: Training, could have been placed under the first one—scientific. It has been treated separately here because of its importance in regards to the mission of universities. It refers to curricula (training programs), pedagogical tools (educational manuals), qualifications (acquired competence in research), entry into the workforce, appropriateness between training and work, career path and of the use of acquired knowledge.	
Curricula	66.a) Training programs
Pedagogical tools	67.a) Teaching manuals
Qualifications	68.a) Acquired competence
Insertion into the workforce	70.b) The duration of the period between the end of studies and the start of a job Fitness between training and job
Career	71.a) Career path 71.b) Salary
Use of acquired knowledge	72.a) The use of knowledge at work or in daily life

Note: An indicator that is identified by the letter “a” indicates the presence of a change produced by the result of research. One identified by the letter “b” is an indicator of the importance of change.

Source: Adapted from: Godin, Benoît, and Christian Doré. *Measuring the Impacts of Science: Beyond the Economic Dimension*. Canadian Science and Innovation Consortium (CSIIC), 2003, p 5-8, 25-44.

Appendix 11: Conventional education indicators

Indicators	Representative sources of indicator programs							
	CAN. 2003	U.S. 1991	U.S. 2005	APEF 96/98	SASK 2002	EC 2000	OECD 2004	UNESCO 2005
Expenditure per student	√	√	√	√	√	√	√	
Expenditure relative to GDP	√	√	√		√		√	
Expenditure per capita	√							
Public and private expenditures	√	√					√	
Total public expenditure	√	√			√		√	
University tuition fees	√							
Private revenues at universities	√							
Levels of student debt	√							
Enrolment rates	√		√	√	√	√	√	
Students per computer	√					√		
Parental support for learning		√		√		√		
Cultural/ community support for learning		√						
Community use of schools				√				
Class size				√	√		√	
School size	√				√			
Pupil-educator ratio	√			√	√			

Indicators	Representative sources of indicator programs							
	CAN. 2003	U.S. 1991	U.S. 2005	APEF 96/98	SASK 2002	EC 2000	OECD 2004	UNESCO 2005
Student-teacher ratio			√	√			√	
Student-support staff ratio				√				
Teacher quality		√		√	√	√		
Age-distribution of educators	√							
Male / female composition of educator workforce	√				√			
Teachers' salaries	√		√				√	
Average years teaching experience					√			
Conditions of teachers' work		√					√	
% students home-schooled or in private sch.					√			
Low income	√	√			√			
Status and background of children / family	√	√						
Availability of resources				√				
Quality of resources		√						
Quality of instruction with inadequate resources					√			
Scope-depth of program offerings				√	√			
Safety / security of students		√		√				
Youth crime rates					√			

Indicators	Representative sources of indicator programs							
	CAN. 2003	U.S. 1991	U.S. 2005	APEF 96/98	SASK 2002	EC 2000	OECD 2004	UNESCO 2005
Health of population					√			
Birth rates and pregnancy among teens					√			
Attendance rates				√				
Suspension rates				√				
Educational attainment of adult population	√		√	√			√	
Secondary sch. graduation rates	√		√	√	√	√	√	
Tertiary (post-sec) grad. rates	√		√				√	
University degrees	√		√					
Graduation rates by field of study	√						√	
High-school drop out rates	√			√	√	√		
Student achievement in reading	√	√	√	√	√	√	√	
Student achievement in mathematics	√	√	√	√	√	√	√	
Student achievement in science	√	√	√	√	√	√	√	
Student achievement in humanities		√						
Student achievement in social sciences		√						
Student achievement in music and arts		√						
Student achievement in foreign language		√				√		

Indicators	Representative sources of indicator programs							
	CAN. 2003	U.S. 1991	U.S. 2005	APEF 96/98	SASK 2002	EC 2000	OECD 2004	UNESCO 2005
Technological competence				√		√		
Achievement and socio-economic status	√				√			
Participation by subject area				√				
Attitudes and behaviour toward math/sci.			√					
Tolerance		√						
Self-direction		√						
Personal responsibility		√			√			
Commitment to craft		√						
Aesthetic expression				√				
Civic achievement			√			√		
Civic participation			√					
Citizenship and volunteerism				√				
Communication				√				
Personal development				√				
Extra-curricular involvement				√				
Satisfaction (parent, student, educator etc.)				√	√			
Creative thinking					√			
Critical thinking and problem solving				√	√			
% students completing high quality work					√			

Indicators	Representative sources of indicator programs							
	CAN. 2003	U.S. 1991	U.S. 2005	APEF 96/98	SASK 2002	EC 2000	OECD 2004	UNESCO 2005

Respect for behavior of future generations and problems			√					√
Engagement in school/learning		√					√	
Study attitudes toward society / lifelong learning				√		√		
Evidence of lifelong learning				√				
Student attitudes toward school					√			
Gender differences in school performance							√	
Labour market outcomes and employment status	√	√	√		√			
Labour force participation by level of education							√	
Education and earnings	√	√	√				√	
Links between human capital and economic growth							√	
R&D within universities	√	√					√	
Sustainable development (SD) themes in education								√
Integration of SD principles in teacher training								√
Respect for current / future								√

Indicators	Representative sources of indicator programs							
	CAN. 2003	U.S. 1991	U.S. 2005	APEF 96/98	SASK 2002	EC 2000	OECD 2004	UNESCO 2005
Respect for and understanding of natural world and how to steward its resources								√
Knowing how to make choices / decisions which take into account long-term future of social equity, ecological viability and economic progress								√
Committed and aware with global view, but also capacity to envision alternative futures and create societal change								√
Capacity to work with others to bring about structural or institutional change within mainstream								√

Notes:

- Phrasing of some of the indicators has been altered for comparison purposes.
- Many other education indicator programs were reviewed but not included here. The above were considered to be representative of the international, national, and provincial systems that currently exist.
- Indeed, many other education indicators exist, but were not included here. These were selected based on two criteria: 1) Popularity: In many of these systems the same indicators (though worded differently) appear over and over again. This prevalence and recognition implies a wide acceptance of them in international / national / provincial circles. 2) Relevance: In some cases we came across education indicators that were unique in that they often did not appear in any of the other indicator

literature, but nevertheless did provide valuable insight into alternative perspectives on the role and purpose of education in society.

- Pupil-educator ratio: educator includes non-teaching staff

Sources:

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Appendix 12: List of indicators used in the fields of education and training within selected community initiatives

Co-Ordination of the Employment Policies: The Luxembourg Process

Indicators of Lifelong Learning Used in the Process of Employment Strategy

Key indicators

- Investment expenditure on education in relation to GDP. Source: Eurostat, UOE.
- Participation rate in education and training. Source: Eurostat, UOE.
- Rate of early-school leavers. Source: Eurostat, LFS.
- Rate of Internet coverage in schools. Source: Eurobarometer 2001 and “eEurope 2002 Benchmarking”, Commission Staff Paper, SEC (2001) 1583/9-11-2001
- Share of teachers with IS literacy. Source: Eurobarometer 2001 and “eEurope 2002 Benchmarking”, Commission Staff Paper, SEC (2001) 1583/9-11-2001.
- Share of employees participating in job-related training. Source: Eurostat—CVTS2, reference year 1999.

Context indicators

- Educational attainment rate of adult population. Source: Eurostat: LFS.
- Participation rate in education and training. Source: Eurostat:UOE.
- Literacy proficiency rate of adult population. Source: IALS, 1994-98, “Literacy in the Information Age”, OECD and Statistics Canada, 2000.
- Rate of student access to computers and to Internet. Source: Benchmarking Report following up the “Strategies for Jobs in the IS”, COM (2000) 48 National data.
- Share of employees participating in job-related training. Source: Eurostat: CTVS 1 and CVTS 2, reference years 1993 and 1999.
- Average hours spent on training per employee. Source: Eurostat: CVTS 2, reference year 1999.
- Share of the workforce using computers for work. Source: Eurobarometer Survey on ICT and Employment, Nov 2000, Oct 2001.
- Rate of working population trained on job related ICT skills. Source: Eurobarometer Survey on ICT and Employment, Nov 2000, Oct 2001.

Communication from the Commission: “Structural Indicators” COM (2001) 619 final

- Total new science and technology doctorates per 1000 of population aged 25 to 34 years. Source: Eurostat, UOE.
- Total public expenditure on education as a percentage of GDP. Source: Joint Eurostat, UOE.
- Percentage of population, aged 25-64, participating in education and training. Source: Eurostat: Labour Force Survey.
- Share of the population aged 18-24 with only lower secondary education and not in education or training. Source: Eurostat: Labour Force Survey.

Communication from the Commission: “Commission’s Action Plan For Skills And Mobility” COM (2002) 72

- Levels of occupational mobility and labour turnover. Source: Eurostat: Labour Force Survey.
- Impact of educational levels on employment and unemployment. Source: Eurostat: Labour Force Survey.
- Employment growth in high education sectors. Source: Eurostat: Labour Force Survey
- Education attainment levels. Source: Eurostat: Labour Force Survey.
- Early school leavers. Source: Eurostat: Labour Force Survey.
- Basic skills (literacy and numeracy): Student performance on the combined reading, scientific and mathematical literacy scales and national income. Source: OECD/Knowledge and Skills for Life, First result from PISA 2000.
- Participation of adult workers in training. Source: Eurostat: Labour Force Survey.
- Shortages in ICT occupations and sectors. Source: IDC / EITO 2001 study.
- Demographic developments: change of working age population and composition by age groups. Source: Eurostat-Demographic database: Population by sex and age on 1/1/2000 (for 2000), Eurostat-BASELINE scenario (for options).
- Levels of geographical mobility. Source: Eurostat: Labour Force Survey.
- Commuting mobility. Source: Eurostat: Labour Force Survey.
- High employment regions and skills needs. Source: Eurostat: Labour Force Survey and Demographics Projections BASELINE scenario.
- Foreign language teaching. Source: Eurostat.
- Migration. Source: Eurostat.

Detailed Work Programme on the Follow-Up of the Objectives of Education and Training Systems in Europe

Indicative List of Indicators to Be Used Within the Open Method of Co-Ordination

- Shortage / surplus of qualified teachers and trainers on the labour market.
- Progression in number of applicants for training programmes (teachers and trainers).
- Percentage of teachers who follow continuous professional training.
- People completing secondary education. Source : Eurostat, UOE
- Continuous training of teachers in areas of emerging skills needs.
- Literacy attainment levels. Source: OECD 2001.
- Numeracy / Mathematics attainment levels. Source: OECD 2001.
- Learning to learn attainment levels.
- Percentage of adults with less than upper secondary education who have participated in any form of adult education or training, by age group.
- Percentage of teachers that have been trained in ICT use in schools.
- Percentage of pupils and students using ICT in their studies.
- Percentage of learning sessions in teaching and training institutions in which ICT is used.

- Increase in number of entries into mathematics, science and technology courses (upper secondary advanced levels and tertiary levels, by gender).
- Increase of graduates in mathematics, science and technology courses, by gender.
- Increase in number of scientists and engineers in society, by gender.
- Increase in number of qualified teachers in MST (secondary level).
- Increase in per capita investment in human resources.
- Percentage of population between 25 and 64 participating in education and training. Source: Eurostat: Labour Force Survey.
- Percentage of working time spent by employees on training per age groups.
- Participation in tertiary education.
- Proportion of the population aged 18-24 with only lower secondary education and not in education or training. Source: Eurostat: Labour Force Survey.
- Percentage of students and trainees in initial training benefiting from placement agreements (éducation en alternance).
- Proportion of self-employed in various sectors of knowledge economy (particularly age group 25-35).
- Percentage of education and training institutions providing counselling and guidance for setting up business.
- Percentage of pupils and students who reach a level of proficiency in two foreign languages.
- Percentage of language teachers having participated in initial training or in-service training courses involving mobility providing direct contact with the language / culture they teach.
- Proportion of national students and trainees carrying out part of their studies in another EU or third country.
- Proportion of teachers, researches and academics from other EU countries employed at different educational levels.
- Number and distribution of EU and non-EU students and trainees in education and training.
- Proportion of undergraduate and postgraduate students continuing their studies in another EU or third country.
- Percentage of graduates obtaining joint degrees in Europe.
- Percentage of students and trainees within ECTS or EUROPASS and / or obtaining Diploma / Certificate Supplement.

Source: Working Group on Quality Indicators. *European Report on Quality Indicators of Lifelong Learning*. European Commission, 2002; accessed April 2005; available from http://europa.eu.int/comm/education/policies/lll/life/report/quality/report_en.pdf, p 85-87.

Appendix 13: International standard classification of education (ISCED-97) and fields of education

Broad Fields	Narrow Fields	Detailed Fields
0 General Programmes	01 Basic / broad general programmes 08 Literacy and numeracy 09 Personal skills	
1 Education	14 Teacher training and education science	*(141 Teaching and training 143–146) 142 Education science 143 Training for preschool teachers 144 Training for teachers at basic levels 145 Training for teachers with subject specialization 146 Training for teachers of vocational subjects
2 Humanities and Arts	21 Arts	211 Fine arts 212 Music and performing arts 213 Audio-visual techniques and media production 214 Design 215 Craft skills
	22 Humanities	221 Religion 222 Foreign languages 223 Mother tongue (224 History, philosophy and related subjects—225 and 226) 225 History and archaeology 226 Philosophy and ethics
3 Social sciences, Business, and Law	31 Social and behavioural science	311 Psychology 312 Sociology and cultural studies 313 Political science and civics 314 Economics
	32 Journalism and information	321 Journalism and reporting 322 Library, information, archive

Broad Fields	Narrow Fields	Detailed Fields
	34 Business and administration	341 Wholesale and retail sales 342 Marketing and advertising 343 Finance, banking, insurance 344 Accounting and taxation 345 Management and administration 346 Secretarial and office work 347 Working life 380 Law
4 Science, Mathematics, and Computing	42 Life Science	421 Biology and biochemistry 422 Environmental science
	44 Physical science	441 Physics 442 Chemistry 443 Earth science
	46 Mathematics and statistics	461 Mathematics 462 Statistics
	48 Computing	481 Computer science 482 Computer use
5 Engineering, Manufacturing and Construction	52 Engineering and engineering trades	521 Mechanics and metal work 522 Electricity and energy 523 Electronics and automation 524 Chemical and process 525 Motor vehicle, ships, and aircraft
	54 Manufacturing and processing	541 Food processing 542 Textiles, clothes, footwear, leather 543 Materials (wood, paper, plastic, glass) 544 Mining and extraction
	58 Architecture and building	581 Architecture and town planning 582 Building and civil engineering
6 Agriculture and Veterinary	62 Agriculture, forestry, and fishery	621 Crop and livestock production 622 Horticulture 623 Forestry 624 Fisheries
	64 Veterinary	641 Veterinary

Broad Fields	Narrow Fields	Detailed Fields
7 Health and Welfare	72 Health	721 Medicine (722 Medical services—725-727) 723 Nursing and caring 724 Dental studies 725 Medical diagnostic and treatment technology 726 Therapy and rehabilitation 727 Pharmacy
	76 Social services	761 Child care and youth services 762 Social work and counselling
8 Services	81 Personal services	811 Hotel, restaurant and catering 812 Travel, tourism, and leisure 813 Sports 814 Domestic services 815 Hair and beauty services
	84 Transport services	840 Transport services
	85 Environmental protection	851 Environmental protection technology 852 Natural environments and wildlife 853 Community sanitation services
	86 Security services	861 Protection of persons and property 862 Occupational health and safety 863 Military and defence

Note: *fields within brackets signify classification system for vocational education and training

Source: Eurostat Task Force on Measuring Lifelong Learning. *Public Eurostat Website on Measuring Lifelong Learning*. European Commission, 2001; accessed April 2005; available from <http://forum.europa.eu.int/Public/irc/dsis/edtc/library?l=/public&vm=detailed&sb=Title>, p. Annex.

Appendix 14: New and ongoing indicator initiatives

In this section we list some of the new and ongoing indicator initiatives that are presented throughout the report. As previously mentioned, these groups are working toward developing indicators for learning, health literacy, and others. Our research might benefit from discussing their work directly with the respective researchers. We have been in contact with the head of the indicator development group for the new Canadian Council of Learning, for example, and found that they are in the early stages of developing a new learning index.

A survey of human resource development interest groups, conducted by Human Resources and Development Canada 15 years ago in 1990, found over 40 federal government agencies, departments, board and councils, and over 200 interest groups involved in education, training, and learning.²²⁸⁵ This represents a great deal of activity but little focus or coherence. Nevertheless, many of these organizations are doing interesting work relevant to our approach. We have reviewed a number of these initiatives. Important ones working on indicator development are listed below.

Human Resources and Social Development Canada (HRSDC)²²⁸⁶

One of the key organizations “dedicated to establishing a culture of lifelong learning for Canadians” is Human Resources and Social Development Canada (HRSDC). In part, HRSDC is working on methods to assess prior learning through Prior Learning Assessment and Recognition (PLAR), which helps individuals develop portfolios and relates experience to formal credentialing procedures. HRSDC also is working to identify essential skills needed for knowledge work, to promote technology use in learning, and to encourage workplace learning.²²⁸⁷ Telecommunications-based and other initiatives are led by Industry Canada through programs such as SchoolNet and Computers for Schools.

²²⁸⁵ Barker, Kathryn. "Lifelong Learning in Canada: Visions for the Future." Paper presented at the Conference on Lifelong Learning. Seventh International Seminar: Social Development and Human Resources Development in the APEC Member Economies, Tokyo, 1998, Human Resources Development Canada.

²²⁸⁶ Human Resources and Social Development Canada (HRSDC). *Website*, accessed January 2005; available from <http://www.hrsdc.gc.ca/en/home.shtml>.

²²⁸⁷ *Ibid.*, accessed.

Centre for the Study of Work and Education (CSWE) at the Ontario Institute for Studies in Education / University of Toronto (OISE/UT): New Approaches to Lifelong Learning (NALL)²²⁸⁸ and Work and Lifelong Learning Research Network (WALL)²²⁸⁹

Nongovernmental organizations that promote lifelong learning include The Research Network to New Approaches to Lifelong Learning (NALL) and Work and Lifelong Learning Research Network (WALL). Located at the Centre for the Study of Work and Education (CSWE) at the Ontario Institute for Studies in Education / University of Toronto (OISE/UT), NALL and WALL are two phases of a research program funded by the Social Sciences and Humanities Research Council (SSHRC). This is part of a larger program that saw SSHRC creating five large-scale research networks in education and training across the country involving more than 140 researchers from Canadian universities and 150 community organizations and private sector companies with provincial and school board representatives. In the first phase of the program, SSHRC invested \$5.6 million dollars.

In 2003, in collaboration with the Institute for Social Research at York University, WALL produced the “National Survey of Learning and Work” and completed interviews over 2003–2004 with 9,000 Canadian adults from coast to coast. The WALL website reveals that the data from the survey are in the process of being analyzed and the results will be available shortly. The 28-page questionnaire is available on line at the WALL website, which describes the survey as follows:

The survey documents paid and unpaid work conditions over the past five years and will generate the first systematic empirical assessments of changing work conditions in relation to the full array of adult learning practices, schooling, further education courses, informal training, non-taught informal learning. It will also provide profiles of workers' perceptions of changes in key dimensions of paid and unpaid work. Evidence generated by our survey work will provide specific insights into the extent and rate of emergence of a "new economy," as well as the impact of such changes on adult learning activities. Our survey will also serve to validate the 1998 NALL survey [on informal learning], permit the first national trend inferences about changes in patterns of informal learning, supplement the narrower conventional surveys of education and employment with much greater attention to informal learning and unpaid work, and provide fuller understanding of the general dynamics of change in learning and work relations.²²⁹⁰

²²⁸⁸ Research Network on New Approaches to Lifelong Learning (NALL). *Website*, Ontario Institute for Studies in Education (OISE), University of Toronto, accessed January 2005; available from <http://www.oise.utoronto.ca/depts/sese/csew/nall/index.htm>.

²²⁸⁹ Livingstone, David. *Exploring the Changing Nature of Work and Lifelong Learning: Preliminary Findings of a Canadian National Survey*, Toronto, WALL Working paper 5, The Research Network on the Changing Nature of Work and Lifelong Learning (WALL), The Centre for the Study of Education and Work (CSEW) at the Ontario Institute for Studies in Education (OISE), University of Toronto, 2004; accessed January 2005; available from <http://www.wallnetwork.ca/index.html>.

²²⁹⁰ Ibid., accessed.

In addition, WALL is conducting 12 case studies that are examining learning within work contexts. These studies have surveys linked to the national survey in the following work contexts: biotechnology; steel / light manufacturing; nursing homes; public sector work; the teaching profession; disabled bank workers; women information technology workers; immigrant workers; housework; volunteer community workers; school–work youth transition; critical transitions through the life course; and labour education programs.

Canadian Council on Learning

The Canadian Council on Learning (CCL) is a national, nonprofit, independent initiative arising from the Canadian Innovation Strategy that emphasizes lifelong learning.²²⁹¹ The government's intention to create a skills and learning network was announced in the Speech from the Throne in 2002. After a consultation process, the mandate was developed and the first Board of Directors was installed in 2003. In March 2004, the CCL received \$85 million from HRSDC to set up five Knowledge Centres across Canada.²²⁹² These centres will focus on work and learning; early childhood learning; adult learning; aboriginal learning; and health and learning. A sixth centre on formal learning will be established through the Canadian Education Statistics Council.

The general mission of CCL is to improve the lifelong learning process and outcomes in Canada by informing Canadians on the progress of learning in Canada, promoting a learning culture in Canada, and by cataloguing information and facilitating the exchange of knowledge and information.

The CCL also plans to monitor and report on the progress of learning outcomes by “using integrated pan-Canadian indicators benchmarking progress on lifelong learning.” They have developed the Composite Learning Index (CLI), which will measure progress on outcomes across lifelong learning. The CCL has been discussed throughout the literature review and the indicators for the CLI are listed in Appendix 21. The CIW has been in contact with individuals developing the index and has established a collaborative relationship.²²⁹³

SSHRC: Valuing Literacy in Canada

A number of other literacy initiatives are active in Canada. One that we have not yet researched might be useful. This is a five-year Strategic Joint Initiative of SSHRC called *Valuing Literacy in Canada*. According to the Canadian Education Association (CEA), “this initiative fosters collaborative, multidisciplinary, policy-oriented and applied research on a broad range of issues that affect adult learners' ability to participate in Canadian society. The objectives of the program are to develop research capacity in

²²⁹¹ Canadian Council on Learning (CCL). *Website*, CCL, accessed March 2006; available from <http://www.ccl-cca.ca/>.

²²⁹² Ibid., accessed.

²²⁹³ Telephone and email correspondence with Marc Lachance, March–April 2005.

Canada in the field of adult literacy, and to encourage and assist co-operation between researchers and adult literacy practitioners.”²²⁹⁴

The Learning for a Sustainable Future (LSF)

The Learning for a Sustainable Future (LSF), created by the National Round Table on the Environment and the Economy (NRTEE), works to support sustainable development concepts and principles within school curricula and communities.²²⁹⁵ The 2-page framework lists knowledge, skills, and values that are needed for the sustainability and wellbeing of the environment, health, the economy, and wellbeing of society.²²⁹⁶

Environment Canada

Between 1999 and 2002, over 5,500 Canadians participated in the National Consultation on Environmental Education and Sustainability led by Environment Canada. This process resulted in designing a framework for Environmental Learning and Sustainability (ELS) that was presented at the World Summit on Sustainable Development in Johannesburg in August 2002.²²⁹⁷ The framework has resulted in an ELS website through Environment Canada, as well as action plans from 236 organizations. These plans include 19 from all levels of government, 4 from universities and research centres, 6 from museums, 105 from schools and colleges, 3 from school boards, 26 from NGOs, and 45 from environmental learning NGOs, among others. Transport Canada, Natural Resources Canada, and Environment Canada all have developed action plans. The specific plans for each of the 236 initiatives are available on the ELS website.²²⁹⁸

²²⁹⁴ Canadian Education Association (CEA). *Focus on Literacy: Policy Landscape*, CEA, 2005; accessed February 2005; available from <http://www.cea-ace.ca/foo.cfm?subsection=lit&page=pol&subpage=lan&subsubpage=can>.

²²⁹⁵ Learning for a Sustainable Future (LSF). *Website*, LSF, York University, accessed April 2005; available from <http://www.lsf-lst.ca/en/home/>.

²²⁹⁶ Manitoba Education, Training and Youth (Sustainable Development Initiative). *Educating for Sustainability. The Status of Sustainable Development in Canada*, Toronto, Council of Ministers of Education Canada (CMEC), 1999; accessed December 2004; available from <http://www.cmec.ca/else/environment.en.pdf>.

²²⁹⁷ Environment Canada. *A Framework for Environmental Learning and Sustainability in Canada*, Government of Canada, 2002; accessed July 2004; available from http://www.ec.gc.ca/education/framework/framework_overview_e.htm.

²²⁹⁸ http://www.ec.gc.ca/education/ee_introduction_e.htm

The Government of Canada initiatives listed on the website include those from the following: Transport Canada; Natural Resources Canada; Environment Canada; Canadian Museum of Nature / Canadian Centre for Biodiversity; Climate Change Action Fund—Public Education and Outreach component; Environment Canada Biosphere—Environmental Observation Centre and Showcase for Information on Water. Among other national initiatives are those from: Association for Canadian Educational Resources, Inc. (A.C.E.R. Inc); BIOCAP Canada Foundation—Queen’s University; Canadian Biodiversity Institute—Great Canadian BioBlitz; Canadian Ecology Centre; Canadian Forestry Association; Canadian Institute for Environmental Law and Policy (CIELAP); Canadian Journal of Environmental Education; Canadian Network for Environmental Education and Communication (EECOM); Centre for Indigenous Environmental Resources; Labour Environmental Alliance Society (LEAS); Learning for a Sustainable Future; Society, Environment and Energy Development Studies (SEEDS) Foundation; Working Group on Museums and Sustainable Communities; and Youth Round Table on the Environment.

Many Canadian initiatives, however, are not included on the ELS website, such as the new Research Chair of Canada in Environmental Education at the Université du Québec à Montréal. This Chair will develop research in community action as a context for environmental education, teacher development, and the integration of environmental education within the curricula of formal education.²²⁹⁹

The measurement of health literacy: Rootman, et al.

The measurement of health literacy is one of the main interests of Irving Rootman. At present, he is working on a project funded by Canadian Institutes of Health Research (CIHR) to develop new measures of health literacy that are appropriate for different population groups.²³⁰⁰ Jim Frankish and Brenda Kwan are working with Rootman to develop new measures specifically appropriate to a Canadian context in relation to use of health services, determinants of health, and quality of life. They plan to test this measure first with older adults, immigrants, and people living in poverty.

OECD indicator development for the knowledge economy

OECD indicator development for the knowledge economy is ongoing, especially through its Working Party on Indicators for the Information Society (WPIIS) group, and with collaborations with Eurostat, the United Nations groups (especially the United Nations Conference on Trade and Development (UNCTAD)), and country-specific statistical bodies such as the Australian Bureau of Statistics and Statistics Canada.²³⁰¹ Currently, the OECD is working on a guide for “information society” measurement to be released in 2005. According to Sheridan Roberts from OECD, the guide “will include information on ICT measurement, including definitions, classifications, methods for international harmonisation of ICT statistics and methodological issues for future measurement and consideration. It will discuss actual country experiences in the implementation of international and national standards and will present metadata information on OECD countries’ survey methods and outputs.”²³⁰²

Canadian benchmarking of science and technology

In 2003, Canada began working on its first benchmarking of science and technology in collaboration with Industry Canada, the Conference Board of Canada, and the Canadian

²²⁹⁹ Environment Canada. *A Framework for Environmental Learning and Sustainability in Canada*, accessed.

²³⁰⁰ Canadian Education Association (CEA). *Focus on Literacy: Research Profile: Irving Rootman*, CEA, 2005; accessed March 2005; available from <http://www.cea-ace.ca/foo.cfm?subsection=lit&page=map&subpage=bio&subsubpage=iro>.

²³⁰¹ Roberts, Sheridan. "OECD Work on Measuring the Information Society." Paper presented at the 19th meeting of the Voorburg Group on Services Statistics, Ottawa, Canada, September 27-October 1, 2004, OECD; accessed May 2005; available from <http://www.oecd.org/dataoecd/6/0/33809872.pdf>.

²³⁰² Ibid.

Consortium on Science and Innovation Indicators (CSIIC).²³⁰³ According to Godin, as of September 2004, the final report had not been published, and a review in April 2005 did not locate the report.

²³⁰³ Godin, Benoît. *Canadian Scoreboards on S&T and Its Further Developments*, Montreal, QU, Canadian Science and Innovation Indicators Consortium (CSIIC), 2004; accessed March 2005; available from <http://www.csiic.ca/Scoreboard.html>.

Appendix 15: Civics education course in the Province of Ontario, grade 10

This course explores what it means to be an informed, participating citizen in a democratic society. Students will learn about the elements of democracy and the meaning of democratic citizenship in local, national, and global contexts. In addition, students will learn about social change, examine decision-making processes in Canada, explore their own and others' beliefs and perspectives on civics questions, and learn how to think and act critically and creatively about public issues.

Informed Citizenship

Overall Expectations:

By the end of the course, students will:

- demonstrate an understanding of the reasons for democratic decision-making;
- compare contrasting views of what it means to be a “citizen”;
- describe the main features of local, provincial, and federal governments in Canada and explain how these features work;
- explain the legal rights and responsibilities associated with Canadian citizenship;
- demonstrate an understanding of citizenship within a global context.

Specific Expectations:

Democratic Decision Making

By the end of the course, students will:

- explain the causes of civic conflict, and identify the need for decision-making processes and structures (e.g., ensure individual and community needs are met, resolve conflict, adapt to change);
- distinguish between democratic and authoritarian forms of decision-making, and compare the benefits and drawbacks of each form when used in everyday contexts;
- research and report on the elements of democratic decision making (e.g., rights and responsibilities of citizens, rule of law, common good, parliamentary system, majority rule, rights of minorities);
- analyse how dimensions of democratic decision-making were practiced in different historical contexts (e.g., Magna Carta, Periclean Athens, Iroquois Confederacy) and in their current circumstances (e.g., classroom, community associations);
- identify similarities and differences in the ways power is distributed in groups, societies, and cultures to meet human needs and resolve conflicts (e.g., in families, classrooms, municipalities).

Elements of Democratic Citizenship

By the end of the course, students will:

- explain what it means to be a citizen in diverse political communities (e.g.,

school student union, community groups, ethnocultural groups, national and international organizations);

- research and write profiles of citizens with varying backgrounds (e.g., culture, religion, gender, socioeconomic status, nationality) who have made a difference in public life, and compare the different types of civic involvement they represent.

The Rights and Responsibilities of Canadian Citizenship

By the end of the course, students will:

- identify the rights and responsibilities of citizenship expected and practiced in their school or classroom, explain why these rights and responsibilities were developed, and evaluate the extent to which they apply to all students;
- describe the changing nature of Canadian citizenship rights and responsibilities based on an examination of provincial legislation, the Bill of Rights (1960), and the Canadian Charter of Rights and Freedoms (1982) (e.g., in terms of fundamental freedoms, democratic rights, mobility rights, legal rights, equality rights, language rights, Aboriginal rights);
- explain why it is essential in a democracy for governments to be open and accountable to their citizens, while protecting the personal information citizens are required to provide to governments (e.g., Municipal Freedom of Information and Protection of Privacy Act);
- demonstrate an understanding of how the judicial system (e.g., law courts, trials, juries) protects the rights of both individuals and society (e.g., the rights of the accused, the rights of the victim, and the role of the judiciary);
- describe a case in which a citizen's rights and responsibilities have been upheld or restricted, outlining the concerns and actions of involved citizens and the reasons for the eventual outcome;
- identify significant political leaders in today's Canada.

Making Decisions, Resolving Conflicts, and Developing Policy in Canada

By the end of the course, students will:

- explain the main features and functions of the different levels of government in Canada (e.g., federal, provincial, municipal);
- compare how laws, regulations, public policies, and decisions are made and enforced at the local, provincial, and federal levels;
- examine and analyse the importance and value of different ways of resolving disputes (e.g., mediation, arbitration) that differ from judicial approaches;
- demonstrate an understanding of the important role played by regulatory and adjudicative (quasi-judicial) agencies in our democratic society when resolving issues and disputes between individuals and groups, and between individuals or groups and government;
- investigate the role of political parties in the parliamentary process and examine the selection process for majority, minority, and coalition governments, using provincial and federal examples;
- examine and describe the roles played by elected representatives and interest groups in the political process (e.g., lobbying);

- research recently passed legislation at the community, provincial, or federal level to resolve public conflict (e.g., smoking and health regulations, drinking and driving laws, gun laws), and then produce a report analyzing the key issues and different points of view on the issues.

Citizenship Within the Global Context

By the end of the course, students will:

- analyze contemporary crises or issues of international significance (e.g., health and welfare, disasters, human rights, economic development, environmental quality) in the context of the global community;
- summarize the rights and responsibilities of citizenship within the global context, as based on an analysis of the United Nations Universal Declaration of Human Rights (1948) and Convention on the Rights of the Child (1989);
- research and summarize civic actions of individuals and non- governmental organizations that have made a difference in global affairs (e.g., Cardinal Paul-Emile Léger, Nelson Mandela, Mother Teresa, Craig Kielburger, David Suzuki, Jean Vanier, Red Cross, Frontier College, Doctors Without Borders, YWCA / YMCA);
- compare the contributions of individuals, as explored in the student summaries, to arrive at a definition of the term “global citizen”;
- examine and describe methods of electing governments in other countries (e.g., France, Israel, South Africa, Ireland).

Purposeful Citizenship

Overall Expectations:

By the end of the course, students will:

- examine beliefs and values underlying democratic citizenship, and explain how these beliefs and values guide citizens’ actions;
- articulate clearly their personal sense of civic identity and purpose, and understand the diversity of beliefs and values of other individuals and groups in Canadian society;
- demonstrate an understanding of the challenges of governing communities or societies in which diverse value systems, multiple perspectives, and differing civic purposes coexist.
- demonstrate an understanding of a citizen’s role in responding to non-democratic movements (e.g., supremacist and racist organizations, fascism, and communism) through personal and group actions (e.g., actions of the Righteous Among the Nations during the Holocaust, Medgar Evers, Emily Murphy).

Specific Expectations:**Democratic Beliefs and Values**

By the end of the course, students will:

- describe fundamental beliefs and values associated with democratic citizenship (e.g., rule of law, human dignity, freedom of worship, respect for rights of others, work for common good, sense of responsibility for others, freedom of expression);
- explain, based on an analysis of cases in local, provincial, national, and global contexts, how democratic beliefs and values are reflected in citizen actions;
- articulate and clarify their personal beliefs and values concerning democratic citizenship, and determine the influence of significant factors (e.g., community, nation, cultural group, religion, gender, socioeconomic status) on their sense of civic purpose.

Beliefs, Values, and Multiple Perspectives

By the end of the course, students will:

- compare the varied beliefs, values, and points of view of Canadian citizens on issues of public interest (e.g., privacy, reducing voting age, freedom of information, compulsory military service, Native self-government, Québec sovereignty);
- explain how different groups (e.g., special interest groups, ethnocultural groups) define their citizenship, and identify the beliefs and values reflected in these definitions;
- analyze a current public issue that involves conflicting beliefs and values, describing and evaluating the conflicting positions;
- describe how their own and others' beliefs and values can be connected to a sense of civic purpose and preferred types of participation.

Civic Purpose, Community, and Personal Responsibilities

By the end of the course, students will

- describe and assess the contributions that citizens and citizens' groups make to the civic purposes of their communities;
- describe, compare, and analyze Canadian cases in which contrasting value systems, multiple perspectives, and civic purposes coexist (e.g., constitutional debates, Québec sovereignty question, Native self-governance);
- research and summarize the introduction of the Nuremberg laws, the public response to these laws in pre–World War II Europe, and the subsequent erosion of human rights that led to the Holocaust;
- analyze the evolution of Canada's participation in international tribunals, from the Nuremberg trials after World War II to the International Court of Justice's ongoing prosecutions involving war crimes and genocide (e.g., Somalia, Rwanda, Bosnia);
- describe ways citizens can be involved in responding to issues in which contrasting value systems, multiple perspectives, and differing civic purposes coexist, and determine their own sense of responsibility in relation to these opportunities for involvement;

- demonstrate an ability to anticipate conflicting civic purposes, overcome personal bias, and suspend judgement in dealing with issues of civic concern.

Active Citizenship

Overall Expectations:

By the end of the course, students will:

- demonstrate an ability to research questions and issues of civic importance, and to think critically and creatively about these issues and questions;
- demonstrate an ability to apply decision-making and conflict-resolution procedures and skills to cases of civic importance;
- demonstrate an ability to collaborate effectively when participating in group enquiries and community activities;
- demonstrate a knowledge of different types of citizenship participation and involvement.

Specific Expectations:

Inquiry Skills

By the end of the course, students will:

- demonstrate an ability to formulate questions; locate information from different types of sources (e.g., texts, special references, news media, maps, community resources, Internet); and identify main ideas, supporting evidence, points of view, and biases in these materials;
- demonstrate an ability to organize information effectively (e.g., using summaries, notes, timelines, visual organizers, maps, comparison organizers);
- demonstrate an ability to effectively use strategies within the inquiry process when studying questions of civic importance in their school or local community.

Decision Making and Conflict Resolution

By the end of the course, students will:

- analyze approaches to decision-making and conflict resolution that can affect their own lives;
- analyze important historical and contemporary cases that involve democratic principles in the public process of conflict resolution and decision-making;
- demonstrate an ability to apply conflict-resolution and decision-making strategies (e.g., identify points of view and values, collect data) to public issues affecting their own lives.

Collaboration

By the end of the course, students will:

- demonstrate an ability to contribute to a positive climate in group settings (e.g., respect rights and opinions of others, accept personal responsibility for group duties, provide leadership when appropriate, encourage others to participate);
- communicate their own beliefs, points of view, and informed judgements, and

- effectively use appropriate discussion skills (e.g., persuasion, negotiation);
- demonstrate an ability to work collaboratively and productively with others when researching civics topics in their community.

Citizenship Participation and Community Involvement

By the end of the course, students will:

- research and compare significant contributions made by individuals and groups to their communities and assess the impact of these individuals' and groups' contributions;
- compare and evaluate the impact of various types of non-violent citizen participation (e.g., advocacy, community service, voting, serving on juries) in resolving public issues in Canada;
- research and describe how family, gender, ethnicity, class, nationality, and / or institutional affiliation may affect one's ability to participate;
- participate effectively in a civil action or project of interest to them and of importance to the community (e.g., attend public hearings, plan religious or cultural event, join special interest group, write letters to editor);
- produce a research report on the contributions of public agencies (e.g., government bodies, service clubs, media, public interest groups) and evaluate the value of these contributions to society.

Source: Ontario Ministry of Education and Training. *Course Profile: English, Grade 10, Academic*, 2000; accessed October 2005; available from

<http://www.curriculum.org/csc/library/profiles/10/pdf/ENG2DP.pdf>.

Appendix 16: Learning Impact Research Project: Generic learning outcomes, libraries and museums

Knowledge and Understanding	Example Statement
Knowing about something	Given me an understanding of using computers. The Internet is the only way I can find the information I am after (Warwickshire Libraries).
Learning facts or information which can be: Subject –specific Interdisciplinary / thematic About museums, archives, libraries About myself, my family, my community, the wider world	I liked going down the mine because in the Victorian times they had to work a long way down and they had a mashin [machine] that was 7 times louder than a drill (Beamish).
Making sense of something	The photographs and slides made everything come alive for us after our initial research about the Victorians from books (Somerset Archives and Record Office).
Deepening understanding	I learned that you can die of AIDS and nobody will want to play with you or even they probably won't want to be your friend (Arizona Science Center).
Learning how museums, archives and libraries operate	I do not usually like museums and listening to head sets but I found this trip very different. I enjoyed and wanted to understand how people could be so awful (Imperial War Museum).
Giving specific information—naming things, people or places	When you went to sketch that rock did look very like a sandwich. I can remember their names they are Hook Norton limestone and clypeus grit (St John's Museum Warwick).
Making links and relationships between things	Eating disorders are usually the consequence of other problems—I'm glad that I have a stable family (Poole Library Teenage Reading Group).
Using prior knowledge in new ways	Made the children more aware of the simplicity of Victorian leisure time. No electricity or TV. Quiz reinforced things that they had learnt about the Victorians (Prescot Museum, Knowsley Borough).

Skills	Example Statement
Knowing how to do something	I think this is a good way to encourage children to read, this also encourages visits to the library and shows children how to get information for themselves (Big Summer Read 2002).
Intellectual skills—reading, thinking critically and analytically, making judgements, etc.	I have learnt to look at the artefacts and reflect on why they are there and their importance (Imperial War Museum).
Key skills—numeracy, literacy, use of ICT, learning how to learn, etc.	My grandson of three had no interest whatsoever in writing, reading or drawing. Since using this scheme he has started to recognise words, write his name on his own and draw (Big Summer Read 2002).
Information management skills—locating and using information, evaluating information, using information management systems, etc.	Taught me how to use the Internet for census records. I was able to find my apparently “non-existent” grandfather using the census records (Warwickshire Libraries).
Social skills—meeting people, sharing, team working, remembering names, introducing others, showing an interest in the concerns of others, etc.	Through a reading group you can gain more insight into the book and see deeper meanings that you otherwise would have missed (Poole Library).
Emotional skills—recognising the feelings of others, managing (intense) feelings, channelling energy into productive outcomes, etc.	The first step for me was the Trongate Studios and the projects after that have made me realise that I do have rights—I am a human being and I am allowed to express myself (Open Museum).
Communication skills—writing, speaking, listening, etc.	I learnt how to debate my ideas and give my opinions on artists (Harewood House).
Physical skills—running, dancing, manipulation, making, etc.	The children enjoyed the hands-on experience of slates, flags, dressing up, blackboard etc. It was different from what they usually do—it felt as though they were in 1897 (Prescot Museum, Knowsley Borough).

Attitudes and Values	Example Statement
Feelings and perceptions	The book made me feel glad that I have a stable family but sad that many people go through what Carmen went through and ashamed that I tend not to think about people with eating disorders (Poole Library).
Opinions about ourselves e.g. self-esteem	At first I thought standing up in front of people and reading our poetry would be difficult but they didn't laugh or anything like that, they supported you instead of laughing. I got more confident because other people felt the same as I did when I was reading mine—before I didn't read out loud in class, I said no. Now I can read in front of everybody (Harewood House).
Opinions or attitudes towards other people	This is a brilliant exhibition—so stimulating and thought provoking—so diverse. I've never seen Joe (my 7 year old son) write so much poetry before—fantastic. Thank you—it showed a window into Joe that I'd never seen before—didn't know it was there—the exhibition opened up that window (Sainsbury Centre for the Visual Arts).
Attitudes towards an organisation e.g. museums, archives and libraries	My son has been visiting the library since he was three weeks old, it didn't have a big impact on his enjoyment of books. What it did do was give him a safe audience outside his own family with whom he could share his enjoyment—a big step forward for a shy little boy (Big Summer Read 2002, Essex Libraries).
Positive attitudes in relation to an experience	Today I met an amazing woman...a mother of eight. We stood and looked at Susan Hiller and Suzanne Lacy's work and when she left I listened. The way this woman had talked so openly about her life, about her pain, was echoed on the words in the Suzanne Lacy performance—my faith has been restored in the gallery as a resting place, a site of discussion and dialogue—a place of learning (Leeds Art Gallery).
Negative attitudes in relation to an experience	Museums are not welcoming to us. I get the feeling you have to look around silently and it is difficult with children, they want to talk and ask questions. You have the staff walking round and following you, feel constantly observed (MGC).
Reasons for actions or personal viewpoints	As a dyslexic I found the thought of researching at the PRO a very daunting prospect—however the help and patience shown to me by your staff made my time at the PRO a very enjoyable experience and for that I thank you. (Public Record Office).
Empathy, capacity for tolerance (or lack of these)	The pit because the boys and men had to work all day and night in horrible conditions and all the gases and danger

Attitudes and Values	Example Statement
	of being killed. Also they did not have very good lights so it would not be at all nice in any way except the pay. They did not have a very exciting life and I'm glad I wasn't alive then (Beamish Museum).

Enjoyment, Inspiration, and Creativity	Example Statement
Having fun	My son has really enjoyed the Jeremy Strong books, they make him laugh out loud and want to read bits to me (Big Summer Read 2002).
Being surprised	Almost without exception the children thoroughly enjoyed the day—one particularly hard to please pupil claiming it was the best trip he had ever been on! It inspired some excellent recounts of the day prompting some to write more than ever achieved in class (St John's Museum Warwick).
Innovative thoughts, actions or things	I think there are lots of connections between the Holocaust and moral / political issues but what is horrible is that the Holocaust used horrible ruthless modern methods to murder large numbers of people (Imperial War Museum).
Creativity	The children enjoyed making pots and looking at the skeleton at the dig. They also enjoyed the jewellery making (Essex Heritage Services).
Exploration, experimentation and making	Learning to draw and paint better—it inspired me to work harder and go and draw landscapes instead of working from pictures (Harewood House).
Being inspired	What was very apparent was the fact that the children had not realised that the people of Taunton were Victorians at the time and they have since begun to research any family histories of their own (Somerset Archives).

Action, Behaviour, and Progression	Example Statement
What people do	I enjoyed wearing the corset because I felt how Victorian people felt it was uncomfortable. The fact that I had to wear a hoop hurt me and I found that it was tough for Victorians (Birmingham Museums and Art Gallery).
What people intend to do (intention to act)	Thank you for your interesting and enlightening presentation- we all enjoyed it immensely and came away thinking we must get back to dig deeper and find out more about our heritage and the homes we live in (Essex Record Office).
What people have done	It's probably one of the most memorable weeks of the children's school life. They have learned a lot about their own skills and capabilities. I have learned a lot about their capabilities. This workshop brought out talents which we don't always see in the classroom. The emphasis on

A change in the way that people manage their lives including work, study, family and community contexts	Before the session I depended on others to get info. Now (I have access through work) I feel more independent (University of Leicester Library).
Actions (observed or reported)	The Reading Planet has helped to hold my daughter's interest in reading during the school holidays. I have also found that she is choosing books outside the normal reading material (i.e., non-fiction and poetry) and forming independent opinions about them (Big Summer Read 2002, Essex Libraries).
Change in behaviour	I felt that I could be free to show my emotions more heavily than when in school (Imperial War Museum).
Progression—towards further learning, registering as a library user, developing new skills—is the result of a purposive action which leads to change	I come here to practice. I am just using the computer. The computer is now an accessory for living (Warwickshire Libraries).

Source: Museums, Libraries and Archives Council (MLA). *Inspiring Learning for All: The Measure Learning Toolkit*, London, U.K., MLA, 2004; accessed September 2005; available from http://www.inspiringlearningforall.gov.uk/measuring_learning/default.aspx.

Appendix 17: Learning Impact Research Project: Generic learning outcomes: questions

QUESTION BANK

- Many of these questions were developed by museums, archives and libraries involved in piloting. The question bank includes the following:
- A range of open questions that can be used on response cards, in questionnaires, and as prompts during an interview or focus group.
- Statements to elicit a yes / no / don't know response—used in questionnaires.
- Questions from focus group and interview guides. These could also be used in semi-structured interviews conducted face-to-face and on the telephone.
- Examples of closed and open questions used with students and teachers in different museum and library settings.

The question bank is divided into 7 sections:

1. Broad contextual questions to explore what we mean by learning
2. Questions based on Knowledge and Understanding
3. Questions based on Skills
4. Questions based on Attitudes and Values
5. Questions based on Enjoyment, Inspiration, and Creativity
6. Questions based on Activity, Behaviour, and Progression
7. Wrap-up and summary questions

1. Broad contextual questions

(The right hand column indicates where and how the question was used originally)

We would be interested to know about your positive and negative experiences of museum / archive / library visits.	General
We would like to explore the different kinds of learning that people experience in museums / archives / libraries: • Can you give an example where you have had a positive learning experience and an example of a negative learning experience? • Learning—how would you define it? What is meant by it?	General
• Were you looking forward to this visit? • What were you expecting to learn from this visit? • What can you remember about your visit—can you tell us about it? • What were the highlights of your day at the museum,	General

archive or library? Was there anything about the visit that made you remember it better?	
- What are your views on the strengths and weaknesses of museums as places to learn? We are interested in children's learning. - What in your view are the strengths and challenges of using museums as places to learn? - Why do you use museums? - What did your children learn? - How, in your view, is learning in the museum different from learning in the classroom? - What would increase your confidence to use a museum more with students? - In what ways do you measure your students' learning at the moment? - What kinds of impact [on learning] do you think that one visit can have? What is possible? Realistic? Learning isn't always positive. Do you have any examples of your students having a negative learning experience, e.g., - Learning that museums are intimidating - Learning that their reading skills are inadequate - Learning that they are not always welcome - Misunderstanding paintings, objects, displays - Not finding themselves represented in the museum	Examples of questions used in a focus group conducted with teachers in a museum

2. Questions to explore Knowledge and Understanding

What has the book added or confirmed about your understanding of this particular theme? disciplinary or thematic	Teenage reading group questionnaire used in a library
To what extent do you think pupils will have gained facts and information during their visit? Subject specific facts Inter-disciplinary or thematic facts Information about museums, galleries or archives Facts about themselves, their families or the wider world Other kinds of facts	Teacher questionnaire Inviting tick box responses—very likely, quite likely, neither, quite unlikely, very unlikely
Has this visit—seeing the Exhibition and being able to talk	Student

about it afterwards—made you feel any differently, or more strongly, about the theme? Was there anything in particular that made you feel very strongly about the subject—perhaps something that you saw, heard or talked about today?	questionnaire used by the Imperial War Museum (Holocaust exhibition)—Key Stage 3 and above students
I felt that I learnt some new information I have developed an increased interest in something I knew little about before coming here I have gained knowledge that I can use or have used in my work as a result of my visit(s) here I have gained a better understanding of other peoples' ideas I have learnt new things about myself and my family's history I understand better the community I live in I discovered some interesting things from the visit today I could make sense of most of the things we saw and did at the museum / archive / library	Statements used to elicit a yes, no or don't know response—used in exit surveys in a range of museums, archives and libraries
Have you discovered any new information here today? Were you looking for anything in particular?	Closed questions—used in questionnaires and interviews—museums, archives and libraries
Did any new information you learned here today add to your understanding of [something] in any way? Please tell us what and how?	Closed and follow on open question used in an exit survey or interview

3. Questions to explore Skills

Did you learn a new skill today? Please tell us about this What new things have you found out how to do?	General
As a result of my visit(s) I understand more about how I can look / search for things I'm interested in using the resources available here I have gained specific practical skills during this or previous visits here A museum / archive / library visit is a good chance to pick up some new skills I'm able to talk about something I have learned here with others and listen to their ideas	Statements requiring a yes or no response—used in questionnaires in museums, archives and libraries
To what extent do you think that your pupils will have increased or gained skills during their museum visit? - Numeracy skills - Literacy skills - Communication skills - Spatial skills - Thinking skills - Social skills - Practical skills - Creative skills - Other skills	Teacher questionnaire inviting tick box responses—very likely, quite likely, neither, quite unlikely, very unlikely All key stages
Which of the following skills would you say your family / group has used in the museum / archive / library today? Prompts Social skills Speaking and listening skills Research skills Thinking skills Problem solving skills Creative or making skills Observation skills Any other skills Please give examples of how or when any of these were used?	Closed question and follow up used in questionnaire—refers to different types of skills to act as prompts
How else can we help you to improve your information searching skills? How did the session improve the way you carry out a literature search?	Closed questions—used as part of the University of Leicester Library email questionnaire

4. Questions about Attitudes and Values

How did the book make you feel? Who / what has the most influence over your behaviour and how you look?	Open questions Library questionnaire— Teenage reading group
Have you made any new connections between the exhibition theme and other moral or political issues? How has this visit been different to learning at school? How do you think young people see museums / archives / libraries? Do you think your visit here today will have affected their view?	Questionnaire or Interview guide— Student
How did you benefit from the visit? -Positive attitudes to experience and desire for future experiences -Increase in confidence, expertise and personal satisfaction of teachers	Teacher focus group questions
I learnt things that made me change my mind about something I am more confident about what I can do / achieve Museums / archives / libraries are more interesting than I thought Today's visit has given me lots to think about I've left the museum / archive / library more interested in the subject / theme than when I came	Statements requiring a yes or no or don't know response—used in questionnaires in museums, archives and libraries
To what extent do you think the visit will have enabled pupils to feel more positive about any of the following? - Themselves and their abilities - Other people / communities - Learning - Museums / Galleries / Archives / Libraries - Anything else	Museum questionnaire for teachers inviting tick box responses—very likely, quite likely, neither, quite unlikely, very unlikely
What, if anything, did you experience that made you change your mind about something? Is there anything you feel more strongly or less strongly about since your visit? What? What is the specific value to you of visiting this museum / archive / library? What is the value in the short term? The long term?	Open questions

5. Questions about Enjoyment, Inspiration and Creativity

What did you particularly enjoy today? Or find inspirational?	Open question
What do you think you've gained and can gain from a Reading Group? Library?	Open question
I was interested in what I saw and did I found my visit inspiring I was excited by what I saw and / or what I did My feelings and emotions were engaged	Statements requiring a yes or no or don't know or tick box response—used in a range of questionnaires
To what extent will you be using the experience to promote creativity? Designing and making Exploring new ideas Dance / drama Creative writing Other forms of creative work	Museum questionnaire for teachers inviting tick box responses—very likely, quite likely, neither, quite unlikely, very unlikely All key stages
Please can you complete any of the following sentences you feel apply to you or your group: Our group was Surprised by... Most interested in... Inspired by... Disappointed by... Bored by... Most enthusiastic about...	Question used in Interview guide for museum / archive / library for group leaders of young people

6. Questions that relate to Action, Behaviour and Progression

What difference do you think visiting / taking part has made to you? Please describe anything that is new or different that you are likely to do in the future as a result of your visit here today?	Open questions—could be used in questionnaires, interviews, comment cards, visitor books
Have you behaved differently here to the way that you	Student

normally behave at school? In what way? Will you talk or think (or have you already talked, thought) about this visit again—about the feelings or issues that it raised for you? Will this visit change the way you think or behave in the future?	questionnaire
Do you think the impact [of the visit] would increase if you came back soon after your first visit with the same students? - Does it matter? - How? What did visiting the museum enable the students to learn that they couldn't have learnt in the classroom?	Teacher focus group
I have developed a new interest during my visit(s) here I can use the knowledge I learnt here when I visit other similar places I am thinking about starting some training or a college course as a result of my experience here I am planning to join a special interest group as a result of my experience here I achieved my intentions I intend to come again Visiting has given me lots of ideas for things I could do The visit has made me want to find out more	Statements requiring a yes or no response—used in a range of questionnaires in museums, archives and libraries
Why did you come here today? What things did you expect to be able to do, to see or to find here? To find out something about a subject To find out things in general To participate in an activity or programme To relax or lose myself To get inspiration for a project It has been on the list of things to do To have fun To spend time with family and / or friends I've been here before and wanted to come back To find out more about my community or myself / my culture Other? (please expand)	Open questions introducing a set of statements
What, if anything, do you think the young people in your group might do as a result of today's visit?	Open question—group leader

7. Summary / Wrap-up questions

What is the single most important thing that you will remember about your experience here today?	Open question
If you could choose one or two of the most significant outcomes or conclusions for you from this visit what would those be?	Open question
If you could choose just one thing what would you say was the most important benefit to your group of their visit today?	Open question
What would have happened if you had not used the museum for learning	Open question— question to teachers
If a colleague asked you why young people should use museums / archives / libraries what would you say? (question to teachers)	Open question— question to teachers

Source: Museums, Libraries and Archives Council (MLA). *Inspiring Learning for All: The Measure Learning Toolkit*, London, U.K., MLA, 2004; accessed September 2005; available from http://www.inspiringlearningforall.gov.uk/measuring_learning/default.aspx.

Appendix 18: Conceptual framework for media education

Media Image	Questions to Ask
INDUSTRY	Who's in charge? What do they want of me, and why? What else do they want? HOW DO I KNOW?
PRODUCT	What kind of text is this? Are conventions followed or broken? How is this message constructed? HOW DO I KNOW?
AUDIENCE	Who is this intended for? What assumptions does the text make about the audience? Who am I supposed to be in relation to this text? HOW DO I KNOW?
VALUES	How real is this text? How / where do I find the meaning? What values are presented? What is the commercial message? What is the ideology of this text? What social / artistic / political messages does the text contain? HOW DO I KNOW?
PREDISPOSITION	Do I agree with (assent to) this text's message? Do I disagree with (resist) this text's message? Do I argue / negotiate with the message of this text? HOW DO I KNOW?
PERCEPTION	How does the text fit my personal values / beliefs / ideology? How does the text relate to my personal needs / hopes / fears / experiences? HOW DO I KNOW?
SKILLS	What skills do I need to apply to this text? How do I deconstruct / reconstruct this text? What new skills does this text demand of me? HOW DO I KNOW?
RECEIVER	What does all this mean in the end? HOW DO I KNOW?

Source: Worsnop, Chris. *Conceptual Framework for Media Education*, Media Awareness Network, 1999; accessed October 2005; available from http://www.media-awareness.ca/english/resources/educational/teaching_backgrounders/media_literacy/conceptual_framework_worsnop.cfm?RenderForPrint=1. Adapted by the author from *Screening Images: Ideas for Media Education*. Wright Communications, 1994.

Appendix 19: MediaPulse: Media use questionnaire

Today's children and youth are growing up in a multimedia world filled with television, movies, music videos, computer and video games, and the Internet. This exposure can have a significant impact on their health and wellbeing. The Media Awareness Network, in partnership with the Canadian Paediatric Society and your doctor, wants to ensure that your child's exposure to these media is positive. Please take a few moments to complete this form. If questions do not apply (e.g., you do not have a computer at home), simply leave that section blank.

Child's Name:

Age:

Today's Date:

Television

Do you have household rules about watching television?

☐ Yes ☐ No

On weekdays, how much television does your child watch each day? ☐ Less than 2 hours
☐ 2 to 4 hours ☐ More than 4 hours

On weekends, how much television does your child watch each day? ☐ Less than 2 hours
☐ 2 to 4 hours ☐ More than 4 hours

Who decides when and what your child watches ☐ Parent ☐ Some limits ☐ Child

Do you use television ratings to choose programs? ☐ Often ☐ Sometimes ☐ Never

Does your family discuss programs and commercials? ☐ Often ☐ Sometimes ☐ Never

Does your child or family eat in front of the television? ☐ Often ☐ Sometimes ☐ Never

Does your child have a television in his or her room? ☐ Yes ☐ No

Music and Videos

Do you have rules about music and music videos? ☐ Yes ☐ No

Do you listen to your child's music or watch the music videos your child is watching? ☐ Often ☐ Sometimes ☐ Never

Do you and your child discuss lyrics or images you find objectionable? ☐ Often ☐ Sometimes ☐ Never

Do you look for parental advisory labels on the music your child buys? ☐ Often ☐ Sometimes ☐ Never

Video, Computer and Internet Games

How long does your child spend playing video games each day? ☐ Less than 2 hours ☐ 2 to 4 hours ☐ More than 4 hours

Do you have household rules about video games? (e.g., no violence, time spent, etc.) ☐ Yes ☐ No

Do you look into games before buying or renting them? (e.g., play game, read reviews, etc.) ☐ Often ☐ Sometimes ☐ Never

Do you use ratings to help decide what to buy or rent? ☐ Often ☐ Sometimes ☐ Never

Does your child ever exhibit aggression or hyperactivity, or experience staring spells after playing video games?

☐ Often ☐ Sometimes ☐ Never

Movies and Videos

Do you check the rating of a movie before buying or renting? ☐ Often ☐ Sometimes ☐ Never

Does your child ever experience nightmares or have trouble sleeping after watching movies? ☐ Often ☐ Sometimes ☐ Never

Internet, E-mail, Instant Messaging

How long does your child spend using the Internet each day? ☐ Less than 2 hours ☐ 2 to 4 hours ☐ More than 4 hours

Does your child have access to the Internet in his or her bedroom? ☐ Yes ☐ No

Do you have rules about Internet use? (e.g., time spent, purpose, chatting or meeting with strangers, protecting privacy, etc.)

☐ Yes ☐ No

Are you aware of how your child uses the Internet (e.g., uses chat rooms, visits Web sites, downloads information, etc.)?

☐ Very much so ☐ Somewhat ☐ Not at all

Do you have any concerns about how these media may be affecting your child's health and well-being? Please explain:

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Source: Media Awareness Network and Canadian Paediatric Society. *Mediapulse: Measuring the Media in Kids' Lives - Overview*. 2003; accessed October 2005; available from http://www.media-awareness.ca/english/special_initiatives/media_pulse/index.cfm?RenderForPrint=1.

Appendix 20: Questionnaire: Transformative & spiritual dimensions of higher education

1. Your name: _____
2. Your title/position: _____
3. May we contact you for follow-up information, if necessary?
 - ☐ Yes
 - ☐ No
4. If yes, please provide your phone and email address:

5. Name of educational institution: _____
6. Location of institution—City: _____
7. Location of institution—State: _____

Information about your school's program

8. Name of department and program within institution:

9. Name of program director (if different than person filling out form):

10. If the program has a website, please list it here:

11. What is the focus of your academic field?
 - ☐ Transformative Learning
 - ☐ education
 - ☐ social sciences
 - ☐ physical sciences
 - ☐ arts and humanities
 - ☐ professional school (law, business, medicine)
 - ☐ other (specify subject)

12. Degree(s) offered:

- ☐ BA
- ☐ BS
- ☐ MA
- ☐ MS
- ☐ PhD
- ☐ other

13. How long has program been in existence?

- ☐ 1-2 yrs
- ☐ 3-5 yrs
- ☐ 5-10 yrs
- ☐ 10+ yrs

14. How many students are enrolled in this program? _____

15. How many faculty teach in this program? _____

16. Please tell us the extent to which transformative and spiritual elements of education are present in the department/program. Are these principles expressed and supported:

- ☐ Throughout the entire department/program
- ☐ By yourself and a number of other professors/staff
- ☐ In only the class/es that you teach
- ☐ Other (please specify)

Tell us more about your program and your ideas about Transformative Learning

17. Please tell us, briefly, how you define transformative learning, especially in the context of your program (or include the program's mission statement here).

18. How important are the following elements in your academic program?

Very important Important Not at all important

Intuitive and imaginative process as a part of learning

Contemplative and spiritual dimension of learning

Facilitating an exploration of one's ethical values

19. Tell us how much you agree or disagree with the following statements:

Strongly agree Agree Disagree Strongly disagree

Transformational Learning is primarily about
developing intellectual autonomy and independence

Students' personal lives have little relationship to their
learning process

Education should be a deeply transformative
experience on both an intellectual and emotional level

Learning should involve the physical, emotional, and
spiritual dimensions of human existence

Students should be strongly encouraged to identify
their belief system and see how it impacts their
relationship to the world around them

An awareness of how one knows what one knows is
equally as important as what one knows

20. If you believe that emotional transformation is a desirable outcome of Transformative Learning, what kinds of transformation are sought? (check as many as apply)

- ☐ equanimity or emotional balance
- ☐ heightened awareness
- ☐ courage to be different
- ☐ I disagree that emotional learning is a goal of Transformative Learning
- ☐ Other (please specify)

21. Which of the following methodologies does your program incorporate into its curriculum? (check as many as apply)

Experiential pedagogy (e.g., participatory learning techniques, experiences in other cultures, wilderness trips) Please give an example

Contemplative practices (e.g., meditation, silence, reflective learning) Please give an example _____

Collaborative learning (e.g., cohorts, learning communities) Please give an example _____

Creative/artistic experiences Please give an example _____

Service learning (e.g., action research, volunteer work) Please give an example _____

Biographical techniques (e.g., journaling, “inner work”) Please give an example _____

22. How do students demonstrate their learning? What methods of evaluation does your program use? (check as many as apply)

- ☐ Written tests
- ☐ Oral presentations
- ☐ Journaling
- ☐ Student portfolios
- ☐ Student projects
- ☐ Other:

23. Do you belong to or are you aware of any local, regional, or national communities/networks of educators who have coalesced around transformative and spiritual dimensions of learning?

Yes No

24. If yes, please describe.

25. Are you engaged in research in your field which uses transformative and/or spiritual methods? Yes No

26. If yes, please describe briefly.

27. Have you published or lectured on these findings?

Yes No

28. If yes, please describe where.

29. Please tell us how helpful each of the following would be, both to your program and to support the movement to bring a transformative/spiritual dimension into higher education.

Very helpful Helpful Not helpful

Graduate-level fellowships

Research support/funding

National conferences

Leadership development/support

Faculty renewal (retreats)

Online resources

Journal

30. In addition to the choices above, please tell us here if there is anything else that would support the work your program is doing to integrate transformative/spiritual elements.

31. Additional comments about your program, or questions about this survey?

32. Please tell us how you found out about this survey:

- ☐ Chronicle of Higher Education advertisement
- ☐ From the MiEN email list
- ☐ From the Contemplative Fellows email list
- ☐ Other (please specify)

Thank you!

Source: Zajonc, Arthur. *Survey of Transformative and Spiritual Dimensions in Higher Education*. Center for Contemplative Mind in Society for the Fetzer Institute, 2003; accessed January 2006; available from http://www.contemplativemind.org/programs/academic/fetzer_report.pdf.

Appendix 21: Canadian Council on Learning (CCL): Composite Learning Index (CLI)

Learning to Know

1. Student reading skills:
Estimated mean reading score, Programme for International Student Assessment (PISA), 2003.
2. Student math skills:
Estimated mean mathematics score, Programme for International Student Assessment (PISA), 2003.
3. Student problem solving skills:
Estimated mean problem solving score, Programme for International Student Assessment (PISA), 2003.
4. High school drop out rate:
Percentage of 20- to 24-year-olds who are without a high school diploma and who are not attending school, Labour Force Survey, 2005, Statistics Canada.
5. Attendance in post secondary education:
Percentage of 20- to 24-year-olds attending post-secondary institution, Labour Force Survey, 2005, Statistics Canada.
6. University attainment:
Percentage of working-age Canadians with completed university program, Labour Force Survey, 2005, Statistics Canada.

Learning to Do

7. Participation in job-related training:
Proportion of working-age population participating in job-related training, Adult Education and Training Survey, 2002, Statistics Canada.
8. Training at work:
Percentage of employers offering any structured training, Workplace and Employee Survey, 2001, Statistics Canada.

Learning to Live Together

9. Charitable giving:
Percentage of tax filers claiming charitable donations, Longitudinal Administrative Data, 2003, Statistics Canada.
10. Volunteer rate:

Percentage of Canadians 15 years and older who volunteer formally, National Survey of Giving, Volunteering and Participating, 2000, Statistics Canada.

11. Spending on clubs:

Percentage of households with spending on clubs and other groups, Survey of Household Spending, 2003, Statistics Canada.

Learning to Be

12. Spending on reading materials:

Percentage of households with spending on reading materials, Survey of Household Spending, 2003, Statistics Canada.

13. Spending on Internet:

Percentage of households with spending on Internet, Survey of Household Spending, 2003, Statistics Canada.

14. Spending on sports and recreation:

Percentage of households with spending on sports and recreation facilities, Survey of Household Spending, 2003, Statistics Canada.

15. Spending on performing arts:

Percentage of households with spending on performing arts, Survey of Household Spending, 2003, Statistics Canada.

16. Spending on visiting museums:

Percentage of households with spending on visiting museums and other activities, Survey of Household Spending, 2003, Statistics Canada.

Source: Canadian Council on Learning (CCL). *Website*. CCL, 2006; accessed March 2006; available from <http://www.ccl-cca.ca/>.

Appendix 22: Questions for the CRIC–Globe and Mail Survey on "The New Canada"

1. Do you strongly agree, agree, disagree or strongly disagree with each of the following statements:

- 1-1. It is the responsibility of the government to reduce the differences between those with high and low incomes.
- 1-2. Trade unions are no longer necessary to protect workers' rights.
- 1-3. I worry a lot about how much debt I have.
- 1-4. During a strike, management should be prohibited by law from hiring workers to take their place.
- 1-5. The government should provide decent housing for all who cannot afford it.
- 1-6. Canada will have more influence on the world stage in the years to come.
- 1-7. A working mother can establish just as warm and secure a relationship with her children as a mother who does not work.
- 1-8. In order to reduce smog in our major cities, we should severely restrict the use of cars in downtown areas.
- 1-9. These days police in most cities treat blacks as fairly as they treat whites. [In MB, SK, AB and BC, the wording is "Aboriginals" instead of "Blacks", and "non-Aboriginals" instead of "whites"]

2. Generally speaking, in your opinion, which is more often to blame if a person is poor—lack of effort on his part, or circumstances beyond his control?

3. It has been said that what counts today is not what you can do, or how hard working you are, but whom you know and how much influence you have. Do you agree or disagree with this statement?

4-A. Do you think it is the responsibility of parents to pay the full costs of daycare for their children if they need it, or is it the government's responsibility to ensure there is affordable day care for Canadians? (HALF SAMPLE)

4-B. Do you think it is the responsibility of families to pay the full costs of nursing home care for the elderly if they need it, or is it the government's responsibility to ensure there is affordable nursing home care for Canadians? (HALF SAMPLE)

5-A. If you had a choice between a higher salary or greater job security, which would you choose? (HALF SAMPLE)

5-B. Which would you prefer: earning more money, even if that meant working more hours each week, or having more time for yourself and your family, even if that meant earning less money? (HALF SAMPLE)

6. Do you think that Canada's Aboriginal peoples should try to maintain their culture and way of life or should they try to integrate fully into mainstream society?

7-A. When you choose a product to buy, which of the following three considerations is MOST important to you:

- 7-1. The product is produced in Canada
 - 7-2. The product is produced in a way that does not harm the environment
 - 7-3. The product has a brand name label that you know and like
 - 7-4. The product sells for a fair and reasonable price
 - 7-5. The product is made in a country with laws that protect workers and ban child labour
 - 7-6. The product has ads that you like
 - 7-7. Don't know/refused
- (HALF SAMPLE)

7-B. And which is next most important?

- 7-1. The product is produced in Canada
 - 7-2. The product is produced in a way that does not harm the environment
 - 7-3. The product has a brand name label that you know and like
 - 7-4. The product sells for a fair and reasonable price
 - 7-5. The product is made in a country with laws that protect workers and ban child labour
 - 7-6. The product has ads that you like
 - 7-7. Don't know/refused
- (HALF SAMPLE)

8. Thinking about today's young adults, that is people in their 20s, when they get older, do you think their standard of living will be better, worse, or about the same as their parents' generation?

9. Over the next ten years, do you think it is very likely, likely, unlikely, or very unlikely that:

- 9-1. Your work will become more interesting.
- 9-2. Your income will significantly increase.
- 9-3. The quality of the environment in Canada will improve.
- 9-4. There will be more peace in the world and less war.
- 9-5. There will be less conflict between different ethnic groups in Canada.
- 9-6. Canada will adopt the U.S. dollar as its currency.

10. Would you describe your life as very stressful, somewhat stressful, not very stressful, or not at all stressful?

11. Some people feel they have completely free choice and control over their lives, and other people feel that what they do has no real effect on what happens to them. Please use a scale of 1–10, where 1 indicates that you have no control, and 10 means that you have a great deal of control.

12. In your opinion, which of the following do you think will be the biggest threat for the country in the future: big business, big labour, or big government?

13. I will read you a list of things and events that some people say make them proud to be Canadian. I would like you to tell me whether each of these makes you feel proud to be a Canadian. Please use a scale of 0–10, where 0 means it does not make you feel proud at all, and 10 means it makes you feel very proud. You can use any number between 0 and 10.

- 13-1. Canadian Olympic hockey team victories
- 13-2. Pierre Trudeau
- 13-3. Having two official languages, English and French
- 13-4. Canada's participation in key battles of World War I or World War II
- 13-5. Multiculturalism
- 13-6. The Charter of Rights and Freedoms
- 13-7. When Canada decided to not participate in the war on Iraq
- 13-8. When Canadian airports took in American planes that were diverted on September 11th, 2001.
- 13-9. Canada's participation in peacekeeping activities around the world
- 13-10. Canadian scientific inventions, like the Canadarm
- 13-11. The vastness and beauty of the land
- 13-12. The CBC
- 13-13. The success of Canadian musicians or actors or artists
- 13-14. Canada's health care system
- 13-15. When the United Nations ranks Canada as the best country in the world in which to live
- 13-16. The Queen
- 13-17. Canada's Politeness and civility
- 13-18. The fact that people from different cultural groups in Canada get along and live in peace

14. I will read you a number of factors which may contribute to one's personal feeling of identity. For each, please tell me whether it is very important, important, not very important, or not at all important to your own sense of identity?

- 14-1. How about...? Nation
- 14-2. Language
- 14-3. Region or Province
- 14-4. Ethnicity or Race
- 14-5. Religion
- 14-6. Gender

15. When choosing a spouse, is it very important, important not very important or not at all important that both people share:

- 15-1. How about...? Similar attitudes towards family and children
- 15-2. Similar religion
- 15-3. Similar moral values
- 15-4. Similar political views
- 15-5. Similar ethnic background
- 15-6. Similar educational background
- 15-7. Similar attitudes towards work and leisure

15-8. Similar sense of humour

15-9. Similar class, that is, economic background or income

16. I'd now like to read you some more statements about life in Canada today. Please tell me how you feel about each statement on a scale of 1–7, where 1 means you totally disagree, and 7" means you totally agree. A neutral answer would be 4.

16-1. How about...? A society that has a variety of ethnic and cultural groups is more able to tackle new problems as they occur.

16-2. It is a bad idea for people of different races to marry one another.

16-3. Non-whites living here should not push themselves where they are not wanted.

16-4. Canadian children growing up surrounded by people of different ethnic and cultural groups will be left without a solid cultural base.

16-5. No Canadian should be forced to work on his or her Holy Day, regardless of the day of the week on which it falls.

16-6. Government should refuse to give contracts to companies that do not have a fair proportion of ethnic and racial minorities.

17. Would you feel very comfortable, comfortable, uncomfortable or very uncomfortable if:

[Answers repeated for:]

Sample a: Your boss was someone who is:

Sample b: a teacher in your local school was:

Sample c: a close relative, like your sister or daughter, was going to marry Someone who is:

17-1. A fundamentalist Christian

17-2. Jewish

17-3. Black

17-4. Aboriginal

17-5. A white supremacist

17-6. Muslim

17-7. Asian Canadian

17-8. French/English Canadian

17-9. An atheist

18. Would you feel very comfortable, comfortable, uncomfortable or very uncomfortable if a close member of your family, such as your brother or sister, or one of your children, said that they were gay.

19. Which statement more closely reflects your own view:

19-1. There is still a lot of racism left in Canada

19-2. There isn't much racism left in Canada

19-3. Don't know/refused

20. When you hear languages other than English or French being spoken on the streets in Canada, do you feel very comfortable, comfortable, uncomfortable or very uncomfortable?

21. Which statement more closely reflects your own view:

21-1. At work or at school in Canada, just about everyone succeeds or fails on the basis of how well they do their work

21-2. Many people are judged at work and school on the basis of their ethnic background, with some having a harder time due to prejudice

21-3. Don't know/refused

22-A. If two equally qualified people [applied for a job], one white and one a visible minority, who do you think would be more likely to get it? The white person, the visible minority person, or would both have an equal chance?

22-B. If two equally qualified people [are being considered for a promotion at their workplace], one white and one a visible minority, who do you think would be more likely to get it? The white person, the visible minority person, or would both have an equal chance?

23-A. If two equally qualified people [applied for a job], one man and one woman, who do you think would get it? The man, the woman, or would they both have an equal chance?

23-B. If two equally qualified people [are being considered for a promotion at their workplace], one man and one woman, who do you think would get it? The man, the woman, or would they both have an equal chance?

24-A. Please think about your few closest friends. [Repeated with following question:]

24-B. Please think about the circle of people you socialize with.

24-1. Are any of them gay or lesbian?

24-2. Do any of them come from a different religious or ethnic background than you do?

24-3. Do any of them come from a different racial background than you do?

25–40. Demographic questions

Source: Centre for Research and Information on Canada (CRIC), *Globe and Mail*, and Canadian Opinion Research Archive (CORA). *The CRIC-Globe and Mail Survey on "The New Canada"*. Canadian Opinion Research Archive, Queen's University, 2003; accessed November 2005; available from <http://jeff-lab.queensu.ca/poadata/info/cric/cricgmnc03.shtml>.

Appendix 23. Motivated Strategies and Learning Questionnaire (MSLQ): Scales, categories, and items related to self-regulated learning behaviours

Scales and categories	Items comprising the scales (numbers correspond to numbers on the questionnaire)
Motivation Scales	
Intrinsic goal orientation	1, 16, 22, 24
Extrinsic goal orientation	7, 11, 13, 30
Task value	4, 10, 17, 23, 26, 27
Control of learning beliefs	2, 9, 18, 25
Self-efficacy for learning & performance	5, 6, 12, 15, 20, 21, 29, 31
Test anxiety	3, 8, 14, 19, 28
Learning Strategies Scales	
Rehearsal	39, 46, 59, 72
Elaboration	53, 62, 64, 67, 69, 81
Organization	32, 42, 49, 63
Critical thinking	38, 47, 51, 66, 71
Metacognitive self-regulation	33, 36, 41, 44, 54, 55, 56, 57, 61, 76, 78, 79
Time & study environment	35, 43, 52, 65, 70, 73, 77, 80
Management: Effort regulation	37, 48, 60, 74
Peer learning	34, 45, 50
Help seeking	40, 58, 68, 75

MSLQ Questionnaire

Students are instructed to mark a number from 1 (*not at all true of me*) to 7 (*very true of me*.)

Part A: Motivation

1. In a class like this, I prefer course material that really challenges me so I can learn new things.
2. If I study in appropriate ways, then I will be able to learn the material in this course.
3. When I take a test I think about how poorly I am doing compared with other students.
4. I think I will be able to use what I learn in this course in other courses.
5. I believe I will receive an excellent grade in this class.

6. I'm certain I can understand the most difficult material presented in the readings for this course.
7. Getting a good grade in this class is the most satisfying thing for me right now.
8. When I take a test I think about items on other parts of the test I can't answer.
9. It is my own fault if I don't learn the material in this course.
10. It is important for me to learn the course material in this class.
11. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.
12. I'm confident I can learn the basic concepts taught in this course.
13. If I can, I want to get better grades in this class than most of the other students.
14. When I take tests I think of the consequences of failing.
15. I'm confident I can understand the most complex material presented by the instructor in this course.
16. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.
17. I am very interested in the content area of this course.
18. If I try hard enough, then I will understand the course material.
19. I have an uneasy, upset feeling when I take an exam.
20. I'm confident I can do an excellent job on the assignments and tests in this course.
21. I expect to do well in this class.
22. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.
23. I think the course material in this class is useful for me to learn.
24. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.
25. If I don't understand the course material, it is because I didn't try hard enough.
26. I like the subject matter of this course.
27. Understanding the subject matter of this course is very important to me.
28. I feel my heart beating fast when I take an exam.
29. I'm certain I can master the skills being taught in this class.
30. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.
31. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

Part B: Learning Strategies

32. When I study the readings for this course, I outline the material to help me organize my thoughts.
33. During class time I often miss important points because I'm thinking of other things.
(REVERSED)
34. When studying for this course, I often try to explain the material to a classmate or friend.
35. I usually study in a place where I can concentrate on my course work.
36. When reading for this course, I make up questions to help focus my reading.
37. I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do. (REVERSED)

38. I often find myself questioning things I hear or read in this course to decide if I find them convincing.
39. When I study for this class, I practice saying the material to myself over and over.
40. Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone. (REVERSED)
41. When I become confused about something I'm reading for this class, I go back and try to figure it out.
42. When I study for this course, I go through the readings and my class notes and try to find the most important ideas.
43. I make good use of my study time for this course.
44. If course readings are difficult to understand, I change the way I read the material.
45. I try to work with other students from this class to complete the course assignments.
46. When studying for this course, I read my class notes and the course readings over and over again.
47. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.
48. I work hard to do well in this class even if I don't like what we are doing.
49. I make simple charts, diagrams, or tables to help me organize course material.
50. When studying for this course, I often set aside time to discuss course material with a group of students from the class.
51. I treat the course material as a starting point and try to develop my own ideas about it.
52. I find it hard to stick to a study schedule. (REVERSED)
53. When I study for this class, I pull together information from different sources, such as lectures, readings, and discussions.
54. Before I study new course material thoroughly, I often skim it to see how it is organized.
55. I ask myself questions to make sure I understand the material I have been studying in this class.
56. I try to change the way I study in order to fit the course requirements and the instructor's teaching style.
57. I often find that I have been reading for this class but don't know what it was all about. (REVERSED)
58. I ask the instructor to clarify concepts I don't understand well.
59. I memorize keywords to remind me of important concepts in this class.
60. When course work is difficult, I either give up or only study the easy parts. (REVERSED)
61. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course.
62. I try to relate ideas in this subject to those in other courses whenever possible.
63. When I study for this course, I go over my class notes and make an outline of important concepts.
64. When reading for this class, I try to relate the material to what I already know.
65. I have a regular place set aside for studying.
66. I try to play around with ideas of my own related to what I am learning in this course.
67. When I study for this course, I write brief summaries of the main ideas from the readings and my class notes.

68. When I can't understand the material in this course, I ask another student in this class for help.
69. I try to understand the material in this class by making connections between the readings and the concepts from the lectures.
70. I make sure that I keep up with the weekly readings and assignments for this course.
71. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.
72. I make lists of important items for this course and memorize the lists.
73. I attend this class regularly.
74. Even when course materials are dull and uninteresting, I manage to keep working until I finish.
75. I try to identify students in this class whom I can ask for help if necessary.
76. When studying for this course I try to determine which concepts I don't understand well.
77. I often find that I don't spend very much time on this course because of other activities.
(REVERSED)
78. When I study for this class, I set goals for myself in order to direct my activities in each study period.
79. If I get confused taking notes in class, I make sure I sort it out afterwards.
80. I rarely find time to review my notes or readings before an exam. (REVERSED)
81. I try to apply ideas from course readings in other class activities such as lecture and discussion.

Source: Duncan, Teresa García, and Wilbert J. McKeachie. "The Making of the Motivated Strategies for Learning Questionnaire." *Educational Psychologist*, 40, no. 2 (2005): 117-128.

Appendix 24: Programme for International Student Assessment (PISA) Cross-Curricular Competencies questionnaire—items measuring student characteristics as learners

Note: The following is organized according to the topic being assessed. The number before each statement represents the number in the actual questionnaire.

Questions 1–28: How often do these things apply to you? Almost never, sometimes, often, almost always

Questions 29–52: How much do you disagree or agree with each of the following? Disagree, somewhat disagree, agree somewhat, agree

Learning strategies

Elaboration strategies

- 9. When I study, I try to relate new material to things I have learned in other subjects.
- 17. When I study, I figure out how the information might be useful in the real world.
- 21. When I study, I try to understand the material better by relating it to things I already know.
- 25. When I study, I figure out how the material fits in with what I have learned.

Memorisation strategies

- 1. When I study, I try to memorise everything that might be covered.
- 5. When I study, I memorise as much as possible.
- 10. When I study, I memorise all new material so that I can recite it.
- 15. When I study, I practice by saying the material to myself over and over.

Control strategies

- 3. When I study, I start by figuring out what exactly I need to learn.
- 13. When I study, I force myself to check to see if I remember what I have learned.
- 19. When I study, I try to figure out, as I read, which concepts I still haven't really understood.
- 23. When I study, I make sure that I remember the most important things.
- 27. When I study, and I don't understand something, I look for additional information to clarify the point.

Motivation

Instrumental motivation

- 6. I study to increase my job opportunities.

- 14. I study to ensure that my future will be financially secure.
- 22. I study to get a good job.

Interest in reading

- 34. Because reading is fun, I wouldn't want to give it up.
- 41. I read in my spare time.
- 45. When I read, I sometimes get totally absorbed.

Interest in mathematics

- 29. When I do mathematics, I sometimes get totally absorbed.
- 38. Because doing mathematics is fun, I wouldn't want to give it up.
- 49. Mathematics is important to me personally.

Effort and persistence in learning

- 7. When studying, I work as hard as possible.
- 12. When studying, I keep working even if the material is difficult.
- 20. When studying, I try to do my best to acquire the knowledge and skills taught.
- 28. When studying, I put forth my best effort.

Self-related beliefs

Self-efficacy

- 2. I'm certain I can understand the most difficult material presented in texts.
- 4. When I sit myself down to learn something really difficult, I can learn it.
- 8. I'm confident I can understand the most complex material presented by the teacher.
- 11. If I decide not to get any bad grades, I can really do it.
- 16. If I decide not to get any problems wrong, I can really do it.
- 18. I'm confident I can do an excellent job on assignments and tests.
- 24. If I want to learn something well, I can.
- 26. I'm certain I can master the skills being taught.

Self-concept of verbal competencies

- 33. I'm hopeless in <test language> classes. (reversed)
- 37. I learn things quickly in <test language> class.
- 51. I get good marks in <test language>.

Self-concept of mathematical competencies

- 40. I get good marks in mathematics.
- 43. Mathematics is one of my best subjects.
- 46. I have always done well in mathematics.

Academic self-concept

- 31. I learn things quickly in most school subjects.
- 35. I'm good at most school subjects.
- 48. I do well in test in most school subjects.

Self-report of social competencies**Preference for co-operative learning**

- 30. I like to work with other students.
- 36. I learn the most when I work with other students.
- 42. I do my best work when I work with other students.
- 47. I like to help other people do well in a group.
- 50. It is helpful to put together everyone's ideas when working on a project.

Preference for competitive learning

- 32. I like to try to be better than other students.
- 39. Trying to be better than others makes me work well.
- 44. I would like to be the best at something.
- 52. I learn faster if I'm trying to do better than the others.

Sources: Organisation for Economic Co-operation and Development (OECD). Programme for International Student Assessment CCC [Cross-Curricular Competencies] Questionnaire 2000, accessed September 2006; available from http://pisaweb.acer.edu.au/oeecd/oeecd_pisa_data_s2.php.

Artelt, Cordula, Jurgen Baumert, Nele Julius-McElvany, and Jules Peschar. *Learners for Life: Student Approaches to Learning. Results from PISA 2000*, Organisation for Economic Co-operation and Development, 2003; accessed September 2006; available from <http://www1.oecd.org/publications/e-book/9603101E.PDF>.

Appendix 25. International Association for the Evaluation of Educational Achievement (IEA) Civic Education Study—student questionnaire

The student instrument presented here is divided into three parts.

For ninth-grade students: The first section is comprised of 16 multiple choice items with correct and incorrect answers. They have been chosen for release from the 38 items included in the test of knowledge of civic content and skills in interpreting civic-related information administered to all respondents. The 22 non-released items are being retained for possible use in future IEA studies in this area. The correct answer for each of the 16 items has been indicated. An alpha coefficient computed on a sample of 14,000 students (500 randomly chosen from each of the 28 countries) for these 16 items is .76.

For upper secondary school students: The nine released questions that are the same in both instruments are marked with *.

The second and third sections are the same for both age groups, with the addition, in the section for older students, of items on the effectiveness of political action and on the use of military force, which are not shown here.

The second section is comprised of the background items.

The third section is comprised of all of the concept, attitude, and behaviour (action) items.

(To save space, the questionnaire multiple choices items are listed here in a different format than that used in the test. The boxes that are used in the questionnaire to mark the answer are not included here. Correct answers are marked with an X.)

Directions for part 1

You will have 35 minutes to answer the 38 questions in this section. Each of the questions or incomplete statements in this test is followed by four possible answers. You are to decide which one of these answers is best.

Tick your answer by placing a cross (X) in the box next to the answer you think is correct.

PART ONE

1. Which of the following is a nation?

- A. Tokyo
- B. Australia - X
- C. Copenhagen
- D. Montreal

2. Which of the following is an accurate statement about laws?

- A. Laws forbid or require certain actions [behaviours]. - X
- B. Laws are made by the police.
- C. Laws are valid only if all citizens have voted to accept them.
- D. Laws prevent criticism of the government.

***3. Which of the following is a political right? The right ...**

- A. of pupils to learn about politics in school.
- B. of citizens to vote and stand for [run for] election. - X
- C. of adults to have a job.
- D. of politicians to have a salary.

5. A woman who has a young child is interviewed for a job at a travel agency. Which of the following is an example of discrimination [injustice]? She does not get the job because ...

- A. she has no previous experience.
- B. she is a mother. - X
- C. she speaks only one language.
- D. she demands a high salary.

***7. In a democratic country [society] having many organisations for people to join is important because this provides ...**

- A. a group to defend members who are arrested.
- B. many sources of taxes for the government.
- C. opportunities to express different points of view. - X
- D. a way for the government to tell people about new laws.

11. In democratic countries what is the function of having more than one political party?

- A. To represent different opinions [interests] in the national legislature [e.g., Parliament, Congress]. - X
- B. To limit political corruption.
- C. To prevent political demonstrations.
- D. To encourage economic competition.

12. In a democratic political system, which of the following ought to govern the country?

- A. Moral or religious leaders.
- B. A small group of well-educated people.
- C. Popularly elected representatives. - X
- D. Experts on government and political affairs.

16. What is the major purpose of the United Nations?

- A. Safeguarding trade between countries.
- B. Maintaining peace and security among countries. - X
- C. Deciding where countries' boundaries should be.

D. Keeping criminals from escaping to other countries.

***17. Which of the following is most likely to cause a government to be called non-democratic?**

- A. People are prevented from criticising [not allowed to criticise] the government. - X
- B. The political parties criticise each other often.
- C. People must pay very high taxes.
- D. Every citizen has the right to a job.

***18. Which of the following is most likely to happen if a large publisher buys many of the [smaller] newspapers in a country?**

- A. Government censorship of the news is more likely.
- B. There will be less diversity of opinions presented. - X
- C. The price of the country's newspapers will be lowered.
- D. The amount of advertising in the newspapers will be reduced.

The next three questions are based on the following imaginary political leaflet [political advertisement].

We citizens have had enough!

A vote for the Silver Party means a vote for higher taxes.
It means an end to economic growth and a waste of our nation's resources.
Vote instead for economic growth and free enterprise.
Vote for more money left in everyone's wallet!
Let's not waste another 4 years! Vote for the Gold Party.

***23. This is an election leaflet [political advertisement] which has probably been issued by ...**

- A. the Silver Party.
- B. a party or group in opposition to [running against] the Silver Party. - X
- C. a group which tries to be sure elections are fair.
- D. the Silver Party and the Gold Party together.

***24. The authors of the leaflet think that higher taxes are ...**

- A. a good thing.
- B. necessary in a [free] market economy.
- C. necessary for economic growth.
- D. a bad thing. - X

***25. The party or group that has issued this leaflet is likely also to be in favour of ...**

- A. reducing state [government] control of the economy. - X
- B. lowering of the voting age.
- C. capital punishment.
- D. more frequent elections.

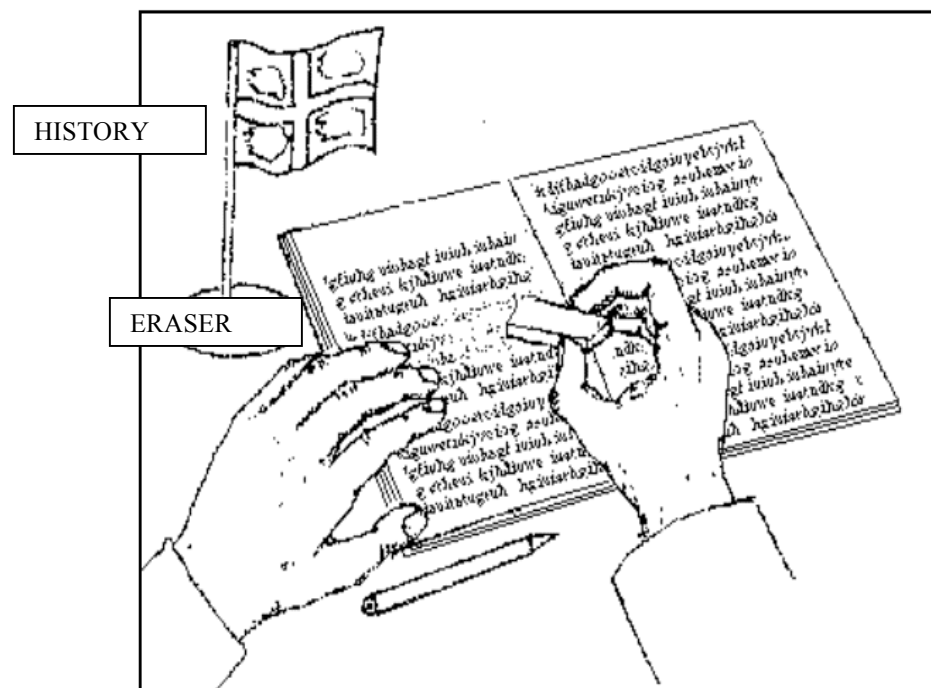
***26. Two people work at the same job but one is paid less than the other. The principle of equality would be violated if the person is paid less because of ...**

- A. fewer educational qualifications.
- B. less work experience.
- C. working for fewer hours.
- D. gender [sex]. - X

The next question differs from those earlier in the test. The following question contains three statements of fact and one statement of opinion. Read each question, and then choose the opinion.

31. Three of these statements are facts and one is an opinion. Which of the following is an opinion?

- A. Actions by individual countries are the best way to solve environmental problems. - X
- B. Many countries contribute to the pollution of the environment.
- C. Some countries offer to co-operate in order to diminish acid rain.
- D. Water pollution often comes from several different sources.



***36. What is the message or main point of this cartoon? History textbooks ...**

- A. are sometimes changed to avoid mentioning problematic events from the past. - X
- B. for children must be shorter than books written for adults.

- C. are full of information that is not interesting.
- D. should be written using a computer and not a pencil.

The next question differs from those earlier in the test. The following question contains three statements of opinion and one statement of fact. Read each question, and then choose the fact.

38. Three of these statements are opinions and one is a fact. Which of the following is a fact [the factual statement]?

- A. People with very low incomes should not pay any taxes.
- B. In many countries rich people pay higher taxes than poor people. - X
- C. It is fair that some citizens pay higher taxes than others.
- D. Donations to charity are the best way to reduce differences between rich and poor.

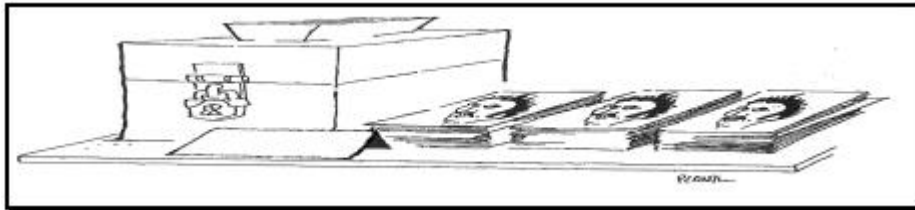
Scale Reliabilities for the 16 test items (Cronbach's Alpha) = .76

Additional questions given to upper secondary school students:

18. What is a coalition government? A government [executive government] ...

- A. consisting of members of one large political party.
- B. consisting of members of two or more political parties. - X
- C. formed without the participation of any political party.
- D. formed with the support of business leaders.

Make your choice!



From: *Introducing Democracy: Questions and Answers*, ©UNESCO 1995

20. What is the message or main point of this cartoon?

- A. Candidates for elections are usually men.
- B. Free elections must have more than one candidate. - X
- C. Elections are the only way to influence politics.
- D. Voting should be in secret.

21. The government has lowered tax rates on income from interest and investment [finance income] and raised tax rates on salaries. A large group carried signs in protest in front of the government's buildings. The protesters are most likely to be ...

- A. people who have large savings accounts.
- B. people who own shares in companies.

- C. unemployed people who receive government benefits.
- D. people who are employed in factories. - X

22. A country has a declining birth-rate and an increasing life span. Which of the following problems will have to be solved as a result? How to ...

- A. build school buildings.
- B. fund [finance] pensions for the elderly. - X
- C. build low income housing.
- D. combat crime and violence.

23. The ambassador from a country called Highland to a country called Lowland was recalled. What is the most likely reason for this?

- A. The relationship between Lowland and Highland is increasingly friendly.
- B. Lowland wants to suggest a treaty with Highland.
- C. Lowland wants to increase trade with Highland.
- D. There has been an event in Lowland offending Highland. - D

25. In the late 1990s, what contributed most to armed conflicts in various parts of the world?

- A. Rising costs of raw materials such as oil.
- B. Decreasing numbers of democratic governments in the world.
- C. Conflicts between national, ethnic, or religious groups. - X
- D. Illegal arms trade across borders.

Please look at the graph below when answering the next question (No. 26).
[graph not reproduced exactly as original]

Labour Costs in five countries

Country A	28.68
Country B.....	24.50
Country C	12.25
Country D.....	10.32
Country E.....	7.51

Average hourly labour costs per country (in US \$)

26. The average cost of labour varies in the countries listed above. These labour cost differences are likely to result in which of the following?

- A. Companies relocating their factories to Country A.
- B. Companies locating factories in all 5 countries.
- C. Companies relocating factories to Country E. - X
- D. Twice as many companies locating factories in Country B as in Country C.

The next question is based on the following part of an article from an imaginary newspaper.

MINISTER ASKED TO RESIGN

Company X was chosen by the Minister of Transport [or national equivalent] to build a road despite the fact that its cost was higher than other companies. It was later revealed that the Minister's brother is a major shareholder in Company X. Members of Parliament [or national equivalent] are calling for the Minister's resignation.

30. Why do Members of Parliament [or national equivalent] want the Minister to resign?

- A. The Minister should not decide who is to build roads.
- B. The Minister's family should not be shareholders in any company.
- C. The Minister was given money by the company who built the road.
- D. The Minister's decision was affected by his private interests. - X

The next question is based on the following part of an article from an imaginary newspaper.

OPEC TO REDUCE OIL PRODUCTION

The Organisation of Petroleum Exporting Countries met in Vienna last week. Leaders of the oil producing countries agreed to reduce the amount of oil each of them pump. At a press conference today, the organisation's spokesman said that this will help to keep the world's economy in balance.

34. Why would the OPEC countries decide to reduce their oil production?

- A. To help economic growth in the world.
- B. To keep oil prices from falling. - X
- C. To save oil for future generations.
- D. To promote the development of new energy sources.

35. If there were a high protective tariff [tax] in Brazil on cars made in Japan, who would most directly benefit?

- A. car-makers in Japan.
- B. people in Brazil who buy cars made in Japan.
- C. car-makers in Brazil. - X
- D. the government in Japan.

PART TWO

General Instructions:

The questions which follow are being asked to students of your age in over 25 countries. Answers to these questions help in interpreting the answers you give in other parts of this booklet. Your answers will be CONFIDENTIAL. Your teachers will not see them. Other students will not see them. Please be careful in reading the instructions and answer the questions honestly.

1. On what date were you born?

Write in the month, day and year.

2. Are you a girl or a boy?

3. Which best describes you?

Tick one box only.

4. Were you born in [country of test]?

5. If you were not born in [country of test], how old were you when you came to [country of test]?

6. How often do you speak [language of test] at home?

Tick one box only.

Never, Sometimes, Always or almost always

7. Does any of these people live at home with you most or all of the time?

No, yes

Mother or stepmother or female guardian,

Father or stepfather or male guardian

8. Altogether, how many people live in your home?

9. Do you get a daily newspaper at home?

No, Yes

..

10. About how many books are there in your home?

Do not count newspapers, magazines or books for school; tick one box only.

1. None

2. 1–10

3. 11–50

4. 51–100

5. 101–200

6. More than 200

11. How many years of further education do you expect to complete after this year?

Please include vocational education and / or higher education. Tick one box only.

- 0 years.....
- 1 or 2 years.....
- 3 or 4 years.....
- 5 or 6 years.....
- 7 or 8 years.....
- 9 or 10 years.....
- More than 10 years.....

12. How far in school did your mother and father go?

Tick only one box in each column.

Mother

Father

- Did not finish elementary school.....
- Finished elementary school.....
- Finished some high school.....
- Finished high school.....
- Some vocational/ technical education after high school.....
- Some community college, college, or university courses.....
- Completed a bachelor's degree at a college or university.....
- I don't know.....

13. Have you participated in the following organisations?

Tick the appropriate box in each row.

No, yes

- a) A student council/student government [class or school parliament].....
- b) A youth organisation affiliated with a political party or union.....
- c) A group which prepares a school newspaper.....
- d) An environmental organisation.....
- e) A U.N. or UNESCO Club.....
- f) A student exchange or school partnership program.....
- g) A human rights organisation
- h) A group conducting [voluntary] activities to help the community.....
- i) A charity collecting money for a social cause.....
- j) Boy or Girl Scouts [Guides].....
- k) A cultural association [organisation] based on ethnicity.....
- l) A computer club.....
- m) An art, music or drama organisation.....
- n) A sports organisation or team.....
- o) An organisation sponsored by a religious group.....

14. Think about all the organisations listed above. How often do you attend meetings or activities for any or all of these organisations?

Almost every day (4 or more days a week).....
Several days (1 to 3 days a week).....
A few times each month.....
Never or almost never.....

In the next few questions think about the days on which you attend school.

15. How often do you spend time [directly] after school talking [hanging out] with your friends?

Almost every day (4 or more days a week).....
Several days (1 to 3 days a week).....
A few times each month.....
Never or almost never.....

16. How often do you spend time during the evening [after dinner or after --] outside your home with your friends?

Almost every day (4 or more days a week).....
Several days (1 to 3 days a week).....
A few times each month.....
Never or almost never.....

17. How much time do you spend watching television or videos on school days?

no time.....
less than 1 hour.....
2 hours.....
3-5 hours.....
more than 5 hours.....

PART THREE

General Instructions:

The questions in this part are being asked to students of your age in over 25 countries. For the questions which follow there are NO RIGHT OR WRONG ANSWERS. Your answers will be CONFIDENTIAL. Your teachers will not see them. Other students will not see them. Please be careful in reading the instructions for the different sets of questions, and be as honest as you can in saying what you think.

Section A: Democracy

You are going to read a list of things that might happen in a country that is a democracy. Each one of them could either be good and have positive results for democracy or it could be bad and have negative results for democracy.

There are **no right answers and no wrong answers** to these questions, because we just want to know what you think about democracy and the things that might influence it.

Please tick the box in the column which best fits your opinion. If you think that the statement does not apply, put a tick in the circle in the last column.

What is good and what is bad for democracy?

very bad for democracy, somewhat bad for democracy, somewhat good for democracy, very good for democracy, don't know/ doesn't apply

- A1. When everyone has the right to express their [sic] opinions freely that is...
- A2. When differences in income and wealth between the rich and the poor are small, that is...
- A3. When political leaders in power give jobs in the government [public sector] to members of their family, that is...
- A4. When newspaper are free of all government [state, political] control, that is...
- A5. When private businesses have no restrictions from government, that is...
- A6. When one company owns all the newspapers, that is...
- A7. When people demand their political and social rights, that is...
- A8. When immigrants are expected to give up the language and customs of their former countries, that is...
- A9. When political parties have rules that support women to become political leaders, that is...
- A10. When people who are critical of the government are forbidden from speaking at public meetings, that is...
- A11. When citizens have the right to elect political leaders freely that is...
- A12. When courts and judges are influenced by politicians, that is...
- A13. When many different organisations [associations] are available [exist] for people who wish to belong to them, that is...
- A14. When there is a separation [segregation] between the church [institutional church] and the state [government], that is...
- A15. When young people have an obligation [are obliged] to participate in activities to benefit [help] the community [society], that is...
- A16. When a minimum income [living standard] is assured for everyone, that is...
- A17. When political parties have different opinions [positions] on important issues, that is...
- A18. When people participate in political parties in order to influence government, that is...
- A19. When laws that women claim are unfair to them are changed, that is...
- A20. When all the television stations present the same opinion about politics, that is...
- A21. When people refuse to obey a law which violates human rights, that is...
- A22. When newspapers are forbidden to publish stories that might offend ethnic groups [immigrant groups, racial groups, national groups], that is...
- A23. When wealthy business people have more influence on government than others, that is...
- A24. When government leaders are trusted without question, that is...

A25. When people peacefully protest against a law they believe to be unjust, that is...

Section B: Good Citizens

In this section there are some statements that could be used to explain what a good adult citizen is or what a good adult citizen does. **There are no right and wrong answers to these questions.**

For each of these statements, tick one box to show how important you believe each is for explaining what a good adult citizen is or does.

An adult who is a good citizen ...

not important, somewhat unimportant, somewhat important, very important, don't know

- B1. obeys the law.
- B2. votes in every election.
- B3. joins a political party.
- B4. works hard.
- B5. would participate in a peaceful protest against a law believed to be unjust.
- B6. knows about the country's history.
- B7. would be willing to serve in the military to defend the country.
- B8. follows political issues in the newspaper, on the radio or on TV.
- B9. participates in activities to benefit people in the community [society] .
- B10. shows respect for government representatives [leaders, officials] .
- B11. takes part in activities promoting human rights.
- B12. engages in political discussions.
- B13. takes part in activities to protect the environment.
- B14. is patriotic and loyal [devoted] to the country.
- B15. would be willing to ignore [disregard] a law that violated human rights.

Section C: Government

Below you will find some statements about the responsibilities of the government [state].

What responsibilities should the government have?

Read each of these statements and tick the appropriate box to decide whether what is described should or should not be the government's [state's] responsibility.

definitely should not be the government's responsibility, probably should not be the government's responsibility, probably should be the government's responsibility, definitely should be the government's responsibility, don't know

- C1. To guarantee a job for everyone who wants one.
- C2. To keep prices under control.
- C3. To provide basic health care for everyone.
- C4. To provide an adequate [decent] standard of living for old people.

- C5. To provide industries with the support they need to grow.
- C6. To provide an adequate [decent] standard of living for the unemployed.
- C7. To reduce differences in income and wealth among people.
- C8. To provide free basic education for all.
- C9. To ensure [be sure there are] equal political opportunities for men and women.
- C10. To control pollution of the environment.
- C11. To guarantee peace and order [stability] within the country.
- C12. To promote honesty and moral behaviour among people in the country.

Section D: Trust in Institutions

In this section we will name several institutions in this country [name of country]:

How much of the time can you trust each of the following institutions?

Consider each of these institutions and select the box in the column which shows how you feel you can trust them.

Never, only some of the time, most of the time, always, don't know

- D1. The national [federal] government [in _____(the national seat of government)].
- D2. The local council or government of your town or city.
- D3. Courts.
- D4. The police.
- D5. News on television.
- D6. News on the radio.
- D7. News in the press [newspapers].
- D8. Political parties.
- D9. United Nations.
- D10. Schools [educational institutions].
- D11. National Parliament [Congress].
- D12. The people who live in this country [name of country].

In the next sections you will find statements on different topics.

You may agree with some of the statements and disagree with others. Sometimes you will feel that you disagree or agree strongly, and sometimes you will feel less strongly.

There are no right and wrong answers to these questions, we just want to know your opinion.

Section E: Our Country

In this section you will find some statements about this country [name of country].

Please read each statement and select the box in the column which corresponds to the way you feel about the statement.

strongly disagree, disagree, agree, strongly agree, don't know

- E1. To help protect jobs in this country [name of country] we should buy products made in this country [name of country].
- E2. We should keep [prevent] other countries from trying to influence political decisions in this country [name of country].
- E3. The flag of this country [name of country] is important to me.
- E4. We should always be alert and stop threats from other countries to this country [name of country]'s political independence.
- E5. This country [name of country] deserves respect from other countries for what we have accomplished.
- E6. There is little to be proud of in this country [name of country]'s history.
- E7. I have great love for this country [name of country] .
- E8. People should support their country even if they think their country is doing something wrong.
- E9. This country [name of country] should be proud of what it has achieved.
- E10. The national anthem of this country [name of country] is important to me.
- E11. I would prefer to live permanently in another country.
- E12. We should stop outsiders from influencing this country [name of country]'s traditions and culture.

Section F: Opportunities

In this section there are some statements about the chances which members of certain groups **really do have** in this country [name of country].

Please read each statement and select the box in the column which corresponds to the way you feel about the statement.

strongly disagree, disagree, agree, strongly agree, don't know

- F1. Children who are members of certain ethnic groups [immigrant groups, national groups, racial groups] have fewer chances than other children to get a [good] secondary [high school] education in this country.
- F2. Girls have fewer chances than boys to get a [good] secondary [high school] education in this country.
- F3. Children from poor families have fewer chances than others to get a [good] secondary [high school] education in this country.
- F4. Children who live in rural [farming] areas have fewer chances than others to get a [good] secondary [high school] education in this country.
- F5. Adults who are members of certain ethnic groups [immigrant groups, national groups, racial groups] have fewer chances than others to get good jobs in this country.
- F6. Women have fewer chances than men to get good jobs in this country.

Section G: Opportunities 2

In this section there are some statements about the opportunities which members of certain groups **should have** in this country [name of the country].

Please read each statement and select the box in the column which corresponds to the way you feel about the statement.

Strongly disagree, disagree, agree, strongly agree, don't know

- G1. Women should run for public office [a seat in the legislature] and take part in the government just as men do.
- G2. All ethnic [racial or national] groups should have equal chances to get a good education in this country.
- G3. Members of anti-democratic groups [groups that are against democracy] should be prohibited from hosting a television show talking about these [their] ideas.
- G4. Women should have the same rights as men in every way.
- G5. All ethnic [racial or national] groups should have equal chances to get good jobs in this country.
- G6. Women should stay out of politics.
- G7. Members of anti-democratic groups [groups that are against democracy] should be prohibited from organising peaceful [non-violent] demonstrations or rallies.
- G8. Schools should teach students to respect members of all ethnic [racial or national] groups.
- G9. When jobs are scarce, men [should] have more right to a job than women.
- G10. Members of anti-democratic groups [groups that are against democracy] should be prohibited from running in an election for political office.
- G11. Men and women should get equal pay when they are in the same jobs [occupations].
- G12. Members of all ethnic [racial or national] groups should be encouraged to run in elections for political office.
- G13. Men are better qualified to be political leaders than women.
- G14. Member of anti-democratic groups [groups that are against democracy] should be prohibited from making public speeches about these [their] ideas.

Note that in this scale some items are stated positively and others stated negatively. The negatively stated items (G 6, 9, and 13) should be reversed when computing any score.

Section H: Immigrants

Listed below you will read several statements about immigrants and immigration in this country [name of country].

Please read each statement and select the box in the column which corresponds to the way you feel about the statement.

strongly disagree, disagree, agree, strongly agree, don't know

- H1. Immigrants should have the opportunity [option] to keep [continue speaking] their own language.
- H2. Immigrants' children should have the same opportunities for education that other children in the country have.
- H3. Immigrants who live in a country for several years should have the opportunity to vote in elections.
- H4. Immigrants should have the opportunity [option] to keep [continue] their own customs and lifestyle.
- H5. Immigrants should have all the same rights that everyone else in a country has.

- H6. Immigrants should be forbidden to engage in political activity.
H7. Having many immigrants makes it difficult for a country to be united and patriotic.
H8. All countries should accept refugees who are trying to escape from wars or political persecution in other countries.

Section I: The Political system

In this section there are some statements about the political system and your personal view on politics in general.

Please read each statement and select the box in the column which corresponds to the way you feel about the statement.

Strongly disagree, disagree, agree, strongly agree, don't know

- I1. The government [people in government] cares [care] a lot about what all of us think about new laws.
I2. I know more about politics than most people my age.
I3. The government [people in government] is [are] doing its best to find out what people [ordinary people] want.
I4. The powerful leaders in government [Government] care very little about the opinions of people [ordinary people].
I5. When political issues or problems are being discussed, I usually have something to say.
I6. In this country a few individuals have a lot of political power while the rest of the people have very little power.
I7. The politicians quickly forget the needs of the voters who elected them.
I8. I am able to understand most political issues easily.
I9. When people get together [organise] to demand change, the leaders in government listen.
I10. I am interested in politics.

Section J: School

Listed below you will find some statements on students' participation [sic] in school life.

Please read each statement and select the box in the column which corresponds to the way you feel about the statement.

Strongly disagree, disagree, agree, strongly agree, don't know

- J1. Electing student representatives to suggest changes in how the school is run [how to solve school problems] makes schools better.
J2. Lots of positive changes happen in this school when students work together.
J3. Organising groups of students to state their opinions could help solve problems in this school.
J4. If members of my class felt they were unfairly treated, I would be willing to go with them to speak to the teacher.
J5. Students acting together [in groups] can have more influence on what happens in this school than students acting alone [by themselves].

- J6... I am interested in participating in discussions about school problems.....
J7... When school problems are being discussed I usually have something to say.....

Section K: School Curriculum

In this section we would like to know what you have learned in school.

Please read each statement listed below and select the box in the column which corresponds to the way you feel about the statement.

strongly disagree, disagree, agree, strongly agree, don't know

- K1. In school I have learned to understand people who have different ideas.
K2. In school I have learned to co-operate [work together] in groups with other students.
K3. In school I have learned to contribute to solving problems in the community [society].
K4. In school I have learned to be a patriotic and loyal [committed] citizen of my country.
K5. In school I have learned how to act to protect the environment.
K6. In school I have learned to be concerned about what happens in other countries.
K7. In school I have learned about the importance of voting in national and local elections.

Section L: Political Action 1

In this set of questions you will find some activities related to politics.

For each of these activities, tick the box to show how often you do it.

How often do you have discussions of what is happening in your national [your country's] politics [government]?

Never, rarely, sometimes, often, don't know

- L1. With people of your own age [peers].
L2. With parents or other adult family members.
L3. With teachers.

How often do you have discussions of what is happening in international politics?

Never, rarely, sometimes, often, don't know

- L4. With people of your own age [peers].
L5. With parents or other adult family members.
L6. With teachers.

How often do you ...

Never, rarely, sometimes, often, don't know

- L7. read articles (stories) in the newspaper about what is happening in this country?

- L8. read articles (stories) in the newspaper about what is happening in other countries?
- L9. listen to news broadcasts on television?
- L10. listen to news broadcasts on the radio?

Section M: Political Action 2

Listed below are several types of action that adults could take: **When you are an adult, what do you expect that you will do?**

*Tick one box in each column for each action to show how likely you would be to do it.
I will certainly not do this, I will probably not do this, I will probably do this, I will certainly do this, don't know*

- M1. Vote in national elections.
- M2. Get information about candidates before voting in an election.
- M3. Join a political party.
- M4. Write letters to a newspaper about social or political concerns.
- M5. Be a candidate for a local or city office.
- M6. Volunteer time to help [benefit] [poor or elderly] people in the community.
- M7. Collect money for a social cause.
- M8. Collect signatures for a petition.
- M9. Participate in a non-violent [peaceful] protest march or rally.
- M10. Spray-paint protest slogans on walls.
- M11. Block traffic as a form of protest.
- M12. Occupy public buildings as a form of protest.

Section N: Classrooms

The next part of the questionnaire includes some statements about things that happen in your school. When answering these questions think especially about classes in history, civic education or social studies [other civic-related subjects].

Please read each statement and select the box in the column which corresponds to the way you feel about the statement.

Never, rarely, sometimes, often, don't know

- N1. Students feel free to disagree openly with their teachers about political and social issues during class.
- N2. Students are encouraged to make up their own minds about issues.
- N3. Teachers respect our opinions and encourage us to express them during class.
- N4. Teachers place great importance [stress, emphasis] on learning facts or dates when presenting history or political events.
- N5. Students feel free to express opinions in class even when their opinions are different from most of the other students.
- N6. Teachers require students to memorise dates or definitions.
- N7. Teachers encourage us to discuss political or social issues about which people have different opinions.

- N8. Teachers present several sides of [positions on] an issue when explaining it in class.
N9. Students bring up current political events for discussion in class.
N10. Memorising dates and facts is the best way to get a good grade [mark] from teachers in these classes.
N11. Teachers lecture and the students take notes.
N12. Students work on material from the textbook.

You have now reached the end of the questions. If you have some time left go back to Parts Two and Three and check your answers and make sure you have answered all the questions you feel you can answer.

Many thanks for taking the time to complete this booklet. Your answers will help in understanding and improving the provision of civic education around the world.

Sources: International Association for the Evaluation of Educational Achievement (IEA). *International Study of Civic Education Student Questionnaire*, 2000; accessed December 2006; available from <http://www.wam.umd.edu/~jtpurta/studentQ.htm>.

International Association for the Evaluation of Educational Achievement (IEA). *International Study of Civic Education. 19 Released Items from Upper Secondary (Older Population Test)*, 2001; accessed December 2006; available from <http://www.wam.umd.edu/~jtpurta/UpperSecondary.htm>.

Complete List of Attitudinal Scales from the IEA Civic Education Study (for ninth grade and upper secondary school students)

Scale title	Items included
Norms of Conventional Citizenship	<i>A Good Citizen...</i> B2. vote in every election B3. joins a political party B6. knows about the country's history B8. follows political issues in the newspaper, on the radio or on TV B10. shows respect for government representatives B12. engages in political discussions
Norms of Social-Movement Related Citizenship	<i>A Good Citizen...</i> B5. would participate in a peaceful protest against a law believed to be unjust B9. participates in activities to benefit people in the community B11. takes part in activities promoting human rights B13. takes part in activities to protect the environment
Government Economic Responsibilities	<i>The Government's Responsibilities should be...</i> C1. To guarantee a job for everyone who wants one C2. To keep prices under control C5. To provide industries with the support they need to grow C6. To provide an adequate standard of living for the unemployed C7. To reduce differences in income and wealth among people

Scale title	Items included
Government Social Responsibilities	<i>The Government's Responsibilities should be...</i> C3. To provide basic health care for everyone. C4. To provide an adequate standard of living for old people C8. To provide free basic education for all C9. To ensure equal political opportunities for men and women C10. To control pollution of the environment C11. To guarantee peace and order within the country C12. To promote honesty and moral behavior among people in the country
Trust in Government Institutions	<i>How much of the time do you trust:</i> D1. The national government D2. The local council or government of your town or city D3. Courts D4. The police D8. Political parties D11. Congress
Trust in News Media	<i>How much of the time do you trust</i> D5. News on television D6. News on the radio D7. News in the press
Positive Attitudes Towards One's Nation	E3. The flag of this country is important to me E7. I have great love for this country E9. This country should be proud of what it has achieved E11. (R) I would prefer to live permanently in another country

Scale title	Items included
Protective Attitudes Towards One's Nation	E1. To help protect jobs in this country we should buy products made in this country E2. We should keep other countries from trying to influence political decisions in this country E4. We should always be alert and stop threats from other countries to this country's political independence E12: We should stop outsiders from influencing this country [name of country]'s traditions and culture
Support for Women's Political Rights	G1. Women should run for public office and take part in the government just as men do G4. Women should have the same rights as men in every way G6. (R) Women should stay out of politics G9. (R) When jobs are scarce, men have more right to a job than women G11. Men and women should get equal pay when they are in the same jobs G13. Men are better qualified to be political leaders than women.
Support for Ethnic Minorities' Political Rights	G2: All ethnic [racial or national] groups should have equal chances to get a good education in this country G5: All ethnic [racial or national] groups should have equal chances to get good jobs in this country G8: Schools should teach students to respect members of all ethnic [racial or national] groups G12: Members of all ethnic [racial or national] groups should be encouraged to run in elections for political office

Scale title	Items included
Tolerance of Anti-Democratic Groups	<i>Note: all items in this scale are reverse-coded for inclusion in the scale.</i> G3: Members of anti-democratic groups should be prohibited from hosting a television show talking about these ideas G7: Members of anti-democratic groups should be prohibited from organizing peaceful demonstrations or rallies G10: Members of anti-democratic groups should be prohibited from running in an election for political office G14: Members of anti-democratic groups should be prohibited from making public speeches about these ideas
Positive Attitudes Towards Immigrants	H1: Immigrants should have the opportunity to keep their own language H2: Immigrants' children should have the same opportunities for education that other children in the country have H3: Immigrants who live in a country for several years should have the opportunity to vote in elections H4: Immigrants should have the opportunity to keep their own customs and lifestyle H5: Immigrants should have all the same rights that everyone else in a country has
Internal Political Efficacy	I2: I know more about politics than most people my age I5: When political issues or problems are being discussed, I usually have something to say I8: I am able to understand most political issues easily I10: I am interested in politics

Scale title	Items included
Confidence in School Participation	J1: Electing student representatives to suggest changes in how the school is run makes schools better J2: Lots of positive changes happen in this school when students work together J3: Organizing groups of students to state their opinions could help solve problems in this school J5: Students acting together can have more influence on what happens in this school than students acting alone
Expectations of Informed Voting	<i>When you are an adult, what do you expect that you will do?</i> M1: Vote in national elections M2: Get information about candidates before voting in an election
[Expectations of] Political Activities	<i>When you are an adult, what do you expect that you will do?</i> M3: Join a political party M4: Write letters to a newspaper about social or political concerns M5: Be a candidate for a local or city office
Expectations of Community Participation	<i>What do you expect that you will do over the next few years?</i> M6: Volunteer time to help people in the community M7: Collect money for a cause M8: Collect signatures for a petition
Expectations of Protest Participation	<i>What do you expect that you will do over the next few years?</i> M10: Spray-paint protest slogans on walls M11: Block traffic as a form of protest M12: Occupy public buildings as a form of protest

Scale title	Items included
Openness of Classroom Climate	N1: Students feel free to disagree openly with their teachers about political and social issues during class N2: Students are encouraged to make up their own minds about issues N3: Teachers respect our opinions and encourage us to express them during class N5: Students feel free to express opinions in class even when their opinions are different from most of the other students N7: Teachers encourage us to discuss political or social issues about which people have different opinions N8: Teachers present several sides of an issue when explaining it in class

Source: Husfeldt, Vera, Carolyn Barber, and Judith Torney-Purta. *Students' Social Attitudes and Expected Political Participation: New Scales in the Enhanced Database for the IEA Civic Education Study*, Civic Education Data and Researcher Service (CEDARS), University of Maryland, 2005; accessed November 2006; available from <http://www.wam.umd.edu/~jtpurta/>.

Appendix 26. Canadian citizenship quiz

Note: ✓ indicates correct answer.

1. What are the three main groups of Aboriginal Peoples?
✓ Inuit, First Nations, and Métis
Iroquois, Haida, and Inuit
Haida, Métis, and Iroquois
2. Why did the early explorers first come to Atlantic Canada?
✓ to fish and trade with the Aboriginal Peoples
to find new routs to Asia
to look for gold and other minerals
3. When did the United Empire Loyalists come to Canada?
✓ 1775 to 1783
1802 to 1808
1760 to 1770
4. How long did the Hudson's Bay Company control the northern lands?
✓ 300 years
100 years
250 years
5. What did the government do to make the immigration to Western Canada easier?
✓ built a railroad
offered free land
gave people money and tools to farm the land
6. Which document made Confederation legal?
✓ The British North America Act
The Dominion Act
The British Dominion Act
7. Which four provinces first formed the Confederation?
✓ Ontario, Quebec, New Brunswick, and Nova Scotia
Ontario, Quebec, Prince Edward Island, and Nova Scotia
Quebec, Nova Scotia, Manitoba, and Prince Edward Island
8. Which was the last province to join Canada?
✓ Newfoundland
Nunavut
British Columbia

9. Who was the first prime minister of Canada?
✓ Sir John A. Macdonald
Louis St. Laurent
Robert Borden
10. When did the Canadian Charter of Rights and Freedoms become part of the Constitution?
✓ 1982
1977
1980
11. Which province is the only officially bilingual one?
✓ New Brunswick
Quebec
Ontario
12. What are the Prairie provinces?
✓ Manitoba, Alberta, and Saskatchewan
Saskatchewan, Alberta, and British Columbia
Northwest Territories, Alberta, and Saskatchewan
13. Where is the Canadian Shield?
✓ Northern Quebec and Ontario
Nunavut and Northern Manitoba
Northern Ontario
14. Name three minerals still being mined in the territories.
✓ gold, lead, and zinc
nickel, gold, and iron
lead, nickel, and zinc
15. What country is Canada's biggest trading partner?
✓ U.S.A.
China
Britain
16. Who is Canada's head of state?
✓ the Queen
the Prime Minister
the Governor General
17. What is an "electoral district"?
✓ a geographical area represented by a member of the House of Commons
the area where the voting booth is set up
the region that a senator represents

18. What is a “party platform”?
- ✓ the plans a political party develops for what they would do in government
 - policies developed by the leaders of each party
 - the history of a political party
19. What do you call a law before it is passed?
- ✓ a bill
 - a bylaw
 - a tabled proposal
20. What are the three parts of Parliament?
- ✓ the Queen, the House of Commons, and the Senate
 - the House of Commons, the Queen, and the Prime Minister’s Office
 - the Prime Minister, the Senate, and the House of Commons
21. When did Canada become a nation?
- ✓ 1867
 - 1876
 - 1890
22. Who has the right to apply for a Canadian passport?
- ✓ a landed immigrant
 - a visa-holder
 - refugee claimant
23. What are the two official languages of Canada?
- ✓ English and French
 - English and Spanish
 - French and German
24. Where do most of the French-speaking people come from in Canada?
- ✓ Quebec
 - New Brunswick
 - Ontario
25. When is Canada Day?
- ✓ July 1
 - July 4
 - May 21
26. What important trade did the Hudson’s Bay Company control?
- ✓ fur
 - timber
 - fish

27. Which province is the leading wheat producer?
✓ Saskatchewan
Alberta
Ontario
28. Which province is the largest producer of hydroelectricity?
✓ Quebec
British Columbia
Newfoundland and Labrador
29. What is the capital of Canada?
✓ Ottawa
Kingston
Toronto
30. Which provinces are joined to New Brunswick by land?
✓ Quebec and Nova Scotia
Newfoundland and Labrador, and Quebec
Prince Edward Island and Nova Scotia
31. Which legal document recognizes the cultural diversity of Canadians?
✓ The Canadian Multiculturalism Act
The Canadian Charter of Rights and Freedoms
The Canadian Citizenship Act
32. What are the provinces of the Atlantic Region?
✓ Prince Edward Island, Nova Scotia, Newfoundland and Labrador, and New Brunswick
New Brunswick, Nova Scotia, Newfoundland and Labrador, and Quebec
New Brunswick, Nova Scotia, Quebec, and Prince Edward Island
33. What is the tower in the centre of the Parliament Buildings called?
✓ Peace Tower
Sir John A MacDonald Tower
Canada Tower
34. In what industry did the Métis first work with European settlers?
✓ fur trapping
fishing
farming
35. Name two mountain ranges in Canada.
✓ Rocky Mountains and Coast Mountains
Coast Mountains and Alberta Mountains
Canadian Shield and Rocky Mountains

36. How many electoral districts are there in Canada?
√ 301
101
201
37. Which region covers more than one-third of Canada?
√ The North
The Prairies
The Central Region
38. When was the Canadian Pacific Railway finished?
√ 1885
1867
1876
39. For what is the Okanagan Valley famous?
√ fruit orchards
coal mining
skiing
40. Who is the Queen's representative in Canada?
√ the Governor General
the Prime Minister
the Speaker of the House

Source: CBC. *Canada Quiz*, 2002; accessed January 2007; available from http://www.cbc.ca/news/becomingcanadian/self_citizen_quiz.html.

Adapted from the 2002 version of Citizenship and Immigration Canada. *A Look at Canada*, [Canada quiz], 2006; accessed January 2007; available from <http://www.cic.gc.ca/english/pdf/pub/look.pdf>.

Appendix 27. Calgary Faculty and Student Alliance (CalFASA) Post-Secondary Education Survey

Part I. Provincial Funding

Background:

Between 1992 / 93 and 2002 / 03, the Alberta government's expenditures on post-secondary education (PSE), excluding monies used to provide repayable student loans, declined by 18.5% in constant dollars—the second most precipitous decline in the country, behind only Nova Scotia (25.5%). On a per-student, (full-time equivalent or “FTE”) basis, government transfers to universities and colleges in Alberta fell from second place in 1992/93 to sixth place in 2002/03. (Source: CAUT Almanac 2004, Tables 6.1, 6.4).

Question:

Using the first measure of funding levels referenced above, will your party commit to the goal of restoring Alberta Post-Secondary Education (PSE) funding to its previous levels within the next five years? Why or why not? Second, given Alberta's enviable fiscal position, will your party commit to returning Alberta to a leading position nationally in per-student funding for colleges and universities? Why or why not?

Part II. Affordability

Background:

[Between 1990 / 91 and 2003 / 04] undergraduate tuition (for a full load of courses, not including books and other fees) at the University of Calgary increased from \$1,168 to \$4,590, an increase of 293%. Tuition and other cost increases at our colleges and technical institutes have been similarly severe. The increased costs are particularly difficult for modest-income students and their families to afford, and those who haven't been deterred from attending are incurring rapidly rising debt loads. Excluding private loans from family, banks, or credit card debt, average debt loads for students who require loans is now approximately \$19,500 for university graduates and \$12,600 for college graduates—a 76% increase since 1990, even when controlling for inflation. Such debt adds significantly to the total costs of higher education, and entails further post-graduation economic “opportunity costs,” such as forgone savings and delayed home purchases or business ventures (Source: Statistics Canada, “Class of 2000: Profile of Post-secondary Graduates and Student Debt,” April 2004).

Question:

What specific budgetary or policy steps, if any, is your party willing to take to reduce these pressures and to ensure that all Albertans have equal access to quality post-secondary education opportunities (e.g., additional operating grants to institutions, changes to the tuition fee regulation, changes to the student financial aid system, etc.)?

Part III. Research Funding

Background:

The recent Toronto Dominion Bank Report on the Calgary–Edmonton corridor reinforced the consensus view that economic diversification, innovation, and productivity are critically tied to investments in research and development. The report noted that while the region boasted numerous institutions with significant research capabilities, overall R&D funding in Alberta, as a percentage of Gross Domestic Product (GDP), is roughly one half the level recorded in Canada overall. It's also worth noting that Canada lags significantly behind the U.S. and other "OECD" (Organisation for Economic Co-operation and Development) countries on this important measure (Source: TD Bank, "The Calgary—Edmonton Corridor: Take Action Now So the Tiger's Roar Doesn't Fade," 2003).

Question:

Do you agree that the provincial government should significantly increase its investment in the research programs and capacities of Calgary's post-secondary institutions as a means to meet the institutions' competitive challenges and the region's economic goals? Why or why not? If so, what level of increase is appropriate, and how should it be delivered and administered?

Third, despite a formal government commitment that the post-secondary education system is to support the social and cultural development of the province, the government's direct funding for researchers does not include those doing work in the arts, humanities, and social sciences. Therefore, would your party commit to establishing a granting agency, similar to the federally funded "Social Sciences and Humanities Research Council" (SSHRC), to support advanced research and education in these areas? Why or why not?

Part IV. Faculty Recruitment and Retention

Background:

Recruiting and retaining top college and university faculty is difficult within existing budgetary constraints. The competition comes not only from other institutions across Canada and around the world, but also, in many fields, from the private sector. The Council of Ministers of Education, Canada reported that on average and in constant dollars, salaries for Canadian university and college faculty fell during the 1990s (Source: Pan-Canadian Education Indicators Program 2003, p. 44, Tables B 3.4 and 3.5). The numbers of full-time faculty at Alberta post-secondary education (PSE) institutions also fell during the 1990s, resulting in significant impacts on class sizes, and concomitant increases in faculty workloads. In 2001, the provincial government's PSE funding review ("Renner") committee acknowledged the challenge of faculty recruitment, and the government created a "funding envelope" to help institutions attract and retain faculty. This envelope has since been cancelled.

Question:

Does your party consider this a serious problem or challenge? If not, why not? If so, what specific steps (again, policy and / or budgetary) would your party take in order to augment the ability of Alberta PSE institutions to recruit and retain world-class faculty?

Part V. Growth and Capacity

Background:

There is a growing appreciation for the role of a well-educated citizenry in creating vibrant communities and economies. Despite this, in 2001 the University of Calgary and Mount Royal College (for example) were unable to accommodate 7,400 qualified students due to lack of space and teaching staff. Based on current demographic projections, this number is projected to reach 15,000 by the year 2010 (Source: MRC/U of C, "Addressing the Access Issue" 2003). At the same time, after operating for years "beyond capacity," the University of Calgary was recently forced to cap overall undergraduate enrolment to protect against further deterioration in educational quality. Even when one-time capital investments have been made to increase the physical capacity of our institutions, ongoing funding commitments have sometimes been insufficient to supply the equipment and staff needed to operate the building and its programs.

Question:

What are your party's plans (short-term, long-term, etc.) to address the demand and capacity challenges facing Calgary's public PSE institutions? Please be as specific as possible.

Part VI. Private Institutions

Background:

Some observers contend that rather than provide additional public dollars to support public services such as post-secondary education, governments should encourage or allow private, for-profit providers to offer parallel services. Others contend that the capacity and quality of the public system should be strengthened since it is better positioned to truly serve the public's broad interest in higher education. Some among this latter group have also raised concerns that provisions of the North American Free Trade Agreement (NAFTA) or the World Trade Organization's evolving agreement on trade in services (GATS) may threaten the viability of the public system if a private, for-profit system were allowed to develop.

Question:

What role, if any, should a private, for-profit post-secondary education sector have in Alberta? Second and more particularly, does your party support giving such institutions the ability to grant publicly accredited baccalaureate degrees in Alberta? Why or why not? Finally, given your understanding of the implications of international trade agreements on the provision or administration of public

services, are there any specific measures your party would take to ensure the long-term viability and health of Alberta's public PSE system?

Part VII. Final Comments

Do you have any other observations on the post-secondary education sector or the issues CalFASA has raised in this survey?

Source: Calgary Faculty and Student Alliance (CalFASA). *2004 Election Special Report: Post-Secondary Education Survey*, CalFASA, 2004; accessed October 2005; available from http://www.calfasa.org/publicationsCalFASA_Election_Survey_Responses_2004.pdf.

Appendix 28. Empathy and altruism questionnaires, U.S. General Social Surveys, 2002 / 2004

1. Davis Empathy Scale

The following statements ask about your thoughts and feelings in various situations. For each item indicate how well it describes you by choosing the number on the showcard, where 1 indicates that it does not describe you very well and 5 means that it does describe you very well. Of course, numbers 2–4 indicate that how well it describes you is in between these points.

- a. I often have tender, concerned feelings for people less fortunate than me.
- b. Sometimes I don't feel very sorry for other people when they are having problems.
- c. When I see someone being taken advantage of, I feel kind of protective toward them [*sic*].
- d. Other people's misfortunes do not usually disturb me a great deal.
- e. When I see someone treated unfairly, I sometimes don't feel very much pity for them [*sic*].
- f. I am often quite touched by things that I see happen.
- g. I would describe myself as a pretty soft-hearted person.

2. Altruistic Love / Agape Scale

Some of the following items refer to a specific love relationship, while others refer to general attitudes and beliefs about love. Whenever possible, answer the questions with your current partner in mind. If you do not have a current partner, answer the question with your most recent partner in mind. If you have never been in love, answer in terms of what you think your response would most likely be.

Do you agree strongly, agree somewhat, neither agree nor disagree, disagree somewhat, or strongly disagree with the following statements?

- a. I would rather suffer myself than let the one I love suffer.
- b. I cannot be happy unless I place the one I love's happiness before my own.
- c. I am usually willing to sacrifice my own wishes to let the one I love achieve his / hers.
- d. I would endure all things for the sake of the one I love.

3. Altruistic Values Scale

Please tell me whether you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree with the following statements:

- a. People should be willing to help others who are less fortunate.
- b. Those in need have to learn to take care of themselves and not depend on others.
- c. Personally assisting people in trouble is very important to me.
- d. These days, people need to look after themselves and not overly worry about others.

4. Altruistic Behaviors Scale

During the past 12 months, how often have you done each of the following things: More than once a week / Once a week / Once a month / At least 2 or 3 times in the past year / Once in the past year / Not at all in the past year.

- a. Donated blood
- b. Given food or money to a homeless person
- c. Returned money to a cashier after getting too much change
- d. Allowed a stranger to go ahead of you in line
- e. Done volunteer work for a charity
- f. Given money to a charity
- g. Offered your seat on a bus or in a public place to a stranger who was standing
- h. Look after a person's plants, mail, or pets while they were away
- i. Carried a stranger's belongings, like groceries, a suitcase, or shopping bag
- j. Given directions to a stranger
- k. Let someone you didn't know well borrow an item of some value like dishes or tools

During the past 12 months, how often have you done any of the following things for people you know personally, such as relatives, friends, neighbors, or other acquaintances?

More than once a week / Once a week / Once a month / At least 2 or 3 times in the past year / Once in the past year / Not at all in the past year.

- a. Helped someone outside your household with housework or shopping
- b. Lent quite a bit of money to another person
- c. Spent time talking with someone who was a bit down or depressed
- d. Helped somebody to find a job

5. Daily Spiritual Experience Scale

The list that follows includes items you may or may not experience. Please consider if and how often you have these experiences and try to disregard whether you feel you should or should not have them. A number of items use the word “God.” If this word is not a comfortable one, please substitute another idea to mean the divine or holy for you.

Many times a day/Every day/Most days/Some days/Once in a while/Never or almost never

- a. I feel God’s presence
- b. I experience a connection to all of life
- c. During worship, or at other times when connected to God, I feel joy which lifts me out of my daily concerns
- d. I find strength in religion or spirituality
- e. I find comfort in my religion or spirituality
- f. I feel inner peace or harmony
- g. I ask God’s help in the midst of daily activities
- h. I feel guided by God in the midst of daily activities
- i. I feel God’s love for me directly
- j. I feel God’s love for me through others
- k. I am spiritually touched by the beauty of creation
- l. I feel thankful for my blessings
- m. I feel a selfless caring for others
- n. I accept others even when they do things I think are wrong
- o. I desire to be closer to God or in union with Him

Source: U.S. General Social Surveys, 2002/2004, cited in Smith, Tom W. *Altruism and Empathy in America: Trends and Correlates*, National Opinion Research Center, University of Chicago, 2006; accessed January 2007; available from <http://www-news.uchicago.edu/releases /06/060209.altruism.pdf>.

Appendix 29. Biotechnology issues important for the populace to know and understand

This appendix is presented as background material for Chapter 21: Scientific Literacy: Public knowledge and understanding of biotechnology. It includes information on the main issues of biotechnology and nanotechnology that the public needs to know and understand in order to make informed decisions, as well as information on the Canadian biotechnology regulatory system.

Philosophical and value issues

The issue that has received the most media coverage and has been central to much of the public debate surrounding biotechnology is the genetic engineering of food (GE), or creating “genetically modified organisms” (GMOs). Linked to this issue is the idea of “food sovereignty,” or the ability of people to have control over what food they produce and eat. In addition, the issue speaks to a deeper level, one that spans the fields of science, politics, and ethics:

[D]ue to its ability to manipulate life forms, biotechnology has generated controversy as well as excitement in many countries, including Canada. This transformative technology has sparked a society-wide debate about whether we should interfere with nature and potentially alter or create life. Some biotechnology innovations challenge the values and beliefs that underpin society, forcing Canadians to confront complex ethical questions never before faced.²³⁰⁴

Brian Tokar says that technologies are a product of their social context, and reinforce the social and political structures that produce them.²³⁰⁵ Issues involving the domination and control over human and non-human nature and the commodification of basic needs are at the heart of the biotechnology debate. Tokar notes, “Biotechnology literally seeks to bring all of life, down to the cellular and molecular levels, into the sphere of commercial products [...]. all of life on earth is being reduced to a set of objects and codes to be bought, sold, and patented under the domain of the capitalist marketplace.”²³⁰⁶ He claims that it is possible for future biotechnologies to “work with the patterns of nature and enhance human participation and harmony with the rest of the natural world.”²³⁰⁷ In Tokar’s vision for the future:

An ecologically-informed biological technology will be a fundamentally different kind of undertaking than the biotechnology that dominates today’s discussions. Today’s biotechnology industry has flourished largely at the expense of more

²³⁰⁴ Government of Canada. *Report on Biotechnology (1998-2003): Biotechnology Transforming Society: Creating an Innovative Economy and a Higher Quality of Life*, 2003; accessed November 2005; available from <http://www.biostrategy.gc.ca/english/view.asp?x=540>, p. 2.

²³⁰⁵ Tokar, Brian. “Biotechnology: Enlarging the Debate.” *Z Magazine*, June, 2001, accessed November 2005; available from <http://www.zmag.org/ZMag/articles/june01tokar.htm>, p. 2.

²³⁰⁶ Ibid. p. 2.

²³⁰⁷ Ibid.

benign, ecological technologies, from sophisticated refinements of organic food raising and permaculture methods to holistic approaches to medical care that are grounded in both traditional knowledge and a non-mechanistic outlook on the inner ecology of the human organism.²³⁰⁸

Drew Kershen, Professor of Law at the University of Oklahoma, argues that expanded knowledge and understanding of biotechnology as a science will not be enough to resolve the debate since it rests on ideological and political beliefs and pressures.²³⁰⁹ He reasons that the acceptance or rejection of biotechnology ultimately will be based on “ideological beliefs and the cultural values adopted by individual human beings who, in turn, will shape societal beliefs and values.”²³¹⁰

Proponents of biotechnology are more interested in the products of the technology than on the engineering process itself, since they view biotechnology as an extension of natural processes and of well-established scientific principles and techniques. They compare the techniques used with traditional genetic manipulation techniques that farmers and geneticists have used for centuries. As a result, they generally consider the products of biotechnology to be equal to products in their natural state and therefore safe, especially since only small changes to the genetic makeup of the organisms are made. They also point out that DNA is not species-specific, which is the reason genes can be exchanged between organisms.²³¹¹

On the other hand, opponents assert that biotechnology is a completely new and unnatural process capable of introducing alien species into the natural world with unknown and unpredictable ramifications. Therefore, they want the regulatory process to embrace the precautionary principle and slow down the approval of GMOs. They also argue that the assessment process should include, according to Kershen, “human health, animal health, environmental, social, economic, cultural, ethical, and communitarian [community] impacts.”²³¹²

David Suzuki disagrees with the assertion that plant breeding techniques traditionally used by farmers and genetic engineering are equivalent since GE “takes a very complicated system and reduces it to the sum of its parts” and “ignores millions of years of evolutionary context.”²³¹³ He argues that genetics is based on the “concept of vertical inheritance,” where genes are passed between members of the same species by natural selection, or the crossbreeding that humans have done using different varieties within the

²³⁰⁸ Ibid.

²³⁰⁹ Kershen, Drew L. "Biotechnology: An Essay on the Academy, Cultural Attitudes and Public Policy," *AgBioForum*, vol. 2, no. 2, 1999: 137-146.

²³¹⁰ Ibid. p. 7.

²³¹¹ BIOTECCanada. *Biotech Classroom - What Is Biotechnology? - Dispelling the Myths*, 2005; accessed November 2005; available from <http://www.biotech.ca/EN/myths.html>.

²³¹² Kershen. "Biotechnology: An Essay on the Academy, Cultural Attitudes and Public Policy." p. 6.

²³¹³ Suzuki, David. *Genetically Modifying Our Food: Part 1*, Science Matters, David Suzuki Foundation, 1999; accessed November 2005; available from http://www.davidsuzuki.org/About_us/Dr_David_Suzuki/Article_Archives/weekly10279901.asp.

same species.²³¹⁴ Genetic engineering, on the other hand, transfers genes horizontally from one species to a completely different species, which is a revolutionary new technology. Suzuki notes:

A pig cannot normally exchange genes with a plant, or a human with a fish, but now biotechnology makes it possible. Now a gene can be placed into a genome (the entire genetic material of an organism) in which it has never existed. Without the evolutionary context, we can no longer predict how the transferred gene will behave. Biotechnologists assume that since all genes are DNA, then a gene is a gene and it doesn't matter where it comes from or where it goes as long as it brings with it the desired trait. But they overlook the fact that genomes are selected as functioning, integrated units. Introducing foreign genes disrupts those genomes [...]. We aren't dealing with an insignificant change to our diets here, we're dealing with a revolutionary technology being used in our food supply—affecting us, future generations and the ecosystems on which we depend. It is bad science to assume roles of heredity acquired after thousands of years of agriculture are equally applicable in the infant field of transgenic strains.²³¹⁵

Suzuki also contends that the imposition of GM foods on the public without consultation or labelling of the foods is an unethical, massive experiment, conducted without informed consent from the participants.²³¹⁶

Human health issues

Proponents of biotechnology argue the technology has a great deal of promise in the area of human health in terms of prevention, diagnosis, and treatment of disease and disability. It has the potential, for example, to be used in screening the population for disease susceptibility, in the development of vaccines, in the application of pharmacogenomics²³¹⁷ to develop the preventive use of anti-microbials, in therapeutic drug development, in the use of stem cells to repopulate diseased organs with healthy cells, in the development of tissue engineering and xenotransplantation,²³¹⁸ in the use of

²³¹⁴ Ibid., accessed.

²³¹⁵ Ibid., accessed.

²³¹⁶ Suzuki, David. *Genetically Modifying Our Food: Part 2*, Science Matters, David Suzuki Foundation, 1999; accessed November 2005; available from http://www.davidsuzuki.org/About_us/Dr_David_Suzuki/Article_Archives/weekly11039901.asp.

²³¹⁷ Pharmacogenomics is a science that examines the inherited variations in genes that dictate drug response and explores the ways these variations can be used to predict whether a patient will have a good response to a drug, a bad response to a drug, or no response at all. National Center for Biotechnology Information. *One Size Does Not Fit All: The Promise of Pharmacogenomics*, 2006; accessed January 2007; available from <http://www.ncbi.nlm.nih.gov/About/primer/pharm.html>.

²³¹⁸ Xenotransplantation is the transplantation of organs from other species into humans. It is a procedure considered to be very risky because of the potential to spread viruses and infectious agents from animal to patient, as well as to the larger community. In 1999, a new breed of pig was developed by the Novartis-owned British company called Imutran. A human gene was introduced into the fertilized egg of the pig to create a transgenic pig with genetically modified organs. Pannozzo, Linda. "This Little Piggy's Going to Market." *THIS Magazine*, July/August, 1999, 34-39.

gene therapy to correct primary genetic defects in humans, and in the use of new nanotechnology techniques.²³¹⁹

Concerns about health risks caused by GE foods are raised by advocacy groups such as Greenpeace and the Council of Canadians, who point out there are no long-term studies on the effects of GMOs on human health.²³²⁰ David Suzuki does not see immediate health risks other than potential allergic reactions; however, he observes that the long-term effects are unknown since the tests have not been done.²³²¹ He also notes that most of the data on health effects have come from the biotechnology industry itself.

The report on food biotechnology by the Royal Society of Canada (RSC) states that potential health risks are generally categorized in three ways as the possible creation of novel toxicants, the possible shifts in nutrient content, and the creation of novel allergens.²³²² Toxicological effects are related to the nature of the substance and to the frequency and amount of exposure. Potential adverse health effects may come from an inability of scientists to identify hazards or to increased exposure to toxicologically active constituents than has previously been encountered by humans. The development of GM foods has not focused on nutritional content to date. New varieties of GM food are under development that would change fatty acids, starch qualities, and proteins and, thus, the nutritional content of the food.

The RSC report found that the current, first generation of GM foods approved for human consumption does not appear to have allergic properties.²³²³ However, the RSC was particularly concerned about the potential of GM foods to create novel allergens since trace amounts of an allergic food contaminant may cause severe and life-threatening reactions and the incidence of allergic disorders in the public has been growing. According to the report, from 1986–2001, the incidence of allergic diseases increased by 30 to 50% in the U.S. and these diseases are now among the most common diseases in industrialized countries.

The RSC also noted that there is “no question that allergenic proteins can be transferred by genetic engineering from one organism to another.”²³²⁴ Major brazil-nut allergens have been transferred to soybeans, and honey-bee venom has been inserted into potatoes, although these products have not been commercialized. The RSC believes the potential

²³¹⁹ Canadian Biotechnology Advisory Committee. *Biotechnology and the Health of Canadians: A Report from the Canadian Biotechnology Advisory Committee on Biotechnology and Health Innovation: Opportunities, Challenges and Public Policy*, Government of Canada, 2004; accessed November 2005; available from <http://cbac-cccb.ca/epic/internet/incbac-cccb.nsf/en/ah00488e.html>.

²³²⁰ CBC News. *Indepth: Genetic Modification: Genetically Modified Foods: A Primer*, CBC News Online, 2004; accessed November 2005; available from http://www.cbc.ca/news/background/genetics_modification/.

²³²¹ Suzuki. *Genetically Modifying Our Food: Part 2*, accessed.

²³²² Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, Health Canada, Canadian Food Inspection Agency, and Environment Canada, 2001; accessed November 2005; available from http://www.rsc.ca//index.php?lang_id=1&page_id=119.

²³²³ Ibid., accessed.

²³²⁴ Ibid., accessed. p. 55.

risk for the development of toxic or allergic reactions to GM foods will likely increase “with advances in the scope and range of genetic modifications, wider acceptance of GM foods, increase in total dietary exposure to novel proteins, introduction of a greater variety of these foods, and more innovative transgenic combinations.”²³²⁵ It also reports that the small amount of protein involved in genetic modification is not a relevant consideration since even a single gene can make the organism allergenic. As well, the introduction to these food proteins to infants could encourage development of an allergy. Development of occupational allergies have been seen in food and feed handlers who are repeatedly exposed by contact or inhalation of proteins.

However, despite fears about potential health effects, BIOTECCanada asserts that “[t]here are no peer-reviewed, science-based studies documenting cases in which genetically modified products approved for legal sale have caused any health problems.”²³²⁶ It also notes that GE technology is making it possible to isolate genes that cause allergen content in foods and may be able to remove known allergens from food in the future. It argues, “The removal of allergens in foods is one of the great advantages of biotechnology. Yet critics contend that biotechnology represents a threat to allergy sufferers.”²³²⁷

The challenges of mitigating the potential harm of biotechnology to health, as well as dealing with the social and ethical implications, are great.

According to the Canadian Biotechnology Advisory Committee:

There are also challenges related to both the process of policy-making and the implementation of strategies for governing and fostering the development and uses of [biotechnology-based health innovation], including: the limited capacity of our systems and personnel to cope with the rapid pace of new technology development; the multiplicity of jurisdictions and stakeholders involved; the diverse levels of knowledge, interest and engagement within the body politic; the constraining effects of international obligations; and the complexity of scientific and ideological issues in debates about biotechnology.²³²⁸

Animal health issues

Biotechnology is widely used in livestock production to make silage inoculants, amino acid supplements, feed enzymes, and pre- and pro-biotics.²³²⁹ It is also used to modify the growth rates and composition of meat-producing animals and the composition of milk and eggs. Risks to animal health from biotechnology are unknown, although there is concern that GM fish that do escape into the wild will contaminate wild species.

²³²⁵ Ibid., accessed. p. 55.

²³²⁶ BIOTECCanada. *Biotech Classroom - What Is Biotechnology? - Dispelling the Myths*, accessed.

²³²⁷ Ibid., accessed.

²³²⁸ Canadian Biotechnology Advisory Committee. *Biotechnology and the Health of Canadians: A Report from the Canadian Biotechnology Advisory Committee on Biotechnology and Health Innovation: Opportunities, Challenges and Public Policy*, accessed. p. vii.

²³²⁹ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

According to the RSC report, GM technologies are also integrated into research on all livestock species, and it argues that, once the technologies are in place, “[t]here is little doubt that breeding companies will be in a position to offer animals bred from proprietary germplasm.”²³³⁰ As of 2001, 28 species of fish have been genetically engineered and work on transgenic fish for the aquaculture industry shows increased growth rates from 200 to 600%, although the mature size of the fish remained the same. In the U.S., the first application for the commercial production of growth-enhanced Atlantic salmon was made in 2000. Research is focusing, in part, on genes that will allow marine fish to survive in fresh water and tolerate other environmental conditions such as cold, shorten the length of their reproductive cycles, enhance resistance to pathogens, increase nutritional qualities, and control sex differentiation and sterility.

Those who are opposed to the use of biotechnology in animal production are usually also concerned with the ethical treatment of these animals, particularly with the often extreme suffering that is afflicted on them through the use of genetic engineering to modify growth rates or milk production.^{2331, 2332}

Environmental health issues: sustainability

The biotechnology industry has claimed that GE technologies can contribute to efforts toward sustainability by providing additional food, fibre, and medicines for human populations without increasing, and possibly even decreasing, demands placed on land and plant fauna habitats.²³³³ It claims that GM crops use fewer agrichemicals and that biotechnology is an information technology that has no material ecological impacts. Vandana Shiva quotes an industry official from Monsanto as arguing: “At the most basic level, biotechnology gives us the chance to achieve sustainability, by substituting information for stuff.”²³³⁴ Shiva, however, points out that Roundup pesticide is “stuff,” not information, and Roundup-Ready soybeans are “stuff” and this “stuff” does have ecological impact. Shiva also notes that, when the biotechnology industry describes the benefits of GM crops, it is comparing them to practices in large-scale industrial agriculture, rather than to ecological, small-scale agriculture, which is the practice of most of the world’s farmers at this point.

This argument illustrates the fact that many of the issues in the biotechnology debate are discussed from different levels, contexts, and worldviews. The biotechnology industry, for example, discusses sustainability from a technical, utilitarian point of view, without necessarily considering the social costs involved. When the industry talks about biotechnology being sustainable and safe, it is often referring to the fact that it is working

²³³⁰ Ibid., accessed. p. 28.

²³³¹ ETC Group: Action Group on Erosion, Technology, and Concentration. *Down on the Farm: The Impact of Nano-Scale Technologies on Food and Agriculture*, ETC Group, 2004; accessed November 2005; available from <http://www.etcgroup.org/article.asp?newsid=485>.

²³³² Schlosser, Eric. *Fast Food Nation: The Dark Side of the All-American Meal*, New York: HarperCollins, 2002.

²³³³ Kershen. "Biotechnology: An Essay on the Academy, Cultural Attitudes and Public Policy."

²³³⁴ Shiva, Vandana. *Stolen Harvest: The Hijacking of the Global Food Supply*, Cambridge, MA: South End Press, 2000. p. 97.

with information, and this information in the form of DNA and genes is limitless and can be broken down and reassembled in an infinite number of ways to create new “products” of information.²³³⁵ Environmentalists, on the other hand, strive to include the larger socioeconomic and political impacts. It is questionable whether these diverse perspectives can be reconciled at all.

External costs of industrialized agriculture

Jules Pretty, Director of the Centre for Environment and Society at the University of Essex in England, and his colleague Rachel Hine contend that the success of industrial agriculture is based on measures of food price, availability, and the amount of food produced, and it must ignore costs of externalities, or unintended consequences to society and the environment.²³³⁶ In a study examining the annual costs of these externalities in Britain during the 1990s, Thayne Cozart reported that Pretty and Hine estimated the externalities to cost 1.54 billion pounds (approximately U.S. \$2.6 billion). According to Cozart, this represents the amount of money Britain had to spend to deal with the effects of industrial agriculture, as well as a hidden subsidy from the public to the polluters. Some of the externalities of industrial agriculture Pretty and Hine evaluated were: water pollution from farm waste, soil nutrients, erosion, and pesticides; loss of landscape and biodiversity; food-borne diseases; air pollution from gaseous emissions; unnecessary transportation costs of food; human dislocation from rural to urban areas; rural community decline; poor human diets and obesity; and the cost of direct government subsidies.²³³⁷

Pretty and Hine also evaluated the benefits of sustainable agriculture such as landscape aesthetics, biodiversity, clean water, wetland benefits for flood protection, waste treatment, wildlife habitats, energy savings on transportation, carbon sequestration to reduce global warming, rural economy, and community cohesion. The largest value ascribed to positive benefits from sustainable agricultural practices was 14 billion pounds (U.S. \$23.7 billion) for rural landscape services (tourism), where the annual value for rural tourism was more than 10 times that of the total value of all food produced.²³³⁸

Pretty and Hine concluded that ‘cheap food’ is actually very expensive because its price includes many hidden costs, such as taxes for subsidies; environmental cleanup costs;

²³³⁵ Heller, Chaia. "McDonald's, MTV, and Monsanto: Resisting Biotechnology in the Age of Informational Capital," in *Redesigning Life? The Worldwide Challenge to Genetic Engineering*, ed. Tokar, Brian. London: Zed Books, 2001.

²³³⁶ Cozart, Thayne. "Industrial vs. Sustainable Agriculture," *Acres: A Voice for Eco-Agriculture*, vol. 33, no. 12, 2003: 1-2; accessed October 2005; available from http://www.acresusa.com/toolbox/reprints/Industrial_vs_sustain_dec03.pdf.

²³³⁷ Pretty, Jules, and Rachel Hine. *Reducing Food Poverty with Sustainable Agriculture: A Summary of New Evidence*, SAFE-World Research Project, Centre for Environment and Society, University of Essex, 2001; accessed November 2005; available from http://www.essex.ac.uk/ces/esu/occasionalpapers/SAFE_FINAL_-_Pages1-22.pdf.

²³³⁸ Ibid., accessed.

treatments for diet-based human health concerns; and economically diminished rural communities.²³³⁹

Loss of biodiversity

The Royal Society of Canada (RSC) report states that the potential impact of GM crops on biodiversity is one of the least understood issues, and detailed studies are needed to assess this impact.²³⁴⁰ It reports that even prior to the introduction of GM crops, agriculture has resulted in “the large-scale global destruction of natural ecosystems with concomitant losses in biodiversity.” It has yet to be determined whether GM crops will increase this loss or whether the impacts will be minimal.²³⁴¹ Loss of biodiversity includes the loss of the ability of a diversity of species to keep natural systems in balance.²³⁴² For example, engineering a plant to render it toxic to one type of insect can also make it toxic to other insects. Suzuki reports results of a study that found nearly half of monarch butterfly larvae feeding on milkweed that had been dusted with pollen from *Bt* maize, a GM corn, died, while none in the control group died.²³⁴³ Suzuki asks: “If we grow fields of crops that are toxic to all organisms except humans, what will that do to beneficial insects, or to the important microorganisms that live in our soils?”²³⁴⁴ He points out that, as is already happening on commercial monoculture farms, the loss of numbers of insects leads to fewer birds and small mammals, and this could have implications up and down the food chain.

Agricultural release of GM crops into the environment

As previously noted, the ultimate ecological impact of GM crops escaping into the environment is unknown, which makes the risks insidious. Suzuki notes that GM crops are living creatures and, unlike drugs found to be unsafe, they cannot be recalled once they have been released into the environment.²³⁴⁵ The RSC argues that most of the major crop species cultivated today, such as corn, rice, wheat, and beans, have been artificially selected over long periods of time to develop traits that give them a low survival rate under most natural conditions.²³⁴⁶ These traits, such as reduced natural chemical defences, lack of seed dormancy, and high fertilizer requirements, restrict the ability of cultivated crops to grow without deliberate cultivation for more than a few seasons.

However, the RSC is particularly concerned with recently engineered crops that more closely resemble their wild ancestors. These may be more likely to persist in the wild and

²³³⁹ Cozart. "Industrial vs. Sustainable Agriculture."

²³⁴⁰ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 129.

²³⁴¹ *Ibid.*, accessed. p. 130.

²³⁴² Suzuki. *Genetically Modifying Our Food: Part 2*, accessed.

²³⁴³ *Ibid.*, accessed.

²³⁴⁴ *Ibid.*, accessed.

²³⁴⁵ *Ibid.*, accessed.

²³⁴⁶ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. pp. 121–122.

become invasive, according to the RSC. Since these plants would most likely be herbicide resistant, traditional methods to cull them through herbicide use would not be effective.²³⁴⁷

Scientists from Agriculture Canada say that wind can blow seeds or pollen between fields and that the DNA of crops in one field often mixes with that of another.²³⁴⁸ Unwanted gene transfer from GM crops to conventional or organic crops by cross-pollination is becoming an increasing problem, especially for farmers who want to produce non-GM varieties. Tokar explains that it was recently discovered that “*Bt* toxin from engineered corn, canola, and cotton can persist in the soil from one growing season to the next, that herbicide-tolerant soybean plants have extra unexplained lignin in their stems, making them unusually brittle in hot weather, and that engineered traits have indeed spread through cross-pollination, creating in one instance a Canadian canola variety that is tolerant to three different kinds of herbicides.”²³⁴⁹ ETC Group, an Ottawa-based organization active in the research and analysis of technological information primarily related to biotechnologies and their socioeconomic implications, says, “In the early days of biotech it was discussed as a remote possibility, it soon became a reality, then a nuisance, and now a crisis (for some).”²³⁵⁰

Literally millions of small seeds are produced and harvested over very large areas. Seeds may be transported accidentally between fields in a number of ways, including by farm machinery or by trucks transporting seeds to and from fields, or by wind, insects, and water. Keeping a distance between conventional and GM crops, as the industry suggests, has not been adequate protection for farmers. For example, in some areas of the Prairie Provinces, herbicide resistant canola plants are developing into a major weed problem. In order to get rid of them, farmers are forced to use older herbicides that are harmful to the environment.²³⁵¹ Organic farmers have been particularly affected because they must ensure their crops are GM-free, and they have not been able to do this. In Saskatchewan, every organic farmer has lost his organic status for canola, and now most organic prairie farmers have opted not to grow canola at all.²³⁵²

GM-crop contamination has also become a serious financial threat to farmers. Monsanto, for example, charges a fee of \$15 per acre for use of its GM seeds, which on a 1500-acre farm amounts to \$22,500 per year.²³⁵³ It also requires farmers to use its herbicide, Roundup, since this is the only herbicide that does not harm the GM crops. In addition, it

²³⁴⁷ Ibid., accessed.

²³⁴⁸ ETC Group: Action Group on Erosion, Technology, and Concentration. *Communique: Seed Industry Concentration*, 2005; accessed November 2005; available from <http://www.etcgroup.org/search.asp?type=communique>.

²³⁴⁹ Tokar. "Biotechnology: Enlarging the Debate."

²³⁵⁰ ETC Group: Action Group on Erosion. *Communique: Seed Industry Concentration*, accessed. p. 4.

²³⁵¹ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

²³⁵² Sierra Club of Canada. *Genetically Engineered Food: An Introduction*, 2002; accessed November 2005; available from <http://www.sierraclub.ca/national/programs/health-environment/food-agriculture/ge-food-introduction.shtml>.

²³⁵³ ETC Group: Action Group on Erosion. *Communique: Seed Industry Concentration*, accessed.

requires farmers to sign a contract that they will not save or share seeds from one season to the next, and that they must sell the crop for consumption to a commercial purchaser authorized by Monsanto.²³⁵⁴ Monsanto has a small army of investigators who routinely check farmers' fields for evidence that this contract is not broken by taking crop samples. Monsanto calls these investigations "audits." When Monsanto finds its seeds in unofficial fields, it sues the farmers for infringement of patent protections. For example, in 1998, Saskatchewan farmer, Edward Zilinski, traded seeds with another farmer in an old farming tradition. However, the seeds he got in return contained Monsanto's DNA and Monsanto charged Zilinski more than \$28,000 in penalties.²³⁵⁵

One case that made front-page headlines was that of Percy and Louise Schmeiser. The couple had been farmers in Saskatchewan for 50 years when their 1,400-acre farm was found to contain a high percentage of Monsanto canola. The Schmeisers postulated that the seeds may have blown from the five farms in the vicinity of their farm that use GM seeds, or been mixed into their saved seeds at the processing plant. In any case, Monsanto sued the Schmeisers for stealing the seeds. The legal battle, which lasted over seven years, cost the Schmeisers over \$600,000 in legal fees and ended up with a 2004 Supreme Court of Canada decision in favour of Monsanto.²³⁵⁶ There are currently 2,000 similar cases filed by Monsanto and other biotechnology corporations against farmers in Canada and the U.S.²³⁵⁷

Stories such as this are very threatening to small farmers all over the world. For example, a number of small, remote communities in Mexico that practice small-scale agriculture, using family labour and very little chemical inputs, participated in studies in 2003 to determine if GM crops had become invasive.²³⁵⁸ These farms, located in areas where the cultivation of GM corn is prohibited by law, produce mainly crops grown from saved seeds for family use. In one study, 48.6% of the samples, gathered from 95 plots in 53 communities, tested positive for transgenic proteins. In another analysis carried out on 2,000 plants from 138 farming and Indigenous communities in nine states, 24% of the samples contained transgenes in the native corn. Some of the transgenes identified in these communities came from a corn that has been altered to produce its own pesticide—patented by Aventis (Bayer). *StarLink*, as it is called, is prohibited in human food due to concerns about allergies. In 2000, the altered corn inadvertently made its way into some processed foods in the U.S. after it mixed with other varieties of corn, triggering a recall

²³⁵⁴ Supreme Court of Canada. *Monsanto Canada Inc. v. Schmeiser*, Lexum, University of Montreal, 2004; accessed November 2005; available from http://www.lexum.umontreal.ca/csc-scc/en/pub/2004/vol1/html/2004scr1_0902.html.

²³⁵⁵ ETC Group: Action Group on Erosion. *Communique: Seed Industry Concentration*, accessed.

²³⁵⁶ Supreme Court of Canada. *Monsanto Canada Inc. v. Schmeiser*, accessed.

²³⁵⁷ Indigenous and farming communities in Oaxaca, Puebla, Chihuahua, and Veracruz, Center for Rural Change in Mexico (CECCAM), Center for Indigenous Missions (CENAMI), Action Group on Erosion Technology and Concentration (ETC Group), Center for Social Analysis Information and Popular Training (CASIFOP), Union of Organizations of the Sierra Juarez of Oaxaca (UNOSJO), and Jalisco Association of Support for Indigenous Groups (AJAGI). *Press Release: Contamination by Genetically Modified Maize in Mexico Much Worse Than Feared*, October 9, 2003; accessed November 2005; available from http://www.etcgroup.org/documents/NR_Maize_10_03ENG3.pdf.

²³⁵⁸ *Ibid.*, accessed.

of more than 300 kinds of processed foods.^{2359, 2360}

At the same time, corn grown from *StarLink*-contaminated seeds was being consumed by the families in Mexico and elsewhere.²³⁶¹ In several of the small farm communities, it was found that plants contained two to four different transgenes, indicating that the contaminated maize had been cross-pollinating for years. The fact that these GM varieties were found within Indigenous communities, far from urban centres, among seed-saving farmers, indicates a potentially widespread problem. Researchers hypothesized that the most likely source of the contamination was from imported GM corn. The ETC Group reports that Monsanto's newspaper ads in Mexico are "already warning peasants that if they are found using transgenic seed illegally, they risk fines and even prison."²³⁶²

Pesticide use

The biotechnology industry repeatedly claims that GM crops require fewer pesticides than conventional varieties. Charles Benbrook, who studied pesticide use on GM crops in the U.S. from 1993–2004, says that for the first three years of commercial use, GM crops did use fewer pesticides than traditional varieties, leading farmers to accept the technology.²³⁶³ However, since 1996, the overall use of agrochemicals on GM-crop acreage has risen 4.1%. The altered crops are mainly engineered to be toxic to *Lepidoptera* (such as leaf-chewing worms) and to tolerate applications of herbicides. Crops engineered to be toxic to insects express the bacterial toxin, *Bacillus thuringiensis*, or *Bt*, and are generally called *Bt* crops. Roundup is the Monsanto trade name for the herbicide glyphosate that is used on the majority of herbicide-tolerant (HT) crops called "Roundup Ready." In the U.S., HT crops are grown on 73% of the total GE acres.²³⁶⁴

Benbrook found that in the U.S. between 1996 and 2004, the use of pesticides on GE corn, soybeans, and cotton increased by 122 million pounds of pesticides:

While *Bt* crops have reduced insecticide use by about 15.6 million pounds over this period, HT crops have increased herbicide use by 138 million pounds. *Bt* crops have reduced insecticide use on corn and cotton about 5 percent, while HT

²³⁵⁹ Reuters. *Aventis Asks for Bio-Corn Residue Limit*, 2001; accessed September 2006; available from <http://www.genet-info.org/genet/2001/May/msg00037.html>.

²³⁶⁰ While *StarLink* is no longer sold as human food, the use of *StarLink* corn in livestock feed and industrial, non-food uses is still approved by the U.S. Environmental Protection Agency (EPA).

²³⁶¹ Indigenous and farming communities in Oaxaca, Center for Rural Change in Mexico (CECCAM), Center for Indigenous Missions (CENAMI), Action Group on Erosion Technology and Concentration (ETC Group), Center for Social Analysis Information and Popular Training (CASIFOP), Union of Organizations of the Sierra Juarez of Oaxaca (UNOSJO), and Jaliscan Association of Support for Indigenous Groups (AJAGI). *Press Release: Contamination by Genetically Modified Maize in Mexico Much Worse Than Feared*, accessed.

²³⁶² ETC Group: Action Group on Erosion. *Down on the Farm: The Impact of Nano-Scale Technologies on Food and Agriculture*, accessed.

²³⁶³ Benbrook, Charles M. *Genetically Engineered Crops and Pesticide Use in the United States: The First Nine Years*, Biotech InfoNet, Technical Paper Number 7, 2004, Oct; accessed November 2005; available from <http://www.biotech-info.net/technicalpaper7.html>.

²³⁶⁴ *Ibid.*, accessed.

technology has increased herbicide use about 5 percent across the three major crops. But since so much more herbicide is used on corn, soybeans, and cotton, compared to the volume of insecticide applied to corn and cotton, overall pesticide use has risen about 4.1 per-cent on acres planted to GE varieties.²³⁶⁵

Benbrook claims that weed scientists have been warning for 10 years that a lack of diversity in weed management systems, and, in particular, a heavy reliance on HT crops, would cause weed resistance, forcing the farmers to apply additional herbicides. Benbrook says that the “ecological adaptations predicated by scientists have been occurring in the case of Roundup Ready crops for three or four years and appear to be accelerating.”²³⁶⁶ Benbrook identifies three reasons for the increased herbicide use. The primary factor is reliance on a single herbicide, glyphosate, as the main method of managing weeds on millions of acres of HT crops. The second factor is the spread of glyphosate-tolerant or resistant weeds such as marestail or horseweed and general shifts in the composition of weed communities. The third factor is the price reductions and market incentives based on volume from herbicide manufacturers.²³⁶⁷ Worldwide, there are over 200 reported cases of herbicide-resistant weed biotypes, and, of these, 30 have been reported in Canada.²³⁶⁸

In a weekly newspaper column written by David Suzuki, he cited a 1999 study that reviewed 8,200 university-based trials of GM soy and found that farmers growing Roundup Ready soybeans used two to five times more herbicide than farmers using conventional weed management systems. He also noted, “Not surprisingly, the same company that produces the modified soybean also produces the herbicide that is sprayed on it.”²³⁶⁹

Increased yields

Genetically engineered crops are expected to produce higher yields than non-GE crops, but this has not proven to be the case. According to the Sierra Club of Canada, the University of Saskatchewan conducted a study that found Roundup Ready canola yielded 7.5% fewer crops than conventional canola. *Bt* corn has produced higher yields, but, according to the U.S. Department of Agriculture, the rate was not high enough to offset the higher production costs.²³⁷⁰

Superweeds and superpests

The RSC reports that it has seen no cases involving the creation of superweeds from commercial-scale planting. However, it reports that gene transfer can occur, and, where commercial and wild plants co-exist in the same area, the environmental impact will

²³⁶⁵ Ibid., accessed. p. 3.

²³⁶⁶ Ibid., accessed. p. 3.

²³⁶⁷ Ibid., accessed. p. 3.

²³⁶⁸ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 130.

²³⁶⁹ Suzuki. *Genetically Modifying Our Food: Part 2*, accessed.

²³⁷⁰ Sierra Club of Canada. *Genetically Engineered Food: An Introduction*, accessed.

depend on whether the wild plants with the newly acquired transgenes increase in numbers.²³⁷¹

The Sierra Club explains that superweeds can also be “volunteers,” or plants left over from previous crops from seeds that can lay dormant in the soil for several years before germinating. Thus, it says, the problem of superweeds will only escalate with continued use of GE seed. Corporations, that hold patents on these seeds, can fine farmers thousands of dollars if the altered crops are found illegally in their fields. Farmers can also be forced to remove them from their crops. But this is not always possible since they look identical to conventional crops. In order to control these plants, farmers are turning to more toxic and persistent herbicides such as paraquat or 2,4D.²³⁷²

The RSC also reports that there is clear evidence that insects have evolved resistance to *Bt* insecticide as well as a number of examples of *Bt* transgenic crops decreasing the target pest but increasing problems with secondary pests that are not affected by the toxin. In addition, it reports that there has been very little work carried out on the potential impact of GM plants on other pollinators such as bumblebees and syrphids.²³⁷³

Nanotechnology issues

In 2001, the U.S. National Science Foundation predicted that, “[n]anotechnology will fundamentally transform science, technology, and society. In 10 to 20 years, a significant proportion of industrial production, healthcare practice, and environmental management will be changed by the new technology.”²³⁷⁴ It also estimated that the industry would be worth a trillion dollars by 2015.²³⁷⁵ Current research and development in the field “ranges from atomically-modified seeds, nano-sensors for precision agriculture, plants engineered to produce metal nano particles, nano-vaccines for farmed fish, nanobarcodes for tracking and controlling food products, and more.”²³⁷⁶

The Ottawa-based Action Group on Erosion, Technology, and Concentration (ETC Group) closely follows developments in nanotechnology and recently published the first comprehensive look at how nanoscale technologies can affect farmers, food, and

²³⁷¹ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

²³⁷² Sierra Club of Canada. *Genetically Engineered Food: An Introduction*, accessed.

²³⁷³ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

²³⁷⁴ Roco, Mihail C., and William Sims Bainbridge. *Societal Implications of Nanoscience and Nanotechnology*, Washington, D.C.: National Science Foundation, 2001, March; accessed November 2005; available from <http://rachel.org/library/getfile.cfm?ID=217>. p. 19, cited in Montague, Peter. *The Revolution, Part 3: Ultrafines*, Rachel's Environment & Health News #774, 2003; accessed November 2005; available from http://www.rachel.org/bulletin/bulletin.cfm?Issue_ID=2371&bulletin_ID=48.

²³⁷⁵ Montague. *The Revolution, Part 3: Ultrafines*, accessed.

²³⁷⁶ ETC Group: Action Group on Erosion, Technology, and Concentration. *ETC Group Releases "Down on the Farm: The Impact of Nano-Scale Technologies on Food and Agriculture"*, 2004; accessed November 2005; available from <http://www.etcgroup.org/>.

agriculture.²³⁷⁷ It estimates that over 140 companies have products that are now on the market. These products, which contain invisible and un-labelled nanoparticles, include powders, sprays and coatings, sunscreens, automobile parts, tennis rackets, scratch-proof eye glasses, stain-repellent fabrics, self-cleaning windows, and others. In addition, ETC reports a number of pesticides containing nanoscale materials have been released into the environment and are commercially available.²³⁷⁸

Rachel's Environment & Health News reported in 2003 that Mitsubishi Chemical in Japan was constructing a plant to manufacture nanotubes²³⁷⁹ at the rate of 120 tons per year, with plans to increase output to 1,500 tons per year by 2007.²³⁸⁰ According to Montague, the manufacture and use of nanoparticles is unregulated in the U.S. and elsewhere and the industry has not developed standard protocols for handling nanoparticles safely during manufacture, use, or disposal. As well, it reports the environmental and human health effects of nanoparticles are untested and unknown.²³⁸¹

According to Montague:

One of the most important characteristics of nano particles is their huge surface-to-volume ratio. The smaller something is, the larger its surface area is, in comparison to its volume. Because nano particles are so small, they have an enormous surface area, relative to their volume. Drug companies are planning to take advantage of those large surfaces—for example, covering nano particles with drugs for targeted delivery into the interiors of our cells. The smaller the size of the particle, the larger the load of drugs it can carry (larger, relative to the particle's volume).

Unfortunately, the large surface area of tiny particles also makes them dangerous for at least two reasons: first, the large surfaces alone promote the reaction of oxygen with human (or animal) tissue, creating free radicals [...] which in turn, cause lung disease, and cardiovascular disease. Furthermore, nano particles carry metals and carcinogenic hydrocarbons deep into the lung, where they exacerbate asthma and other serious breathing problems. In addition, nano particles combined with metals can pass directly into the brain where they promote the formation of waxy amyloid plaques, which are the signature feature of

²³⁷⁷ ETC Group: Action Group on Erosion. *Down on the Farm: The Impact of Nano-Scale Technologies on Food and Agriculture*, accessed.

²³⁷⁸ ETC Group: Action Group on Erosion, Technology, and Concentration. *Nanotech Meets the Environment Making a Mole Hill out of a Mountain?*, 2003; accessed November 2005; available from <http://www.etcgroup.org/>.

²³⁷⁹ A carbon nanotube is a cylindrical molecule made of carbon atoms. When aligned in a certain way it can be 20 times as strong as steel, able to bend without breaking, and conduct electricity 1,000 times better than copper.

²³⁸⁰ Montague, Peter. *The Revolution, Part I*, Rachel's Environment & Health News #772, 2003; accessed November 2005; available from http://www.rachel.org/bulletin/bulletin.cfm?Issue_ID=2362.

²³⁸¹ Ibid., accessed. p. 2.

Alzheimer's disease.²³⁸²

Montague states that the estimate by Dr. Joel Schwartz of the U.S. Environmental Protection Agency that fine particles were responsible for the deaths of 60,000 people each year in the U.S. is now widely accepted, and recent studies have found that ultrafines are 10 to 50 times as damaging to lung tissue, compared to larger fine particles.

In fact, recent scientific studies have raised serious concerns about the toxicity of nanoparticles. A list of studies supplied by the ETC Group includes the following "Ten Toxic Warnings":

- Titanium dioxide / zinc oxide nanoparticles from sunscreen are found to cause free radicals in skin cells, damaging DNA. (Oxford University and Montreal University)²³⁸³
- Engineered nanoparticles accumulate in the organs of lab animals and are taken up by cells, which is an entry point for nanomaterials into the food chain.²³⁸⁴
- Effects of nanotubes on the lungs of rats produced more toxic response than quartz dust [...] varying but still worrying findings on nanotube toxicity [show] nanotubes can be highly toxic.²³⁸⁵
- The smaller the particle, the higher its likely toxicity and nanoparticles have various routes into the body and across membranes such as the blood brain barrier.²³⁸⁶
- Nanoparticles can travel unhindered through the soil and could easily be absorbed by earthworms, possibly allowing them to move up the food chain and reach humans.²³⁸⁷
- Nanoparticles are able to move easily from the nasal passageway to the brain.²³⁸⁸
- Nanosafety researchers from University of Leuven, Belgium, write in the journal *Nature* that nanoparticles will require new toxicity tests.²³⁸⁹
- Initial findings show that gold nanoparticles can move across the placenta from mother to fetus.²³⁹⁰

²³⁸² Ibid., accessed.

²³⁸³ Dunford, Rosemary, Angela Salinaro, Lezhen Cai, Nick Serpone, Satoshi Horikoshi, Hisao Hidaka, and John Knowland. "Chemical Oxidation and DNA Damage Catalysed by Inorganic Sunscreen Ingredients," *FEBS Letters*, vol. 418, no. 1-2, 1997: 87-90.

²³⁸⁴ Brown, Doug. "Nano Litterbugs? Experts See Potential Pollution Problems." *Small Times*, 2002 March 15; accessed November 2005; available from <http://www.smalltimes.com/>.

²³⁸⁵ Hogan, Jenny. "Special Report on Nano Pollution: How Safe Is Nanotech," *New Scientist*, vol. 177, no. 2388, 2003: 14.

²³⁸⁶ ETC Group: Action Group on Erosion, Technology, and Concentration. *Size Matters! The Case for a Global Moratorium*, ETC Group Occasional Paper Series, 7, no. 1, 2003; accessed November 2005; available from <http://www.etcgroup.org/>.

²³⁸⁷ Brumfiel, Geoff. "A Little Knowledge..." *Nature*, vol. 424, no. 6946 (July), 2003: 246.

²³⁸⁸ Kirby, Alex. *Tiny Particles Threaten Brain*, BBC News Online, January 8, 2004; accessed November 2005; available from <http://news.bbc.co.uk/1/hi/sci/tech/3379759.stm>.

²³⁸⁹ Hoet, Peter, Abderrahim Nemmar, and Benoit Nemery. "Health Impact of Nanomaterials," *Nature Biotechnology*, vol. 22, no. 1, 2004: 19.

- Cadmium selenide nanoparticles (quantum dots) can break down in the human body potentially causing cadmium poisoning.²³⁹¹
- Nanoparticles cause rapid brain damage in juvenile fish along with changes in gene function. They also are toxic to small crustaceans (water fleas).²³⁹²

The ETC Group gives examples of nanoenvironmental products designed to prevent erosion or to clean up contaminated sites, which have unknown short- and long-term implications for health and the environment.²³⁹³ They describe what they consider to be the “single largest environmental release involving a nanotechnology product.”²³⁹⁴

A Utah-based company, Sequoia Pacific Research, participated in a \$4 million Bureau of Indian Affairs contract to protect more than 1,400 acres of fire-ravaged land on a mountainside near Taos, New Mexico. Sequoia’s SoilSETTM was used to aid the soil-stabilization effort. SoilSETTM is a unique and reportedly organic and biodegradable product that undergoes a 4 nm-level electrochemical reaction when mixed with water. The reaction causes silicates in the soil and silicates in the product to self-assemble into a kind of crust that remains for up to a year. The crust is claimed to prevent soil runoff and allows seeds blended into the product to establish themselves [...]. Asked by ETC Group for the chemical composition of the product, Paul Clayson, Chief Operating Officer for Sequoia, declined to say citing the need for confidentiality pending patent approval. When ETC Group inquired into the approval process for the product, Clayson said that the company had contacted a regional office of the Environmental Protection Agency (EPA) and was told that no approval was required [...]. Pat Mooney, Executive Director of ETC Group worries, “The public needs to know how SoilSETTM’s matrix forms; how long it lasts; what it does to the living soil; and where the changed particles end up. It is simply unacceptable for this large-scale release to be unregulated.”²³⁹⁵

Montague also reports that nanoscale materials have different properties than the same materials in a larger scale. They are generally more reactive and mobile if they enter the body where they can move practically unhindered into any area.²³⁹⁶ If they become airborne, they can float for long periods of time since they do not settle readily onto surfaces. In water, they cannot be filtered out, and in the soil they can travel unhindered,

²³⁹⁰ Wootliff, Ben. "British Scientist: Nanoparticles Might Move from Mom to Fetus." *Small Times*, January 14, 2004, accessed November 2005; available from <http://www.smalltimes.com/>.

²³⁹¹ Mullins, Justin. "Safety Concerns over Injectable Quantum Dots," *New Scientist*, vol. 181, no. 2436, 2004: 10.

²³⁹² Sampson, Mark T. *Type of Buckyball Shown to Cause Brain Damage in Fish*, Eurekaalert, 2004; accessed November 2005; available from http://www.eurekaalert.org/pub_releases/2004-03/acs-ob031904.php.

²³⁹³ ETC Group: Action Group on Erosion. *Nanotech Meets the Environment Making a Mole Hill out of a Mountain?*, accessed.

²³⁹⁴ Ibid., accessed.

²³⁹⁵ Ibid., accessed.

²³⁹⁶ Montague, Peter. *Nanotechnology and the Precautionary Principle*, Rachel’s Democracy & Health News #816, 2005; accessed November 2005; available from http://www.rachel.org/bulletin/bulletin.cfm?Issue_ID=2498.

can easily be absorbed by earthworms and the roots of plants , thus entering the food chain.

Montague explains:

In the realm below 50 nanometers, the normal laws of physics no longer apply, quantum physics kicks in and materials take on surprising new properties. Something that was red may now be green; metals may become translucent and thus invisible; something that could not conduct electricity may now pass a current; nonmagnetic materials may become magnetized; insoluble substances may dissolve. Knowing the properties of a substance in bulk tells you nothing about its properties at the nano scale, so all nano materials' characteristics—including hazardous traits—must be learned anew by direct experiment.²³⁹⁷

The Royal Society of Canada says that the industry should be responsible for producing information about the safety of the products, not the public. It also recommends prohibiting the commercial release of products until potential risks and benefits are evaluated.²³⁹⁸

The ETC Group recommends, in keeping with the precautionary principle, that all food, feed, and beverage products (including nutritional supplements) that incorporate manufactured nanoparticles be removed from commercial sales and agricultural input products such as pesticides and be prohibited from environmental release until regulations are in place and they are shown to be safe. Similarly, it recommends that “synthetic biology” materials should not be used “until society can engage in a thorough analysis of the health, environmental, and socio-economic implications.”

The ETC Group argues:

By allowing nanotech products to come to market in the absence of public debate and regulatory oversight, governments, agribusiness and scientific institutions have already jeopardised the potential benefits of nano-scale technologies. First and foremost, society—including farmers, civil society organisations and social movements—must engage in a wide debate about nanotechnology and its multiple economic, health and environmental implications [...]. Any efforts by governments or industry to confine discussions to meetings of experts or to focus debate solely on the health and safety aspects of nano-scale technologies will be a mistake. The broader social and ethical issues must also be addressed.²³⁹⁹

²³⁹⁷ Ibid., accessed.

²³⁹⁸ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

²³⁹⁹ ETC Group: Action Group on Erosion. *Down on the Farm: The Impact of Nano-Scale Technologies on Food and Agriculture*, accessed. pp. 1–2.

Einsiedel reports that the nanotechnology industry would like to see public debate take place in the development stages of the technology, rather than in the commercialization stage. She explains:

The emergence of new technologies in the public arena is occurring much earlier in the innovation trajectory; many becoming a fixture in the public landscape even as early as the stage of “technology design.” In some ways, this may be occurring from the benefit of hindsight. That is, when we look back to the experience of “older” technologies—nuclear power, GM food are particular examples—we see that discussions of these technologies occurred at the commercialization stage when it was ‘too late’. Those engaged in nanotechnology design see this as a key lesson to be learned.²⁴⁰⁰

Information capital and the service economy

Social ecologist and ecofeminist Chaia Heller does not view biotechnology as an isolated technology but fits it into the wider economic and political trends that are currently dictating the way knowledge, culture, and society are produced.²⁴⁰¹ She notes that biotechnology is the “systematic conversion of biological nature into informational capital,” representing a new way of producing and ordering society and nature:

While some claim that [biotechnology] is ‘nothing really new’, that its transgenic creations represent a continuity with such previous biotechnologies as plant and animal breeding, they deny the underlying issue: transgenic biotechnology emerges out of a different *world* than plant breeding or beer making. It emerges out of a different set of economic, political, and social demands and commitments. Biotechnology is a new form of production that emerged as capital hit the limits of industrial production and began to enter what may be called its *organic* phase: a phase in which capital targets the reproductive dimensions of cultural and biological life as loci for intensified production and commodification.²⁴⁰²

Heller argues that there are similarities between the characteristics of the service economy and biotechnology:

In this phase, a service economy marshals what I will call the organic reproductive processes of everyday life including food, health, and recreation, transforming them into franchised formations ranging from fast-food and HMOs, to MTV and Disneyland. Biotechnology emerges as part of this trend, reducing

²⁴⁰⁰ Einsiedel, Edna F. "Introduction: Making Sense of Emerging Technologies," in *First Impressions: Understanding Public Views on Emerging Technologies*, 2-5, Canadian Biotechnology Secretariat, Genome Prairie; accessed November 2005; available from <http://www.biostrategy.gc.ca/english/View.asp?x=524,2005http://www.biostrategy.gc.ca/english/View.asp?x=524>, p. 4.

²⁴⁰¹ Heller. "McDonald's, MTV, and Monsanto: Resisting Biotechnology in the Age of Informational Capital."

²⁴⁰² Ibid.

cultural and biological life processes into an ever renewable and flexible raw material for production.²⁴⁰³

For example, Heller notes:

[A] chain-store owes its economic and cultural potency to its ability to reproduce a set of patented symbols, images, texts, building design, and production protocols dispersed in the form of franchised service factoryettes. For reproductive cultural practice to become capital intensive, both the service product and process must be transformed into intellectual property. The corporation of the informational age, then, must sell more than mere service product. McDonalds' success lies in their ability to transform hamburgers into a patented semiotic field of informational signs, symbols, images, and texts. In the post-war period, we see mega-corporations mass produce service commodities whose value is linked not necessarily to their general *content*, but to their *form* or informational value. In the end, it's the golden arch, not the beef, that makes McDonalds a world power.²⁴⁰⁴

The connection between these cultural franchises with biotechnology, in part, concerns the mode of production. In the factory mode of production, small units such as automobile parts are combined to produce a whole, such as a car. The service mode, on the other hand, starts with large units of information, cuts these units into smaller units, and then recombines them into new products. Heller calls this *recombinance* the “emblem of informational capitalism.” For example, she explains:

Within recombinant production, cultural artifacts are reduced to information bits to be cut and spliced together to create novel commodities. In the music industry, we see a shift from artist-driven music production to a music produced primarily by sound engineers who sample and mix pre-produced music tracks, which represent the hallmark of recombinant culture. And recombination is prolific: one song can provide the seed for a limitless crop of arrangements to be sold to dance clubs, dentists, retailers, and shopping malls. More and more, we do not create integrally, conveying the gradual and coherent unfolding of one idea or image to another. Those who grew up on a diet of MTV and video games are often more comfortable selecting items from pre-prescribed digital menus or just moving things around.²⁴⁰⁵

McDonalds, as a new recombinant mode of production, also becomes “an informational technology for producing new understandings and practices of culture through the production of service.” Heller proposes that the problem is “the *primacy* of profit-driven recombination, as a principal form of capital-intensive production, *over* non-commodified forms of local, fluid, and hybrid cultural production.”²⁴⁰⁶

²⁴⁰³ Ibid.

²⁴⁰⁴ Ibid. p. 5.

²⁴⁰⁵ Ibid. p. 6.

²⁴⁰⁶ Ibid. p. 7.

Biotechnology also recombines information through techniques such as those which produce recombinant deoxyribonucleic acid (DNA). Recombinant DNA (rDNA) are DNA fragments that are assembled to form new human-made DNA molecules, which are then inserted into a desired strain or used to replace an existing gene, in order to genetically modify or engineer the new organism.²⁴⁰⁷ The Royal Society of Canada Expert Panel on Biotechnology further explains this technology. The gene transfer system for incorporating foreign DNA into a plant genome requires:

[C]oating the foreign DNA onto microprojectiles (e.g. tiny gold beads), and blasting these into living plant cells at high velocities [into the recipient cell. ...] The DNA coat is presumed to leach off the microprojectile surface once it is inside the recipient cell and a small fraction of the DNA becomes incorporated into the cell's genome through a largely unknown process [...]. The incorporated DNA sequence has often been reorganized by the time it is stably inserted into the plant genome. Nevertheless, the "gene gun" method [...] will, in principle, allow any plant species to be transformed [...]. In order to create a transformed plant made only of cells carrying the new gene, two further steps must be successfully completed. First, a plant must be regenerated that is solely derived from one or more of the original transformed cells, and, second, in this process all non-transformed cells must be eliminated.²⁴⁰⁸

Montague notes that the microscope used in nanotechnology allows scientists to "click and drag" individual atoms to build new things—substances and machines, in new ways. Biotechnology has an endless supply of biological information in the form of genes, bacteria, viruses and other organisms, which are less expensive than natural resources such as fossil fuels. Potentially valuable genes of plants, animals, and humans are presently gathered and stored in "biodiversity inventories" for use in commercial applications later.²⁴⁰⁹

Heller further investigates the cultural similarities between franchises and biotechnology processes:

Corporations such as Monsanto use the same franchise logic as McDonalds to extend their information-based service empire, transforming farmers into franchise middle managers who will buy their cloned and patented informational product. Like McDonalds' middle managers, farmers 'lease,' rather than own, the materials obtained from the 'parent' corporation. Farmers who buy Monsanto seeds are obliged to sign one-time use agreements promising not to replant seeds for the next year's season. Under the reign of agricultural biotechnology, farmers become increasingly de-skilled and dependent upon the activities of service providers, such as agrochemical companies who begin to provide seeds, and

²⁴⁰⁷ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 15.

²⁴⁰⁸ Ibid., accessed. pp. 17–18.

²⁴⁰⁹ Montague. *The Revolution, Part 1*, accessed.

products that farmers formerly provided for themselves.²⁴¹⁰

Control of biotechnology by multinational corporations

Only a few corporations control the biotechnology industry. Tokar notes that, in terms of economics, “[t]he biotechnology industry represents an unprecedented concentration of corporate power over our food and our health.”²⁴¹¹ Heller argues this as a situation where citizens are disempowered and either obliged to accept or merely protest decisions of capitalist leaders “who represent less than one percent of the people on the planet.”²⁴¹²

In his vision for the future, Tokar sees the possibility for a more democratic scenario, whereby:

[C]ommunities of people will reclaim decision-making power around what kinds of technologies are most amenable to the creation of an ecological future. Communities can debate and decide how to allocate resources toward research and discovery in a free, open and directly democratic forum, instead of corporate executives and government bureaucrats deciding largely in secret.²⁴¹³

Michael Dorsey, Professor of International Equity and Biopolitics at Dartmouth College in New Hampshire, acknowledges that multinational corporations have “tremendous influence over knowledge, information and public perception of GMOs, GM crops and foods.”²⁴¹⁴ He notes: “Conjoining tight control over markets and knowledge is a relatively new threat to ecosystems and humanity.”²⁴¹⁵ He begins a discussion on the corporate control of agriculture and knowledge with a few statistics for 2001:

- The top 10 agrochemical corporations controlled 84% of the \$30 billion agrochemical market;
- The top 10 veterinary pharmaceutical companies controlled 60% of the \$13.6 billion world market;
- The top 10 pharmaceutical companies controlled an estimated 48% of the \$317 billion world market;
- Six “life science” corporations (BASF, Bayer-Aventis, Dow, DuPont, Monsanto and Syngenta) controlled 98% of the world’s market in genetically modified crops;
- The same six firms also controlled 70% of the world’s pesticide market; and

²⁴¹⁰ Heller. “McDonald’s, MTV, and Monsanto: Resisting Biotechnology in the Age of Informational Capital.” p. 8.

²⁴¹¹ Tokar. “Biotechnology: Enlarging the Debate.”

²⁴¹² Heller. “McDonald’s, MTV, and Monsanto: Resisting Biotechnology in the Age of Informational Capital.” p. 10.

²⁴¹³ Tokar. “Biotechnology: Enlarging the Debate.”

²⁴¹⁴ Dorsey, Michael K. “Who Will Control Agriculture and Knowledge?” *Synthesis / Regeneration: A Magazine of Green Social Thought*, Winter, 2004.

²⁴¹⁵ Ibid. p. 4.

- 94% of all genetically modified crops grown worldwide, mainly canola, corn, cotton, and soybeans, were from one company's germplasm: Monsanto's.²⁴¹⁶

In January 2005, Monsanto moved into the vegetable seed market by acquiring Seminis, a supplier of over 3,500 seed varieties for fruit and vegetable growers in 150 countries.²⁴¹⁷ Monsanto now assumes a leading market share in the global vegetable market controlling between 23 and 38% of seeds for tomatoes, cucumbers, onions, sweet and hot peppers, and beans. Monsanto is 85% owned by the pharmaceutical giant, Pharmacia.²⁴¹⁸

Vandana Shiva, Director of the Research Foundation for Science, Technology and Natural Resource Policy, and leader of the movement for biodiversity conservation and farmers' rights in India, claims that genetic engineering is leading to monopolies over knowledge and information, and monopolies over life itself.²⁴¹⁹ It is also causing the "genetic pollution of biodiversity," as well as knowledge pollution by undermining independent science. She contends:

Commercial crops produced through genetic engineering are not producing more food nor are they reducing the use of chemicals. While the hunger argument is the most frequently used argument to promote and push genetic engineering, GMOs have more to do with corporate hunger for profits than poor people's hunger for food [...]. The technology of genetic engineering is not about overcoming food scarcity but about creating monopolies over food and seed, the first link in the chain and over life itself.²⁴²⁰

Shiva points out that herbicide-resistant and pest-resistant crops account for more than 80% of the biotechnology research in agriculture. However, she notes: "Evidence is already available that, rather than controlling weeds, pests, and diseases, genetic engineering increases chemical use and can create superweeds, superpests, and superviruses."²⁴²¹ For example, Monsanto's Roundup herbicide is designed to kill weeds by blocking an enzyme essential to a plant's growth, but it effectively kills desirable vegetation as well. This led Monsanto to develop plants such as soybeans, canola, and corn that have genes inserted in the seed to block the action of the herbicide.²⁴²²

Government subsidies

Governments contribute tax dollars to corporate research into biotechnology. Montague argues: "Government donates publicly-created knowledge and investment to corporate

²⁴¹⁶ Ibid. p. 1.

²⁴¹⁷ ETC Group: Action Group on Erosion. *Communique: Seed Industry Concentration*, accessed.

²⁴¹⁸ Tokar. "Biotechnology: Enlarging the Debate."

²⁴¹⁹ Shiva, Vandana. *Biotech Wars: Food Freedom Vs Food Slavery*, ZNET, June 23, 2003; accessed November 2005; available from <http://www.zmag.org/sustainers/content/2003-06/23shiva.cfm>.

²⁴²⁰ Ibid., accessed.

²⁴²¹ Shiva. *Stolen Harvest: The Hijacking of the Global Food Supply*.

²⁴²² Ibid.

elites who then make profits.”²⁴²³ He notes that, by law, “corporations are required to put profits before public health.”²⁴²⁴ On the Government of Canada BioPortal website, evidence of financial support for the biotechnology sector is clear:

Generous government support promotes R&D initiatives:

- Ninety-six per cent (\$494 million) of the federal biotech spending in 2001–2002 was devoted to research and development.

Great R&D at Huge Savings:

Canada’s tax-based incentives permit firms to significantly reduce R&D costs through direct investment or subcontracting in Canada.

- Canada’s R&D tax treatment is the most generous among the G-7.
- Includes immediate full write-offs for all expenditures in R&D capital equipment, and appreciable tax credits, whether it be for direct investment or subcontracting in Canada.
- In Canada, \$1 of R&D expenditure results in 18.7 cents of tax relief [compared with 0.096 in the U.K. and 0.066 in the U.S.].
- Canada’s Scientific Research and Experimental Development (SR&ED) program spends about \$460 million annually in tax credits to biotech companies.

Assisting Biotech Research through numerous Institutes:

- Canadian Institutes of Health Research, Genome Canada’s five genome science centres, Canadian Foundation for Innovation, seven Networks of Centres of Excellence working in biotec-related fields, such as the Canadian Genetic Diseases Network, the Protein Engineering Network, and the Stem Cell Network, to name a few.²⁴²⁵

Past abuses by multinational corporations

The OECD has noted that it is particularly disturbing that a number of the companies involved in biotechnology have lengthy records for illegal activities, which calls into question their ability to self-regulate.²⁴²⁶ Michael Dorsey contends: “The nature, extent and recurrence of these crimes underscore the fact that there is something fundamentally and systematically wrong with the ‘life science’ industry as a whole.” A sampling of Dorsey’s examples, include:

²⁴²³ Montague, Peter. *The Revolution, Part 2*, Rachel’s Environment & Health News #773, 2003; accessed November 2005; available from

http://www.rachel.org/bulletin/bulletin.cfm?Issue_ID=2363&bulletin_ID=48.

²⁴²⁴ Montague. *The Revolution, Part 3: Ultrafines*, accessed.

²⁴²⁵ Government of Canada. *BioPortal Website*, accessed November 2005; available from <http://www.biportal.gc.ca/>.

²⁴²⁶ Organisation for Economic Co-operation and Development (OECD). *Voluntary Approaches for Environmental Policy: Effectiveness, Efficiency and Usages in Policy Mixes*, Paris: OECD, 2003. cited in: Dorsey. “Who Will Control Agriculture and Knowledge?”

- Dow Chemical Company, and DuPont: For nearly the past 50 years, Dow has been surreptitiously involved in the manufacture and illegal dumping of dioxin-laden chemicals. DuPont and other chemical companies have been accused of trying to suppress evidence regarding the severe toxicity of dioxins.
- Monsanto Company: In 2002, a jury in the State of Alabama found Monsanto Co. guilty of releasing tons of polychlorinated biphenyls (PCBs) into the city of Anniston and covering up its actions for 40 years. The jury held Monsanto liable on all six criminal counts including “outrage.” Under Alabama law, the rare crime of “outrage” typically requires conduct “so outrageous in character and extreme in degree as to go beyond all possible bounds of decency so as to be regarded as atrocious and utterly intolerable in civilized society.”
- Syngenta: In 2002, the Natural Resources Defense Council (NRDC) asked the U.S. Environmental Protection Agency (EPA) to ban the use of atrazine, the most widely used weed-killer in the country. NRDC further requested that EPA and the Justice Department launch a criminal investigation of Syngenta, atrazine’s principal manufacturer, for allegedly covering up studies, which show that atrazine poses a significant threat to public health. Syngenta also attracted criticism for its continued manufacture and sale of the herbicide paraquat. Workers and farmers regularly exposed to paraquat experience serious ill health, even death.²⁴²⁷

The following examples of corporate abuses and crimes do not deal specifically with the biotechnology sector, but are provided to illustrate that in most cases, abuses occur when government regulations are either absent or not enforced. For example, Janet Woodcock, Deputy Commissioner of operations at the Food and Drug Administration in the U.S., notes that, as far as regulation goes, the drug approval process in the U.S. has “pretty much broken down [...] and has been for some time,” mainly because of a focus on approving new drugs at the expense of monitoring the ones already on the market.²⁴²⁸ Montague reports that one FDA analyst estimated that Vioxx, now off the market, caused between 88,000 and 139,000 heart attacks and killed somewhere between 26,400 and 55,600 people (assuming 30 to 40 % of heart attacks were fatal).²⁴²⁹

In 2000, the 3M corporation announced it would phase out a family of compounds that have been manufactured for 50 years and used in Scotchgard, Teflon, and many other consumer products. The corporation stated that the perfluorochemicals (PFO) had been found to persist in human blood and wildlife. According to internal company documents, obtained by *MotherJones Magazine*, companies such as 3M and DuPont have known since the late 1970s that the human body can absorb PFOs. Jane Houlihan, Director of

²⁴²⁷ Dorsey. “Who Will Control Agriculture and Knowledge?” pp. 1–2.

²⁴²⁸ Montague, Tim. *Science under Siege*, Rachel’s Democracy & Health News #822, 2005; accessed November 2005; available from http://www.rachel.org/bulletin/bulletin.cfm?Issue_ID=2507.

²⁴²⁹ Ibid., accessed. The source for this fact did not distinguish whether the heart attacks referred to happened in the U.S. alone, or whether this phenomenon was global. However since the FDA is a U.S. agency, it is assumed that the heart attacks took place in the U.S.

Research at the Washington-based Environmental Working Group, reported that 3M and DuPont understood the persistence and toxicity of these chemicals 25 years ago. In fact, in 1993, DuPont was concerned enough about the potential of PFOs to cause cancer that it began to look for a substitute. According to *Mother Jones*, Rich Purdy, an ecotoxicologist who worked for 3M for 19 years, warned the company in 1998 that PFO levels in the environment were high enough to kill wildlife such as eagles, mink, and polar bears, but nothing was done about it.²⁴³⁰

According to *Mother Jones*, in 1999, researchers analyzed blood samples from a random group of 600 adults and 600 children and found PFOs in all of the samples. Although 3M still insisted that the chemicals posed no health threat to humans or animals, it reported to the U.S. Environmental Protection Agency that “an unusually high number of its workers” had died of bladder cancer. Although researchers do not know how PFOs have become so ubiquitous in humans and animals, they speculate that “as perfluorochemicals degrade, millions of people may be absorbing the compounds each day through contact with carpeting, clothing, and furniture treated with Scotchgard, and from industrial waste discharged from factories that produce Teflon.”²⁴³¹

Montague provides examples from the past where over and over again science has revealed that the corporate assurances were hollow, causing many people to be skeptical about the notion of corporate responsibility:

For at least the last thirty years science has strongly supported the positions taken by environmental and public health advocates. The proponents of ‘business as usual’ have claimed that chemical and nuclear technologies have created only minor problems or no problems whatsoever—but time after time science has shown otherwise. They said global warming was a “chicken little” fantasy. They said the Earth’s ozone shield couldn’t possibly be harmed. They argued that asbestos was benign. They said lead in paint and gasoline was entirely safe. They said harm from hormone-disrupting chemicals was imaginary. They said a little radioactivity might actually improve your health. They said human health was constantly and consistently improving—until scientific study revealed increases in birth defects, asthma, diabetes, attention deficits, nervous system disorders, diseases of the reproductive system, immune system disorders, cancer in children, and on and on. In each of these cases science showed that the advocates of ‘business as usual’ were simply wrong.²⁴³²

Intellectual property

In the early 1980s, U.S. patent law recognized GMOs as ‘inventions,’ which gave private industry and public universities a commercial incentive to develop and eventually market

²⁴³⁰ Morris, Jim. "Coming Clean: Did 3M and Dupont Ignore Evidence of Health Risks?," *Mother Jones*, vol. 26, no. 5, 2001: 17-18.

²⁴³¹ Ibid. p.2.

²⁴³² Montague. *Science under Siege*, accessed. p. 1.

transgenic products.²⁴³³ In a 1980 landmark decision, the U.S. Supreme Court broadened the legal definition of intellectual property to provide patent protection for the first time to living organisms.²⁴³⁴ Canada has subsequently followed this lead. The RSC remarks: "Newly engineered microbial strains thus moved from simply being trade secrets to forming part of their "owners" IP portfolio, to be traded, sold, or protected by litigation, as necessary."²⁴³⁵

Multinational corporations now have applied for and received patents for previously shared properties such as seeds and have transformed these into their own "intellectual property." As Tokar points out, patenting living things is an extremely contentious issue:

[C]orporate "bioprospectors" (many call them "biopirates") are surveying the entire biosphere, from the arctic to the tropics, in search of plants, animals, and DNA sequences, including millions of fragments of human DNA to study, manipulate, and patent.²⁴³⁶

In the case of *Monsanto Canada v. Schmeiser*, cited above, Schmeiser relied on a previous legal case involving the question of whether higher life forms can be patented at all.²⁴³⁷ The precedent case involved the decision to allow Harvard University to patent a mouse that it had designed for use in cancer research. The Supreme Court of Canada, however, ruled at that time (2002), that "OncoMouse" could not be patented since it was a higher life form. However, in 2004, the Supreme Court decided otherwise:

The Canadian Supreme Court decision effectively nullifies the Court's 2002 decision, which held that higher life forms, including plants, are not patentable subject matter. According to today's decision, a patent on a gene or cell can be infringed by a farmer's use of a plant or seed into which the patented material has been incorporated.²⁴³⁸

The Supreme Court eventually ruled five to four in favour of Monsanto.

The Supreme Court majority ruled, that despite the unpatentability of the plants themselves, the patent on genes and cells can confer enforcement rights over the whole plant.²⁴³⁹ Also, since the Schmeisers had actively cultivated Roundup Ready canola as part of their business operation, whether they knew it or not was irrelevant. The Court

²⁴³³ Heller. "McDonald's, MTV, and Monsanto: Resisting Biotechnology in the Age of Informational Capital."

²⁴³⁴ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed.

²⁴³⁵ *Ibid.*, accessed. p. 29.

²⁴³⁶ Tokar. "Biotechnology: Enlarging the Debate."

²⁴³⁷ ETC Group: Action Group on Erosion, Technology, and Concentration. *Canadian Supreme Court Tramples Farmers' Rights, Affirms Corporate Monopoly on Higher Life Forms*, 2004; accessed November 2005; available from <http://www.etcgroup.org/>.

²⁴³⁸ *Ibid.*, accessed.

²⁴³⁹ Torys LLP. *Intellectual Property Bulletin: Supreme Court of Canada Rules on Schmeiser v. Monsanto*, May 26, 2004; accessed November 2005; available from <http://torys.com/>.

ruled that the Schmeisers had used the patented genes and cells and so had infringed on Monsanto's patent, even though they did not use the herbicide developed specifically for use on the GM canola or receive profit causally attributable to the GM seeds. Effectively, the ruling found that a gene patent extends to any higher organism that contains the patented gene. It puts the burden on farmers to prove they are not infringing on a patent, even if the gene blew into their fields and was unwanted.²⁴⁴⁰ This decision was applauded by the biotechnology industry since it was the first ruling in which the highest court in any country had ruled on patent issues involving plants and seed genes.²⁴⁴¹

Genetic Use Restriction Technologies (GURT) or "terminator" seeds

In the late 1990s, the U.S. government and the biotechnology company Delta and Pine Land patented a technology to produce infertile seeds called GURT, or genetic use restriction technologies by the proponents and "terminator seeds" by the opposition.²⁴⁴² Monsanto argues that the technology is necessary in order to protect intellectual property and investments, prevent the re-use of seeds, and reduce the legal costs of investigation and suing farmers accused of illegal seed use.²⁴⁴³ News of the possible introduction of these seeds into the market produced a backlash among many African and Asian governments who called for a permanent ban on the technology.²⁴⁴⁴ Central to the opposition was the fear that "terminator" genes would spread to non-GM crops and prevent farmers from saving their seeds, as they have always done. In 1998, at the U.N. Convention on Biological Diversity, a moratorium on "terminator" seeds was instituted as a precautionary measure, and Monsanto and other GM companies that were developing similar technologies, complied and voluntarily halted research on their products at that time.²⁴⁴⁵

The Subsidiary Body on Scientific, Technical and Technological Advice, a group to which the U.S. is not a signatory and which advises the U.N.'s Convention on Biological Diversity, met in Bangkok in 2005 to discuss GM crops. Canada's position on GURT is that they should be allowed in field trial evaluations. The Canadian government advised the Canadian contingent, headed by Robert McLean of Environment Canada, to attack an official U.N. report recommending prohibition of the technology and to recommend that all governments accept the testing and commercialization of "terminator" crop varieties.²⁴⁴⁶ The Canadian group was also advised "to block consensus on any other option."²⁴⁴⁷ Despite the Canadian government move to lift the moratorium, African

²⁴⁴⁰ ETC Group: Action Group on Erosion. *Canadian Supreme Court Tramples Farmers' Rights, Affirms Corporate Monopoly on Higher Life Forms*, accessed.

²⁴⁴¹ Ibid., accessed.

²⁴⁴² RAFI Communique. *Suicide Seeds on the Fast Track: Terminator 2 Years Later*, Rural Advancement Foundation International, 2000; accessed November 2005; available from <http://www.rafi.org/>.

²⁴⁴³ Leahy, Stephen. *Ban Endures on Terminator Seeds*, Inter Press Service (IPS), 2005; accessed November 2005; available from <http://www.mindfully.org/GE/2005/Canada-Terminator-Seeds11feb05.htm>.

²⁴⁴⁴ Vidal, John. "Canada Backs Terminator Seeds," *The Guardian (U.K.)*, no. Feb 9, 2005; accessed November 2005; available from <http://www.mindfully.org/GE/2005/Canada-Backs-Terminator9feb05.htm>.

²⁴⁴⁵ Leahy. *Ban Endures on Terminator Seeds*, accessed.

²⁴⁴⁶ Vidal. "Canada Backs Terminator Seeds."

²⁴⁴⁷ Leahy. *Ban Endures on Terminator Seeds*, accessed.

countries, Austria, Switzerland, Peru and the Philippines strongly objected to Canada's proposal, and were successful at retaining the moratorium. The issue will no doubt be debated at future meetings.

World Hunger

The biotechnology industry claims that engineering food will reduce food shortages and prevent world hunger and starvation. Monsanto supports this view in its \$1.6 million European advertising campaign:

Worrying about starving future generations won't feed them. Food biotechnology will. The world's population is growing rapidly adding the equivalent of a China to the globe every ten years. To feed these billion more mouths, we can try extending our farming land or squeezing greater harvests out of existing cultivation. With the planet set to double in numbers around 2030, this heavy dependency on land can only become heavier. Soil erosion and mineral depletion will exhaust the ground. Lands such as rainforests will be forced into cultivation. Fertilizer, insecticide, and herbicide use will increase globally. At Monsanto, we now believe food biotechnology is a better way forward.²⁴⁴⁸

Some argue, however, that the incidence of world hunger is more a political problem than an agricultural problem. According to Montague, the causes include poor distribution networks, poverty, which prevents people from purchasing available food, and the lack of access to land and credit by the mostly women who produce up to 80% of food.²⁴⁴⁹ Shiva, who represents the views of many people in the South, attributes most of the reasons for hunger to the current ideology that nations in the South can "develop" by creating exports. She points out that many nations that are affected by hunger are actually exporting food to developed nations.²⁴⁵⁰ She explains:

Since the Third World is being told to stop growing food and instead to buy food in international markets by exporting cash crops, the process of globalization leads to a situation in which agricultural societies of the South become increasingly dependent on food imports.²⁴⁵¹

Shiva says more and more land and water are being diverted to provide luxuries for people in Northern countries. Land, which could be used to produce staple food products and help make the local people "self-sufficient," is used to create cash crops such as cotton for export. This leads to rising prices for food staples and declining consumption by the poor.²⁴⁵²

²⁴⁴⁸ Shiva. *Stolen Harvest: The Hijacking of the Global Food Supply*. pp. 11–12.

²⁴⁴⁹ Montague. *The Revolution, Part 2*, accessed. Pretty, and Hine. *Reducing Food Poverty with Sustainable Agriculture: A Summary of New Evidence*, accessed.

²⁴⁵⁰ Suzuki, David. *Genetically Modifying Our Food: Part 3*, Science Matters, David Suzuki Foundation, 1999; accessed November 2005; available from http://www.davidsuzuki.org/About_us/Dr_David_Suzuki/Article_Archives/weekly11109901.asp.

²⁴⁵¹ Shiva. *Stolen Harvest: The Hijacking of the Global Food Supply*. p. 15.

²⁴⁵² Ibid.

The industry argues that the money received from the sale of exports will pay for needed food and other resources. However, Shiva maintains: "For every dollar earned as foreign exchange from exports, six to ten dollars' worth of destruction takes place in the local economy." These costs include the destruction of local food consumption, ground-water resources, fisheries, agriculture, and livelihoods associated with traditional occupations in each of these sectors. Also currencies are frequently devalued through "trade liberalization and economic reform," which causes exports to earn less and imports to cost more. Therefore, people do not receive a high enough rate of return for their exports to pay for imported food.²⁴⁵³

There are also concerns that the food biotechnology industry is creating food insecurity by disrupting cultural practices and monopolizing food sources. Corporate control and ownership of over half the world's commercial seed supply is linked to global food insecurity since it makes the world's food supply vulnerable to market fluctuations, creates limited types of crops, and deprives traditional farmers of their ability to save and share seeds.²⁴⁵⁴ Suzuki highlights another problem, which is that biotechnology companies are concentrating their time and money on engineering profitable crops to be used in processed foods and livestock feed, which will not benefit poor countries.²⁴⁵⁵

Shiva also argues that biotechnology creates food insecurity by wasting resources through one-dimensional monocultures that must be maintained with intensive external inputs. She cites a study by Francesca Bray that compares differences in food production costs between traditional polycultures and industrial monocultures. The study found that "a polycultural system can produce 100 units of food from 5 units of inputs, whereas an industrial system requires 300 units of input to produce the same 100 units. The 295 units of wasted inputs could have provided 5,900 units of additional food. Thus the industrial system leads to a decline of 5,900 units of food."²⁴⁵⁶ In another example, Shiva cites the biotechnology industry consultant Clive James' claim that herbicide-resistant potatoes save farmers \$6 per acre. Shiva asserts that this figure is based on a farm that spends between \$30 and \$120 per acre on insecticide control. Herbicide-resistant potatoes actually increase costs by \$25 to \$115 per acre for an organic, ecological farm, and also require increased insecticide use.²⁴⁵⁷ Shiva states: "This is a recipe for starving people, not for feeding them."²⁴⁵⁸

Sustainable agriculture and organic foods²⁴⁵⁹

It is clear that worldwide demands for food are growing, and the conventional opinion is that agriculture must be modernized. Others, however, claim this demand could be met

²⁴⁵³ Ibid.

²⁴⁵⁴ ETC Group: Action Group on Erosion. *Communique: Seed Industry Concentration*, accessed.

²⁴⁵⁵ Suzuki. *Genetically Modifying Our Food: Part 3*, accessed.

²⁴⁵⁶ Bray, Francesca. "Agriculture for Developing Nations." *Scientific American*, July, 1994, 33-35. cited in Shiva. *Stolen Harvest: The Hijacking of the Global Food Supply*. p. 13.

²⁴⁵⁷ Shiva. *Stolen Harvest: The Hijacking of the Global Food Supply*.

²⁴⁵⁸ Ibid. p. 13.

²⁴⁵⁹ See also Chapter 23. Food and Nutrition Literacy in this literature review.

by low-cost and readily available technologies and practices that increase local food production.²⁴⁶⁰ The Center for Environment and Society (CES) at the University of Essex in the U.K. defines “sustainable agriculture” as follows:

A more sustainable agriculture seeks to make the best use of nature’s goods and services as functional inputs. It does this by integrating natural and regenerative processes, such as nutrient cycling, nitrogen fixation, soil regeneration and natural enemies of pests into food production processes. It minimises the use of non-renewable inputs (pesticides and fertilizers) that damage the environment or harm the health of farmers and consumers. It makes better use of the knowledge and skills of farmers, so improving their self-reliance. And it seeks to make productive use of social capital—people’s capacities to work together to solve common management problems, such as pest, watershed, irrigation, forest and credit management [...]. Sustainable agriculture jointly produces food and other goods for farm families and markets, but it also contributes to a range of public goods, such as clean water, wildlife, carbon sequestration in soils, flood protection, and landscape quality. It delivers many unique non-food functions that cannot be produced by other sectors (e.g. on-farm biodiversity, groundwater recharge, urban to rural migration, social cohesion).²⁴⁶¹

Jules Pretty, Director of CES, has studied these initiatives and is convinced that, if attempted on a larger scale, they could feed the growing world population without harming the environment.²⁴⁶² He says what is needed is the development of “social learning systems” and an increase of ecological literacy “to develop novel and robust systems of social learning that build up relations of trust, reciprocal mechanisms, shared values and rules and new forms of connectedness.”²⁴⁶³

In 2000, Pretty directed the SAFE-World research project—the “largest known survey of worldwide sustainable agriculture.”²⁴⁶⁴ This audit involved 208 cases using sustainable agriculture practices from 52 countries mainly in Africa, Asia, and Latin America, nearly 9 million farmers, and roughly 29 million hectares of farmland. This represents 3% of the total land used worldwide for arable and permanent crops. The survey included projects and initiatives at three levels: research projects with active farmer involvement, but which may not yet have spread; community-based projects with proven impacts; and regional initiatives / projects that have spread to many communities. The CES excluded projects where farmers had been paid to participate and where yield increases rose only from fossil fuel-derived external inputs. The CES wanted to see what farmers could achieve with locally available, natural and human resources. Most of the sustainable

²⁴⁶⁰ Pretty, and Hine. *Reducing Food Poverty with Sustainable Agriculture: A Summary of New Evidence*, accessed.

²⁴⁶¹ Ibid., accessed. p. 2.

²⁴⁶² Campbell, Tom. *Book Review: Jules Pretty. Agri-Culture: Reconnecting People, Land, and Nature*, Earthscan, Feasta Review, 2002; accessed November 2005; available from <http://www.feasta.org/documents/review2/agri-culture.htm>.

²⁴⁶³ Ibid., accessed. p. 3.

²⁴⁶⁴ Pretty, and Hine. *Reducing Food Poverty with Sustainable Agriculture: A Summary of New Evidence*, accessed.

agriculture projects reported significant increases in household food production, measured using nine types of improvements including higher yields, greater diversity of food types, or better use of natural resources. The evidence showed that:

- for 4.4 million farmers on 3.6 million hectares, average food production per household increased by 1.7 tonnes per year (an increase of 73%);
- for the 146,000 farmers on 542,000 hectares cultivating roots (potato, sweet potato and cassava), the increase in food production was 17 tonnes per year (an increase of 150%);
- for the larger farms in Latin America (average size = 90 ha/farm), total production increased by 150 tonnes per household (an increase of 46%).²⁴⁶⁵

In 2001, the International Centre for Insect Physiology and Ecology in Nairobi conducted trials on more than 2,000 farms in Africa. Dozens of different strategies were used, included replacing pesticides with natural predators and using natural fertilizers from animal dung, crop wastes, and plants that fix nitrogen from the air. For example, Striga is a parasitic plant that causes \$10 billion worth of damage to maize crops every year in Africa. In one trial, instead of applying pesticides, farmers planted Desmodium between the rows of maize—a plant that releases a chemical that kills the Striga. In another trial, when Napier grass was planted in the maize fields, the stem borer insect avoided the maize and ate the Napier grass instead. The grass produces a sticky substance that traps and kills the stem borer larvae. Overall in the study, the use of these and other natural methods resulted in a 100% increase in production.²⁴⁶⁶ In addition, Madagascan farmers achieved typical rice yields of 3 to 12 tonnes per hectare by transplanting seedlings earlier and in smaller numbers so more could survive, keeping the paddies unflooded for most of the growing period, and using compost rather than chemical fertilizers. Over 20,000 rice farmers in Madagascar have adopted these techniques and tests in China, Indonesia and Cambodia have all resulted in raised rice yields. In Cuba, farmers were forced to adopt sustainable agricultural techniques, including the use of oxen to replace tractors, in the 1990s after the collapse of the Soviet Union, and their subsequent loss of subsidies. Using only organic processes, they have doubled their yields. Techniques such as these are also being incorporated into large agribusiness farms in the South.²⁴⁶⁷

The Organic Consumers Association (OCA) claims that ten million U.S. households are buying organic foods on a regular basis.²⁴⁶⁸ It reports that the organic food industry is worth \$10 billion per year and the current growth rate for organic foods is 24% annually, which is almost 10 times the growth rate for conventional foods. The OCA predicts that organic agriculture will become the dominant form of agriculture in the U.S. by the year 2020. The OCA attributes the popularity of organic foods to concerns over unlabelled GE foods, irradiated foods, pesticide and drug residues routinely found in non-organic

²⁴⁶⁵ Ibid., accessed. p. 5. Some of the numbers have been rounded.

²⁴⁶⁶ Pearce, Fred. "An Ordinary Miracle: Focus Bigger Harvests, without Pesticides or Genetically Modified Crops? Farmers Can Make It Happen by Letting Weeds Do the Work," *New Scientist*, vol. 169, no. 2276, 2001: 16-17.

²⁴⁶⁷ Ibid.

²⁴⁶⁸ Organic Consumers Association. *Despite U.S. Pressure Five E.U. States Continue Bans on GE Crops*, 2005; accessed November 2005; available from <http://www.organicconsumers.org/ge/bans062805.cfm>.

produce, and the increase in incidence of food poisoning, which the Centers for Disease Control estimates affects 76 million Americans annually.²⁴⁶⁹ Regarding pesticide and drug residues, the OCA reports:

Consumer Reports found that 77 percent of non-organic produce items in the average supermarket contain pesticide residues. The beef industry acknowledges that 94 percent of all U.S. beef cattle have hormone implants, which are banned in Europe as a cancer hazard. Some 30 percent of all U.S. dairy cows are injected with the controversial genetically engineered Bovine Growth Hormone, banned in every other industrialized country in the world. The Centers for Disease Control recently warned that 16 percent of all U.S. ground meat contains potentially dangerous antibiotic resistant bacteria. Organic farming prohibits the use of pesticides, drugs, hormones and antibiotics.²⁴⁷⁰

The RSC recognizes that sustainable agriculture might be an alternative to some biotechnology methods. It notes:

Many argue that conversion from industrial agriculture to more sustainable systems that depend less on chemicals for their productivity would eliminate the need for some of the currently projected products of biotechnology. There are probably alternatives to some biotechnology products; many of these alternatives are likely not other products, but instead the systems and methods of sustainable agriculture. It seems likely that much more research and discussion will be required to enable society to make informed choices between these alternative approaches to food production. This exploration will need to address both societal concerns about how food is produced, and assessment of “global” (or societal) costs of the choices to be made.²⁴⁷¹

Canadian Biotechnology Strategy:

Benefits of biotechnology

Specifically, the Canadian Biotechnology Strategy lists the following as some of the benefits of biotechnology:

- Earlier, more reliable disease diagnosis
- New drug therapies and formulations
- Crops with higher yields and greater pest resistance

²⁴⁶⁹ "Organic Foods: Dangerous for Human Consumption - No: Consumers Are Flocking to Organic Foods Because They Know What's Good for Them." *Charlotte Observer*, Charlotte, North Carolina, May 18, 2002, accessed January 2007; available from http://archives.foodsafetynetwork.ca/agnet/2002/5-2002/agnet_may_21.htm.

²⁴⁷⁰ Organic Consumers Association. *Despite U.S. Pressure Five E.U. States Continue Bans on GE Crops*, accessed.

²⁴⁷¹ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 29.

- Foods with health benefits
- Innovative tree production and biological pest-control methods
- New forms of bio-remediation for ecologically sound clean-ups
- Renewable fuels to reduce greenhouse gases
- Gene probes to monitor and track the genetic diversity of fish
- Cleaner bio-processes, which are expected to replace more polluting chemical processes within 10-15 years²⁴⁷²

Criticism of the Canadian Biotechnology Strategy

The Canadian Women's Health Network is critical of the Canadian Biotechnology Strategy. These criticisms are outlined in a series of papers presented at its National Strategic Workshop held at York University in 2000, entitled "The Canadian Biotechnology Strategy: Assessing its Effects on Women and Health."²⁴⁷³ Susan Sherwin, Professor at Dalhousie University, argues that values should be central to any biotechnology policy.²⁴⁷⁴ She contends, "There are basic questions of values related to the genetic modifications of humans and other organisms that must be identified and addressed."²⁴⁷⁵ She also argues that the "freedom of choice" argument—that people will have the choice to purchase or refuse genetically engineered products—is a red herring because if the technology becomes "normalized," there may be no option to refuse it. In addition, having the freedom to choose implies that products need to be labelled as "genetically engineered," otherwise people would have no way of knowing what to choose.

Nandita Sharma argues that the main aim of the Canadian Biotechnology Strategy is to market biotechnologies and to make sure the public understands their benefits.²⁴⁷⁶ Sharma points out that at the same time that agriculture is increasingly being concentrated in a small number of hands, there is also the unprecedented proliferation of chemicals into the world's food supply and new rights being granted to biotechnology companies preventing farmers from saving their seeds in the way they have always done. In the words of Vandana Shiva, this is "akin to the closing of the commons."²⁴⁷⁷

²⁴⁷² Canadian Biotechnology Strategy Secretariat. *The 1998 Canadian Biotechnology Strategy: An Ongoing Renewal Process*, Industry Canada, 1998; accessed November 2005; available from <http://bioportal.gc.ca/english/View.asp?pmiid=520&x=535>.

²⁴⁷³ Canadian Women's Health Network. *Canadian Biotechnology Strategy: Assessing Its Effects on Women and Health*, National Strategic Workshop, York University, Feb. 11-12, 2000; accessed November 2005; available from <http://www.cwhn.ca/groups/biotech/availdocs/tableofcontents.htm>.

²⁴⁷⁴ Sherwin, Susan. "Placing Values at the Centre of Biotechnology Policy: The Canadian Biotechnology Strategy and Women's Health. Opening Remarks." Paper presented at the Canadian Biotechnology Strategy: Assessing its Effects on Women and Health National Strategic Workshop, York University, Feb. 11-12, 2000, Canadian Women's Health Network; accessed November 2005; available from <http://www.cwhn.ca/groups/biotech/availdocs/tableofcontents.htm>.

²⁴⁷⁵ Ibid. p. 2

²⁴⁷⁶ Sharma, Nandita. "One Part of an Anti-Racist Feminist Political Standpoint against Biopiracy." Paper presented at the Canadian Biotechnology Strategy: Assessing its Effects on Women and Health National Strategic Workshop, York University, February 11-12, 2000, Canadian Women's Health Network; accessed November 2005; available from <http://www.cwhn.ca/groups/biotech/availdocs/tableofcontents.htm>.

²⁴⁷⁷ Shiva. *Stolen Harvest: The Hijacking of the Global Food Supply*.

Helen Bequaert Holmes argues that the economic language used in the Canadian Biotechnology Strategy, such as references to economic potential, international competitiveness, markets, and revenue generation, begs the question of who receives these economic benefits and who suffers the costs. She notes that large biotechnology firms receive many of the benefits, in the form of profits and large tax breaks, and that the public suffers the consequences, such as new environmental diseases and increasing allergies or serious side effects from drugs.²⁴⁷⁸

The Canadian biotechnology regulatory system

Seven ministries have responsibility for regulating biotechnology in Canada, including Health Canada, Agriculture and Agri-Foods Canada, Industry, Environment Canada, Natural Resources, Fisheries and Oceans, and International Trade.²⁴⁷⁹ Einsiedel notes that the primary responsibility over GM foods rests with the Canadian Food Inspection Agency and Health Canada.²⁴⁸⁰

The Government has a “dual role,” both as a promoter and a regulator of biodiversity, with a mandate to ensure the health and safety of Canadians and the environment by “managing risks,” as well as to maximize the benefits of biotechnology. In 1998, Canada developed the Canadian Biotechnology Strategy (CBS) through consultations with individuals and organizations.²⁴⁸¹ The strategy aims to integrate “social, ethical, health, economic, environmental and regulatory considerations into biotechnology development decisions.”²⁴⁸² To do this, the Government claims it “requires an in-depth understanding of basic science, health and environmental impacts, technological adaptation, industrial applications, as well as sensitivity to social and ethical values.”²⁴⁸³

BIOTECCanada, which represents the biotechnology industry, states that it is interested in “dispelling the myths” about biotechnology.²⁴⁸⁴ On its website it offers the following information concerning the regulation of genetically modified (GM) products.²⁴⁸⁵

²⁴⁷⁸ Holmes, Helen Bequaert. *Biotechnology, Strategy, and Wealth for Whom: Commentary on the Theme of Biotechnology and Wealth*, Canadian Women's Health Network, National Strategic Workshop, York University, "The Canadian Biotechnology Strategy: Assessing its Effects on Women and Health", 2000, February 11-12; accessed November 2005; available from <http://www.cwhn.ca/groups/biotech/availdocs/18-holmes.PDF>.

²⁴⁷⁹ Einsiedel, Edna F., Karen Finlay, and Jennifer Arko. *Meeting the Public's Need for Information on Biotechnology: Prepared for the Canadian Biotechnology Advisory Committee Project Steering Committee on the Regulation of Genetically Modified Foods*, Canadian Biotechnology Advisory Committee (CBAC), 2000; accessed March 2005; available from <http://cbac-cccb.ca/epic/site/cbac-cccb.nsf/en/ah00513e.html>.

²⁴⁸⁰ Ibid., accessed.

²⁴⁸¹ Canadian Biotechnology Strategy Secretariat. *The 1998 Canadian Biotechnology Strategy: An Ongoing Renewal Process*, accessed.

²⁴⁸² Government of Canada. *Report on Biotechnology (1998-2003): Biotechnology Transforming Society: Creating an Innovative Economy and a Higher Quality of Life*, accessed.

²⁴⁸³ Ibid., accessed. p. 5.

²⁴⁸⁴ BIOTECCanada. *Biotech Classroom - What Is Biotechnology? - Dispelling the Myths*, accessed.

²⁴⁸⁵ Throughout this review the terms genetically engineered (GE), genetically modified (GM), and genetically modified organisms (GMOs) are used interchangeably, as they are in the literature. Technically,

- Only a few genetically modified crops have been approved for use in Canada. These include canola, corn, tomato, potato, soybean, cottonseed, flax and squash. These crops were required to undergo rigorous, science-based safety assessments before being approved for the marketplace.
- Products developed using genetic engineering are equivalent to their traditional counterparts. This means no changes have occurred in the composition, nutrition, and health or safety status of the food.
- Companies who develop foods using genetic engineering must meet stringent requirements of the regulatory system enforced by the Canadian Food Inspection Agency, Health Canada and Environment Canada.
- Companies supply the raw research data, often using independent laboratories and university scientists. Health Canada scientists then review the data to thoroughly assess the compositional, nutritional, toxicological and molecular profile of food produced using biotechnology to ensure it is safe for human consumption.
- This process whereby companies submit data to Health Canada for review and assessment is the same process that has governed pharmaceutical approval for years.
- It costs companies an enormous amount of money to test products. If the onus were on the regulator, taxpayers would find themselves funding the process that helps companies get their products to market.
- All crops produced using biotechnology are subjected to a rigorous environmental, livestock feed and food safety assessment before they can be sold in the marketplace. Expert scientists from the Canadian Food Inspection Agency (CFIA) and Health Canada are responsible for a critical review of the data collected from laboratory and field experiments conducted by the companies.
- All assessments are performed on a case-by-case basis and only products judged to be as safe as their traditional counterparts are approved.²⁴⁸⁶

However, despite these positive assurances of the biotechnology industry, a recent government-commissioned report on the ability of the federal government to adequately regulate and ensure the safety of GM food raises serious doubt as to whether these responsibilities are being met. Health Canada, the Canadian Food Inspection Agency (CFIA), and Environment Canada commissioned the RSC in 2001 to “provide advice on the regulatory system and the scientific capacity the federal government requires into the 21st century to ensure the safety of new food products being developed through

however, crops can be genetically modified through traditional breeding methods but in the literature GM is used to refer to GE.

²⁴⁸⁶ BIOTECCanada. *Biotech Classroom - What Is Biotechnology? - Dispelling the Myths*, accessed.

biotechnology.”²⁴⁸⁷ The result was a 265-page report covering the history, regulation, and challenges of the future of food biotechnology entitled, *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*. The report also reviews the technical literature and gives numerous examples of previous tests and results. It points out multiple gaps in the assessment process and possibilities for harm for humans, plants, and animals, especially in light of rapidly developing new technologies, which will require a more stringent assessment process in the future. In general, the Panel concluded:

Serious risks to human health, such as the potential for allergens in genetically engineered foods, risk of extensive, irremediable disruptions to the natural ecosystems through emergence of highly aggressive or invasive weed species, or of serious diminution of biodiversity, demand that the best scientific methods be employed to reduce the uncertainties with respect to these risks [...]. Even though the risks [appear] remote on the basis of the available evidence, the potential seriousness of the health risks justify extraordinary precaution before a fuller scientific picture [is] available.²⁴⁸⁸

The Panel also found the dual function of government—as both the promoter and regulator of biotechnology—problematic and a potential source of conflict of interest. The Panel stated:

If the same governmental agency that is charged with the responsibility to protect the public health and environmental safety from risks posed by technologies also is charged with the promotion of that same technology and if its safety assessments are, by official policy, balanced against the economic interests of the industries that develop them, this represents, from the point of view of both the public and the industrial stakeholders a significant conflict of interest [...]. the more the regulatory agencies are, or are perceived to be, promoters of the technology the more they undermine public trust in their ability to regulate the technology in the public interest.²⁴⁸⁹

As noted above, GM products in Canada are assessed by several agencies, including Health Canada and the Canadian Food Inspection Agency (CFIA), which play lead roles. In particular, the CFIA is responsible for regulating GM plants and their impacts on the environment and biodiversity, as well as their safety as livestock feed. A biotechnology firm must also obtain permission from the CFIA in order to conduct field trials for a new GM crop. While the CFIA makes public the reasons for its decisions, it does not release any of the primary research including the study design and the results of the experiments on which the assessment is based. The Expert Panel felt that, in the absence of an

²⁴⁸⁷ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 1.

²⁴⁸⁸ Ibid., accessed. p. 206.

²⁴⁸⁹ Ibid., accessed. p. 212.

independent peer review, “the decision-making process in general lacks transparency, and thus credibility.”²⁴⁹⁰

Health Canada is responsible for ensuring the safety of GM foods, which it calls “novel foods.” The main assessment guideline used is whether the novel product, which has a transgenic trait, is “substantially equivalent” to the original food. According to the Panel, the application of the “substantially equivalent” designation to GM crops, within the current regulatory environment, is effectively “a declaration of safety.” The “substantially equivalent” designation “pre-empts any requirements in Canada to assess further the new variety for unanticipated characteristics,” and, thus with this designation, the product is considered safe. As the Panel notes, “Conceptual and practical implementation of ‘substantial equivalence’ is thus the most critical element in the current approval process.”²⁴⁹¹ The Panel saw this distinction as inherently illogical, since if a novel gene is introduced to a plant, it is no longer equivalent except at face value. The Panel concluded that “substantial equivalence does not function as a scientific basis for the application of a safety standard but rather as a decision procedure for facilitating the passage of new products, GM and non-GM, through the regulatory process.”²⁴⁹²

The Panel found that Health Canada has no formal criteria or decision-making framework with which to approve GM products, other than basic guidelines. It stated:

Decisions are largely made on a case-by-case, ad hoc basis [...]. As in the CFIA procedures, the applicant is responsible for supplying all of the data to be evaluated, which may be supplemented by any relevant scientific literature. No independent testing of the safety of a GM food by a governmental or other, independent, laboratory is required [...]. Again, the data on which the decision was based are not revealed. In the case of approvals of GM food additives, such as flavours and enzymes that are derived from GM microorganisms, no decision documents are released and in the lists of these additives there is no indication whether or not they are derived from GM organisms.²⁴⁹³

In evaluating the practices of Health Canada in assessing GM food toxicity, the Panel found:

[R]egulatory requirements related to toxicological assessment of GM food appeared to be ad hoc and provided little guidance either as to when specific studies would be required or what types of studies would be most informative. In particular, the Panel was unaware of any validated study protocols currently available to assess the safety of GM foods in their entirety (as opposed to food constituents) in a biologically and statistically meaningful manner.²⁴⁹⁴

²⁴⁹⁰ Ibid., accessed.

²⁴⁹¹ Ibid., accessed.

²⁴⁹² Ibid., accessed. pp. 181–182.

²⁴⁹³ Ibid., accessed. pp. 37–38.

²⁴⁹⁴ Ibid., accessed. p. 48.

The Panel also found that environmental risks associated with GM crops were difficult to predict because of “the diverse ecological interactions that can potentially occur in agricultural and natural plant communities.”²⁴⁹⁵ A major difficulty for sound risk assessment, it argues, is the “sparse knowledge base available concerning the ecology and genetics of GM crops.”²⁴⁹⁶ The Panel found that the focus of environmental assessment is specifically on the agroecosystems and little effort has gone into assessing possible impacts on the biodiversity of natural ecosystems. It also noted that “the quantity and quality of research on the potential environmental impacts of GMOs is not sufficient to address many of the pressing questions that concern the environmental impacts of GMOs.”²⁴⁹⁷ It concluded:

[T]he lack of transparency in the current approval process, leading as it does to an inability to evaluate the scientific rigor of the assessment process, seriously compromises the confidence that society can place in the current regulatory framework used to assess potential risks to human, animal and environmental safety posed by GMOs.²⁴⁹⁸

In light of these findings, the Panel discussed the precautionary principle, which is basically a rule about how to handle uncertainty in risk assessments. The environmental movement developed the principle in the 1970s as a response to scepticism about the ability of scientific risk assessment and management models to effectively predict adverse consequences arising from new technologies. Basically the precautionary principle advises that when there is scientific uncertainty or lack of knowledge, it is better to err on the side of human and environmental safety than to err on the side of risk. Kershen further defines the components of the precautionary principle:

The precautionary principle has four components: taking precaution in the face of scientific uncertainty; exploring alternatives to harmful actions; placing the burden of proof on proponents of an activity or product rather than on victims or potential victims of the activity; and using democratic processes to carry out and enforce the principle, including the public right to informed consent. Others argue that the precautionary principle must be strengthened by adding four additional components: precaution must be the default mode of all technological decision making; past technological decisions must be re-examined and reformed, if needed; precaution demands that the mode of regulation fit the scope of the threat; and society must identify, and accommodate itself to broad patterns in ecological processes.²⁴⁹⁹

Proponents of the principle see it as necessary in order to protect human, animal, and environmental health from potentially catastrophic harm that cannot be predicted even with the best science. The opponents argue the principle is unscientific, based on

²⁴⁹⁵ Ibid., accessed. p. 131.

²⁴⁹⁶ Ibid., accessed. p. 131.

²⁴⁹⁷ Ibid., accessed. p. 132.

²⁴⁹⁸ Ibid., accessed. p. 215.

²⁴⁹⁹ Kershen. "Biotechnology: An Essay on the Academy, Cultural Attitudes and Public Policy." p. 8.

unfounded fears, and inhibits economic and technological development. The principle, however, is now one of the main principles in over 20 international laws, treaties, protocols, and declarations.²⁵⁰⁰ The Panel based its recommendations on the basic tenets of the precautionary principle calling for it to guide the management of risks associated with food biotechnology. The Panel further recommended:

Because the principle has become deeply embedded in the many international agreements and protocols to which the Canadian government is a party, and is increasingly affirmed by European, North American and international regulatory bodies as a guiding principle for policy, it is appropriate that Canadian biotechnology regulatory policy reflect the basic sentiments and spirit of the principle [...].

In general, those who are responsible for the regulation of new technologies should not presume its safety unless there is a reliable scientific basis for considering it safe. This approach is especially appropriate for those who are responsible for the protection of health and the environment on behalf of the Canadian people. Any regulatory mechanism, which assumes that a new product is safe on less than fully scientifically substantiated basis, violates this fundamental tenet of precaution.²⁵⁰¹

In response to the Panel Report, Health Canada, the Canadian Food Inspection Agency, Agriculture and Agri-Food Canada, Environment Canada, and Fisheries and Oceans Canada developed a plan to review and update their policies, especially as they relate to the safety assessment of food biotechnology and agri-food products.²⁵⁰² In the Action Plan, they discuss taking a “precautionary approach,” which may not be as confining as the precautionary principle. They also make a commitment “to maintain our objective and neutral stance about the risks and benefits of biotechnology in public statements and interpretations of the regulatory process.”²⁵⁰³ The Action Plan concurs with many of the Panel’s recommendations including those on potential health impacts. The Action Plan states:

We agree with the need to further refine our tools and continuously improve our approach for the safety and nutritional assessment of GM-foods and feeds, particularly for future, more complex products. We also agree that we need clear criteria in our guidelines related to toxicological testing, i.e., when and what types of studies are required. We agree that we need to further develop and strengthen our tools for the assessment of the allergenicity potential of novel foods and the nutritional assessment of future GM-foods and feeds with significant composition

²⁵⁰⁰ Royal Society of Canada. *Elements of Precaution: Recommendations for the Regulations of Food Biotechnology in Canada: An Expert Panel Report on the Future of Food Biotechnology*, accessed. p. 194.

²⁵⁰¹ Ibid., accessed. pp. 205–206.

²⁵⁰² Government of Canada. *Action Plan of the Government of Canada in Response to the Royal Society of Canada Expert Panel Report Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada*, 2001; accessed November 2005; available from http://www.hc-sc.gc.ca/sr-sr/pubs/gmf-agm/intro_e.html.

²⁵⁰³ Ibid., accessed. p. 5.

/ nutritional changes [...]. We agree with the need for rigorous assessments of GM-animals, as well as transgenic fish and aquatic organisms, and of GM-feeds.²⁵⁰⁴

To date, the Canadian government has published eight progress reports toward this goal and expects to continue the review process for some time. One progress report notes, “As science progresses and more advanced methods become available, protocols will be refined.”²⁵⁰⁵

²⁵⁰⁴ Ibid., accessed. pp. 6–7.

²⁵⁰⁵ Government of Canada. *Progress Report: Action Plan of the Government of Canada in Response to the Royal Society Expert Panel Report, Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada*, 2005; accessed November 2005; available from http://www.hc-sc.gc.ca/sr-sr/pubs/gmf-agm/prog-rep-rap_06_2005_e.html. p. 5.

Appendix 30. University of Arizona general knowledge and reasoning test, 2002

Question	Percentage of correct answers	Source
1. Who was the father of the U.S. Constitution? a. George Washington b. Thomas Jefferson c. Benjamin Franklin d. James Madison*	14	Elite College History Survey
2. What is the capital of Vietnam? a. Bangkok b. Saigon c. Ho Chi Minh City d. Hanoi*	36	Authors of test
3. A line passes through (-4,4) and (4,-6). What is the slope of this line? a. $-5/4$ * b. -1 c. $-4/5$ d. $4/5$	44	Authors
4. What was the source of the following phrase: "Government of the people, by the people, for the people?" a. The speech: "I have a Dream" b. Declaration of Independence c. U.S. Constitution d. Gettysburg Address*	21	Elite College History Survey
5. An object has a positive electric charge whenever a. It contains an excess of electrons. b. It contains a deficiency of electrons.* c. The nuclei of its atoms are positively charged. d. The electrons of its atoms are positively charged.	41	College-Level Examination Program (CLEP) 2001 Study Guide
6. Where is the Suez Canal? a. India b. Egypt* c. Panama d. China	56	Cultural Literacy Test
7. Identify Snoop Doggy Dogg. a. A rap singer* b. Cartoon by Charles Schulz c. A mystery series d. A jazz pianist	93	Elite College History Survey
8. In what year did the Civil War end?	41	Dartmouth Review 1990

Question	Percentage of correct answers	Source
a. 1864 b. 1865* c. 1863 d. 1866		
9. What did the scarlet "A" stand for on Hester Prynne's dress? a. Accused b. Adultery* c. Amish d. Agnostic	86	Mindfun.com
10. If you have 1 pair of red and 1 pair of blue socks in your drawer, what is your chance of getting a matching pair if you draw 2 socks at random? a. $\frac{2}{3}$ b. $\frac{1}{2}$ c. $\frac{1}{4}$ d. $\frac{1}{3}$ *	16	CLEP 2001 Study Guide
11. Who wrote the 1812 Overture? a. Mozart b. Beethoven c. Bach d. Tchaikovsky*	35	Dartmouth Review 1986
12. Which of the following is physically possible: a. A spaceship flying faster than the speed of light b. A perpetual motion machine c. Hearing an explosion on the Moon d. Carbon spontaneously turning into nitrogen*	27	Authors
13. When students in "Dead Poets Society" stood on their desks and said "Oh Captain, my Captain," they were quoting what American poet? a. Walt Whitman* b. Robert Frost c. Carl Sandburg d. E.E. Cummings	54	Mindfun.com
14. The opening of diplomatic relations between the United States and China's communist government occurred during the presidential administration of a. Harry S. Truman b. John F. Kennedy c. Lyndon B. Johnson d. Richard M. Nixon*	53	National Assessment for Educational Progress (NAEP) History 1994
15. Who painted Guernica?	41	Authors

Question	Percentage of correct answers	Source
a. Renoir b. da Vinci c. Giotto d. Picasso*		
16 When you try to open a file on your computer you get a message saying there has been a sharing violation. The most likely cause is that the file: a. Is currently being used by another user.* b. Belongs to another user. c. Is a read-only file d. Cannot be found by the operating system.	62	Foreign Service Exam Study Guide
17. A certain company keeps a list of 50 employees and their annual salaries. When the salary of the very highly paid president is added to this list, which of the following statistics is most likely to be approximately the same or nearly the same for the original list and the new list? a. The highest salary b. The range c. The mean d. The median*	65	NAEP Math, Grade 12, 1992
18. What are the four basic forces in the universe? a. Gravity, electromagnetism, strong nuclear force, weak nuclear force* b. Gravity, electromagnetism, chemical force, atomic force c. Gravity, centrifugal force, centripetal force, Coriolis force d. Gravity, electromagnetism, thermodynamic force, quantum force	14	Dartmouth Review 1990
19. John Tyler, James Buchanan, William H. Harrison, Millard Fillmore, and James Abram Garfield were all: a. House speakers b. United States presidents* c. Newspaper publishers d. New York City mayors	64	CLEP 2001 Study Guide
20. In classical mythology, who performed the twelve great labors? a. Achilles b. Oedipus c. Theseus d. Hercules*	62	CLEP 2001 Study Guide
21 What are the three basic economic problems	67	Foreign Service Exam Study

Question	Percentage of correct answers	Source
that every economy must solve? a. What to produce, where to produce, for whom to produce b. What to produce, how to produce, for whom to produce* c. Whether to produce, where to produce, why to produce d. Why to produce, how to produce, which to produce		Guide
22. Chains of amino acids that are fundamental components of all living organisms are: a. Proteins* b. Carbohydrates c. Minerals d. Elements	80	Authors
23. The term "Reconstruction" refers to: a. Payment of European countries' debts to the United States after the First World War b. Repairing of the physical damage caused by the Civil War c. Readmission of the Confederate states and the protection of the rights of Black citizens* d. Rebuilding of the transcontinental railroad and the canal system	30	Elite College History Survey
24. Plato was a pupil of: a. Aristophanes b. Socrates* c. Crito d. Aristotle	52	CLEP 2001 Study Guide
25. In the American political system, "separation of powers" means: a. The division of governmental functions into three distinct branches, namely executive, legislative, and judicial.* b. The division of church, state, and press. c. The division of political power in the hands of the president, the Senate, and the House of Representatives. d. The army, navy, and the air force.	77	CLEP 2001 Study Guide
26. If $x-4 = 4(1-x)$, then what is the value of x? a. 0.80 b. 0.63 c. 1.60* d. 4.0	65	Authors
27. The property of light waves that leads to the phenomenon of color is their: a. Amplitude	81	CLEP 2001 Study Guide

Question	Percentage of correct answers	Source
b. Velocity c. Wavelength* d. Intensity		
28. The Monroe Doctrine declared that: a. The American blockade of Cuba was in accord with international law b. Europe should not acquire new territories in the Western Hemisphere* c. Trade with China should be open to all Western nations d. The annexation of the Philippines was legitimate	56	Elite College History Survey
29. A gifted composer whose operas include The Marriage of Figaro and The Magic Flute was: a. Antonin Dvorak b. Gustav Mahler c. George Gershwin d. Wolfgang Amadeus Mozart*	49	CLEP 2001 Study Guide
30. In what modern nation was the Boer War fought? a. South Africa* b. India c. Cuba d. Egypt	68	Dartmouth Review 1990
31. Which of the following is not guaranteed by the First Amendment to the U.S. Constitution? a. The right to the free exercise of religion b. The right to assemble peacefully c. The right to free speech d. The right to a trial by jury*	75	Cultural Literacy Test
32. It is a common practice of regular e-mail users to have some specific text automatically appear at the end of their sent messages. This text is referred to as their: a. Attachment. b. Subject. c. Signature* d. Protocol.	71	Foreign Service Exam Study Guide
33. Who invented calculus? a. Isaac Newton* b. Carl Friedrich Gauss c. Galileo Galilei d. Christian Huygens	46	Dartmouth Review 1990
34. Renoir and Monet belong to which school of art? a. Surrealism b. Abstractionism	76	Dartmouth Review 1986

Question	Percentage of correct answers	Source
c. Impressionism* d. Realism		
35. There are 93 students in the class; 42 like math, while 41 like English. If 30 students don't like either subject, how many students like both? a. 10 b. 20* c. 41 d. The answer cannot be determined from the data given	34	CLEP 2001 Study Guide
36. What is the Magna Carta? a. The foundation of the British parliamentary system* b. The Great Seal of the monarchs of England c. The French Declaration of the Rights of Man d. The charter signed by the Pilgrims on the Mayflower	49	Elite College History Survey
37. The phrase, "...from each according to his ability, to each according to his need..." is attributed to which author? a. Thomas Jefferson b. Karl Marx* c. Franklin Roosevelt d. Adam Smith	61	Marianne Jennings
38. Which Swiss psychologist wrote on the collective unconscious? a. Carl Gustav Jung* b. Sigmund Freud c. Gottfried Wilhem von Leibniz d. Christian von Ehrenfels	32	Dartmouth Review 1990
39. Who is the author of Crime and Punishment? a. Solzenitsyn b. Pasternak c. Dostoyevsky* d. Tolstoy	50	Marianne Jennings
40. In an attempt to restrain the president's ability to unilaterally commit the U.S. forces to action, Congress in 1973 passed the: a. War Powers Resolution* b. National Emergencies Act c. International Crisis Response Act d. Foreign Military Commitments Resolution	55	Foreign Service Exam Study Guide

Note: Correct answers marked with *.

Source: Adapted from Block, Michael K., Robert J. Franciosi, and Melissa Geiger. *What Do College Graduates Know? A Survey of Arizona Universities*, University of Arizona, 2002; accessed February 2007; available from http://www.nas.org/affiliates/arizona/az_survey_revised.pdf.

Appendix 31. Proposal for a Canadian Knowledge Survey

As a result of the extensive Literature Review conducted for the Canadian Index of Wellbeing (CIW) Educated Populace Domain, the authors determined the necessity for an assessment of the state of public knowledge in Canada. Such data are required to assess learning outcomes that reflect knowledge gained by the Canadian populace in formal, nonformal, and informal lifelong learning processes. To that end, a preliminary proposal was drafted in July/August of 2006 to develop a template for a new and comprehensive Canadian Knowledge Survey (CKS).

This suggested proposal is provided below, and has been updated.

Purpose

It is recommended that funding be sought to develop a draft template for a new and comprehensive Canadian Knowledge Survey (CKS) that would measure the public knowledge of Canadian adults in environmental, social, and economic areas. The educated populace domain of the CIW requires an assessment of the state of public knowledge as a learning outcome that reflects knowledge gained in formal, nonformal, and informal lifelong learning processes. However, the requisite data for such an assessment do not presently exist. With few exceptions (basic literacy—generally defined as prose literacy, document literacy, and numeracy), current conventional education indicators are based largely on input and output data (educational expenditures, enrolment and graduation rates, and so on) rather than on societal learning outcomes. Yet the latter are essential in order to assess whether Canadians are becoming more knowledgeable in a wide range of areas that contribute directly to their own wellbeing and that of their country.

The new CKS would indicate whether or not knowledge and lifelong learning in the Canadian populace are improving in the specific areas of ecological literacy, scientific literacy, arts literacy, health literacy, food and nutrition literacy, civic literacy, multicultural literacy, media literacy, Indigenous knowledge literacy, statistical literacy, and other key knowledge areas to be determined by consultation. A draft template of such a survey, once prepared, should be presented to Statistics Canada as a specific recommendation for a new national survey, the need for which has emerged from the evidence and the current lack of data in these important areas. The draft would include key questions selected from the international literature in this field that are recognized as being highly relevant to Canada, and would focus on the substance and content of potential recommended questions rather than the fine points of survey design, which can be dealt with after there is agreement on the survey content. Statistics Canada representatives, including Michael Wolfson, Assistant Chief Statistician, have participated in the development of the CIW and in CIW meetings and would be consulted as the draft survey template is prepared.

Background

It is widely accepted that creating and nurturing healthy and sustainable societies—including social, economic, cultural, and physical environments—requires increased knowledge and awareness. For example, improved population health requires deeper and more extensive public knowledge about nutrition, the value of physical activity, and the social determinants of health. Similarly, multicultural and civic knowledge are necessary for informed and responsible citizenship. On the environmental front, educator David Orr has noted:

Sustainability will require a much higher degree of ecological literacy throughout the entire population. In democratic societies, wise public choices about environmental issues depend largely on the extent and breadth of public knowledge of ecology. [...] If large numbers of people do not understand the environmental facts of energy, resources, land, water, and wildlife, there is little hope for building sustainability at any level.²⁵⁰⁶

Increased knowledge of the environment is therefore a first step in public awareness and action toward sustainable behaviour, but we currently have no systematic way of assessing the extent and depth of Canadians' knowledge in this vital area. In the research presented in the Literature Review, these areas of knowledge are referred to as "literacies," or competencies in specific fields of knowledge.

The Educated Populace Domain research group of the CIW has conducted an extensive, 1,450-page Literature Review as a first step in developing new indicators of an educated populace. Based on this Literature Review, indicators were developed and data assembled in two of the areas covered by the Literature Review—formal education and the multiple literacies listed above. The available data, along with a description of potential indicators for which data are currently unavailable, were assembled in a 741-page Indicator Report. From that, a shorter headline indicator document was prepared, based on which the CIW National Working Group will select headline indicators at its June 5–6 meeting in Ottawa.

This work began with the mandate to develop indicators that could assess whether Canadians are becoming wiser and more knowledgeable in areas needed to improve wellbeing and sustainability. The Literature Review found that standard indicators used for education are not adequate for the goals of the CIW. Current education indicators are mainly confined to formal schooling, and most conventional education indicator systems presently use quantitative outputs such as educational attainment based on number of years of education completed, graduation rates, drop out rates, and student achievement, based on standardized test results in a small number of areas (reading, writing, math, science).

²⁵⁰⁶ Orr, David. W., *Ecological Literacy. Education and the Transition to a Postmodern World*, Albany: State University of New York Press, 1992.

Existing education indicators do include measures of basic adult literacy in reading, writing, numeracy, and problem solving, but they do not measure the broader literacies that the CIW and Canada need to track, and, as such, they tell very little about the content or quality of education in Canada, or about its success in producing a more educated populace. In particular, a review of the literature identified knowledge as necessary for individual development and social wellbeing in at least the following 10 broad areas—ecological literacy, scientific literacy, arts literacy, health literacy, food and nutrition literacy, civic literacy, multicultural literacy, media literacy, Indigenous knowledge literacy, and statistical literacy. These are here called multiple literacies, or “multiliteracies.”

As well, indicators of formal schooling—currently the central focus of most conventional indicator systems—reflect only one determinant of an educated populace. International organizations such as the United Nations²⁵⁰⁷ and the Organisation of Economic Co-operation and Development (OECD),²⁵⁰⁸ as well as Canadian organizations such as the new Canadian Council on Learning (CCL),²⁵⁰⁹ recognize that learning and education occur not only in formal schooling, but also through informal and non-traditional learning that takes place in settings including the home, community, and workplace, and through the broadcast and print media and the Internet. As well, values and attitudes held by the public influence knowledge and learning. Therefore, the CIW education indicators need to go well beyond those of the formal schooling system alone, and include measures of informal learning and multiliteracies.

Framework context

The CIW Educated Populace Domain research group has developed an indicator framework based on its Literature Review. This is summarised in this Literature Review in Document 1, Figures 1–3, which illustrate the context within which the broad literacies, proposed here as learning outcomes, are placed. Figure 1 includes the proposed framework for an ideal educated populace indicator set. Ideally, we would have indicators for each component of this framework. Figures 2 and 3 are further elaborations of the “Populace” and “Context / determinants” areas.

The “Learning Outcomes” area, which would be addressed by the proposed new national survey, is organized according to the Delors UNESCO Task Force on Learning report, entitled *Learning: The Treasure Within. Report to UNESCO of the International Commission on Education for the Twenty-First Century*.²⁵¹⁰ This learning outcomes

²⁵⁰⁷ United Nations Educational, Scientific and Cultural Organization (UNESCO), *U.N. Decade of Education for Sustainable Development 2005-2014. International Implementation Scheme (Draft)*, UNESCO, 2005, accessed April 2005; available from http://portal.unesco.org/education/admin/ev.php?URL_ID=36026&URL_DO=DO_TOPIC&URL_SECTION=201&reload=1099410445.

²⁵⁰⁸ Organization for Economic Co-operation and Development (OECD), *Lifelong Learning for All* (Paris: OECD, 1996).

²⁵⁰⁹ Canadian Council on Learning, *Developing the Composite Learning Index. A Framework. Draft*.

²⁵¹⁰ Delors, Jacques, *Learning: The Treasure Within. Report to UNESCO of the International Commission on Education for the Twenty-First Century*, Paris: UNESCO, 1996.

framework is also used for the new Composite Learning Index of the Canadian Council on Learning. The Delors framework is organized around four pillars of learning: learning to know, learning to do, learning to live together, and learning to be. The broad literacies that the CIW recommends tracking can be placed within these four broad areas, which in turn will allow them to be linked to the Canadian Council on Learning's CLI framework. The arrows in Figure 1 indicate that the learning process and outcomes have a multi-causal and interdependent relationship, rather than a linear relationship based on simple cause and effect, or input-output models.

The CIW considers that good education indicators should be able to assess whether Canadians are becoming more aware of contextual situations and systems, social and economic interconnections, current world events, the processes of the natural world, and the influence of current life styles on population health and on the choices and quality of life of future generations. For example, effective societal education and learning outcomes should be reflected in desired social outcomes such as economic prosperity, equity, environmental stewardship, cultural diversity, and social tolerance. From this broad perspective, failure in those realms might be seen as failures in education.

Proposed survey

Presently, indicators of broader literacies are not systematically or consistently tracked in Canada, although these new directions are being explored within individual disciplines. In developing its new Composite Learning Index (CLI), for example, the Canadian Council on Learning (CCL) was not able to extend its indicator selection to include these broad knowledge areas due to lack of sufficient data. The CIW is proposing that—in order to address the data gap in the specific areas of ecological literacy, scientific literacy, art literacy, health literacy, food and nutrition literacy, civic literacy, multicultural literacy, media literacy, Indigenous knowledge literacy, statistical literacy, and other knowledge areas to be determined by consultation—a new and comprehensive Canadian Knowledge Survey (CKS) be developed. A first step towards that goal is the development of a draft template outlining potential survey questions that might be asked to gather data on essential knowledge required for individual development and effective societal functioning and wellbeing.

We believe that the proposed new survey will be of very great interest both to Statistics Canada and to educators, educational institutions, and policy audiences nationwide, and would constitute an important and highly practical outcome of the CIW educated populace domain research. Needless to say, the proposed template would be only a very preliminary first draft that will then need to be circulated among a wide range of interest groups for commentary and feedback on content and substance, and then at a later stage carefully designed by Statistics Canada's Social Survey Methods Division before it is ready for administration. But we are certain that this initiative would fill a very important existing data gap and contribute to Statistics Canada's reputation as the world's best and most innovative statistical agency. We are also confident that such a Canadian Knowledge Survey would provide the country, and policy makers, with vital information required to improve the wellbeing and prosperity of Canadians.

The initial set of proposed questions for the survey could be based on the extensive CIW Educated Populace Literature Review, which has reviewed Canadian and international surveys based on these multiple literacies. Despite the present lack of systematic and integrated data at the national level, there are a number of very important Canadian and international initiatives that can inform the proposed new CKS.

For example, scientific and environmental literacies have been tracked in the United States for the past two decades, through the U.S. National Science Foundation Public Attitudes toward Science and Technology survey²⁵¹¹ and the National Environmental Education and Training Foundation's NEETF / Roper Research survey on environmental literacy.²⁵¹² Unfortunately, similar surveys in these fields do not presently exist in Canada. In Canada, a joint initiative of the National Institute of Nutrition and the Canadian Food Information Council has conducted the Tracking Nutrition Trends survey since 1989 to investigate the self-reported knowledge, attitudes, and behaviours of the adult Canadian population with respect to food and nutrition.²⁵¹³ The National Literacy and Health Research Program is developing a new measure of health literacy that could also inform the proposed new Canadian Knowledge Survey.²⁵¹⁴

Rudimentary information concerning civic literacy is collected through *ad hoc* surveys and also through the Canadian Election Study, which asks political knowledge questions. In terms of multicultural literacy, the Treasury Board of Canada measures outcomes related to "Diversity as a Fundamental Canadian Value," based on the quarterly Focus Canada survey conducted by the Environics Research Group. As well, Canadian Heritage has reviewed public opinion research on multiculturalism from firms such as Decima, Ekos, and Environics.

In addition, Canada is a worldwide leader in media literacy. For example, the Ontario Ministry of Education has produced the *Media Literacy Resource Guide*, which recently has been reprinted and translated into French, Japanese, Spanish, and Italian.²⁵¹⁵ Most of the instruments designed to measure statistical literacy, including attitudes toward statistics and statistical reasoning, have been developed for use in small-scale interview or classroom settings.²⁵¹⁶ However, the Statistical Reasoning Assessment is one of very few instruments developed that possibly could be applied on a large scale and could be

²⁵¹¹ Miller, Jon D., "The Measurement of Civic Scientific Literacy," *Public Understanding of Science* 7 (1998).

²⁵¹² Coyle, Kevin, *Environmental Literacy in America. What Ten Years of NEETF/Roper Research and Related Studies Say About Environmental Literacy in the U.S.*, The National Environmental Education and Training Foundation (NEETF), 2005, accessed July 2006; available from <http://www.neetf.org/pubs/ELR2005.pdf>.

²⁵¹³ National Institute of Nutrition and Canadian Food Information Council, *Tracking Nutrition Trends V*, 2004, accessed July 2006; available from <http://www.ccfnc.ca/pdfs/TNTV-FINAL.pdf>.

²⁵¹⁴ Rootman, Irving and Barbara Ronson, *Literacy and Health Research in Canada: Where Have We Been and Where Should We Go?* Canadian Institutes of Health Research (CIHR), 2003, accessed April 2005; available from <http://www.igh.ualberta.ca/RHD/Synthesis/Literary.htm>.

²⁵¹⁵ Duncan, Barry, John J. Pungente, and Ontario Ministry of Education, *Media Literacy Resource Guide*, Toronto: Harcourt Brace Canada, 1989.

²⁵¹⁶ Tempelaar, Dirk, "Statistical Reasoning Assessment: An Analysis of the SRA Instrument".

used for the adult population.²⁵¹⁷ These, and other sources, which can provide an important basis for the proposed Canadian Knowledge Survey, are reviewed in detail in the CIW Educated Populace Literature Review.

As these few examples demonstrate, there are currently excellent surveys and research initiatives in place or under development designed to assess knowledge in these multiple literacy areas. The proposed Canadian Knowledge Survey would therefore bring these and many other international initiatives together in a systematic and integrated way as an ideal CKS instrument that could address some of the many information gaps in education data. The new survey could begin to re-orient indicators in this field towards learning outcomes rather than the much more limited input and output data that currently dominate the education indicators field. The questions proposed in the new draft CKS template would be specific, well-framed, objective, and suitable for a survey (e.g., easy to code and grade, closed-ended, and not ambiguous), although details of survey design should not be addressed at this initial stage. As much as possible, the survey template developers would use already-constructed survey questions from other sources, which can be re-cast as part of the template for a much-needed, new Canadian Knowledge Survey.

²⁵¹⁷ Ibid.

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