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GPIAtlantic

MEASURING SUSTAINABLE DEVELOPMENT

**APPLICATION OF THE GENUINE PROGRESS INDEX TO NOVA
SCOTIA**

HOW EDUCATED ARE NOVA SCOTIANS?

EDUCATION INDICATORS FOR THE
NOVA SCOTIA GENUINE PROGRESS INDEX

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February 2008

Library and Archives Canada Cataloguing in Publication

Pannozzo, Linda

How educated are Nova Scotians? [electronic resource] : education indicators for the Nova Scotia Genuine Progress Index / prepared by Linda Pannozzo, Karen Hayward, and Ronald Colman ; with assistance from Vanessa Hayward.

Includes bibliographical references.
ISBN 978-0-9780611-5-9

Education–Nova Scotia–Statistics. 2. Educational indicators–Nova Scotia. I. Hayward, Karen II. Hayward, Vanessa III. Colman, Ronald, 1947- IV. GPI Atlantic V. Title.

LA418.N6P35 2008

370.9716

C2008-901495-2

Publication Type: website: <http://www.gpiatlantic.org>
Access Type: open

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It is ideas that determine the direction in which civilizations go. If you don't get your ideas right, it doesn't matter what policies you try to put in place. The policies will backfire, because the ideas that dominate will not be the right ideas. You have to begin with the ideas—then you can simply go ahead and put them into effect.

John Ralston Saul

If society's education system is ineluctably determined by economic requirements, and these economic requirements are the requirements of established market-capitalism, then it follows that we face the prospect of an inevitable transformation of our educational process into an organ of the capitalist market [...]. Because an educational process is required by its nature to reflect upon and question presupposed patterns of being, its absorption into one of these patterns, the global market system, must leave society in a very real sense without its capacity to think. It becomes a kind of mass creature, a collective system of gratifying desires for private profit and consumption with no movement beyond itself towards understanding and consciousness as a human purpose in its own right.

John McMurtry

This crippling of individuals I consider the worst evil of capitalism. Our whole educational system suffers from this evil. An exaggerated competitive attitude is inculcated into the student, who is trained to worship acquisitive success as a preparation for his future career.

Albert Einstein

The goal of education is to make people wiser, more knowledgeable, better informed, ethical, responsible, critical and capable of continuing to learn...[.] Education is also the means for disseminating knowledge and developing skills, for bringing about desired changes in behaviours, values and lifestyles, and for promoting public support for the continuing and fundamental changes that will be required if humanity is to alter its course, leaving the familiar path that is leading towards growing difficulties, and starting the uphill climb towards sustainability. Education, in short, is humanity's best hope and most effective means to the quest to achieve sustainable development.

United Nations: Decade of Education for Sustainable Development

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1. Introduction and Framework

Genuine Progress Index (GPI) Atlantic recognizes that the wellbeing of Canadian and Nova Scotian society is correlated with certain key conditions, including physical and mental health, healthy ecosystems, decent living standards, strong social ties, vibrant culture, and the ability to balance the often competing demands of paid and unpaid work with ample leisure time. Wellbeing in the GPI is also explicitly defined to include the welfare of future generations of Canadians and Nova Scotians as well as that of the present generation. In particular, whether Canadians and Nova Scotians have the knowledge required to improve wellbeing and sustainability is seen as a key connection between all of these conditions. In that sense, these GPI educated populace indicators serve as vital connective tissue linking all the components of the Genuine Progress Index.

Abundant evidence indicates that education has a significant effect on quality of life in terms of its impact on income, population health, environmental quality, civic engagement, and other dimensions of wellbeing. Therefore, the evidence of whether or not Canadians and Nova Scotians are learning what they need to know to create a healthy, wise, and sustainable society should be seen in desirable social outcomes such as equity, environmental stewardship, good health, cultural diversity, and social tolerance. From this broad perspective, failure in those realms and poor scores on a range of relevant societal indicators might be seen as failures in education and in learning processes. This view of educational objectives and indicators is considerably broader than that found in conventional education indicator systems.

International organizations such as the United Nations and the Organisation for Economic Co-operation and Development (OECD), as well as Canadian organizations such as the Canadian Council on Learning (CCL), have recognized that learning takes place not only in formal school settings, but also through informal and nonformal settings such as in the home, community, and workplace, and through broadcast, print, and electronic media.^{1,2,3}

For these reasons, indicators selected for the GPI education component need to go well beyond those pertaining to the formal schooling system alone, and must include measures both of informal learning and of competencies in specific fields of knowledge that are required to improve wellbeing. For example, basic literacy skills improve employability and therefore living standards; a basic knowledge of health is required to improve population health; political knowledge is required for effective civic engagement; and knowledge of sustainable living practices is required to improve ecosystem health. We have labelled these kinds of knowledge “literacies” in their various fields.

From this broad GPI perspective, good education indicators should also be able to assess whether Canadians and Nova Scotians 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 lifestyles on population health and on the choices and quality of life of future generations.

Thus, education—in the broadest sense of lifelong learning—is seen as a vital contribution to, and investment in, both the quality of life and wellbeing of the populace and the health of the natural environment upon which that populace depends for its survival and prosperity.

1.1 What is an educated populace?

In order for a society to assess social progress in general and advances in learning and education in particular, it must first identify and define the knowledge required to create a healthy and sustainable society. In this endeavour, the key question therefore is: What is an educated populace? Some experts have identified proficiency in a range of knowledge areas that can be taken as indicative of an educated populace in the 21st century, including basic literacy (reading, writing, numeracy, problem solving), science, ecology, health, nutrition, civics, arts, culture, statistics, Indigenous knowledge, and the media. Others see the mark of an educated populace as going beyond knowledge.

In February 2004, for example, the Canadian Education Association (CEA) engaged almost 100 Canadians from diverse backgrounds in a dialogue asking: “What is an educated Canadian?”⁴ Forum participants described educated people as those who demonstrated values such as care, concern for others, humility, and empathy, and who have knowledge about, as well as love and appreciation of, life. The most common word used in the dialogues—said by the CEA to rise effortlessly from the groups—was “wise.”⁵

Perhaps one of the most inclusive statements concerning the goal of education comes from the United Nations:

The goal of education is to make people wiser, more knowledgeable, better informed, ethical, responsible, critical and capable of continuing to learn. Education also serves society by providing a critical reflection on the world, especially its failings and injustices, and by promoting greater consciousness and awareness, exploring new visions and concepts, and inventing new techniques and tools. Education is also the means for disseminating knowledge and developing skills, for bringing about desired changes in behaviours, values and lifestyles, and for promoting public support for the continuing and fundamental changes that will be required if humanity is to alter its course, leaving the familiar path that is leading towards growing difficulties, and starting the uphill climb towards sustainability. Education, in short, is humanity’s best hope and most effective means to the quest to achieve sustainable development.⁶

Douglas Stewart, professor emeritus of education at the University of Regina, sees the heart of education as its transformative capacity:

I am drawing upon a conception of ‘education’ as transformative and empowering. It is one that implies the development and enlargement of human consciousness or awareness of the world, of ‘seeing’ or looking at the world with new and enriched perspectives that transcend the local and particular, and that enable individuals to achieve a greater meaning and sense of who they are and how they relate to the world.⁷

Stewart argues that social, vocational, and economic goals are secondary goals that will come out of an education that focuses on training the mind or developing “a differentiated consciousness.”⁸ Training the mind, according to Stewart, is a prerequisite for becoming more conscious and aware, and includes the cognitive aspects of social, emotional, and moral development.

In 1997, the Organisation of Economic Co-operation and Development (OECD) initiated an interdisciplinary program to identify “key competencies” that contribute to a “well-functioning society” and that are “necessary for individuals to lead an overall successful life, and for society to face the challenges of the present and the future.”⁹

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. [...] 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.¹⁰

The OECD program identifies three criteria for competencies that are broad enough to be used in a variety of contexts. Competencies should: 1) contribute to highly valued outcomes at the individual and societal level; 2) be instrumental for meeting important, complex demands and challenges in a wide variety of contexts; 3) be important for all individuals.¹¹ The OECD emphasizes that the specific nature of competencies is shaped by cultural, situational, and other contextual factors.

For the education component, GPIAtlantic has used these OECD criteria to assess competencies in relation to multiple literacies (including basic literacy, science, ecology, health, nutrition, civics, arts, culture, statistics, Indigenous knowledge, and the media.) It has also defined these criteria more specifically using the “principled ground” proposed by John McMurtry. This main principled ground and criterion developed for this education component can be applied to formal, nonformal, and informal education.¹²

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.¹³

In applying this 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 other dimensions of literacy can all be evaluated on the basis of this criterion:

All of these forms of understanding express educational attainment or lack of it insofar as they enable a more inclusively coherent understanding of human and 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.¹⁴

Therefore, the basic criteria used to assess competencies in the various literacies explored by GPIAtlantic (including basic literacy, science, ecology, health, nutrition, civics, arts, culture, statistics, Indigenous knowledge, and the media), in the few selected literacies presented in this summary report, are (1) that they “enable a more inclusively coherent understanding of human and natural phenomena,” as McMurtry suggests, and (2) that they “contribute to highly valued outcomes at the individual and societal level,” as the OECD recommends.

In sum, the long-term goal of any comprehensive and holistic education indicator program should be to track whether, and the degree to which, society is teaching and learning what is necessary to enable a better understanding of both human society and the natural world and to create the outcomes required for a sustainable society that promotes the wellbeing of present and future generations. This includes assessing whether Canadians and Nova Scotians actually know what they need to know in order to enhance social wellbeing, and whether such knowledge is being effectively generated, transmitted, and used for the public good.

This effective creation and use of knowledge for societal benefit requires both basic literacy and knowledge of multiple literacies in relevant areas such as ecology, civics, science, health, and culture. It must be emphasized that there is no pretence that these and other literacies considered in this study 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 reasonable understanding about important issues that affect daily life, such as those concerned with health, science, the environment, and its own and other cultures and histories; if it can understand the meaning of statistics and how the media presents

information; and if it knows enough to make informed decisions when voting. A focus on these and other selected key markers does not deny that there are other areas important to an educated populace that are not assessed in this study.

1.2 Conventional education indicators

By contrast to the goals outlined above, an extensive exploration of the literature in this field found that the conventional education indicators that currently exist to assess educational attainment are too limited, and that many key learning outcomes are not adequately represented. As well, the last two decades have seen a surge in education indicators related to economic policy objectives in an effort to assess whether formal education in particular is contributing adequately to economic productivity and competitiveness in the global economy. But critics have argued that what is perhaps most problematic about this increased focus on the role of education in serving economic imperatives is that broader considerations, such as “the role of schooling in social justice, the inculcation of democratic values and the transmission of cultural values and forms of knowledge,” have become increasingly marginalized.²²⁵

With few exceptions, like basic literacy assessments, most conventional education indicators provide very little information about learning or social *outcomes*, which are the key concerns of GPIAtlantic. In fact, a Special Study Panel on Education Indicators convened by the U.S. Department of Education in the early 1990s to review existing education indicator models and the criteria for indicator selection concluded that the common practice of relying on limited sets of conventional education indicators was “misguided” and did not “do justice to the complexity of the educational enterprise.”¹⁵ The Special Study Panel rejected the dominant ‘input-processes-output’ model stating that it was “flawed” and “encouraged the view that the educational system produces ‘products’ by taking various raw materials (e.g. students and resources) and processing them in schools.”¹⁶ This critique has also been echoed by UNESCO’s *Education for All* report and other experts in the field.

It is noteworthy that the U.S. Study Panel’s argument in this regard is precisely the rationale for developing broader and more comprehensive measures of societal progress like the GPI. What a society measures reflects what it values, and determines what gets onto the policy agenda of governments. A narrow focus on GDP-based measures of progress not only “may create more problems than [it solves],” to borrow the panel’s phrase, but also skews policy responses and ignores key social issues like population health, environmental quality, and community vitality. In sum, if a key goal of the GPI is to broaden our assessments of progress in order to gauge wellbeing more accurately and comprehensively, we must apply the same criterion to each component of the GPI, including our education indicators—as the U.S. Study Panel and McMurtry recommend.

A detailed critique of conventional education indicators has been undertaken by GPIAtlantic. Here we simply note that these conventional indicators focus too narrowly on outputs of the formal education system that may be unrelated to desired learning and

societal outcomes, that they generally ignore informal and non-formal learning processes that may have a greater impact on learning outcomes than schooling, and that they frequently send contradictory messages as noted for example in Chapter 3, section 2 below.

1.3 Indicator framework

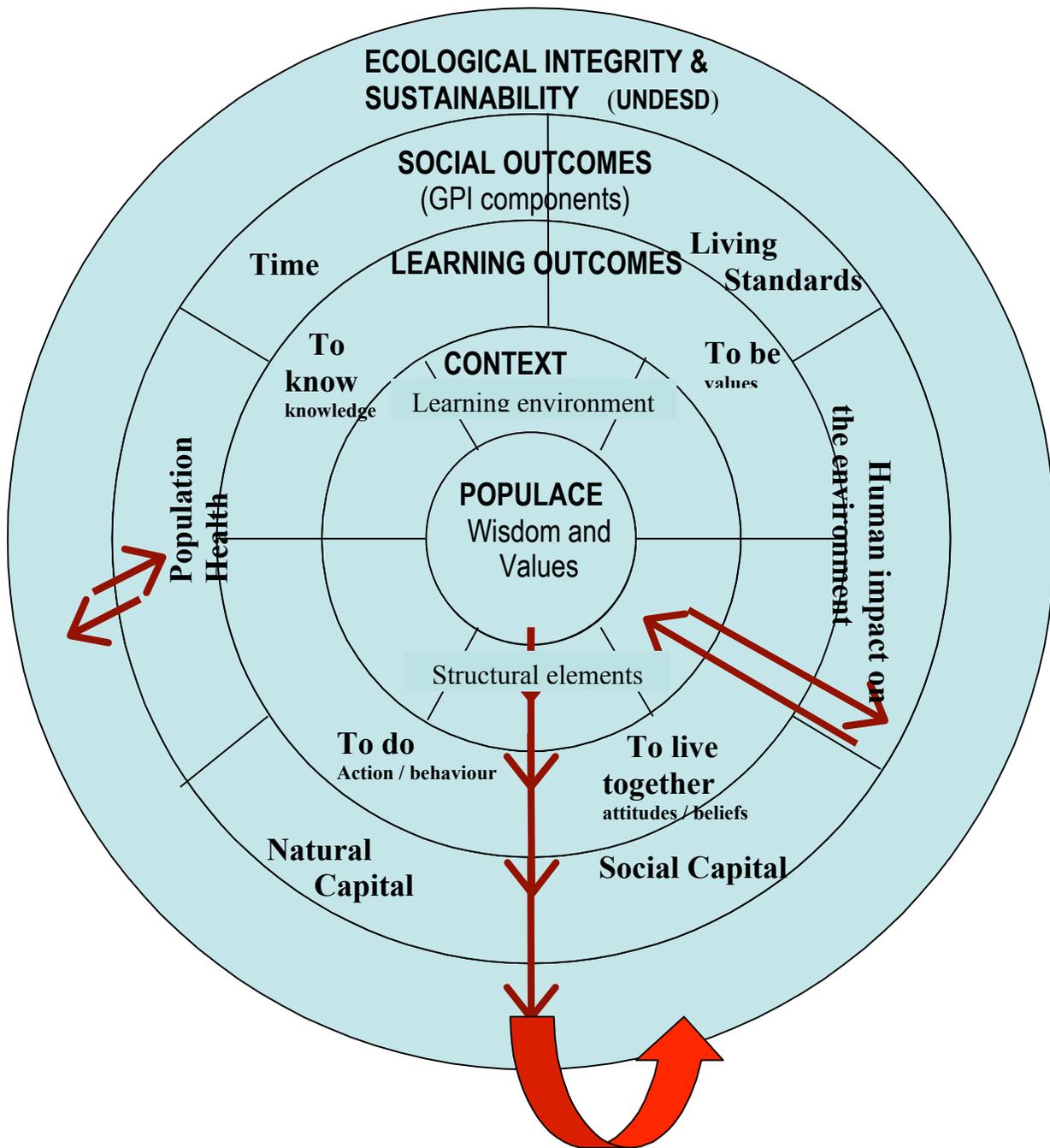
The following framework was developed by GPIAtlantic and is based on a systems and sustainability lens that encompasses all aspects of lifelong learning from early childhood education, through primary and secondary school, to higher education, adult education, and learning for life. The framework also includes “lifewide” learning—including the formal education system, both work-related and personal-interest nonformal learning, and tacit and informal learning—in all its settings. Ideal comprehensive indicators that might eventually populate this framework (but for which data mostly do not yet exist) are presented in a separate list accompanying this summary report. These ideal indicators represent a long-term developmental objective for this domain.

Among the many potential frameworks for education indicators reviewed, presented, and explored by GPIAtlantic, five (including the GPI framework itself) were identified as forming an appropriate basis for an indicator framework for the GPI education component. The five sources identified as main influences are:

1. Educational values for an ecologically sustainable future as defined by C.A. Bowers¹⁷
2. The Delors report, *Learning the Treasure Within*, from UNESCO, especially Delors’ four pillars of learning—learning to be, learning to live together, learning to know, and learning to do¹⁸
3. The Centre for Ecoliteracy framework comprising four metaphors, which correspond to the four-part Delors framework—learning for spirit, heart, head, and hands¹⁹
4. The United Nations Decade of Education for Sustainable Development (DESD)²⁰
5. The Genuine Progress Index itself—particularly the 19 domains (in addition to education), which are taken to represent the desired societal outcomes of effective educational processes and structures.²¹

The framework for the GPI education component is also based on a *relationship* between the pillars of learning (Delors) on the one hand and specified economic and social outcomes that the educational system is expected to produce on the other. This framework, illustrated in Figure 1 below, is circular, with the individual components nested within each other, rather than formed by a vertical or horizontal relationship.

Figure 1. Framework for the GPI education component



This relationship demonstrates that the identified learning processes and outcomes have a multi-causal and interdependent relationship, rather than a linear relationship based on overly simplistic cause and effect, or input–output models.

As Figure 1 illustrates, the wisdom and values of the populace are at the centre of a series of concentric circles, in which the larger, overarching context of ecological integrity and sustainability forms the outermost circle. Between these two basic reference points—reflecting the innermost wisdom and values of the populace and the all-encompassing ecological context—are intermediate circles representing: contextual elements (or determinants) of learning, learning outcomes, and social outcomes. In this multi-dimensional approach, all of the elements within the circles of the framework interact to produce an educated populace, as illustrated by the arrows.

The **innermost circle** of the framework in Figure 1, labelled “Populace: wisdom and values,” represents the wisdom and values of the populace, which are both an outcome and a determinant of an educated populace. Educators such as Nicholas Maxwell, of the University of London, suggest that the basic aim of learning should be to cultivate wisdom in society rather than only to promote the acquisition of knowledge, since knowledge without the wisdom to use it beneficially can be extremely dangerous, as seen in its contributions to war and environmental damage.²²

There is a general consensus among researchers that acquiring wisdom is a lifelong process consisting of an amalgamation of knowledge and deep understanding. This understanding has been identified as including particular characteristics that have been associated with wisdom, such as awareness that we are part of something larger than ourselves, compassion and respect for all life forms, action toward improving the common good, and profound transformation, on both individual and societal levels.²³

If the cultivation of wisdom is one bedrock of an educated populace, then the cultivation of particular values is the other. GPIAtlantic recognizes that any measure of progress is based on the implicit question—“progress towards what?”—and is therefore value-based by its very nature. Measures of progress and wellbeing assess progress towards defined goals and therefore inherently embody a vision or ideal towards which society aspires. In other words, it is literally not possible to measure progress without a clearly defined sense of what it is that society wants to achieve, which in turn is based on fundamental values. Because values are learned and transmitted through a wide range of learning processes, and because they, in turn, act as a determinant of educational content, they are a central element of any comprehensive education indicator framework.

The **all-encompassing outer circle** in the framework chart—ecological integrity and sustainability—represents the overarching framework through which all other components are evaluated. A key criterion for determining relevance in selecting indicators of an educated populace is therefore the concept of sustainability, or the understanding that development must meet the needs of the present without jeopardizing the ability of future generations to meet their own needs. Ideally, therefore, it would be possible to assess the degree to which existing learning processes and educational

systems in Canada transmit or ignore the dependence of human society on the natural world—our essential life support system—and the degree to which they teach behaviours that support or undermine ecosystem health and sustainability.

Moving from the inside out, the **contextual elements of learning** form the next circle in the framework. These contextual factors are divided into two parts. The first part of this contextual circle includes the physical and mental environments within which learning takes place. This section specifically looks at the **contexts of lifelong and life-wide learning**, including nonformal and informal learning; the influences of commercialization on education; participation in cultural activities as a reflection of informal learning environments; and the influence of the mental environment (mass media, advertising messages, etc.) on learning.

The second part of the contextual circle includes **structural elements of the formal education system**, such as financial investments in education, access to education, and opportunities for learning. These elements correspond to those usually found in conventional education indicator frameworks, and they are generally represented by input, process, and output indicators such as financing (input), class size (process), and graduation rates (output). Specifically, these structural elements include formal education structures from early childhood education settings through elementary and secondary schools to universities, financing systems (including shifting balances between public and private funding), student achievement testing, and access and barriers to education. The higher education section of this analysis includes a discussion of several key contextual elements, ranging from the role of the university in society to research and development within the university and the extent of independence of that research.

The **learning outcomes circle**—represents what an educated populace potentially needs to know to create a healthy and sustainable society. This view of successful learning outcomes vastly expands the conventional use of the term “literacy” to encompass a much broader spectrum of knowledge, which collectively is sometimes referred to as “cultural literacy” or as “ecoliteracy.” Ecologist and educator David Orr suggests that, in order to meet the challenge of sustainability, society needs to become “ecoliterate.”²⁴ Ecoliteracy goes beyond environmental or ecological literacy alone and includes a broad range of literacies or knowledge needed to foster wellbeing in a sustainable world. It includes the basics of knowing how to read, write, and count, but it also includes adequate knowledge of health, ecology, science, civics, culture, and other aspects of human interaction with the larger world.^{25, 26}

The literacies explored in detail by GPIAtlantic include the following: basic adult literacy, arts literacy, media literacy, health literacy, food and nutrition literacy, civic literacy, multicultural literacy, Indigenous knowledge literacy, statistics literacy, ecological literacy, and science literacy. This is not an exhaustive list of learning outcomes, but it is recommended here as a useful, adequate minimum that can begin to assess what people need to know to improve wellbeing and sustainability. The available evidence indicates that reasonable competence in the 11 different literacies listed here can potentially provide Canadians and Nova Scotians with the tools they need to live well and

to leave a decent future for their children. Competence in these multiple literacies can therefore be taken as indicators or markers of an educated populace from a learning outcomes perspective.

Finally, the **social outcomes circle** completes the framework. This element of the education framework links the indicators in this domain with the indicators in the other 19 GPI domains. From GPIAtlantic's perspective, therefore, the components of the social outcomes circle in Figure 1 above represent the desired social outcomes that can presumably be nurtured and improved by a truly educated populace.

Exploring this relationship between learning outcomes and social outcomes is vital for policy purposes. To give just one example, using the framework in Figure 1 as a basis, an exploration of the rise of obesity rates might examine the comparative influence of school-based nutritional education programs with the learning that occurs through advertising and other commercial influences and the financing of each of these learning contexts. In short, this framework enables us systematically to relate learning contexts like television, commercials, and classroom instruction with learning outcomes like knowledge of healthy eating, and finally with social outcomes like rates of obesity.

While Figure 1 above provides a suitable framework for the development of indicators for the GPI education component, it must be emphasized that GPIAtlantic has hitherto undertaken data collection and analysis for only two parts of this framework: 1) the formal education dimension of the **context** circle, and 2) the middle **learning outcomes** circle. This brief summary includes just a few select indicators from each of these two parts for which data are available.

Other key dimensions of the overall framework depicted in Figure 1 have been explored by GPIAtlantic but have not yet been the subject of data collection and analysis for this report. Some of these key dimensions are briefly reviewed in the form of recommendations for future indicator development in Section 4 of this summary.

In addition, as noted, a comprehensive list of ideal indicators, which could eventually be used to populate the above framework as data become available, accompanies this summary report.

1.4 A note on data limitations

A number of data challenges arose in the process of developing indicators for the education component of the GPI. First, there are a number of indicators in the accompanying comprehensive list of indicators where no pan-Canadian data were available, where only single-year data existed, where the data available were too old to be useful, or where no data were available at all. For example, no pan-Canadian data were available for class size, victimization rates of teachers and students, or research and development funds for basic or curiosity-driven research. Only single-year data were available for some indicators, including the incidence of advertising in public schools,

public engagement in creative arts activities, health literacy scores, and other indicators using one-time survey results, such as the immigrants' citizenship quiz given only once to the general public.

Second, a substantial portion of essential data needed for this domain is available from Statistics Canada for a fee. In select cases where data were not available through any secondary source, GPIAtlantic purchased these data from Statistics Canada at a considerable cost. However, financial resources were not available to buy all the required data. Needless to say, where primary Statistics Canada data were available for free, we have used them. In cases where primary data were not available, we have often relied on free copies of such data produced by other agencies, such as the Council of Ministers of Education Canada's Reports of the Pan-Canadian Education Indicators Program (PCEIP), for example, or even by Statistics Canada itself in publicly available summary and analytical reports.

Also, many private polling firms have produced data series that could be useful to populate some of the multiple literacy indicators. However, this syndicated research is extremely expensive to purchase, and many of these data are not freely available and have not been publicly released.²⁷

The lack of data is especially the case for indicators of multiple literacies. However, current data, research, and promising initiatives in various parts of the world, including Canada, suggest that it is indeed possible to develop suitable composite indicators for each of the literacies. For example, while no assessment of science literacy is yet possible for the adult population in Canada, the United States has comprehensive, multiple-year national data on science literacy at the population level that could serve as a model for Canada.

Although experimental work that may facilitate development of indicators for these literacies in the future is continuing in various fields, there are currently very few Canadian data sources that can be used to populate suitable indicators in these areas at present. Therefore, as seen by comparison with the accompanying list of ideal comprehensive indicators at the end of this summary report, it is not yet possible to produce an inclusive and adequate set of education indicators.

2. Key Nova Scotia Results

This report on indicators of education constitutes one of the 20 core social, economic, and environmental components of the Nova Scotia Genuine Progress Index (GPI). This section provides a summary of a few key findings for Nova Scotia in the areas of formal education and multiple literacies, selected from among the dozens of indicators explored in detail by GPIAtlantic for this study, with selection based largely on data availability.

2.1 Student debt: Average amount of student debt at time of graduation

Result: Postsecondary students in Nova Scotia today are graduating with unprecedented debt loads. NS has the second highest level of (university) student debt in the country.

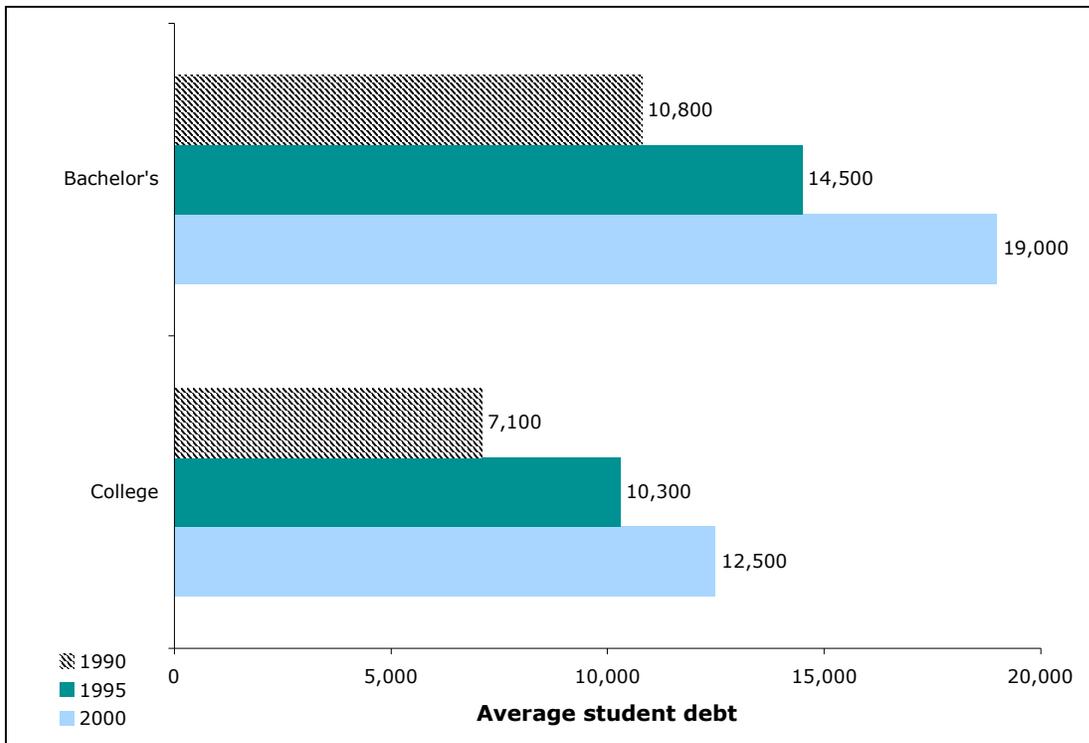
Students pursuing a postsecondary education today face increased financial pressures. Rising tuition fees, student debt levels, loan default rates, student employment rates, and student work hours, along with slower loan repayment rates and increased reliance on private fundraising, are all evidence of this trend.

Increased student debt levels, in particular, raise serious concerns both about equitable access to postsecondary education and about the wellbeing of Canadian youth who may face the stress of loan repayment requirements for years to come. Canadian youth are experiencing higher rates of low wage employment which may accentuate the difficulty of meeting loan payment obligations.

According to Statistics Canada, Canadian student debt levels increased dramatically in the 1990s. The undergraduate university graduating class of 2000 owed an average of \$19,000 in government debt, about 30% more than the class of 1995, and 76% more than the class of 1990 (in 2000 constant dollars). College graduates in the class of 2000 with student loans from government loan programs owed \$12,500, 21% more than their counterparts in the class of 1995, and 76% more than those in the class of 1990 (see Figure 2 below).

When private sources of debt are also included, debt loads are much higher. In 2000, the 11% of undergraduate university graduates who owed money to both government and non-government sources had an average combined debt of \$32,000. The average combined public and private debt of the 8% of college graduates who owed money to both sources in 2000 was \$20,000.²⁸ Unfortunately, no time series data are available for combined public and private debt loads, so Figure 2 reports only on debt from government loan programs.

Figure 2. Average amount of government student debt at time of graduation (\$2000 CDN), undergraduate classes of 1990, 1995, and 2000, Canada

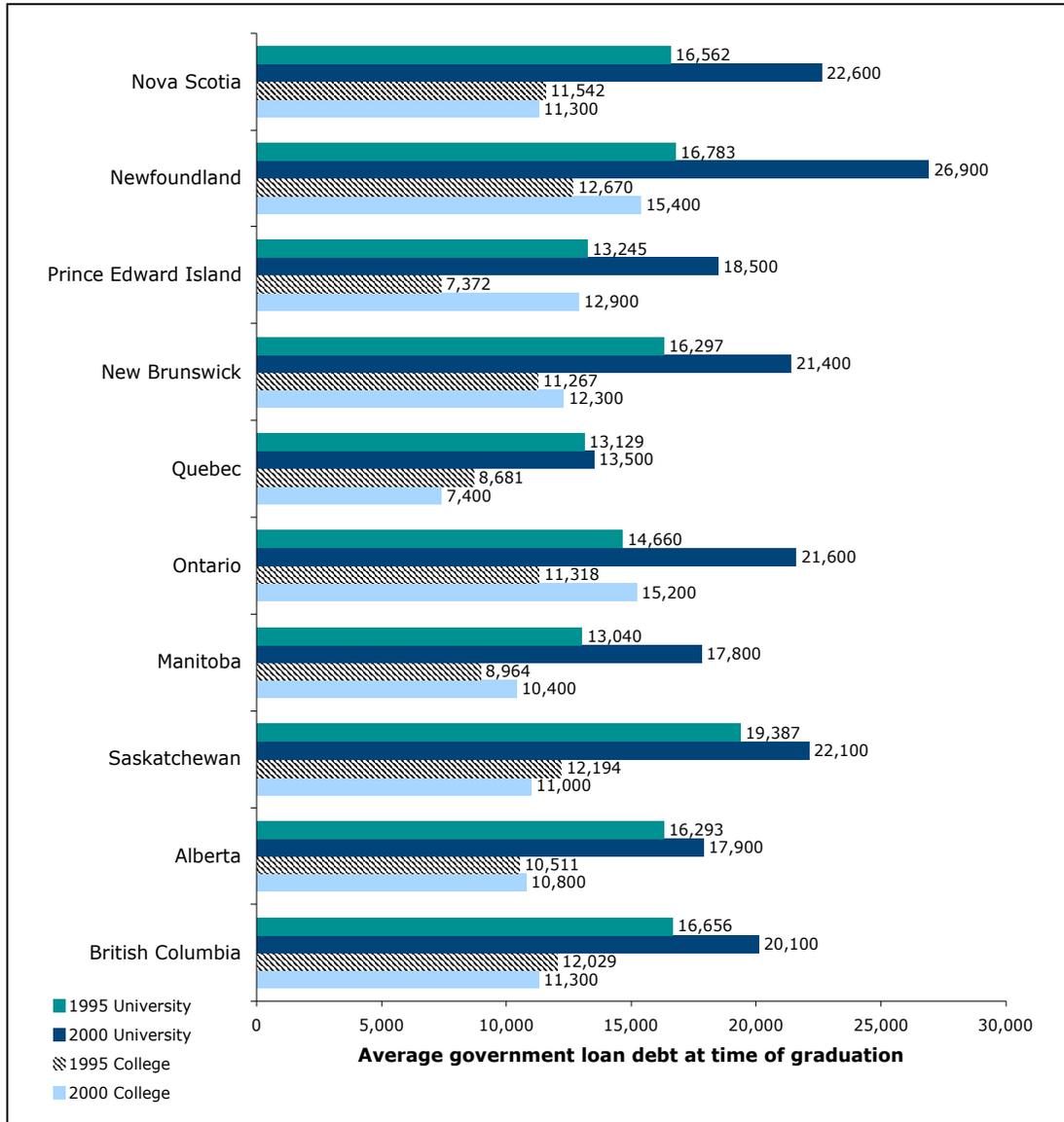


Source: Mary Allen and Chantal Vaillancourt. *Class of 2000 – Student Loans, Canadian Social Trends*. Autumn 2004. Statistics Canada. Catalogue No. 11-008. Data from National Graduates Surveys (classes of 1990, 1995, 2000).

Note: This Figure refers only to graduates who have not completed any further education in the two years after graduation.

At the provincial level, average student debt from government sources for the class of 2000 was highest in Newfoundland and Labrador, followed by Nova Scotia, Saskatchewan, Ontario, and New Brunswick. Quebec had by far the lowest average debt levels in the country—about half the levels in Newfoundland and Labrador (see Figure 3 below). This is clearly related to the relatively lower tuition levels in Quebec and the correspondingly higher provincial government support of postsecondary education in that province. In addition, while average university student debt levels increased sharply in almost all provinces when comparing the classes of 1995 and 2000, they increased only marginally in Quebec (by 3%) during this period. The sharpest increases were in Newfoundland and Labrador (60%), Ontario (47%), Prince Edward Island (40%), and Nova Scotia and Manitoba (36.5% each). As noted below, these 2000 Newfoundland numbers do not account for the lowering of tuition fees in that province since that time.

Figure 3. Average debt from government student loans at graduation, by province, classes of 1995 and 2000 (\$2000)



Source: Pan-Canadian Education Indicators Program (PCEIP), 2005. Data from National Graduates Survey.

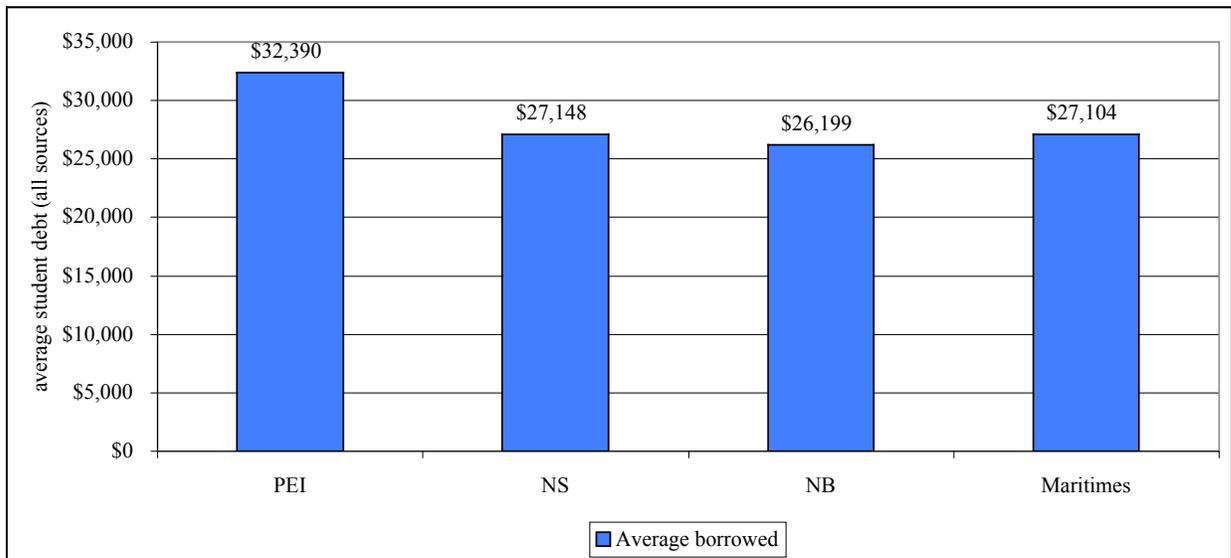
Note: University includes Bachelor’s, Master’s and Doctorate degrees.

GPIAtlantic always conservatively uses the latest pan-Canadian, provincially comparable data available from Statistics Canada. For student debt and tuition, these are the data reflected in the charts and text presented in this report. However, provincially comparable student debt trends from Statistics Canada are only presently available to 2000 and are only provided for government debt (thus excluding the burgeoning portion of debt that is from private sources).

In light of these limitations—both of scope and currency—in the available pan-Canadian Statistics Canada data, it is important to note that there are very recent Nova Scotia-specific and regional data (released just this year), which show that average student debt in the Maritimes from all sources (government student loans *and* private sources) has continued to climb—increasing by 10% in recent years from \$24,976 in 2003 to \$27,486 in 2007 (\$2007).²⁹

Survey data from the Maritime Provinces Higher Education Commission (MPHEC) indicate that the average amount of student debt in Nova Scotia from all sources for the class of 2003 was \$27,148, second to Prince Edward Island (\$32,390). New Brunswick students owed \$26,199 in student loans (all figures in 2005 dollars). In Nova Scotia, 40% of all graduates with student debt owed more than \$30,000 in loans (see Figure 3a below).³⁰

Figure 3a. Average amount borrowed (all sources) for the 2003 degree, post-2003 degree education or both, by Maritime province of graduation, 2005



Source: Maritime Provinces Higher Education Commission. 2007. 2005 Survey of 2003 Maritime University Graduates: Selected Provincial Statistics. MPHEC. Available from <http://www2.mphec.ca/english/pdfs/GFU2003in2005ProvEng.pdf>. Table 1.11a.

In light of the limitations in the available Statistics Canada data on student debt, any future updates of this Education Indicators Report for Nova Scotia would also utilize these regional data in order to present a more current and complete picture of the student debt situation in this province (counting both government and private loan sources). Unfortunately, these more recent provincial and Maritime data are not comparable with data from other provinces.

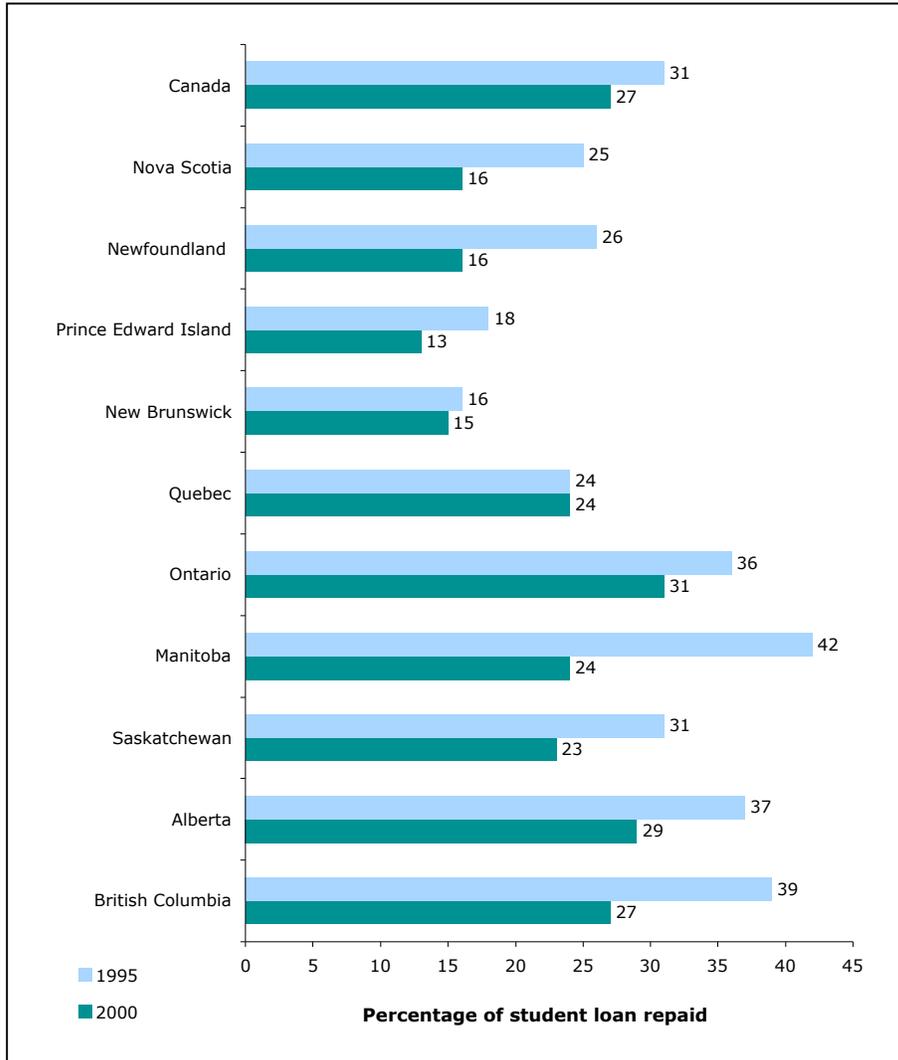
For that reason, GPIAtlantic will also continue to cite the most recently available Statistics Canada on debt from government sources alone—however outdated—in order to place student debt in Nova Scotia in a larger comparative context. Without that use of the older data on debt from government sources, it is not possible to recognize the sharp divide among the provinces, and to acknowledge (a) that provincial policies (like those of Quebec) are able to provide considerable debt relief to students, and (b) that provincial governments do have the option to effect significant reductions in student debt loads.

EKOS Research Associates and the Canada Millennium Scholarship Foundation conducted two national surveys of the finances of postsecondary students, first in 2003 and then with a follow-up survey in 2005. This Canadian Post-Secondary Student Financial Survey, administered to both students and parents, found that the incidence and amount of student borrowing from government loan programs declined with the level of parental financial support, particularly among those under the age of 23.³¹ This has important implications for access, as it indicates that students from families with higher incomes are more immune to the trends described above, and that the increases in student debt depicted in Figures 2, 3, and 3a above are likely disproportionately affecting students of lower socioeconomic status. For example, the GPI Debt Report recently found that in 2005 by far the largest holders of student debt in Canada are households in the bottom wealth quintile (bottom 20% of households in terms of wealth). These poorest Canadian households account for about 50% of total outstanding Canadian student debt.³²

Furthermore, using data from Statistics Canada's National Graduates Survey (NGS), the 2005 report of the Pan-Canadian Education Indicators Program noted that in almost all provinces, postsecondary graduates took longer to pay off their government student loan debts in 1995 than in 1990, and even longer still in 2000.³³ See Figure 4 below, which summarizes the rate of student loan debt repayment for all university graduates (Bachelor's, Master's, and Doctoral) by province in 1995 and 2000.³⁴ This figure includes both federal and provincial government loans, but excludes private loans such as lines of credit, family loans, credit card debt, and so on.

The difference between the two cohorts in the rate of debt repayment was most dramatic in Manitoba, where the 1995 cohort had repaid 42% of its student loan two years after graduation, while graduates from the Class of 2000 had only repaid 24% of their loans two years after graduation. Debt repayment for the Class of 2000 was slowest in Atlantic Canada (13% to 16%), with Atlantic Canadian students repaying only about half as much debt within two years as those in Ontario. For the Class of 2000, the rate of loan repayment was generally faster in Ontario (31% of debt repaid two years after graduation), Alberta (29%), and British Columbia (27%) than in the rest of the country (see Figure 4 below). Similarly, college graduates also had increasing difficulty repaying their debts between 1995 and 2000.

Figure 4. Debt repayment rate (percentage of student loan repaid) 2 years after graduation, all university graduates, by province, 1995 and 2000



Source: Canadian Education Statistics Council. 2006. Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program. Statistics Canada and Council of Ministers of Education, Canada. Ottawa. Table B3.1, p. 191. Original data from the National Graduates Survey.

Note: “All university graduates” includes Bachelor’s, Master’s and Doctorate graduates.

In addition to being an indicator of access, student debt is also an indicator of the financial pressure and stresses facing young people upon graduation. For these young people, the prospect of spending many years following graduation paying off large debt loads with interest may adversely affect their wellbeing and quality of life for years to come.

2.2 Tuition: Average postsecondary tuition fees

Result: Nova Scotia has the highest average undergraduate tuition fees in Canada. Over the last 30 years, tuition has accounted for an increasing share of university operating revenue in Canada.

The increase in student debt in the 1990s, illustrated in Figures 2 and 3 above, mirrors the simultaneous rise in postsecondary tuition fees. Between 1990/1991 and 2007/2008, average annual undergraduate tuition fees in Canada more than doubled from less than \$2,000 to \$4,382 (constant \$2005). In many provinces, the rise in tuition fees has sharply exceeded the Canadian average, leading to increasing inter-provincial disparities. For example, in Nova Scotia, average undergraduate tuition jumped by nearly 126% from \$2,519 in 1990/1991 to \$5,694 in 2007/2008 (\$2005), and is currently the highest in the country (see Figure 5 below). Undergraduate tuition fees in Nova Scotia are presently nearly 30% higher than the Canadian average and 190% higher than in Quebec. It should be noted that between 2005/2006 and 2007/2008, tuition fees in Nova Scotia declined by 9%.

However, it should be acknowledged that there has been some controversy over whether this is in fact the case. According to the Nova Scotia Department of Education, administrative changes at Acadia University “caused some statistical anomalies in Nova Scotia’s reported numbers.”³⁵ According to an October, 2007, Department news release, Acadia University transferred a \$1,419 laptop computer charge from tuition to compulsory fees, which “artificially increased StatsCan’s reported tuition decrease” and artificially increased the rise in compulsory fees in Nova Scotia.

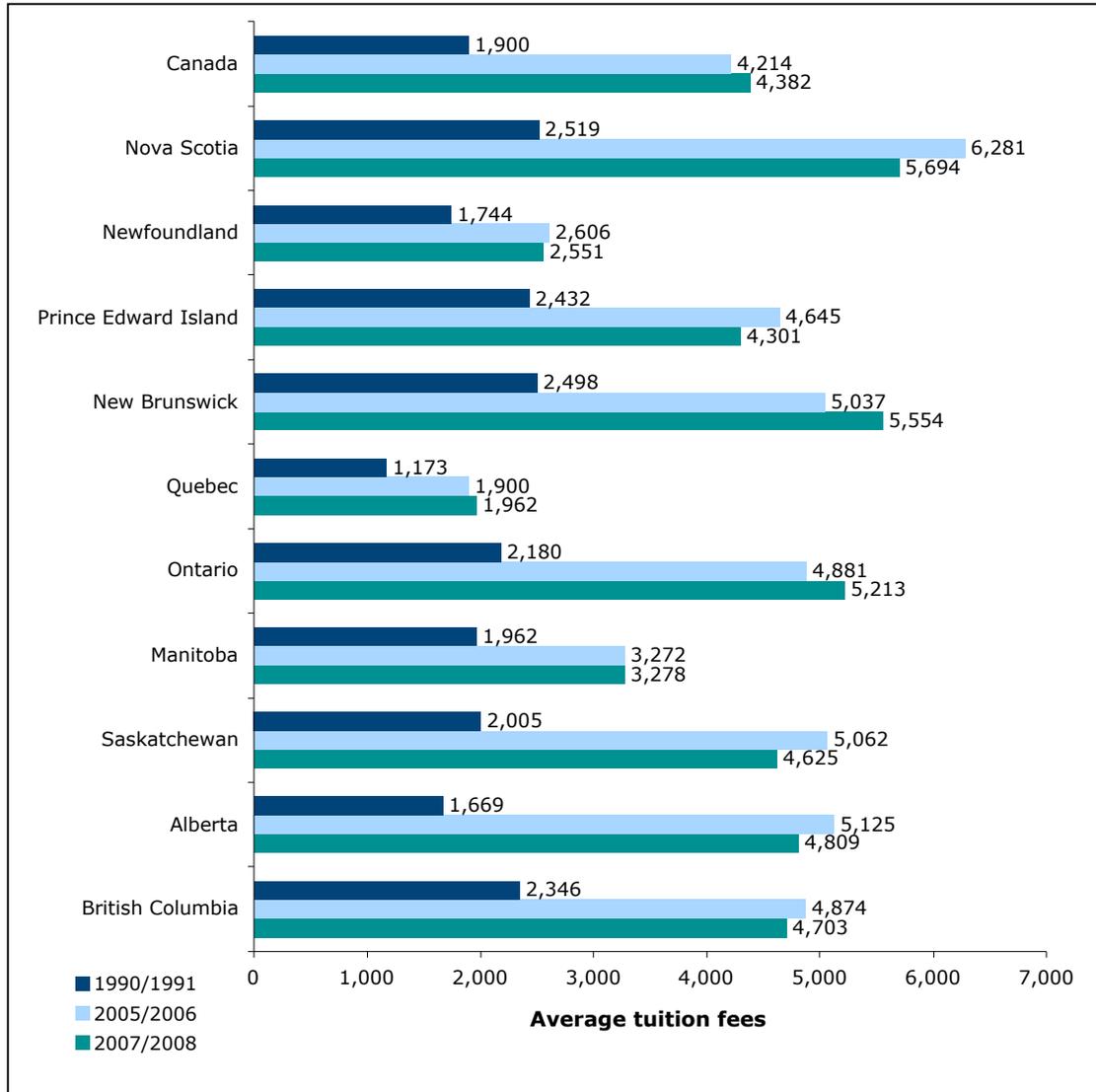
According to Statistics Canada, compulsory fees in Nova Scotia increased by 26% between 2006/2007 and 2007/2008 (the Canadian average increase was 10%). However, the Nova Scotia Education Department maintains that “even when the Acadia anomaly is factored out, Nova Scotia remains one of two provinces to reduce tuition at a time when several provinces are increasing tuition.”³⁶

Yet Kaley Kennedy, Nova Scotia representative of the Canadian Federation of Students, argues that the increases in compulsory fees, and the fact that these fees are already the highest in the country, render the recent tuition cuts meaningless.³⁷ According to Statistics Canada, Nova Scotia university students pay an average of \$882 in extra fees, which is one-third higher than the Canadian average. Statistics Canada reports that average compulsory fees in Canada in 2007/2008 were \$663.³⁸

According to the MPHEC, between 1999/2000 and 2006/2007 the enrolment of Maritimers at Memorial University in Newfoundland increased 884% from 103 students to 1,014 students. Students originally from Nova Scotia showed a more than ten-fold increase from 64 students in 1999/2000 to 725 students in 2006/07. This increase in

enrolment from the Maritimes has been largely attributed to the NL government freeze and lowering of tuition fees in that province.³⁹

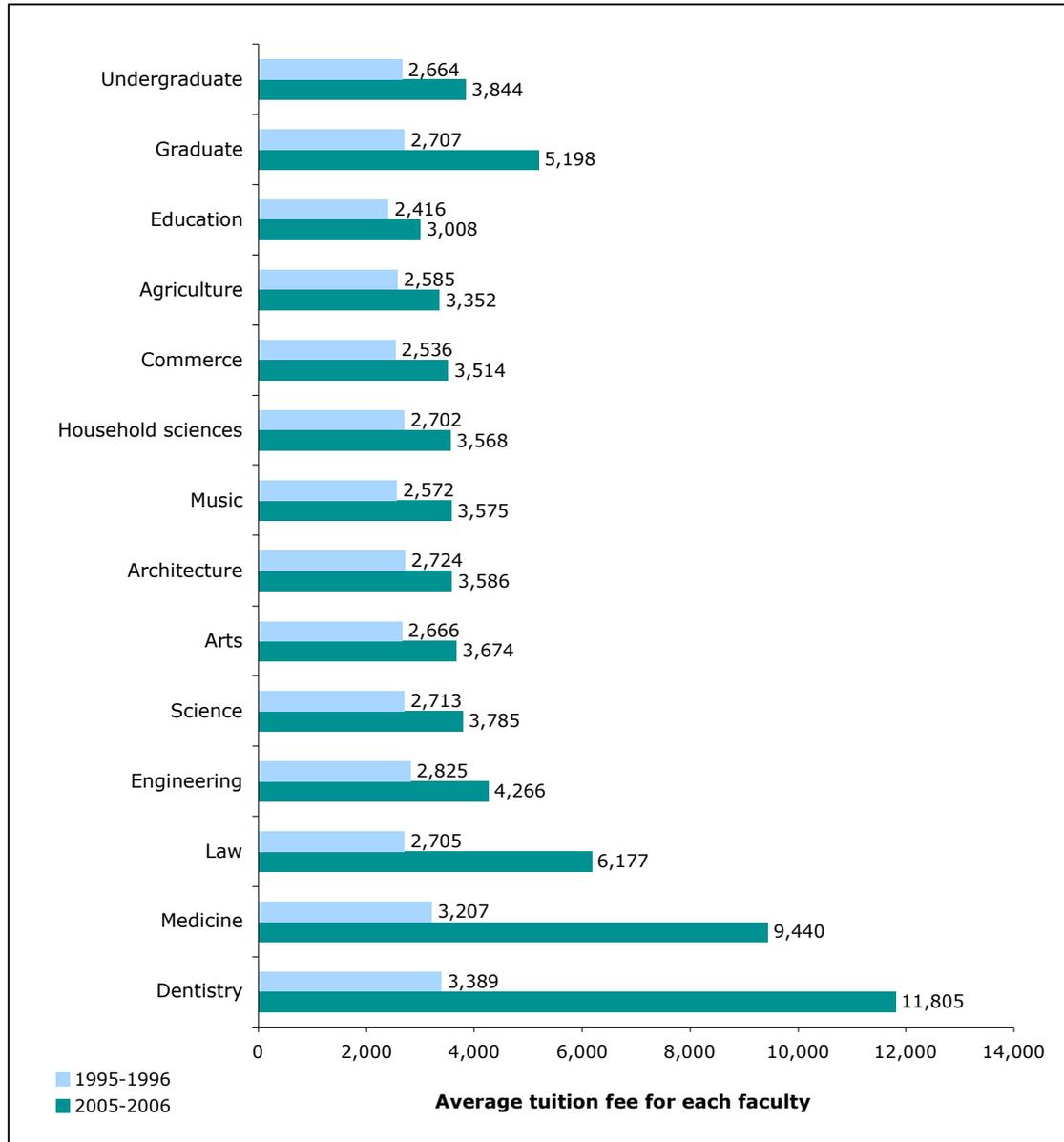
Figure 5. Average undergraduate university tuition fees, Canada and provinces, 1990/1991, 2005/2006, and 2007/2008 (in 2005 constant dollars)



Source: Statistics Canada. *University Tuition Fees. The Daily*. Thursday, September 1, 2005; Statistics Canada. *University Tuition Fees. The Daily*. Thursday October 18, 2007. Data source: Survey of Tuition and Living Accommodation Costs for Full-time Students, Statistics Canada.

Note: All figures for 1990/1991 were converted to 2005 constant dollars using Bank of Canada’s Inflation Calculator, February 19, 2007. Figures for 2007/2008 were converted using Bank of Canada’s Inflation Calculator, October 22, 2007.

Figure 6. Average university tuition fees by faculty, Canada, 1995/1996 and 2005/2006 (in 2001 constant dollars)



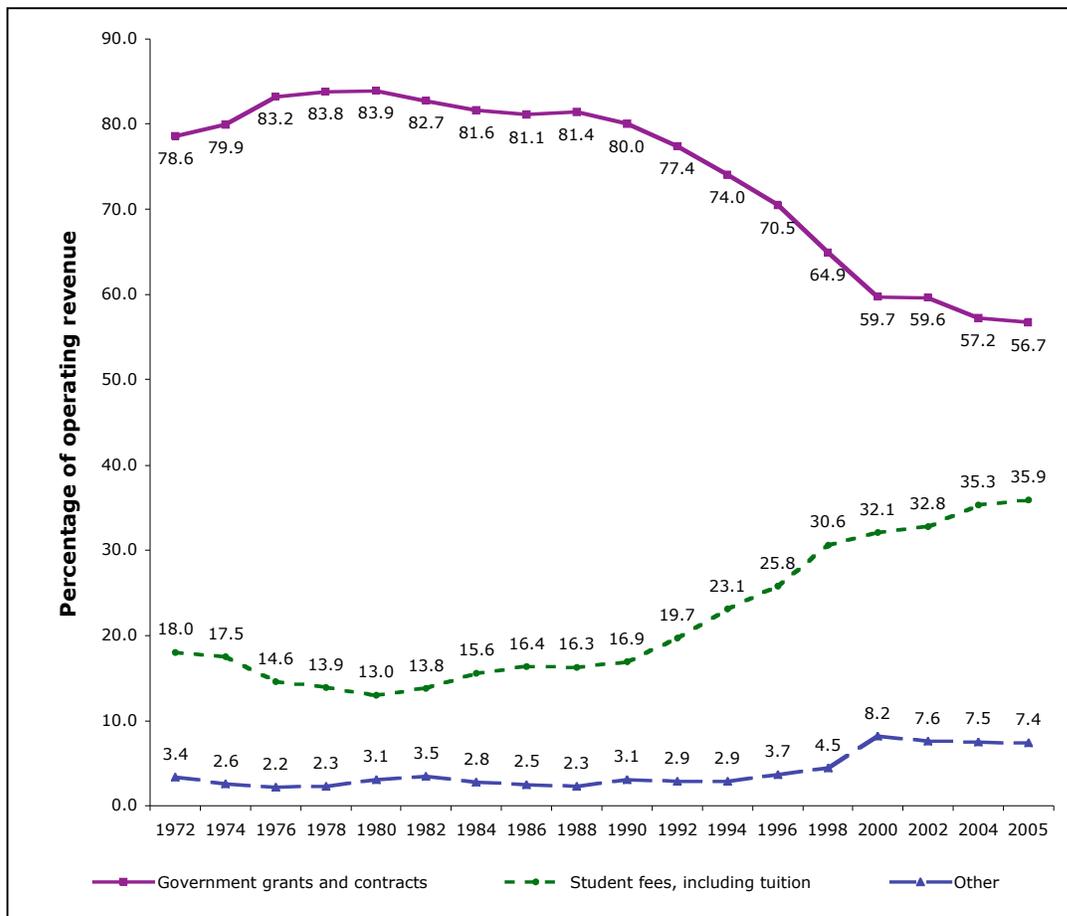
Source: Canadian Education Statistics Council. 2006. *Education Indicators in Canada. Report of the Pan-Canadian Education Indicators Program*. Statistics Canada and Council of Ministers of Education, Canada. Ottawa. Data updated December, 2006. Data are from the Survey of Tuition and Living Accommodation Costs for Full-time Students, and are presented here in 2001 dollars just as in the PCEIP report, rather than converted to 2005 dollars, which would make the results more comparable to those in Figure 5 above.

Note: More recent data for tuition by faculty do exist, however, due to definitional and classification changes, it was not possible to compare the 2007/2008 data for tuition by faculty to earlier survey years. For this reason, the 2007/2008 data are not included in the analysis above.

Because the latest Statistics Canada data on student debt from government sources are from 2000, Figure 3—showing student debt in Newfoundland and Labrador as the highest in the country in 2000, followed by Nova Scotia—do not reflect these more recent NL government policy changes and their consequent effect on student debt loads.

Figure 6 above illustrates the skyrocketing of tuition fees in several professional graduate programs between 2000/2001 and 2005/2006. In particular, annual tuition fees in law, medicine, and dentistry in Canada jumped by 128%, 194%, and 248%, respectively. In dentistry and medicine, average annual tuition fees in 2005/2006 were \$11,805 and \$9,440, respectively (\$2001).

Figure 7. Share of university operating revenue by source, Canada, 1972–2005



Source: Data are originally from Statistics Canada’s Financial Information of Universities and Colleges (FIUC) survey, and were provided to GPIAtlantic free of charge by Larry Dufay, Senior Research Officer, Canadian Association of University Teachers (CAUT).

Note: “Other” includes revenues from donations (including bequests), non-government grants and contracts, investments, and the sale of services and products. Prior to 2000, funds from the sale of products and services were not counted as contributing towards general operating revenue.

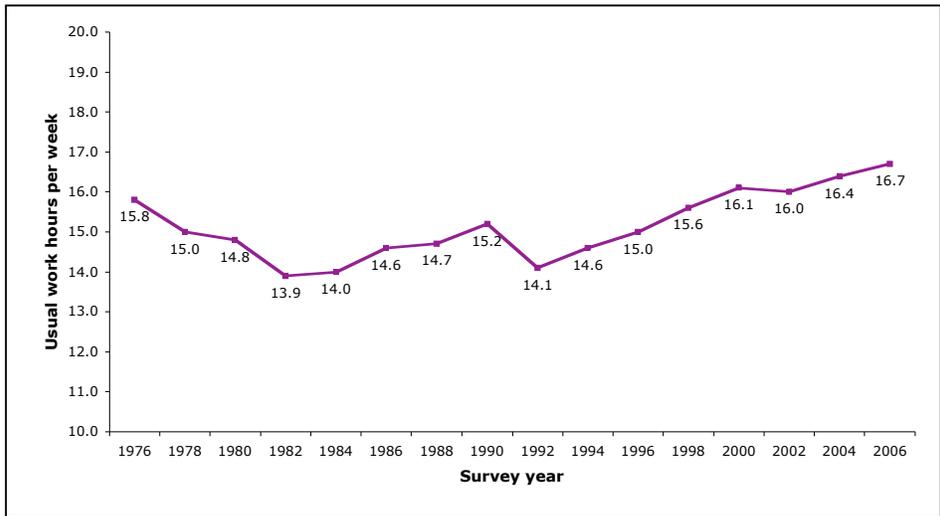
Tuition fees and other student fees also now make up a much larger share of total university operating revenues, doubling in the last 34-year period from 18.0% of operating revenues in 1972 to 35.9% in 2005. Correspondingly, the government share of total operating revenues, counting all levels of government, decreased from 78.6% in 1972 to 56.7% in 2005 (see Figure 7 above).

2.3 Student work hours: Average weekly work hours of full-time postsecondary students

Result: Postsecondary students are working longer hours today than at any time in the last 30 years.

Another important access issue closely linked to financial barriers is that many full-time students have to work in order to finance their studies. The additional time commitment required by their jobs has an effect on the amount of time these students can devote to their studies, and these time pressures in turn can result in increased stress.⁴⁰ This factor also has equity implications. Students who have to work long hours to help finance their postsecondary studies will have less time for study, may perform less well, and are therefore at a distinct academic disadvantage compared to students who do not have to hold down jobs or who work fewer hours.

Figure 8. Average usual work hours worked per week during the school year for full-time students, aged 18–24 years, with jobs, Canada, 1976–2006



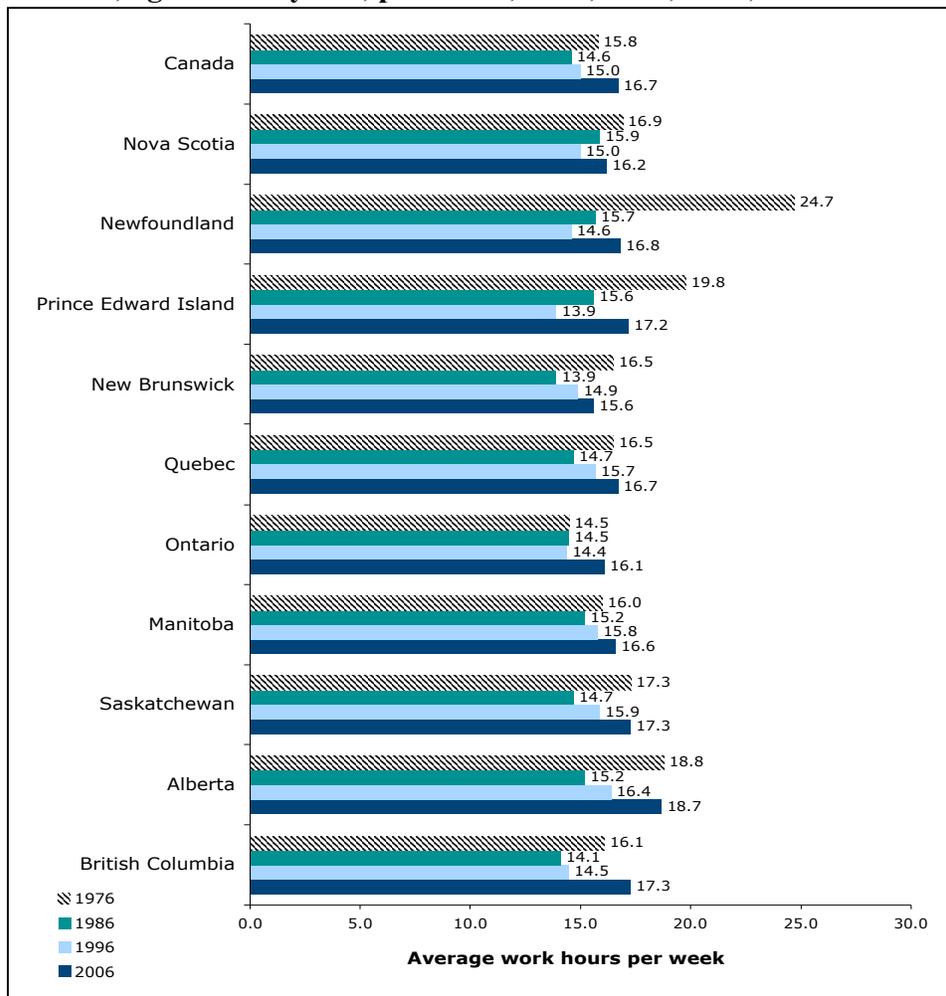
Source: Statistics Canada, Labour Force Survey, 1976–2006. Special tabulation.

According to Statistics Canada data, the employment rate of full-time students aged 20 to 24 years increased from 26.6% in 1976 to 46.9% in 2006. Unpublished Statistics Canada data, specially tabulated and purchased for the purpose of this report, show that average

usual work hours during the school year for full-time students between the ages of 18 and 24 years with jobs steadily increased from 14.1 hours a week in 1992 to 16.7 hours in 2006—the highest ever recorded in the 30 years that consistent records have been kept (see Figure 8 above).⁴¹

Historical LFS data indicate that every province in the country saw an increase in usual weekly hours between 1986 and 2006 among full-time working students between the ages of 18–24 years. In 2006, students from Alberta worked the longest hours among Canadian students—an average of 18.7 hours a week—up 23% from 15.2 hours in 1986, while students in New Brunswick worked the shortest weekly hours in the country (15.6 hours in 2006). See Figure 9 below for a summary of average usual work hours for full-time working students by province in 1976, 1986, 1996, and 2006.

Figure 9. Average usual hours worked per week during the school year for full-time students, aged 18–24 years, provinces, 1976, 1986, 1996, and 2006



Source: Statistics Canada, Labour Force Survey, 1976–2006. Special tabulation.

Interestingly, full-time working students in Nova Scotia, where tuition is the highest in the country, worked an average of 16.2 hours a week in 2006—the third lowest in the

country—while students in Quebec, where tuition is by far the lowest in the country, worked an average of 16.7 hours a week—the same as the Canadian average.⁴² As well, the data in Figure 9 above show that, in every province, average student work hours were longer in 1976 than in 1996 when tuition rates were higher. Thus, relative tuition levels alone clearly do not explain the length of working hours.

While tuition alone cannot explain the length of working hours, other evidence does point to a direct link between students' work and their financial needs, indicating that further investigation into this important issue is required. Thus, for example, the Canadian Post-Secondary Student Financial Survey, conducted in 2003 by EKOS Research Associates and the Millennium Scholarship Foundation, found that the vast majority (83%) of students who worked during the school year did so because they needed the income. Only 7% worked to maintain a position in a job, and just 6% worked to gain experience.⁴³

Despite the increase in average weekly work hours in the 1990s, coupled with unprecedented levels of student debt, there is currently very little information on the school–work relationship among this group of students and on how the resulting time crunch is linked to stress levels and academic success, let alone on how the burden of debt has affected students' short and long-term quality of life and sense of wellbeing.

Aside from the possible health, income, achievement, and access issues already mentioned, the work-study relationship also has important equity implications, and potential influences on the quality of postsecondary education altogether. For example, if lower-income students are more likely to work long hours during the school year to help pay for their postsecondary studies while higher-income students have greater luxury to devote themselves more fully to their studies without working for pay, then this may produce important income-related disparities in performance, educational outcomes, and future employment prospects that in turn fuel a wider range of inequities. For all these reasons, research into student work hours, including both the reasons for their increase and their impacts, merits considerably greater attention.

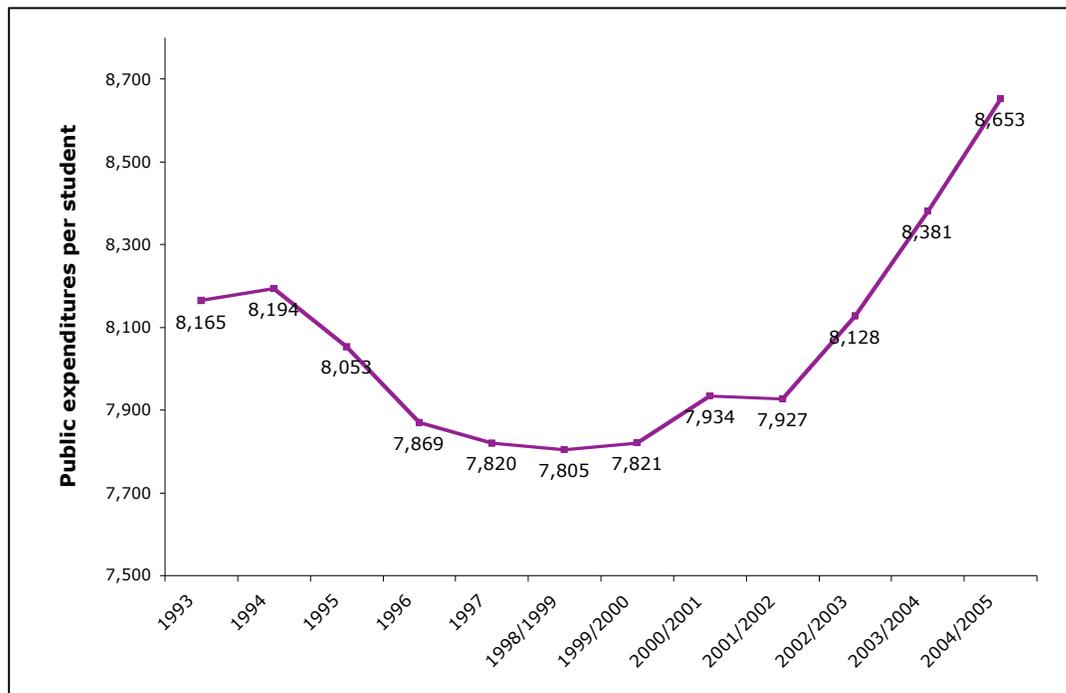
2.4 Financing the public school system: Public expenditures per full-time student (K–12)

Result: Nova Scotia spent the second lowest amount of money per student in the country in 2004/2005.

There is a demonstrated link between public funding level inputs and the quality of education. Under-funded schools are less likely than well-funded schools to provide good computers, quality library books, adequate facilities, art and music supplies, and a range of extra-curricular programs, and are more likely to have students sharing outdated texts.

In Canada, public expenditures per full-time student declined in the 1990s from an average of \$8,194 per full-time student in 1994 to \$7,805 per student in 1998/1999 (in constant \$2003 dollars). Since then, expenditures per student have risen, finally surpassing the levels of the early 1990s for the first time in 2003/2004, when they reached \$8,381 per student, and increasing further to \$8,653 in 2004/2005 (see Figure 10 below).⁴⁴

Figure 10. Public expenditure per full-time equivalent public school student, Canada, 1993–2005, (\$2003 CDN)

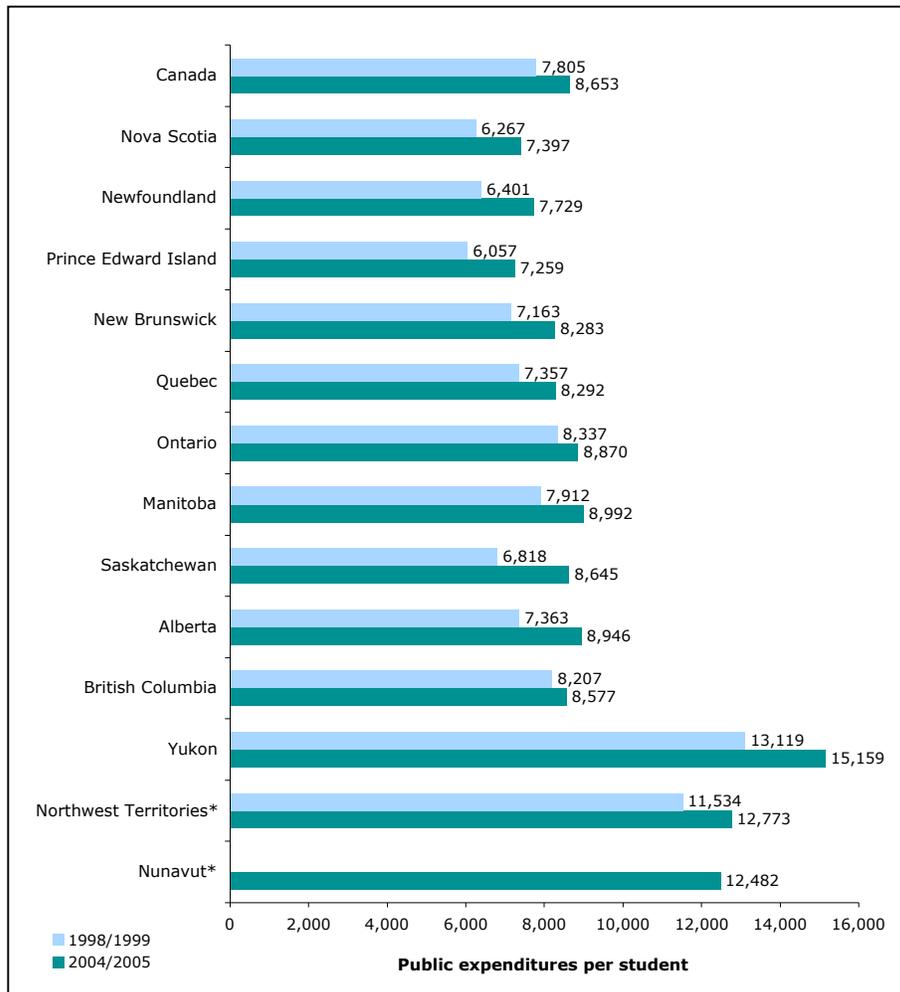


Sources: Blouin, Patric and Marie-Josée Courchesne. 2007. Research Paper: Summary Public School Indicators for the Provinces and Territories, 1998/1999 to 2004/2005. Statistics Canada. Ottawa; Statistics Canada, *The Daily*, July 28, 2000. School board revenues and expenditures, 1993–1997. Accessed December 2004.

Note: All figures were converted to 2003 constant dollars using the Bank of Canada’s Inflation Calculator, September 26, 2007. The data from 1998/99 onwards are for a school year, rather than a calendar year. The more recent year was used when converting to constant dollars. Figures were also rounded.

At the provincial and territorial level, Nova Scotia spent the second lowest amount per student in the country (\$7,397) in 2004/2005—17% less than the Canadian average (\$8,653), more than 21% less than provincial front-runner Manitoba (\$8,992), and 12% less than neighbouring New Brunswick (\$8,283). Spending per student was highest in the Yukon, Northwest Territories, and Nunavut—where operating costs are higher due in part to the geographic dispersal of a small population over a large area—followed by Manitoba, Alberta, Ontario, Saskatchewan, and British Columbia. Prince Edward Island spent the least amount (\$7,259) per student (see Figure 11 below).

Figure 11. Public expenditure per full-time equivalent student, provinces and territories, 1998/1999 and 2004/2005 (\$2003 CDN)



Source: Blouin, Patric and Marie-Josée Courchesne. 2007. Research Paper: Summary Public School Indicators for the Provinces and Territories, 1998/1999 to 2004/2005. Statistics Canada. Ottawa.

Notes: All figures were converted to 2003 constant dollars using the Bank of Canada’s Inflation Calculator, September 26, 2007. The data are for a school year, rather than a calendar year. The more recent year was used when converting to constant dollars. Figures were also rounded. *Starting in 1999/2000, the Northwest Territories excludes Nunavut. Higher spending per student in the Northwest Territories, Yukon Territory, and Nunavut reflects higher operating costs in the North.

The provincial and territorial data also indicate that real (inflation-adjusted) public spending per student increased in all provinces and territories over the six-year period from 1998/99 to 2004/05, with the largest increases occurring in Saskatchewan (28%) and Alberta (21%), compared to an 11% increase nationwide. Newfoundland and Labrador, Prince Edward Island, and Nova Scotia also experienced significant spending increases per student—21%, 20%, and 18% respectively. However, these three provinces

were the lowest spenders per student in 1998/1999, and, despite the large increases in per student spending since that time, still remain well below the Canadian average and still have the lowest per student expenditures in the country.

2.5 Structure: Class size

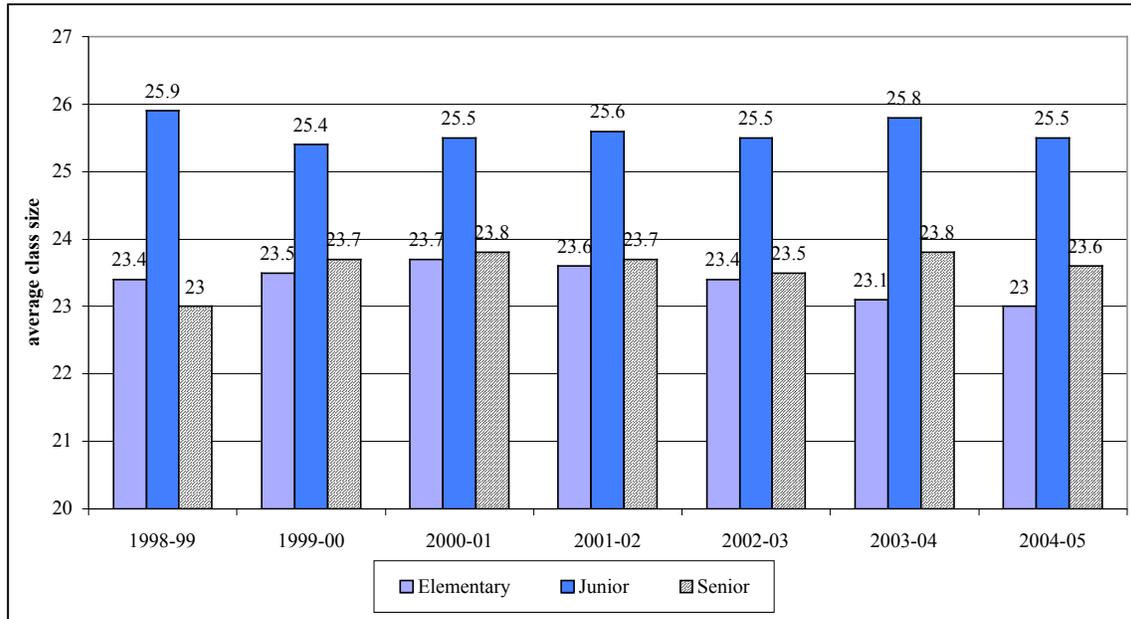
Result: There were no significant changes in class sizes in Nova Scotia (K-12) between 1998-99 and 2005-06.

According to the literature in this field, class size—particularly in the early grades—influences educational outcomes of students, teacher workloads, and the learning environment in general. Pan-Canadian data on class size are not available for any level of education. Some provinces, such as Nova Scotia, Saskatchewan, Ontario, and Alberta do collect and report data on this indicator, but even these data are not comparable, for reasons explained in the GPI education report.

Instead, pan-Canadian data are available for student–educator ratios at the elementary–secondary level, but these are often much smaller than actual class sizes, because *educators* include both teachers and *administrators* who may never enter a classroom. These student-educator ratios are therefore far less indicative of potential influences on educational outcomes than class sizes.

In Nova Scotia, the Department of Education fortunately does publish detailed data on class size for the province overall and for each school board at the elementary, junior, and senior levels. As Figure 12 indicates, class sizes at all levels did not change much between 1998-99 and 2005-06. In 1998-99 the definitions of average class size were revised, and therefore historical comparisons with prior periods are not possible.

Figure 12. Class size by educational level, Nova Scotia, 1998–99 to 2005–06

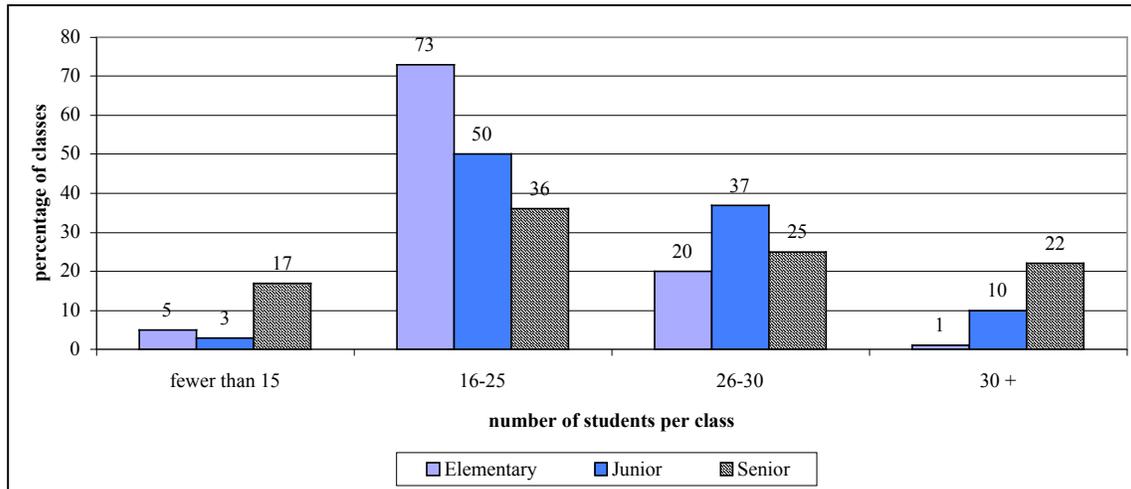


Source: Statistical Summaries for education are available from the Nova Scotia Department of Education at <http://stats-summary.ednet.ns.ca>. Class size data for 2005/2006 can be found at <http://stats-summary.ednet.ns.ca/publicat.shtml>. Class size data are collected from every school in every school board in the province.

Notes: At the elementary level, class size is defined as the homeroom class size at each grade. At the junior level, class size is the Language Arts or French Language Arts class at each grade. At the senior level, class size is defined as any group of students, regardless of size, that occupies one teacher for one full period of instruction.

The Department of Education also reports the number and proportion of classes in different class size categories. For example, in 2005/2006, at the elementary level, 5% of classes had fewer than 15 students, 73% had between 16 and 25 students, 20% had between 26 and 30 students and 1% had greater than 30 students. At the junior level, 3% of classes in the province had fewer than 15 students, 50% had between 16 and 25, 37% had between 26 and 30, and 10% had more than 30 students. At the senior level, 17% of classes had fewer than 15 students, 36% had between 16 and 25, 25% had between 26 and 30, and 22% had more than 30 students (see Figure 10).⁴⁵

Figure 13. Percentage of classes by size, by educational level, Nova Scotia, 2005–06



Source: Statistical Summaries for education are available from the Nova Scotia Department of Education at <http://stats-summary.ednet.ns.ca>. Class size data for 2005/2006 can be found at <http://stats-summary.ednet.ns.ca/publicat.shtml>. Class size data are collected from every school in every school board in the province.

2.6 Independence: Public versus private share of sponsored research at Canadian universities

Result: The ratio of private to public funding of research has increased since the early 1970s, posing a potential threat to the academic integrity and independence of Canadian university research.

Detailed evidence examined by GPIAtlantic for this study suggests that, when university research is privately funded, there is a greater potential for investigators to face outside interference and challenges with regard to study design, access to data, and publication rights than when research is publicly funded. This problem—particularly restriction on publication rights—is clearly not limited to university research, but may apply whenever private funding contributes to research of any kind.

In addition, increased pressure is being placed on university and other researchers to find commercial applications for their work, thus potentially restricting basic or curiosity-based research.

Indeed, anything that restricts or limits the educational horizons of students and researchers or prevents them from an unhindered pursuit of truth runs counter to the principle of “systematic, scientifically-based investigation” that the Pan-Canadian Education Indicators Program identifies as a central and defining role of postsecondary

education.⁴⁶ Analysts have therefore described external influences on university and other research as anti-educational. According to philosopher John McMurtry:

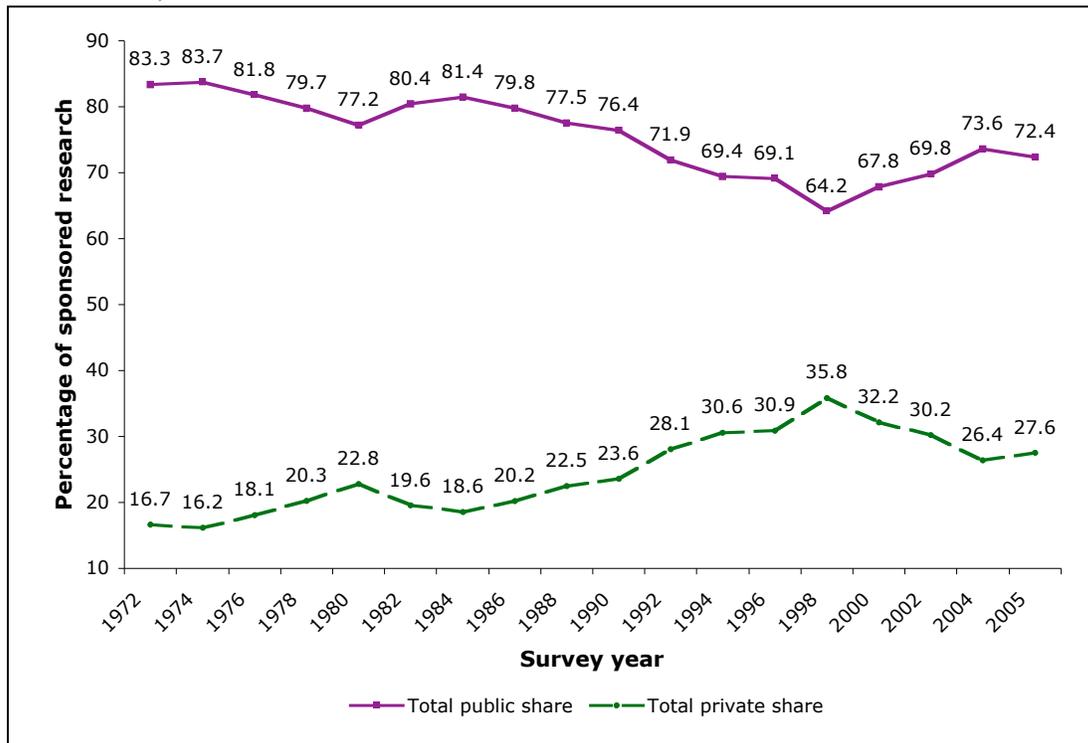
If society's education system is ineluctably determined by economic requirements, and these economic requirements are the requirements of established market-capitalism, then it follows that we face the prospect of an inevitable transformation of our educational process into an organ of the capitalist market [...]. Because an educational process is required by its nature to reflect upon and question presupposed patterns of being, its absorption into one of these patterns, the global market system, must leave society in a very real sense without its capacity to think. It becomes a kind of mass creature, a collective system of gratifying desires for private profit and consumption with no movement beyond itself towards understanding and consciousness as a human purpose in its own right.⁴⁷

While no direct measures of external influence or interference in research are available, the public versus private share of sponsored research at Canadian universities may potentially point to issues of independence and academic integrity. This indicator therefore serves here as a proxy measure—with an increased private share of funding taken here as denoting potential threats to independence—until more direct measures are developed.

It should be noted, however, that increased requirements for public–private partnerships and for commercialization of research in some public funding agreements are blurring conventional distinctions between public and private funding. As well, public funding also undoubtedly reflects dominant social paradigms and is therefore by no means immune to the more subtle research design and content distortions described above. This indicator on the private versus public share of sponsored research by no means gets at that more subtle dimension of dependence, and therefore again represents only a very modest first step in efforts to assess genuine research independence.

Over the last 30 years, there has been a marked increase in the private share (and decline in the public share) of funding for university research. As Figure 14 below indicates, the public share of sponsored research gradually declined from 83.3% in 1972 to 64.2% in 1998 and then increased to 72.4% in 2005 largely as a result of recent public funding commitments to the Canada Research Chairs, Canada Foundation for Innovation, and Canadian Institutes of Health Research (CIHR). During the same time period, the private share of sponsored research more than doubled from 16.7% in 1972 to 35.8% in 1998, and then declined to 27.6% in 2005, again largely because of the more recent infusion of public monies noted above.

Figure 14. Public versus private share of sponsored research at Canadian universities, 1972–2005



Source: Larry Dufay, Senior Research Officer, Canadian Association of University Teachers (CAUT). Personal communication, September, 2006. Original data from Statistics Canada's Financial Information of Universities and Colleges (FIUC) survey and Canadian Association of University Business Officers (CAUBO).

Notes:

- Categories of public funding sources include Social Sciences and Humanities Research Council (SSHRC), Health Canada, Natural Sciences and Engineering Research Council (NSERC), Canadian Institutes of Health Research (CIHR), Canada Foundation for Innovation (CFI), Canada Research Chairs, other federal sources, and provincial, municipal, other provincial, and foreign sources. Private funding sources include: a) donations and bequests from individuals, business enterprises, foundations, and non-profit organizations and b) non-government grants and contracts from individuals, business enterprises, foundations, and non-profit organizations.
- According to CAUT's Senior Research Officer Larry Dufay, prior to 2000, CAUBO did not disaggregate the data for private funding by type of source; therefore, prior to 2000, private funding is presented as a total for the sector.⁴⁸
- By definition, sponsored research is from sources external to the universities themselves. Therefore, Figure 14 above does not include research funding provided by the universities.

2.7 Basic adult literacy: Trends in prose and document literacy

Result: Despite higher rates of postsecondary graduation, there has been little change in the literacy profiles of Canadians between 1989 and 2003.

Basic adult literacy is the one form of literacy that has been the subject of an impressive amount of study, data collection, and analysis both in Canada and internationally over the last 20 years. While literacy in the Genuine Progress Index is more broadly defined to include multiple literacies in several knowledge areas rooted in particular social and cultural locations and practices, the available data describe literacy in narrower terms. Thus, the three domains of basic literacy skills measured in the 1994 International Adult Literacy Survey (IALS) were document, prose and quantitative literacy and the four domains measured in the 2003 International Adult Literacy and Skills Survey (IALSS) were prose, document, numeracy, and problem solving.

Due to methodological and definitional issues, the 1994 IALS and the 2003 IALSS are not fully comparable, and only the prose and document literacy sections in both rounds of testing are sufficiently similar that they can be compared.⁴⁹ Thus, trend lines are only presently possible for prose and document literacy, which are defined as follows:

- Prose literacy measures 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.⁵⁰

In both surveys, literacy skills are divided into five levels of difficulty, from the lowest proficiency at level 1 to the highest proficiency at level 5. Level 3 is defined as 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.”^{51, 52} In 1994, 53% of Canadians scored at level 3 or higher in prose literacy and 52% scored at level 3 or higher in document literacy, compared with 52% and 51% in 2003 respectively—indicating a possible marginal, though not statistically significant, decline in prose and document literacy nationwide.

When average scores are examined, there was little change in the prose and document literacy profiles of Canadians between the 1994 IALS and 2003 IALSS. In fact, the only statistically significant changes in the 9-year period were in Quebec, where there was an increase in average prose literacy from 255 to 266 and in document literacy from 254 to 263, and in the Atlantic region, where there was an increase in document literacy from 259 to 267 (see Figures 15 and 16 below for average prose and document literacy scores by region).⁵³

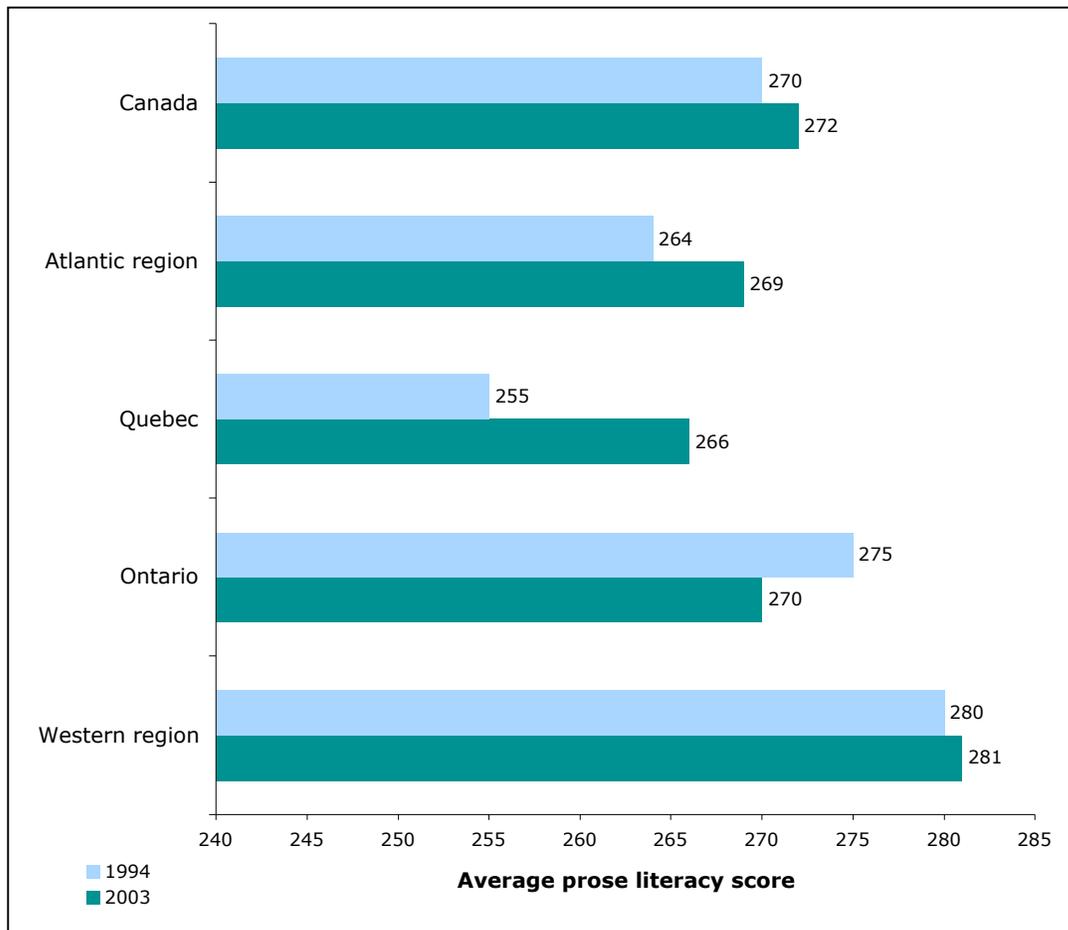
Furthermore, when earlier Statistics Canada literacy data are adjusted for methodological changes and analyzed by comparison with the 1994 and 2003 results, it is apparent that literacy levels in Canada have not improved substantially since 1989—the first available

observation.⁵⁴ Thus, over a nearly 15-year period, literacy levels have remained stable despite rising levels of formal educational attainment in the Canadian populace.

According to Statistics Canada, literacy levels were expected to improve between 1994 and 2003 based on the retirement of older, less educated workers; the tendency of new immigrants to be more highly educated; and the growth in the proportion of the Canadian-born population with postsecondary education.⁵⁵

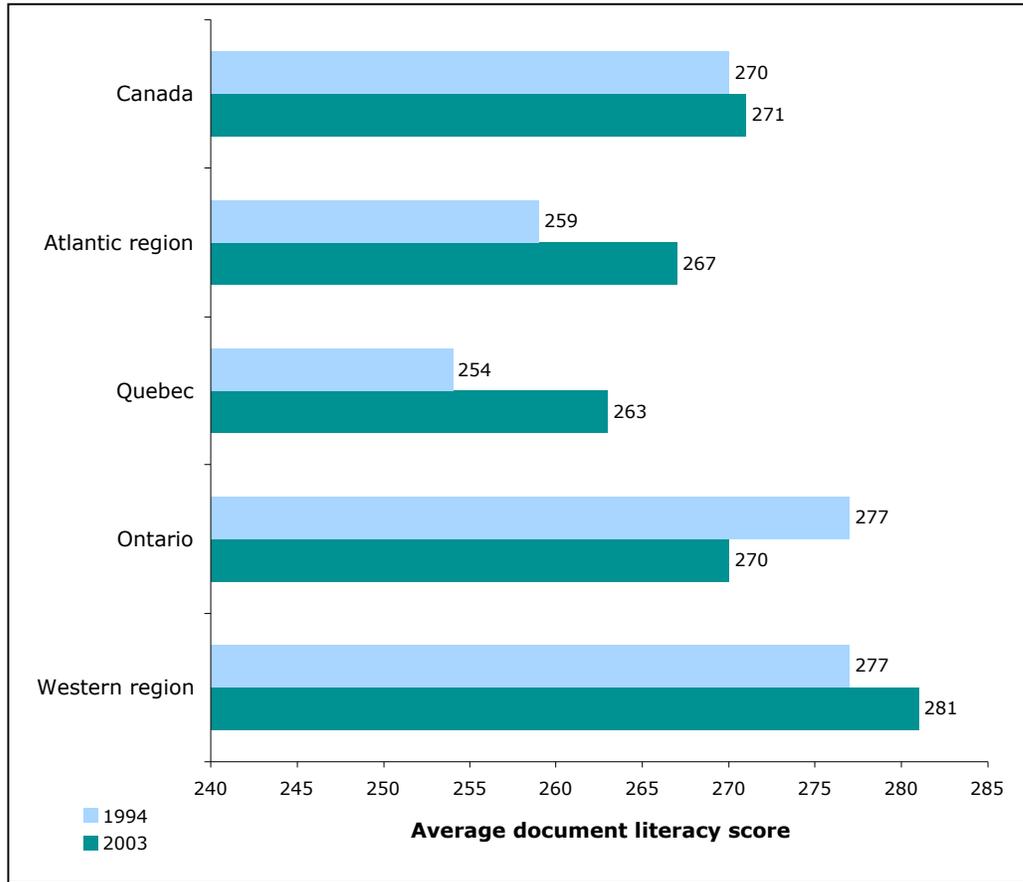
The lack of improvement was also surprising to the Canadian Council on Learning (CCL), which stated: “We urgently need to understand why our current literacy and learning programs are not succeeding in order to develop more effective approaches.”⁵⁶

Figure 15. Average prose literacy scores across selected regions and provinces, Canadian population aged 16 and over, 1994 and 2003



Sources: International Adult Literacy Survey, 1994; International Adult Literacy and Skills Survey, 2003.
 Notes: In this comparison, the territories are excluded from the Canadian average. The Western region includes Manitoba, Saskatchewan, Alberta, and British Columbia. The Atlantic region includes Newfoundland and Labrador, Nova Scotia, New Brunswick, and Prince Edward Island. Except for Quebec, the differences in prose literacy scores between 1994 and 2003 are not statistically significant.

Figure 16. Average document literacy scores across selected regions and provinces, Canadian population aged 16 and over, 1994 and 2003



Sources: International Adult Literacy Survey, 1994; International Adult Literacy and Skills Survey, 2003.

Notes: In this comparison, the territories are excluded from the Canadian average. The Western region includes Manitoba, Saskatchewan, Alberta, and British Columbia. The Atlantic region includes Newfoundland and Labrador, Nova Scotia, New Brunswick, and Prince Edward Island. Except for Atlantic region and Quebec, the differences in document literacy scores between 1994 and 2003 are not statistically significant.

2.8 Civic literacy: Trends in general political knowledge by age cohort

Result: The political knowledge of Canadians is in general decline. This decline is particularly marked among younger people, who tend to have considerably less political knowledge today than younger people did a generation ago.

Henry Milner, of the Université Laval in Quebec, defines civic literacy simply as “the knowledge and capacity of citizens to make sense of their world,” or the “knowledge to be effective citizens.”⁵⁷ Explaining the value and importance of civic literacy, Milner argues that, because knowledge of the world and of civic processes inevitably points to needed actions, civic literacy encourages political participation as well as more equitable societies “based on sustainable wellbeing.”⁵⁸ Milner also notes that: “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 [...] outcomes.”⁵⁹

Researchers have found political knowledge to be highly correlated with voter turnout and political engagement, especially among young adults. Well-informed citizens are more likely to follow and be interested in politics, to participate in politics by voting, to work for a political party, and to attend community meetings.⁶⁰ Research also 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).⁶¹ Therefore, even a very limited and partial assessment of political knowledge might serve to indicate broader political knowledge and to predict levels of civic engagement.

Paul Howe, of the University of New Brunswick, has analyzed results from selected Canadian Election Study (CES) surveys. He notes that the CES is “the only [Canadian study] on which a reasonable selection of knowledge-based items appear.”⁶²

Howe has constructed a knowledge scale, based on 29 questions from the 1984, 1993, 1997, and 2000 CES surveys, in order to measure general political knowledge across time and by age-group distribution. The questions include knowledge of the names of premiers, party leaders, and the federal finance minister, and knowledge of party positions and campaign promises. Howe’s composite scale allows a comparison of levels of political knowledge over time despite the different questions asked in the different CES surveys.⁶³ While results for a wide range of specific questions have been explored for this report, we reproduce only one Table here, based on Howe’s composite political knowledge scale.

In order to help identify general trends over time, “sub-par levels” of knowledge (below 50th percentile) are located to the left of the zig-zag line in Table 1 below, and “above-average” levels of knowledge (above 50th percentile) are located to the right of the zig-zag line.⁶⁴

Table 1 indicates that, in general, younger people have considerably less political knowledge than older people, and that the political knowledge of younger people is decreasing over time and at a faster rate than for any other group.⁶⁵ Thus, between 1984 and 2000, scores fell by 20% for the youngest group (aged 18–23), by 17% for the next youngest group (24–29), by 8% for those aged 30–34, and by between 4% and 6% for middle-aged Canadians, while knowledge scores improved for those 50 and over.

The results show clearly that political knowledge generally increases with age, with those 50 and older being considerably (and increasingly) more knowledgeable than those younger than 30. For example, in 1984, the 18- to 23-year-old age group was in the 39th percentile, whereas the 60 and older age group was in the 52nd percentile—a difference of 13 percentage points. By 2000, this gap had increased sharply, so that 18- to 23-year-olds were in the 31st percentile and those 60 and older were in the 58th percentile—a difference of 27 percentage points. Thus, the gap between the political knowledge levels of the youngest and oldest age groups grew by 14 percentage points between 1984 and 2000.

The gap between the 18- to 23-year-olds and 50- to 59-year-olds also increased during this period—from a gap of 18.6 percentage points in 1984 to a gap of 28.3 percentage points in 2000—an increase of 9.7 percentage points. The gap between the political knowledge of the next youngest group (aged 24–29) and those 60 and older also grew sharply during this period—from a gap of 8.7 percentage points in 1984 to a gap of 22.1 percentage points in 2000—an increase of 13.4 percentage points.

In comparing the political knowledge of young people in 2000 with the political knowledge of young people in previous years, there is evidence of a fairly steady decline in knowledge. In 1984, the 18–23 and 24–29 age groups were in the 39th and 43rd percentiles, respectively. By 2000, these scores had dropped to the 31st and 36th percentiles respectively, representing drops of 8 and 7 percentage points, respectively, between 1984 and 2000.

Finally, the number of age groups falling below the 50th percentile has also increased steadily over time, as the zig-zag line in Table 1 demonstrates. In 1984, only the youngest groups (those aged 18–29) had percentile scores under 50. In 1993, these two groups were joined by 30- to 34-year-olds; and by 1997, the 35–39 age group had also fallen into the lower half of the scores. This decline in political knowledge among younger Canadians over time is largely confirmed again by the 2000 results, in which (despite marginal improvements in the scores of those aged 30–39) Canadians under 40 again fell below the 50th percentile.

Indeed, the 1984–2000 CES results appear to indicate that, except for those 50 and older, the level of political knowledge in the Canadian populace is in general decline.

Table 1. Percentile scores of correct answers to general political knowledge questions, by age group, 1984, 1993, 1997, and 2000

Year	Age Group						
	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
1993	36.7	46.7	47.1	50.3	55.5	53.1	56.0
1997	37.8	41.0	46.1	47.7	53.2	58.4	57.0
2000	31.4	36.2	47.6	49.5	51.4	59.7	58.3

Source: Adapted from 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, based on the 1984, 1993, 1997, and 2000 CES surveys.

Note: Knowledge scores for each election year are based on the number of questions respondents answered correctly in each year, with results then converted to percentile scores. Relative knowledge levels of the different age groups were calculated based on the mean percentile scores within each age group.

2.9 Multicultural literacy: Proportion of Canadians and Nova Scotians who are English–French bilingual

While Canada may be officially bilingual, bilingualism is not a reality for the vast majority of Canadians. Only one in ten Nova Scotians speaks both official languages fluently. Increases in bilingualism nationwide are mostly due to more native French speakers learning English rather than to more English speakers learning French.

Multicultural literacy 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.”⁶⁶ It also includes an understanding and appreciation of diversity and equity issues. According to Saskatchewan Education, multicultural literacy should “lead towards the elimination of racism, prejudice and intolerance in order to create a politically, socially and economically just society.”⁶⁷

In light of the significance of multiculturalism, particularly within the Canadian context where it is official policy, Canadian educators have frequently stressed that it is important for Canadians to learn about, understand, and appreciate multiculturalism and diversity as part of their core stock of knowledge. Canadian Heritage notes that legislation is not enough to ensure equity, peace, and understanding among and between multiple cultures. Rather, it argues that multicultural literacy in the general populace, acquired through experience and informal learning, as well as through formal multicultural education, is also necessary.⁶⁸

At this point, we have found no comprehensive, common international or national indicators of multicultural literacy that can be adequately and effectively utilized in the GPI education indicators report from the perspective of learning outcomes. Public opinion research firms conduct periodic surveys about attitudes, interests, sense of heritage, and perceptions of social integration, including feelings about racism and discrimination—all of which are relevant to multiculturalism. These surveys consistently find that Canadians appreciate diversity and the contribution of different cultures, and value the retention of cultural heritages and knowledge. However, the public opinion results tell more about whether the basic concept of multiculturalism is generally accepted in Canada than about the actual level of multicultural literacy—including the state of learning and level of knowledge about diverse cultures—that exists in the populace.

In light of the lack of suitable data to indicate multicultural literacy, we report here only one small element of multicultural literacy as an interim proxy measure—the percentage of Canadians who speak both English and French fluently. According to U.S. educational consultants from The Metiri Group who have constructed a framework for assessing multicultural literacy, bilingualism and multilingualism are important elements of multicultural literacy.⁶⁹ As one analysis notes: “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.”⁷⁰

Both English and French are official languages in Canada, and bilingualism is a fundamental aspect of Canada’s identity, culture, federal government policy and practice, and commitment to multiculturalism. Both of Canada’s two official languages are taught in formal education systems across the country in order to foster bilingualism and knowledge of both English and French cultures. Moreover, the benefits of bilingualism and multilingualism go beyond the particularly Canadian dimensions of this country’s official two-language policy and were explored in some detail by *GPIAtlantic*.

Over the past four decades, the number of Canadians who speak both English and French has more than doubled to 5.2 million people. Nevertheless, most of this increase simply reflects overall population growth, and the actual percentage of English–French bilingual Canadians has remained relatively small, increasing only marginally over time. Based on Census data from 1991, 1996, and 2001, as illustrated in Table 2 below, 17.7 % of Canadians identified themselves as English–French bilingual in the 2001 Census, up slightly from 17.0% in 1996 and 16.3% in 1991. In Nova Scotia, 10.1% of the population identified itself as bilingual in 2001, up from 9.3% in 1996 and 8.6% in 1991.^{71,72}

The majority of bilingual Canadians live in Quebec and New Brunswick (3.4 million out of 5.2 million nationwide). These are the two provinces with the highest proportion of native French speakers. When the rest of Canada without Quebec is considered, only one in ten Canadians is bilingual (10.3% in 2001). This rate has remained fairly stable since 1991 (10.2% in 1996, and 9.8% in 1991).

Table 2. Percentage of Canadians who are English–French bilingual, by province and territory, 1991, 1996, and 2001

Region	Survey year		
	1991	1996	2001
Canada	16.3	17.0	17.7
Canada less Quebec	9.8	10.2	10.3
Nova Scotia	8.6	9.3	10.1
Newfoundland and Labrador	3.3	3.9	4.1
Prince Edward Island	10.1	11.0	12.0
New Brunswick	29.5	32.6	34.2
Quebec	35.4	37.8	40.8
Ontario	11.4	11.6	11.7
Manitoba	9.2	9.4	9.3
Saskatchewan	5.2	5.2	5.1
Alberta	6.6	6.7	7.0
British Columbia	6.4	6.7	7.0
Yukon	9.3	10.5	10.1
Northwest Territories	-	7.7	8.3
Nunavut	-	4.1	3.8

Source: Statistics Canada. *2001 Census: Analysis Series: Profile of Languages in Canada: English, French and Many Others*, Catalogue no. 96F0030XIE2001005, 2002; accessed October 2006; available from <http://www12.statcan.ca/english/census01/Products/Analytic/companion/lang/pdf/96F0030XIE2001005.pdf>.

Note: Hyphens indicate that data are not available for that year (—Nunavut was founded only in 1999).

In fact, most of the overall increase in bilingualism in Canada is due to its rapid growth in Quebec, where bilingualism increased from 35.4% of the population in 1991 to 40.8% in 2001. In New Brunswick, too, bilingualism increased sharply from 29.5% of the population in 1991 to 34.2% in 2001, though that province’s much smaller population (750,000 in 2006 compared to 7.7 million in Quebec⁷³) means that the impact of its increase on the national rate of bilingualism was only one-tenth that of Quebec.

By contrast to these two provinces, there was almost no increase in the rate of bilingualism in Ontario and in the Prairie provinces in the decade from 1991 to 2001. Although the number of bilingual Atlantic Canadians outside New Brunswick remains small, it is noteworthy that in *relative* terms, the rate of increase in bilingualism has been faster in this region than in any other part of the country. Thus, between 1991 and 2001, the rate of bilingualism increased by 17% in Nova Scotia, 19% in PEI, 16% in New Brunswick, and 24% in Newfoundland and Labrador, compared to just 3% in Ontario, 1% in Manitoba, 6% in Alberta, and 9% in BC, while it declined by 2% in Saskatchewan.

In Quebec, the rate of bilingualism increased by 15% between 1991 and 2001, with that increase alone accounting for by far the largest absolute increase in bilingualism nationwide—with more than four in ten Quebecois now bilingual compared to an average

of just one in ten Canadians outside Quebec, as noted above.

In Canada, according to the 2001 Census, English is spoken as a first language (Anglophone) by 58.5% of the population, and French is spoken as a first language (Francophone) by 22.6% of the population. Another 18.5% of Canadians speak one of the more than 100 other languages spoken in Canada as their native tongue (—these people are labelled as “Allophone” by Statistics Canada).⁷⁴

Table 3 below shows the percentage of Canadians who are bilingual according to their native language. English–French bilingualism is greatly skewed towards the 22.6% of Canadians whose native language is French. While 43.4% of Francophones speak English fluently, only 9.0% of Anglophones are able to speak French fluently. This is a smaller proportion than among Allophones, of whom 11.8% are fluent in both English and French in addition to their ability to speak their own native language. However, English–French bilingualism among Allophones is concentrated mainly in Quebec.

Additionally, bilingualism grew at a faster rate among Francophones than among Anglophones, increasing from 38.6% of the Francophone population in 1991 to 40.8% in 1996 to 43.4% in 2001. By contrast, bilingualism among Anglophones increased by less than one percentage point over the decade—from just 8.2% in 1991 to 8.8% in 1996 to 9.0% in 2001. Thus, the overall increase in bilingualism in the country (from 16.3% of Canadians in 1991 to 17.7% in 2001) is mostly due to more native French speakers learning English rather than to more English speakers learning French.

The provincial breakdowns in Table 3 below show that, between 1991 and 2001, bilingualism increased among Francophones, Anglophones, and Allophones in Quebec and New Brunswick—the two provinces with the largest proportion of native French speakers. Two-thirds (66.1%) of all Anglophones in Quebec spoke French fluently in 2001, up from 58.4% in 1991, while 36.6% of Francophones in Quebec were bilingual, up from 31.3% in 1991. Half (50.4%) of all Allophones in Quebec were English–French bilingual in 2001, up from 46.5% in 1991.

New Brunswick, Canada’s only officially bilingual province, saw similar rates of increase in bilingualism between 1991 and 2001—from 62.5% to 71.5% among Francophones, from 12% to 15% among Anglophones, and from 14.8% to 17.5% among Allophones.

Outside Quebec and New Brunswick, however, the picture is very different, with only one in 14 Anglophones outside Quebec able to speak French fluently in 2001. Thus, while 85.1% of Canadian Francophones outside Quebec were bilingual in 2001, up from 81.2% in 1991, only 7.1% of Anglophones outside Quebec spoke French fluently, up marginally from 6.3% in 1991. While 50.4% of Allophones in Quebec are bilingual, only 5.7% outside Quebec are English–French bilingual.

In Nova Scotia, only 6.4% of Anglophones were bilingual in 2001 compared to 93.7% of Francophones, up from 4.8% and 91.6% respectively in 1991.

Table 3. Percentage of Canadians who are English–French bilingual, by language groups, provinces, and territories, 1991, 1996, and 2001

Region	Anglophone			Francophone			Allophone		
	1991	1996	2001	1991	1996	2001	1991	1996	2001
Canada	8.2	8.8	9.0	38.6	40.8	43.4	11.3	11.2	11.8
Canada less Quebec	6.3	6.9	7.1	81.2	83.8	85.1	5.3	5.3	5.7
Newfoundland and Labrador	2.8	3.5	3.7	86.0	88.4	85.8	7.1	7.0	6.5
Prince Edward Island	6.4	7.2	8.3	88.0	91.3	90.1	6.6	11.7	10.0
Nova Scotia	4.8	5.7	6.4	91.6	92.4	93.7	9.7	8.9	10.7
New Brunswick	12.0	14.0	15.0	62.5	68.9	71.5	14.8	15.7	17.5
Quebec	58.4	61.7	66.1	31.3	33.7	36.6	46.5	46.7	50.4
Ontario	7.5	8.1	8.2	86.7	88.4	89.4	6.3	6.3	6.8
Manitoba	5.8	6.3	6.5	90.4	91.5	91.6	2.6	2.5	2.9
Saskatchewan	3.5	3.7	3.6	89.5	88.0	87.8	1.8	1.8	2.0
Alberta	4.9	5.1	5.3	89.2	89.7	89.6	3.8	3.9	4.1
British Columbia	5.2	5.7	6.0	88.1	88.6	89.0	4.5	4.3	4.4
Yukon	6.5	7.3	7.3	91.2	93.5	89.3	5.3	5.8	8.2
Northwest Territories	-	6.2	7.0	-	92.1	86.2	-	2.5	3.2
Nunavut	-	8.5	7.3	-	93.8	86.3	-	0.6	0.7

Source: Statistics Canada. *2001 Census: Analysis Series: Profile of Languages in Canada: English, French and Many Others*, Catalogue no. 96F0030XIE2001005, 2002; accessed October 2006; available from <http://www12.statcan.ca/english/census01/Products/Analytic/companion/lang/pdf/96F0030XIE2001005.pdf>.

Notes: Anglophone: the population with English as mother tongue; Francophone: the population with French as mother tongue; Allophone: the population with a non-official language as mother tongue. The hyphens indicate that data are not available for that year (—Nunavut was founded only in 1999).

2.10 Ecological literacy: Percentage who know basic ecological facts

Canadians have a relatively low level of basic ecological knowledge.

According to U.S. educator and renowned ecologist David Orr and others, ecological literacy—or knowledge of the Earth’s ecosystems and of the interrelatedness of all life—is crucial knowledge for an educated populace in today’s world, and is essential for the sustainability and wellbeing of the planet and all of its occupants.⁷⁵ As well, the United Nations has identified education as “humanity’s best hope and most effective means to the quest to achieve sustainable development,”⁷⁶ and the overriding objective of the entire United Nations Decade of Education for Sustainable Development (2005-2014) may be seen as improving the ecological literacy of the world’s population.

Environment Education Ontario (EEON) defines ecologically literate citizens simply as those who “understand ecological concepts and environmental issues,” and who “make changes in behaviours and practices that will positively affect the environment.”⁷⁷

Unfortunately—despite the vital importance of this issue—data are not currently available to construct a comprehensive indicator to assess the overall level of ecological literacy in Canada. For that reason, the following indicator—knowledge of basic environmental facts, or the percentage of the adult population who can correctly answer questions about basic environmental facts (which is considered to be one essential component of ecological literacy)—is used here as a proxy to begin to point toward the possible level of ecological literacy in this country. Additional indicators that address the value, attitudinal, and behavioural components of ecological literacy have been explored by GPIAtlantic for this study.

Results for the indicator reported here are drawn from the International Social Survey Programme (ISSP) in Cologne, Germany, which conducts annual social surveys in approximately 41 countries on topics of interest to social science research.⁷⁸ Table 4 below shows the 1993 and 2000 results for 12 ISSP questions on basic environmental and scientific facts, with comparisons for Canada, the U.S., the Netherlands, and Norway. The Netherlands and Norway were chosen for comparison purposes here because those countries are often thought to have a relatively high level of environmental awareness and consciousness. Unfortunately, the sample size for Canada was insufficient to provide provincial breakdowns, so data for Nova Scotia are not available from this source.

In both its 1993 and 2000 environment questionnaires, the ISSP survey asked respondents for their opinions on a series of statements describing basic environmental facts.⁷⁹ Due to changes in the wording and content of the questions in 2000, only six of the twelve questions are comparable across the two survey years.

For each of the statements given, the respondents were asked if it was definitely true, probably true, probably not true, or definitely not true. Results are presented below only for those who reported the correct answer—“correct” answers here being defined as those where respondents correctly identified a statement as being “definitely” true or not true, with “probably true” or “probably not true” answers excluded because these responses might represent guesses rather than actual knowledge.

In general, the Americans scored lower on almost all questions than the Canadians, Dutch, and Norwegians, while Canadians scored lower than the Europeans on some questions and better on others. For the six questions asked in both 1993 and 2000, respondents in all four countries scored lower on most questions in 2000 than in 1993, which may possibly indicate that the level of ecological literacy is declining rather than improving, though far more rigorous and detailed sampling and analysis are necessary to assess whether this is actually the case.

For Canada, only two of the six questions that were asked in both years (1993 and 2000) show an increase in the proportion of correct answers among Canadians—from 37.6% to 43.1% for the question “Every time we use coal or oil or gas, we contribute to the greenhouse effect,” and from 36.0% to 45.3% for the question “Antibiotics can kill bacteria but not viruses.” The other four questions showed a decline in the proportion answering correctly.

In addition, only one question out of the 12 was answered correctly by more than half of Canadian respondents—in 1993, 58.4% of respondents correctly identified as false the statement, “Cars are not really an important cause of air pollution in Canada.” This question was not asked in 2000, in which year not one of the six questions was answered correctly by more than half of Canadian respondents. These results again appear to indicate a low level of ecological knowledge among Canadians.

Nevertheless, for *all* questions, a higher proportion of Canadians than Americans answered correctly. With the exception of the question on antibiotics (where correct responses increased from 28.6% to 35.2%), there was very little change in the percentage of American respondents correctly answering the six questions that were asked in both years. Moreover, three of these six questions were answered correctly by only about 15% of the U.S. population, and only in five Americans knew that using coal, oil, or gas contributes to the greenhouse effect. Only one question was answered correctly by half of the U.S. population:—in 1993, 50.1% of Americans knew that the statement about cars not causing air pollution was false.

Table 4. Percentage of the populace who can correctly answer questions about basic environmental facts, Canada, United States, Netherlands, Norway, 1993 and 2000

Statement	Canada		United States		Netherlands		Norway	
	1993	2000	1993	2000	1993	2000	1993	2000
1. If someone is exposed to any amount of radioactivity, they are certain to die as a result. (incorrect)	47.3	34.2	30.2	31.0	29.5	20.9	47.6	38.8
2. The greenhouse effect is caused by a hole in the earth's atmosphere. (incorrect)	26.8	22.0	14.9	14.7	28.4	30.1	26.6	28.1
3. Every time we use coal or oil or gas, we contribute to the greenhouse effect. (correct)	37.6	43.1	20.6	20.9	32.0	30.5	43.8	40.3
4. Some radioactive waste from nuclear power stations will be dangerous for thousands of years. (correct)	44.9	-	35.2	-	46.9	-	42.5	-
5. All pesticides and chemicals used on food crops cause cancer in humans. (incorrect)	21.8	-	16.4	-	27.1	-	30.0	-
6. Human beings are the main cause of plant and animal species dying out. (correct)	30.8	-	16.6	-	37.3	-	39.4	-
7. Cars are not really an important cause of air pollution in [country, e.g., Canada]. (incorrect)	58.4	-	50.1	-	30.7	-	40.6	-
8. Antibiotics can kill bacteria but not viruses. (correct)	36.0	45.3	28.6	35.2	34.1	35.6	49.1	52.0
9. Human beings developed from earlier species of animals. (correct)	32.1	26.8	15.2	15.7	25.3	24.7	33.6	34.0
10. All man-made chemicals can cause cancer if you eat enough of them. (incorrect)	17.9	12.8	14.5	15.7	20.3	14.9	22.9	18.6
11. All radioactivity is made by humans. (incorrect)	43.4	-	32.3	-	36.2	-	32.6	-
12. Astrology—the study of star signs—has some scientific truth. (incorrect)	30.6	-	23.6	-	24.6	-	27.1	-

Sources: International Social Survey Program. *Codebook, ZA Study 2450, ISSP 1993, Environment I*, Cologne, Germany, Zentral archiv fur Empirische Sozialforschung, 1993; accessed May 2007; available from <http://www.za.uni-koeln.de/data/en/issp/codebooks/s2450cdb.pdf>; and International Social Survey Program. *Codebook, ZA Study 3440, ISSP 2000, Environment II*, Cologne, Germany, Zentral archiv fur Empirische Sozialforschung, 2000; accessed May 2007; available from <http://www.za.uni-koeln.de/data/en/issp/codebooks/ZA3440cdb.pdf>.

Notes: A hyphen (-) denotes that the question was not asked in that year. Percentages are based on the number of people who correctly answered the statements by stating they are definitely true for correct statements and by stating they are definitely not true for incorrect statements. Questions 1–7 are considered in the ISSP study to be environmental questions and questions 8–12 are considered to be science questions.

Of the six questions comparable across the two years, the Europeans showed an increase in the proportion answering correctly in only two of these. Unlike Canadians, there was an increase in the proportion of both Dutch and Norwegian respondents correctly identifying as false the statement, “The greenhouse effect is caused by a hole in the earth’s atmosphere”—from 28.4 to 30.1% of Dutch respondents and from 26.6 to 28.1% of Norwegian respondents. By contrast, only 22% of Canadians in 2000 answered that question correctly, down from 26.8% in 1993. Fewer than 15% of Americans could answer that question correctly in both years.

The proportion of Dutch and Norwegians answering the antibiotics question correctly also increased in both countries between 1993 and 2000—from 34.1 to 35.6% of Dutch respondents and from 49.1 to 52.0% of Norwegian respondents. This question was also the only one answered correctly by at least half of Norwegian respondents, while no question was answered correctly by half of Dutch respondents. It is interesting to note that, while the statement about cars causing pollution was the only question answered correctly by at least half of North Americans, only 30.7% of Dutch respondents and 40.6% of Norwegian respondents answered this question correctly.

As noted, the above data appear to indicate that Canadians have a relatively low level of basic ecological knowledge. Fewer than half of Canadian respondents in both 1993 and 2000 correctly identified as definitely true or false several key environmental knowledge statements. However, more recent data and responses to a wider range of questions need to be considered in order to fully assess Canadians’ understanding of ecological knowledge.

This low level of ecological literacy is also seen in the U.S., the Netherlands, Norway, and other countries, with the U.S. manifesting particularly low scores. In fact, according to the U.S.-based National Opinion Research Center, Canada actually ranked highest out of 20 countries on a composite environmental knowledge index.⁸⁰ As the U.S. National Science Foundation notes: “Setting aside the issue of ranking, these results suggest that the residents of major industrial nations throughout the world have a relatively low level of understanding of basic environmental concepts.”⁸¹

Since education is a provincial and territorial rather than federal responsibility in Canada, GPIAtlantic has made a preliminary attempt to assess provincial and territorial

commitments to supporting education for sustainable development, which includes improving levels of ecological literacy. GPIAtlantic did this by assessing responses to a United Nations survey on commitments to the UN Decade on Education for Sustainable Development (2005-2014) that was distributed to all provincial and territorial education departments by the Council of Ministers of Education, Canada (CMEC).

Among all provinces, Manitoba very clearly demonstrated the strongest commitment by far in this area, with financial support, teacher training programs, curriculum development, a dedicated website, and other actions designed to improve education for sustainable development. Other provinces that have taken at least a few significant steps in this direction are Quebec and Newfoundland and Labrador, while the remaining provinces scored poorly, generally responding to the CMEC survey with only vague, general, and non-substantive statements.

Nova Scotia, unfortunately, was the only province not to respond at all to the CMEC survey. Recent GPIAtlantic correspondence with the Nova Scotia Department of Education on this issue indicates that the Department is beginning to take steps to address the issue, though its definition and use of the term sustainability remain problematic, and its approach is far from systematic. It will be important to monitor the Department's actions over time, as well as curriculum development, teacher training, and educational outcomes among Nova Scotia students in this area, to assess whether serious and systemic efforts to improve ecological literacy and education for sustainable development in the province have taken root and yielded success.

2.11 Ecological Footprint

Result: Those with the highest levels of educational attainment have the greatest impact on the environment.

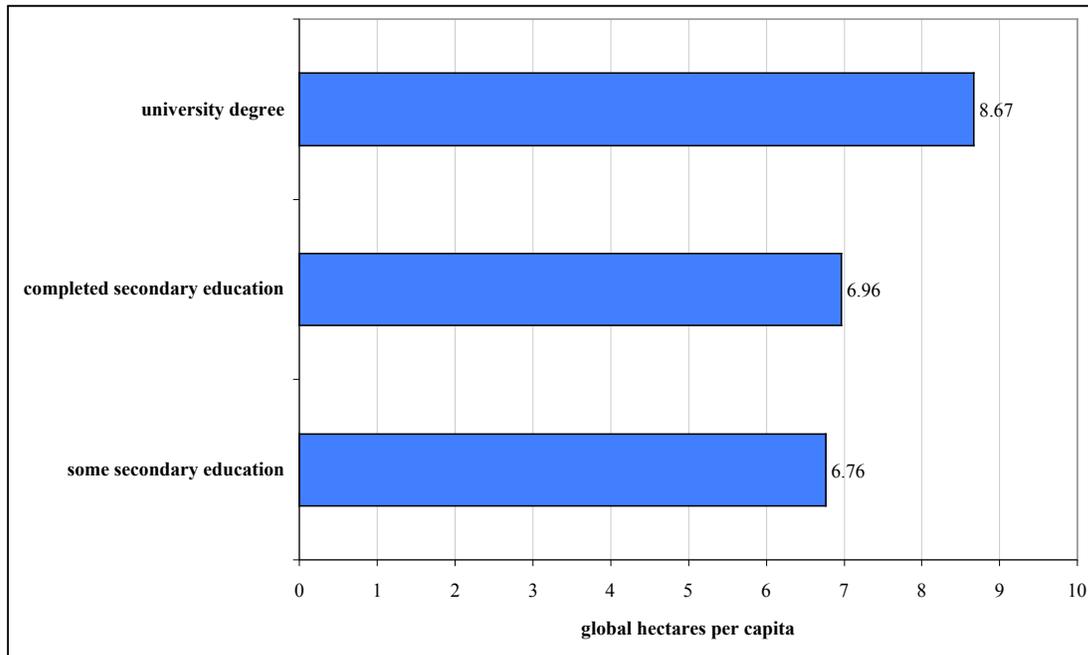
According to the Global Footprint Network, the average ecological footprint per Canadian resident is 7.6 global hectares (gha), signifying the biologically productive land and sea area required to support the average Canadian's lifestyle and resource consumption.⁸² This is far in excess of the 1.8 gha/capita of bioproductive area globally available to the world's population, and indicates that if everyone in the world were to consume resources at the rate that Canadians do, we would require more than three additional planets Earth to provide the necessary resources.

According to educator and ecologist David Orr: "We may reasonably surmise that, on average, those whose lifetime earnings are enhanced by [higher education] degrees do more damage to the planet than those less encumbered."⁸³

For the first time, in this educated populace study, data are now available on the ecological footprints of Canadians based on their educational attainment. These results

support Orr’s observation that higher levels of formal education lead to more unsustainable lifestyles. Thus, those Canadians who have only some secondary education use 6.76 global hectares per capita, those who have completed secondary education use 6.96 global hectares, while those who have a university degree use 8.67 global hectares each in order to sustain their lifestyles (see Figure 17 below).⁸⁴

Figure 17. Ecological Footprint by Educational Attainment, Canada, 2005



Source: Estimates developed by Hans Messinger, HFM Consulting, are based on source data from Statistics Canada’s Social Policy Simulation Database, National Accounts Analytical Studies Branch, and Global Footprint Network / International Institute for Sustainable Development data for the National Ecological Footprint and Biocapacity Accounts, 2005 edition.

Note: The ecological Footprints by education illustrate the global hectares consumed per person for the individual with the highest income in each household, disaggregated by that person’s level of formal educational attainment. A global hectare is an area weighted by productivity or “the amount of biological material useful to humans that is generated in a given area.” (Global Footprint Network, *Footprint Term Glossary*, 2007; accessed August 2007; available from http://www.footprintnetwork.org/gfn_sub.php?content=glossary.)

This evidence has important implications for the content and processes of formal education in the future. If the Canadian populace is to practice sustainable living in daily life, then—in line with the goals and objectives of the United Nations Decade of Education for Sustainable Development (2005-2014)—higher education should support rather than undermine sustainability. The footprint data by educational level, assembled in detail for the first time here will be a useful tool to monitor progress and suggest educational policy options in this area.

3. Key Findings: An Overview

Based on a close examination of the available evidence in the field of education indicators, we have identified a number of key findings that have emerged from this extensive body of evidence. These messages, which are additional to the summary discussion accompanying the key Nova Scotia results above, provide a more general and extensive overview of the GPI education component, and of some of the most important issues in further development of this domain. These findings and messages are summarized below.

Please note: the following key findings are not listed in order of significance. In general following some comments on data availability, formal education messages appear first, followed by key findings from the literacies. This accords with the order in which the Nova Scotia results were presented above.

1. There is an unavailability of basic data in key areas.
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- **Early childhood education:** The need for good indicators of early childhood education is widely accepted. However, at present, a comprehensive pan-Canadian assessment of early childhood education is not available. The Early Development Instrument (EDI) is an excellent model for assessing children’s readiness for school, but EDI data are presently only available for three provinces (Manitoba, Ontario, and British Columbia).

Research in the field of early childhood development has found that children’s engagement in co-operative play and make-believe play helps to build their capacity for empathy towards others, which is defined as “a deeply felt, not just understood, concern for the well-being of the Earth and of all living things; the ability to see from and appreciate multiple perspectives; a commitment to equity, justice, inclusivity, and respect for all people; [and] skills in building, governing, and sustaining communities.”⁸⁵ Statistics Canada’s National Longitudinal Survey of Children and Youth does broach the subject of co-operative play, and perhaps this question could be expanded to produce the more extensive, specific, and detailed data required to develop and produce this indicator in future.

- **Class size:** According to the literature in this field, class size—particularly in the early grades—influences educational outcomes of students, teacher workloads, and the learning environment in general. Pan-Canadian data on class size are not available for any level of education. Some provinces, such as Nova Scotia, Saskatchewan, Ontario, and Alberta do collect and report data on this indicator, but even these limited data sets are not comparable, in part because not all provinces report class sizes for all grades.

Instead, pan-Canadian data are available for student–educator ratios at the elementary–secondary level, but these are often much smaller than actual class sizes, because “*educators*” include both teachers and administrators who may never enter a classroom.

In Nova Scotia, the Department of Education publishes data on class size for the province overall and for each school board at the elementary, junior and senior levels. It also reports the number of classes by size and the percentage of classes with 25 or fewer students. For example, in 2005/2006, the province-wide average class size for the elementary grades was 22.4, and 77.6% of all classes at that level consisted of 25 or fewer students. At the junior high level, the average class size was 24.9 students, but only 53% of all classes had fewer than 25 students. At the senior high school level, average class size in Nova Scotia was 23.7, but again only 53% of all classes had 25 or fewer students in them.⁸⁶

At the postsecondary level, student–faculty ratios are also available, but again these include faculty who may only teach one class or who may not teach at all at the undergraduate level.

Even though student–educator ratios and student–faculty ratios therefore reveal less about students’ actual learning environment than class size data, consistent pan-Canadian data are available for those two indicators, whereas class size data are not—at either the elementary, secondary, or postsecondary levels.

- **Integration of sustainability concepts into school curricula:** The Maritime Provinces Education Foundation identified curriculum as one of the most challenging areas to assess and evaluate.⁸⁷ Nevertheless, the content of school curricula is one of the most important ways that public schools, as state institutions, “reproduce the existing culture” and reinforce “the modern mindset.”⁸⁸

In 2002, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) declared the period from 2005 to 2014 as the United Nations Decade of Education for Sustainable Development (DESD). Its basic vision is a “world where everyone has the opportunity to benefit from education and learn values, behaviour and lifestyles required for a sustainable future and for positive societal transformation.”⁸⁹ This relationship between curriculum, learning outcomes, and broad societal outcomes, recognized by the U.N., is also integral to the GPI education indicators report framework (Figure 1 above).

The U.N. Ministerial Round Table on Quality Education further argues that quality education “takes into consideration the social, economic, and environmental contexts of a particular place and shapes the curriculum or programme to reflect these unique conditions.”⁹⁰

Content analysis of school curricula should assess 1) the extent to which ecological literacy and other key literacies are part of existing elementary and secondary school curricula, and 2) how these literacies are presented—for example, from an economic resource / anthropocentric perspective or from an ecocentric one.

Currently, Canada does not assess school curricula in this way and it does not have a nationwide strategy for integrating sustainability concepts, goals, principles, and practices into school curricula, despite numerous calls to do so by Manitoba Education and Training, Environment Canada, and the Canadian Institute for Environmental Law and Policy.

- **Safety and security in public schools:** The quality of the learning environment in schools can be highly influenced by the level of safety and security experienced by both teachers and students. While there are a number of surveys on this subject, overall, consistent national data on school violence and bullying trends over time are not available in Canada. By contrast to the paucity of available Canadian data in this area, the U.S. National Center for Education Statistics does collect data and report trends on a regular basis for 21 specific indicators of school violence, crime, and safety. These U.S. indicators, which have been explored by GPIAtlantic, could serve as a potential model for Canada.
- **Student satisfaction and engagement:** The degree to which students are engaged in their studies reflects the quality of their learning as well as the quality of their overall educational experience. Currently, there are no pan-Canadian data available for student engagement at the lower grades (K–7). Questions regarding student satisfaction are asked in the student questionnaires that accompany the School Achievement Indicators Program (SAIP) written assessments, but results are not published or otherwise made publicly available through SAIP. Statistics Canada’s National Longitudinal Survey of Children and Youth (NLSCY) is developing an indicator of student engagement, which may possibly match the one we are proposing here and which should certainly be reported here when results become available.

In Atlantic Canada, a survey of Grade 8 students assessing their satisfaction was conducted in 1995 and studied by GPIAtlantic. However, 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 of the four Atlantic provinces’ separate departments of education, and to date no follow-up surveys have been conducted on this subject in any of the four provinces.⁹¹

No pan-Canadian data on postsecondary student satisfaction and engagement presently exist. Potential survey models for Canada do exist, based particularly on the U.S. National Survey of Student Engagement (NSSE), which has been administered annually in the U.S. since 2000, and on related surveys administered by individual postsecondary institutions in Ontario, Alberta, and British Columbia. These potential models were explored in the research for this study.

- **Independence of university research:** There are currently no pan-Canadian data available assessing the independence of research at Canadian universities—particularly with regard to research funded by private sources. A national survey of research officials at more than 100 U.S. medical schools, conducted by the International Committee of Medical Journal Editors (ICMJE) to assess researchers’ independence in clinical trials sponsored by pharmaceutical companies, has been studied in detail by GPIAtlantic as a potential model for Canada.
- **Relative share of commercial to non-commercial research at universities:** Despite clear evidence showing an increase in the commercialization of university research overall, it is not certain whether or not a greater *share* of university research is now commercialized. Thus, we do not know the relative shares of commercial and non-commercial or basic / curiosity-driven research, and the degree to which this ratio has been changing over time. An analysis similar to that comparing the public versus private share of university research funding is necessary here, based on new data collection in this field, as the data for such an analysis currently do not exist.
- **Literacies:** With the exception of data for basic adult literacy, there is almost a complete lack of data available to indicate whether the Canadian populace has the knowledge needed to be considered literate in each of the other knowledge areas explored by GPIAtlantic for this study: arts, media, health, food and nutrition, civics, multiculturalism, Indigenous knowledge, statistics, science, and ecology. Indeed, we were able to report findings for only three headline indicators that had time-series data in just three of these areas (civics, multiculturalism, and ecology), and even these three indicators only included very partial elements of the literacies under consideration.

This lack of Canadian data on the various literacies need not be so, since other countries—especially the United States—do have extensive data on some of these literacies. Below we have listed civic, scientific, media, and ecological literacy as four examples where excellent data are available in other jurisdictions. These could serve as models for Canada. In addition, GPIAtlantic has explored developmental work in a number of these areas that is presently taking place both in Canada and abroad. We have also recommended developing and administering a Canadian Knowledge Survey to Canadian adults—discussed further in the next section—in order to acquire the data needed to assess the extent of understanding in the Canadian populace in these and other key knowledge areas.

- **Civic literacy:** There is a lack of quality data on civic literacy in Canada, although this is not the case internationally. The International Association for the Evaluation of Educational Achievement (IEA), an international consortium of educational research organizations in almost 60 countries, has conducted the International Civic and Citizenship Education Study, called “the largest and most rigorous study of civic education ever conducted internationally.”⁹² However, Canada did not participate in the quantitative phase of this initiative, which surveyed 2,000 to 3,000 students per country in 28 countries on their knowledge, attitudes, and values towards

citizenship.⁹³ The next round of this survey will be in 2009, and it is unknown whether Canada will elect to participate.

There are also other frameworks for collecting data on civic literacy that Canada could use as a model to collect relevant data on a regular basis. For example, in 2006, the U.S.-based National Conference on Citizenship initiated an annual Civic Health Index, which includes key elements of civic literacy, in order to promote public deliberation about civic health and to examine ways for its improvement.

In addition, the citizenship quiz that immigrants are required to take to gain Canadian citizenship, which the Canadian Democratic Audit (CDA) calls “the benchmark for assessing democratic citizenship” in Canada,⁹⁴ is probably the most comprehensive potential measure of civic literacy currently available in Canada. But this immigrant citizenship quiz has only once been administered in survey form to the Canadian public, and therefore has limited utility here, since it cannot be used to assess trends over time. Nevertheless, those results along with other one-time survey results were explored by *GPIAtlantic* for this study to demonstrate their potential utility.

- **Scientific literacy:** *GPIAtlantic* uncovered only one national Canadian survey on adult scientific literacy, despite a rather exhaustive review. This was a 1989 study conducted by Edna Einsiedel of the University of Calgary.

Numerous other surveys have been conducted periodically that measure some of the particular topic areas that together might be taken to constitute scientific literacy, but these topic-specific surveys have limited utility because they lack comprehensiveness, are inconsistent, do not yield time series, or are not publicly available. For example, public opinion surveys on biotechnology and other specific topics have been conducted in Canada by private polling consultants, but their results are not in the public domain, as these surveys were privately commissioned by industry.

The OECD has a section on its website that reports the results of surveys of public understanding of science by country, but Canada is not among the countries reviewed, presumably because of its lack of data in this area.

However, this data paucity is not the case in the United States or Europe and, therefore, clearly does not need to be so in Canada either. For example, the U.S. National Science Foundation (NSF) *Science and Engineering Indicators* series has a Public Attitudes Toward Science and Technology (PATSAT) survey that has been conducted in the U.S. every two years since 1979. This U.S. model also forms the basis of the multi-national Eurobarometer survey that is regularly conducted in the European Union countries, and could potentially be a model for a similar survey in Canada.

- **Media literacy:** Canada is a recognized international leader in media literacy education, with Ontario having introduced media literacy into secondary school curricula as early as 1987, and with education for media literacy now included in the

K–12 curricula in most Canadian public schools. However, in Canada there is no national or provincial data source that either assesses or evaluates actual media literacy in children, youth, or adults.

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.⁹⁵ This led Ofcom to administer the first annual adult Media Literacy Audit in the U.K. to a sample of 2,357 adults, with results reported in 2006.⁹⁶ While the Ofcom media literacy audit does not include important aspects of media literacy such as critical thinking skills in any depth, it does indicate a governmental acknowledgement of the importance of assessing the extent of media literacy in the populace, and could form the basis or kernel of a more extensive and in-depth survey or audit in Canada.

- **Ecological literacy:** There are no reliable, recent, consistent, and publicly available pan-Canadian or international surveys that track the ecological knowledge, values, attitudes / beliefs, and behaviour of Canadians over time. Therefore, there are no sources that can presently provide comprehensive data to assess the level of ecological literacy within the populace. For example, one 2007 study examining cross-national environmental concern used a 1992 source,⁹⁷ and another 2006 study on general beliefs and environmental concern used 2000 data.⁹⁸

Several observers have commented on the paucity of comprehensive data sources on ecological literacy both in Canada and elsewhere. According to one analyst: “There are no survey data on public attitudes toward ‘sustainable development’ as a holistic concept.”⁹⁹ Another notes: “There is a great need for collaborative research to identify, measure, and explain trends and changes in global sustainability values, attitudes, and behaviours over time.”¹⁰⁰

There have been many ad hoc surveys conducted in Canada that examine the knowledge, attitudes, and behaviour of Canadians concerning specific aspects of the environment like global warming, or focussing on individual regions. However, all of these studies are too narrow to produce a comprehensive assessment of ecological literacy in Canada. Nevertheless, the results of many of these ad hoc surveys were explored by GPIAtlantic for this study to provide at least some indication of Canadian values and attitudes on environmental issues.

Other countries, though, do produce more comprehensive and consistent time series data in this area. For example, since 1993, the U.S.-based National Environmental Education and Training Foundation (NEETF) has annually collected nationally representative survey data on American environmental knowledge, attitudes, and behaviour. Along with basic knowledge questions, the NEETF survey also assesses self-reported levels of knowledge in order to compare them with actual levels. Results of this survey are likely comparable to those that would be found in Canada if a similar survey were to be administered here.

2. Conventional indicators of educational attainment such as graduation rates and standardized test results are contradictory and inadequate, and do not tell us whether the Canadian populace is becoming more educated or not.

Graduation and drop out rates are among the most commonly used indicators of educational attainment and system effectiveness. However, they are not good indicators of school performance since they are influenced by a number of other factors that have little to do with actual achievement: including trends in labour market conditions, poverty (particularly child poverty), economic insecurity (including the erosion of the social safety net in the 1990s), family size, and teenage pregnancy, to name a few.

For example, provincial disparities indicate the potentially strong influence of labour market conditions in influencing decisions to stay in school or leave school. According to data from Statistics Canada's Labour Force Survey (LFS), high school drop out rates in Canada have declined fairly steadily from 16.7% in 1990/1991 to 9.8% in 2004/2005, falling in every province in the country. The decline has been most apparent in Atlantic Canada where, on average for the 1990/1991 to 1992/1993 school years, 20% of youth between the ages of 20 and 24 in Newfoundland and Labrador, 19% in Prince Edward Island, and 17.9% in Nova Scotia were not attending school and did not graduate from high school. At that time, these were the highest drop out rates in the country. Over the more recent time period (2002/2003 to 2004/2005), the drop out rate in Newfoundland and Labrador was 8% (one of the lowest in the country), in Prince Edward Island it was 10% and in Nova Scotia it was 9%. Drop out rates were highest in Manitoba (13%), Alberta (12%), and Quebec (12%).

How are these provincial disparities to be interpreted? Analysts generally attribute the higher drop out rates in provinces like Alberta to the financially lucrative opportunities offered by a booming economy that lures students out of school and into the work force. By contrast, a relative lack of such opportunities in Newfoundland and Labrador may encourage young people to stay in school. If labour market conditions influence drop out rates to this extent, it is difficult to use that indicator as a marker of school performance or educational system effectiveness.

Similarly, between 1997/1998 and 2002/2003, high school graduation rates across Canada increased from 72% to 74%. In 2002/2003, high school graduation rates were highest in Prince Edward Island (83%), New Brunswick (82%), and Nova Scotia (81%), while the lowest provincial rate was in Alberta (67%). Though graduation rates are conventionally taken as a key indicator of educational attainment, the provincial disparities again point to the influence of labour market conditions as a much more salient explanatory factor.

Claims of "achievement" supposedly signified by higher graduation rates must therefore be carefully tested against a range of other achievement indicators like literacy rates (which have not improved despite higher secondary and postsecondary graduation rates),

standardized test results (which show very different provincial results), the declines in political knowledge among the young noted in the civic literacy section of this report, and other indicators, before an assumption of association between graduation and educational performance, achievement, and knowledge can be made. This is further illustrated below.

2a. Standardized test results and graduation / drop out rates provide conflicting messages.

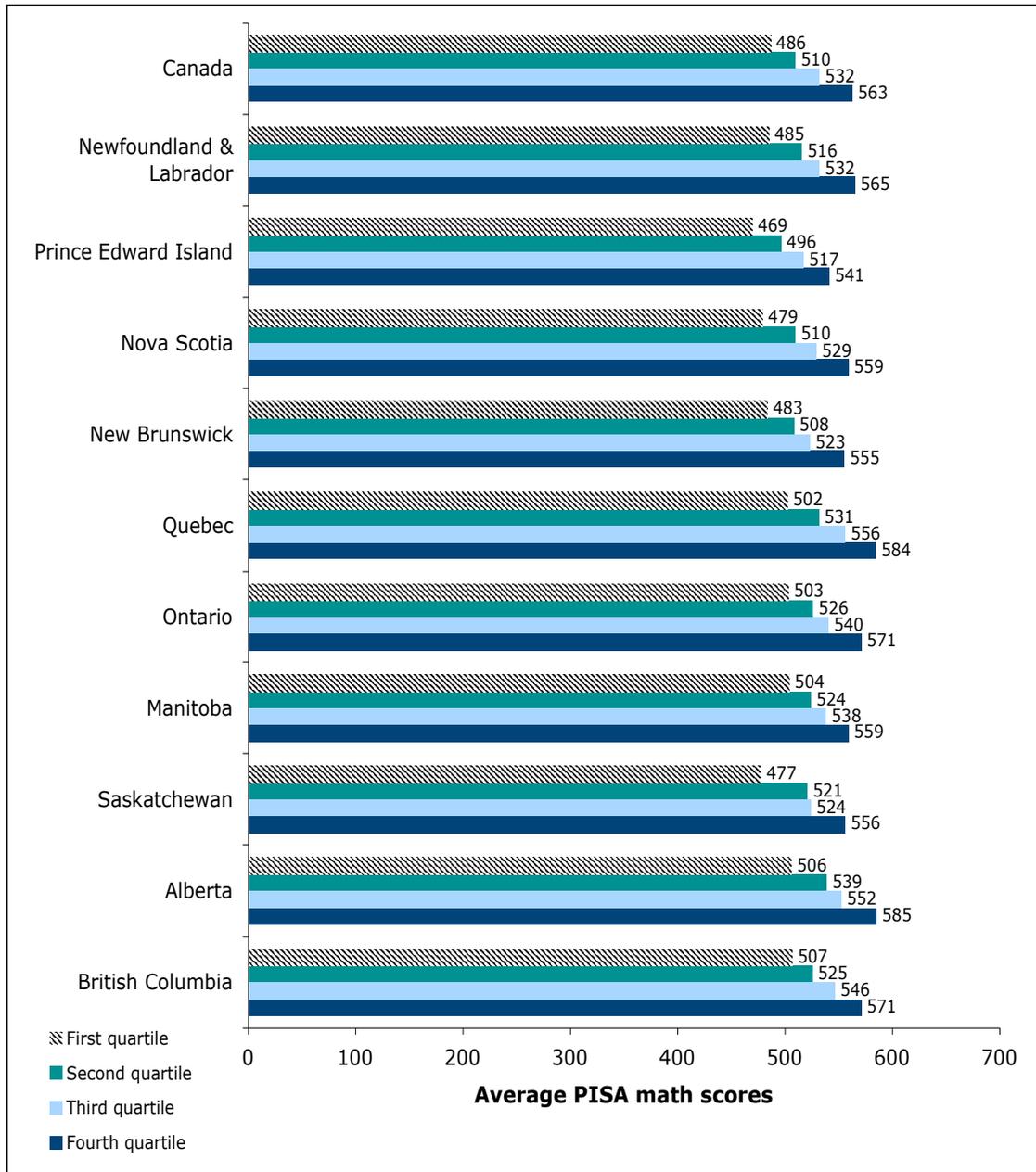
On the international, national, and provincial levels, student achievement is frequently measured using standardized testing in the areas of mathematics, reading, writing, and science, mostly for the purposes of cross-national or cross-provincial comparisons. In some cases, standardized provincial exams also count for a portion of a student's final grade. In many cases, educational achievement measurement has become synonymous with the use of standardized examinations and test scores.

However, a key problem with relying on both test scores and graduation rates as key indicators of student achievement and educational attainment in Canada is that test scores and graduation rates frequently send contradictory messages. For example, in the OECD's 2000 and 2003 Programme for International Student Assessment (PISA), Alberta's 15-year-olds ranked the highest in the country in reading, math, and science, and yet in 2002/2003, Alberta had the lowest high school graduation rate (67%) and the second-highest drop out rate (12%) among the provinces. Likewise, the Maritime provinces have the highest graduation rates in the country but rank near the bottom in standardized test results.¹⁰¹

PISA results also show that students from higher socioeconomic backgrounds tend to have stronger literacy skills and perform better in math. The same pattern was observed in all 32 countries that participated in the PISA assessments.¹⁰² By way of example, see Figure 18 below for a breakdown of 2003 math results by quartile for Canada and the provinces. The results reveal a clear income-related performance gradient, with scores increasing with each income level in every province in the country.

In 2000, in a book analysing the PISA results, the OECD observed that "the school students attend is strongly predictive of their performance" and that "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."¹⁰³ In sum, do the standardized test results reflect actual capacity, attainment, and knowledge, or do they reveal far more about students' socio-economic status and the socio-economic composition of the schools they attend?

Figure 18. Average scores in the PISA math assessment by quartile of family socioeconomic status, 15-year-olds, Canada and provinces, 2003



Source: PCEIP, 2006. Table C4.6, p. 208.

In addition to the contradictory messages transmitted by conventional indicators of educational attainment and the fact that scores often reflect and reinforce socioeconomic inequalities, educators have pointed to other key problems associated with reliance on standardized test scores. Analysts note that these tests focus on only a few academic subject areas—mathematics, reading / writing, and science—which have thereby assumed greater general importance than music, art, history, foreign languages, social studies, ecology, and other key subject areas.

As well, critics have noted instances where standardized test results have been misused and manipulated to support misguided calls for reform, including curriculum reforms that emphasize a “return to basics” at the expense of other key subjects and the development of critical thinking skills. Educators also frequently bemoan the fact that, since standardized tests take place every few years, they frequently do not reflect or evaluate what the students have actually been learning in the classroom. As well, teachers have complained that the pressure to perform well on the standardized math, science, and reading/writing tests can result in *teaching to the test*, at the expense of class discussion, creative teaching, fostering of critical skills, and focus on non-test subject areas.¹⁰⁴

At an even more basic level, critics have questioned the utility of “output” indicators like graduation rates, drop out rates, and standardized test results, when actual learning “outcomes” like basic adult literacy and political knowledge have not responded to changes in educational system outputs. As noted above, Statistics Canada and the Canadian Council on Learning have expressed surprise and puzzlement that adult literacy rates have not improved nationwide since 1989 despite higher apparent rates of formal educational attainment. As well, we noted that political knowledge among the young has actually declined dramatically over the last two decades, despite an assumed association between formal educational attainment and political knowledge.

3. Evidence suggests a widening gap in access to quality education among elementary and secondary students.

“Access” is defined not only by physical access to a school, but by the availability of quality education. According to some analysts, more parents are turning to private schools because the latter offer smaller class sizes and because cuts to public education budgets especially in the 1990s have reduced offerings of music, art, excursions, and a range of extra-curricular activities. John Ralston Saul reflects bluntly: “It is only with great difficulty that I could imagine a greater betrayal of the principle of Canadian democracy than the piecemeal reduction of public education to private education.”¹⁰⁵

In 1998/1999, 5.6% of all children in elementary and secondary schools in Canada were enrolled in private schools, up from 4.6% in 1987/1988. In 1998/1999, the proportions of private school students were highest in Quebec (9.2%) and British Columbia (8.8%) and lowest in the Atlantic provinces. Unfortunately, Statistics Canada stopped collecting data

on private school enrolment at the very time that private school enrolment was showing its largest increase, so the most recent year for which data are available is 1998/1999.

However, the available evidence indicates the growing emergence of a two-tier private–public education system in Canada based on the capacity to pay. This two-tier system is emerging not simply in the distinction between public and private schooling, but within the public school system itself, as an apparent increase in reliance on private fundraising and user fees for basic school needs and activities favours schools in higher income neighbourhoods.

In 2006, the Canadian Teachers’ Federation (CTF) released the results of the first pan-Canadian survey of its kind to collect data on a wide range of commercial and fundraising activities in schools, including the incidence of private fundraising for basic educational needs in Canadian public elementary and secondary schools. The STF survey found that nearly 50% of all schools fundraise for library books, 73% fundraise for school trips, 24% fundraise for academic programs, and 18% fundraise for supplies. As well, 70% of secondary schools fundraise for athletic programs.¹⁰⁶ Similarly, Canadian schools are increasingly charging user fees for various services and activities that were once provided for free. Nearly 80% of all public schools charge user fees for activities and materials like school trips, supplies, programs, clubs, and sports teams.

In a speech to the CTF entitled “In Defence of Public Education,” John Ralston Saul argued: “The whole idea of private fundraising for public schools is the first step towards introducing a class-based society into Canada. Private fundraising is, in and of itself, a form of exclusion.”¹⁰⁷

4. There appears to have been an increase in the extent of commercial activity in Canadian schools in the last two decades, with public funding sources more frequently replaced by alternative funding sources.

Evidence strongly suggests that the decline in provincial spending on public education in the 1990s resulted in two simultaneous trends: 1) the increasing commercialization of education, as school boards seek alternative financial support, and 2) a shift in the burden of educational costs onto families and households.

When alternative funding comes from the corporate sector, a number of potential conflicts may arise, as corporate funding often comes with conditions intended to benefit the funder, but which may or may not benefit the students and the quest for genuine knowledge. This external influence can potentially erode a school’s independence, compromise the students, and, according to Henry Giroux, reduce education’s “public and critical role.”¹⁰⁸

The Canadian Teachers’ Federation (CTF) survey in 2003/2004 is the first ever pan-Canadian survey of its kind to collect data on a wide range of commercial activities in

public schools, including advertising, partnerships and sponsorships, and corporate-sponsored educational materials. The CTF survey found that 32% of all public elementary and secondary schools in Canada allow advertising (28% of elementary schools and 55% of secondary schools). In Atlantic Canada, nearly 35% of all elementary and secondary schools allow advertising. In addition, 19% of public schools in Canada had sponsorships or partnerships with a corporation. In general, the data indicate a regional pattern in the incidence of commercial activity, with the highest rates in the West and by far the lowest rates in Quebec.

Despite the lack of long-term pan-Canadian data on this important subject, a number of teacher organizations and parent groups as well as educational experts have asserted, based on their own surveys, monitoring, and observations, that there has been an increase in the extent of commercial activity in Canadian schools over the last two decades.¹⁰⁹

5. Commercialization of intellectual property at Canadian universities is on the rise.

According to Statistics Canada, income from the commercialization of intellectual property (IP) at universities increased from \$18.9 million in 1999 to \$51.2 million in 2004 (current dollars)—a very substantial relative increase (of 170%) in a very short time span of just five years.¹¹⁰ In addition to these increased commercial revenues, the number of inventions reported or disclosed by researchers to universities and hospitals increased by 73% between 1999 and 2004, from 829 to 1,432; the number of patent applications filed increased by 105%, from 616 to 1,264; and the total number of patents held increased by 109%, from 1,826 to 3,827.^{111,112} In addition, in 2004, Canadian universities and hospitals created 50 additional spin-off companies to commercialize their technologies—bringing the total to 968 to-date, an increase of 113% since 1999.¹¹³

Observers have noted that the granting of university research funds is increasingly contingent upon the ability of investigators to demonstrate that their research has market potential or can be commercialized. However, John McMurtry contends that the maintenance of “pure” or “curiosity-driven” research, which is not commercial research, is a key indicator of a society’s wellbeing and one of its most endangered spheres under the increasing commercialization trend.¹¹⁴ Despite the importance of basic / curiosity-driven research, it is not tracked in the way that commercial research is, and there are no data to indicate whether it is increasing or declining, or able to attract the same level of funding as in the past. Such an investigation must begin simply by defining and categorizing this type of non-commercial research effectively so that it can be tracked and measured accurately.

Thus, even though the available evidence points to an increase in commercialization overall, it is not certain whether or not a greater *share* of university research is now commercialized than in the past. Nor do we know whether the present share of commercial research is, overall, larger than the share of non-commercial research either

in funding attracted or in the proportion of university researchers engaged. An analysis comparing commercial and non-commercial research, similar to that comparing the public versus the private share of university funding, is necessary here, based on new data collection in this field.

6. The participation gap at Canadian universities has remained constant through the 1990s.

Statistics Canada data indicate an income-related gradient in university participation. Thus, youth (18 to 24 years) whose parents had high incomes (more than \$100,000 annually) were most likely to attend university throughout the 1990s, whereas those whose parents were in the lowest income group (less than \$25,000 annually) were the least likely to attend university. However, the data also show that, despite the fact that tuition fees increased by 77% between 1993 and 2001 in real terms and that student debt levels also increased sharply, this “participation gap” has remained fairly constant and even narrowed marginally. For example, in 1993, 18.4% of youth whose parents had incomes of less than \$25,000 a year attended Canadian universities compared with nearly 50% of youth whose parents had incomes exceeding \$100,000 a year. By 2001, the participation rates were 19.5% and 45.6% respectively.

The retention of low-income groups could be related to higher loans (due to changes in the maximum amount of loan receivable from the Canada Student Loans Program) and also to more borrowing from alternative sources, therefore possibly contributing to the increased debt levels denoted in Figure 2 above.

7. There is no indication that levels of knowledge are increasing in the Canadian populace—basic literacy is stagnant and there is evidence of low knowledge levels in areas like politics, health, and the environment—despite the fact that the formal educational attainment of the Canadian populace has never been higher.

Since 1989, as noted, basic adult literacy levels in Canada have not risen despite rising levels of formal educational attainment in the Canadian populace. In the area of civic literacy, the 1984–2000 Canadian Election Study (CES) results appear to indicate that, except for those 50 and older, the level of political knowledge in the Canadian populace may be in general decline. This is especially true of political knowledge among the young, as discussed below. Research explored by GPIAtlantic also reveals low knowledge levels among the public in Canada, and in North America in general, about a wide range of important social, economic, health, and environmental issues ranging from political policy issues, to nutrition and medical instruction, to the connections between

resource extraction, energy use, and other consumption patterns on the one hand and the health of the environment on the other hand.

As found in the research to this report, this lack of knowledge often manifests in uninformed action, again demonstrating the crucial nexus between learning outcomes and social outcomes. Thus, for example, statistics indicate increased rates of driving, gasoline use, and use of large vehicles with low gasoline mileage, which may illustrate a lack of knowledge and understanding of the impact of human energy use on climate change, and of the value of energy conservation, or a disregard of the consequences of global warming. However, there is some indication that an increase in extreme weather events—including droughts, heat waves and fires, or hurricanes and tornados—coupled with the rising price of gasoline, may be changing this particular public knowledge deficit and the consequent actions.

8. Young people today tend to have less political knowledge than young people did a generation ago.

Younger Canadians not only have less political knowledge than older age groups, but this political knowledge is decreasing over time and at a faster rate than for older groups. That young people are generally less politically knowledgeable than older people is referred to as the “life-cycle” effect, and analysts note that it is to be expected as part of the developmental process.¹¹⁵ In other words, when young people enter the workforce and have families, their priorities shift and political knowledge becomes more relevant to them. Therefore, their interest and knowledge levels gradually increase as they age.

However, the so-called “life-cycle” effect cannot explain the apparent decline in young people’s political knowledge, voting, and political engagement in recent years. This recent decline is often referred to as the “generational effect,” meaning that young people today tend to be less knowledgeable than young people were a generation ago. This suggests there is a drop in *general* political knowledge that will continue over time as less informed young adults age. Analysts like Howe argue that a low level of political *interest* among youth seems to reflect the life-cycle effect, while low political *knowledge* seems to indicate a generational effect.¹¹⁶

Correlating political knowledge with voter turnout reveals both a growing knowledge-related voter turnout gap over time and a significantly larger knowledge-related turnout gap among younger Canadians than among older ones. The latter finding means that older Canadians with less political knowledge are still relatively more likely to vote than uninformed younger Canadians. This, coupled with evidence that more young Canadians may be losing the motivation to be politically knowledgeable, is very disturbing both for the long-term civic health of the country and because young people are becoming increasingly disenfranchised in practice. Thus, Howe concludes that lower levels of political knowledge among the young are working together with the overall rising impact

of knowledge on political participation to reduce voter turnout rates among younger age cohorts.¹¹⁷

9. Youth and adults may lack the critical analysis skills needed to discern and deal effectively with the meanings, messages, organization, and techniques of mass media practices, including the influence of advertising in the media.

The media have a profound affect on our social, economic, political, and cultural lives. Not only do the media help shape our local and national culture, including our vocabulary, common experiences, and references, but the influences and effects of Western media are also widely spread globally. Therefore, as Len Masterman—the foremost British authority on media literacy—notes, it is important to understand “the ways in which the media represent reality, the techniques they employ, and the ideologies embedded within their representations.”¹¹⁸

In general, researchers have found that “audiences lack the more complex skills, for a sufficiently discerning or critical understanding, to deal with the highly sophisticated construction of media messages.”¹¹⁹ In an Australian media literacy assessment, less than 10% of secondary school students had the critical analysis skills required for media literacy.¹²⁰ Although these results are for Australian students, this finding appears to reflect a global phenomenon, and it is quite likely that similar results would be found in Canada if the Australian assessment were replicated here.

10. Canadians’ health literacy tends to decline with age, to increase with higher education, and to be directly correlated with health status. Senior citizens, who have the greatest medical and health care needs, have by far the lowest health literacy levels.

More than half of Canadian adults (54.7%) do not have adequate levels of health literacy. This means that most Canadians may not know how to maintain and improve their health, including following medical advice and prescription drug instructions and avoiding key risk factors. Also, one in five Canadians lacks even the most basic ability to read and understand health information, while only one in nine Canadians can digest complex health information. The Canadian Council on Learning (CCL) notes that health literacy tends to decline with age, is directly correlated with health status, and increases with higher education.¹²¹

Younger Canadians are somewhat more health literate than older Canadians. At least half of Canadians aged 16–35 are classified by Statistics Canada as having adequate health literacy skills, and one in eight can digest complex health information. The level of health literacy then declines with age, with 47% of those aged 36–45, less than one-third in the

56–65 age group, and only one in eight of those over 65 having at least adequate health literacy skills. Fully 61% of seniors, who have the greatest health needs and problems, score at the lowest level in the health literacy scale, indicating that they do not have even the most basic ability to understand health information and thus to take informed action to maintain and improve their health.

Also, in general, those with excellent and very good health score higher on the health literacy scale than those in poor health. There is also a gradient of health literacy by level of formal educational attainment, with university educated Canadians having the highest level of health literacy, while those with less than a high school education have the lowest level of health literacy.

11. There has been a marked increase in interest in and knowledge about organic food within a very short period of time. Interestingly, those who buy organic food are not those with the highest incomes or formal education.

According to one analyst, the growth of organic agriculture is a knowledge-based phenomenon. Thus, increased knowledge on the part of the public about how food is grown and processed has been directly responsible for the development and growth of the organic food industry.¹²² In Canada, the organic food market has been reporting growth of 15% to 20% per year since the late 1990s, with organic retail sales topping \$3 billion in 2005. By 2010, the organic food industry's market share is expected to increase to 10% of the Canadian retail market.¹²³ 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. [...] 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.¹²⁴

The Tracking Nutrition Trends (TNT) surveys found that, in a very short period of time, there has been a marked increase in interest in and knowledge about organic food. In 2004, 41% of adults indicated that organic production methods were “somewhat / very influential” in their food choices, compared with 57% who said they were “not too / not at all influential.” By 2006, 50% of adults stated that organic production methods were somewhat or very influential in their food choices compared with 48% who said they were not too influential or not at all influential.¹²⁵

The TNT surveys also found that Canadians who see themselves as health- and nutrition-oriented more often choose organic food than those who are not health- and nutrition oriented.¹²⁶ Interestingly, consistent buyers of organic food—which tends to be more expensive than conventionally produced food—do not have higher incomes than most

other Canadians. They tend to be somewhat more educated than the national average but are by no means the most highly educated group in terms of formal higher education. In other words, buyers of organic food tend to be much closer to the socio-economic centre of the spectrum than might otherwise be assumed.

12. Non-Indigenous Canadians may have a poor understanding of Indigenous knowledge and culture.

Indigenous knowledge systems have much to teach Western culture about sustainability and human interactions with the natural world, about holistic and interconnected ways of thinking, about non-linear methods of understanding, learning, and integrating spiritual and cognitive knowledge, and about survival in general.¹²⁷ One important indicator of Indigenous knowledge literacy, therefore, is the extent to which the general populace knows about and understands Indigenous knowledge and culture, and is willing to learn from it. Another aspect of Indigenous knowledge literacy, considered below, is the degree to which this knowledge and culture is effectively transmitted among Canada's Indigenous peoples.

The only survey in Canada that broaches the subject of general Canadian understanding of Indigenous knowledge and culture is a 2003 survey conducted by the Aboriginal Cultures and Tourism Working Group (ACTWG), which interviewed Aboriginal leaders representing the four regions and various sectors that comprise Canada's Aboriginal cultural tourism industry. One question used in this survey was: "What level of understanding do the majority of your Canadian visitors have of Aboriginal people and culture prior to their visit?" Non-Indigenous visitors were scored very poorly by the Aboriginal cultural tourism leaders.

Only 12% of respondents perceived the majority of non-Indigenous visitors as having a good prior understanding of Indigenous knowledge and culture, and none at all rated that understanding as excellent. By contrast, 33% of respondents thought that the majority of non-Indigenous visitors had only a fair understanding of Indigenous knowledge and culture prior to visiting, while 27% thought they had a poor understanding of Indigenous knowledge prior to visiting. Although this survey and these results are not nationally representative, the responses do suggest that there may be a very low level of Indigenous knowledge understanding among non-Indigenous Canadians, as perceived by Indigenous people themselves.

13. Very few Aboriginal children are learning to speak their native language with any degree of proficiency. Moreover, fewer Aboriginal children with a parent who has some postsecondary education can speak or understand their native language than can Aboriginal children with a parent who has not gone beyond elementary school.

Research indicates there are close links between language and knowledge, that Aboriginal languages express concepts not captured in other languages, and that languages are a vital means of transferring oral knowledge between generations.^{128,129} Knowledge of Aboriginal languages in Canada is particularly vulnerable, as only three (Inuktitut, Cree, and Ojibway) out of over 50 remaining Aboriginal languages currently have a sufficient base of speakers to be considered relatively secure from the threat of extinction.¹³⁰ In order for Aboriginal languages to continue flourishing over time, there must be solid intergenerational transmission. Thus, the most crucial relationship fostering this transmission is that between parents and their children. According to UNESCO, a language is considered endangered if it is not learned by at least 30% of the children in the community.¹³¹

Census data show that the proportion of First Nations children aged 14 and under with an Aboriginal mother tongue—defined as the language first learned at home in childhood and still understood—fell from 9% in 1996 to 7% in 2001. In addition, the percentage of Aboriginal children who use an Aboriginal language at home declined from 6% in 1996 to 5% in 2001.^{132,133} These declines can be considered very sharp indeed considering the very short period of time (just five years) over which they have occurred.

Inuktitut remains one of the strongest Aboriginal languages, and its decline is not as rapid as that of most other Aboriginal languages.¹³⁴ In the Canadian Arctic, over 90% of Inuit, including both children and adults, can understand or speak their native language.¹³⁵ In general, nearly three-quarters of Inuit children 14 and under still have an Aboriginal language as their mother tongue. However, overall, Inuktitut is being used at home less often than before. For example, in 1996, Inuktitut was the language used most often at home by 68% of Inuit, but by 2001, this percentage had declined to 64% of Inuit.

While 44% of non-reserve Aboriginal children who have a parent who has not gone beyond elementary school can speak or understand an Aboriginal language, only 17% of children with a parent who has completed some postsecondary education can do so.¹³⁶ This pattern is apparent within all three major Aboriginal groups. Among Inuit children, 92% of those with a parent who has not gone beyond elementary school can speak or understand an Aboriginal language, while just 51% who have a parent with some postsecondary education can speak or understand their native language.

Among First Nations children, 33% with a parent who has not gone beyond elementary school can speak or understand an Aboriginal language, while 21% who have a parent with some postsecondary education can do so. Finally, while 25% of Métis children with a parent who has not gone beyond elementary school can speak or understand their

Aboriginal language, only 9% of those with a parent who has some postsecondary education can do so.¹³⁷

14. Canadians are not only often *uninformed* about major issues, they are also often *misinformed*.

Results from the Canadian Democratic Audit indicate that large numbers of Canadians are not only *uninformed* about politicians, simple political facts and concepts, and political parties' stands on key issues, but they are also often *misinformed* about basic policy issues like income distribution, crime rates, pollution, and the living standards of Aboriginal peoples. This lack of knowledge and misinformation results in voting behaviour that is often not consistent with people's values.¹³⁸

15. While Canadians often express concern about the environment, most Canadians do not support higher prices or taxes to protect the environment or engage in basic pro-environmental behaviours like reducing their driving.

Analysts agree that ecological literacy has four components – knowledge, values, attitudes/beliefs, and behaviour. If the first three are sufficiently strong, it is assumed they will induce behavioural change. This is generally not yet the case in Canada. In general, the vast majority of Canadians definitely express that they are concerned about the environment, yet for most, this concern is not reflected in their attitudes towards policy or in their personal behaviours when asked about solutions to specific ecological problems. For example, although Canadians in general terms support government leadership and regulation to protect the environment, most say they are not willing to pay higher prices or higher taxes or to accept a cut in their standard of living in order to achieve these goals.

With the notable exception of recycling, the available data indicate that most Canadians do not engage in even the most basic pro-environmental behaviours, despite their expressions of concern about environmental issues. For example, while 57% of Canadians acknowledge global warming to be a “very serious” issue and another 33% acknowledge it to be “somewhat serious,” most remain particularly attached to their cars and unwilling to reduce their driving. According to the 2006 Statistics Canada Household and Environment Survey (HES), 80% of Canadians use private motor vehicles to get to work during the colder months and 72% do so in the warmer months, when more active transportation options are possible. Overall, more than half of Canadians do not carpool but drive alone to work.¹³⁹ A 2007 Angus Reid survey on climate change found that one in five Canadians drive at least 25,000 km a year, while more than half of all respondents said they would either never, or not in the next year, cut their driving by half.¹⁴⁰

Only one in ten respondents to the HES said they take public transportation to work. Yet, according to the 2007 Angus Reid survey on global warming, nearly three-quarters (72%) of Canadians said they actually have public transit available to them in their own area.¹⁴¹ Despite this availability, 56% of the Angus Reid respondents said they never presently use public transit, 45% said they would never use it on a daily basis in the future, and a further 26% said they would not do so in the next year.

16. The percentage of Canadians who consider the environment as a high priority for government action has seen a dramatic increase in the last decade.

Despite the fact that behaviour in matters like transportation has not yet changed significantly, the Centre for Research and Information on Canada (CRIC) *Portrait of Canada* surveys has found a sharp increase since 1997 in the proportion of Canadians ranking the environment as a high priority for government. In 2005, 78% of Canadians identified the environment as a high priority for government—a higher proportion than for any other issue listed. 2004 and 2005 marked the first times in over 10 years of CRIC survey questions on government priorities that the environment had ranked so high in public concern.¹⁴² Confirming these CRIC results, the 2007 TSN Canadian Facts survey also saw the environment ranking as the highest issue of public concern in Canada.

Regional differences are notable. In the 2005 CRIC survey, fully 89% of those in the North, and 85% of Atlantic Canadians and Quebecois considered the environment a high priority for the federal government, as did 76% in the West and 73% in Ontario.

Results from several other surveys examined in detail by GPIAtlantic also point to Canadians' strong support for government targets, laws, and regulations to protect the environment, to the importance of greater government leadership in this field, and to the need for better educational programs aimed at both the adult and youth populations. As well, 90% of respondents to a 2006 Sustainability Research Initiative survey acknowledged that Canadian lifestyles are presently unsustainable.

When the array of available evidence is considered as a whole, the detailed survey results seem to indicate that vigorous and strong government action may be a prerequisite and necessary step to induce significant personal behavioural change. Thus, 80% of Canadian respondents to the International Social Survey Program's 2000 questionnaire agreed that: "Government should pass laws to make ordinary people protect the environment, even if it interferes with people's rights to make their own decisions." And 96% agreed that: "Government should pass laws to make businesses protect the environment, even if it interferes with businesses' rights to make their own decisions."¹⁴³

As well, more than half of Canadian respondents to the 2007 Angus Reid climate change survey supported a ban on SUVs.¹⁴⁴ And in response to an open-ended 2006 Sustainability Research Initiative question on why they and other Canadians presently behave unsustainably, respondents listed lack of government leadership ahead of any

other reason.¹⁴⁵ In short, government action on the environment appears to be an essential bridge to personal behavioural change.

17. There are many key linkages between learning outcomes and the other GPI domains.

Knowledge is essential to improve wellbeing in many spheres of life. For example, linkages between literacy and health, and between living standards and education have long been recognized. Linkages between the array of results in this education indicators report and the results in the other 19 GPI domains should now be explored in greater depth and detail.

For example, various studies have uncovered several disturbing trends relating to Canadian youth that may be linked: Canadian youth have experienced a decline in self-rated health and higher rates of depression; low-wage labour among youth is increasing despite an economic boom; there are lower levels of political knowledge and voting among young people despite increased graduation rates; and debt levels and work hours are increasing among postsecondary students. Together these factors may point to higher levels of financial and time stress among youth, and even to patterns of exclusion. Such linkages between the education and other GPI domains must be examined more fully in future research in order to create a properly integrated Genuine Progress Index.

4. Recommendations

The findings presented in this summary Nova Scotia GPI Education Indicators report and in the accompanying comprehensive list of recommended indicators, are merely a first step in a long-term process of developing meaningful indicators for the education component of the GPI. The present inadequacy of most existing education indicators and data sources, as discussed above, requires that new data sources be developed.

It should be noted that the indicators for which data were assembled by GPIAtlantic, including those highlighted here, explore only two of the several areas examined—namely literacy and formal education. In fact, GPIAtlantic’s research covers a much wider range of learning and knowledge dimensions, corresponding to the framework illustrated in Figure 1 above, which together constitute key components of an educated populace. These additional dimensions include assessments of wisdom, the learning of values, elements of lifelong and life-wide learning, non-cognitive learning, and evaluations of the quality of information in the learning environment. Therefore, future updates of this domain should include indicators in each of these areas, which are summarized below.

As a starting point for the longer-term development of the education domain, it is suggested that the comprehensive list of recommended indicators accompanying this report be used as a reference point for the construction of the new data sources and the considerable developmental work that will be required in this area in the years ahead. Here we briefly summarize some of the key areas—not yet covered in this summary report or in the foundational work assembled by GPIAtlantic that are integral to the overarching education domain framework summarized in Figure 1 above—in which such developmental work is required.

The following very brief summary highlights just a few of the key themes from that larger framework and from the foundational work for this report that have been identified as priorities for future research and development.

4.1 Wisdom

Though extraordinarily difficult to measure by conventional means, wisdom has been defined as the most important outcome of lifelong learning and described as the “pinnacle of successful human development.”¹⁴⁶ It involves the ability not just to acquire information and possess knowledge, but to process that knowledge in such a way as to develop deep understanding, to see reality directly and clearly, and to act effectively.¹⁴⁷ As noted earlier, knowledge and learning without wisdom can actually be dangerous, as evidenced in their use for war and environmental destruction. According to Bassett, wisdom especially involves:

- an ability to think holistically, and to discern whether or not something is beneficial or harmful to oneself and society
- having openness, caring and compassion, and respect for all life forms
- having a commitment to action toward enhancing the common good
- understanding that we are part of something larger than ourselves, and undergoing profound transformation, or increased integration, on both individual and societal levels.¹⁴⁸

Despite the enormous challenges involved, it should be an underlying and long-term goal to assess progress towards the higher stages of the data–wisdom hierarchy. As found in the research for this study, analysts have defined the steps along this hierarchy as data, information, knowledge, and wisdom (in ascending order), with understanding being the factor that connects all four levels.

GPIAtlantic examined four examples of attempts to create scales to measure elements of wisdom through survey questionnaires. Although none of these “wisdom scales” have yet been used in large, public or population-wide samples, and while all of them are still in various stages of development, they do present possibilities for incorporating a wisdom element into education indicators if properly and reliably administered in Canada.

4.2 Values

According to Francis Heylighen, values are the moral or ethical convictions or attitudes on which a population bases its sense of purpose, goals, or directions to guide its actions.¹⁴⁹ The utilitarian function of values is that they can help discriminate between what is beneficial to the wellbeing and sustainability of society and what is detrimental. Values are transmitted through learning processes and are a key learning outcome, and they also in turn determine what is learned and how information is processed.

GPIAtlantic recognizes that any measure of genuine progress is based on the implicit question “progress towards what?” and is therefore normative by its very nature. A measure of genuine progress assesses progress towards defined outcomes, thus inherently embodying a vision or ideal towards which society aspires. In other words, it is literally not possible to measure progress without a clearly defined sense of what it is that society

wants to achieve, which in turn is based on fundamental values. Those values in turn are learned and transmitted through a wide range of formal and informal educational processes and structures.

GPIAtlantic is especially concerned with identifying those Canadian values that positively affect human and ecosystem wellbeing and found that it is widely accepted that broad values such as equity, compassion, and a concern for the common good, among others, are more likely to lead to socially valuable outcomes than values based more strongly on individualism and self-interest. Thus, it is important for the GPI as a whole, and for the GPI education domain in particular, to assess the prevalence of particular values in the Canadian populace, to understand how these values are learned and transmitted, and to determine whether or not these values are changing over time. Because learning systems play an important role in questioning and potentially provoking shifts in values, the effectiveness of these learning systems can be assessed in part by the extent to which they successfully teach and transmit values that enhance social wellbeing and ecosystem health, and the extent to which they effectively identify, examine, and critique dominant social values and paradigms that potentially undermine wellbeing.

In sum, identifying, questioning, examining, learning, and acting on values is as critical a part of educational processes and systems as the acquisition of facts and information. Yet educational systems are rarely assessed or evaluated according to their effectiveness in questioning and transmitting values. Considerable developmental work is clearly required in this area before indicators and results in this field can be included in the GPI education domain.

4.3 Lifelong and life-wide learning

Lifelong learning refers to learning that does not stop with formal education, but continues throughout the individual's lifetime. Life-wide learning refers to the fact that learning takes place in nonformal and informal modes in many settings other than schools and universities—including the home, workplace, and community, and through advertising and the media.¹⁵⁰ Yet, due both to methodological and data challenges, and to time and resource constraints, this is another key area not yet integrated into this summary report.

Although lifelong and life-wide learning indicators have not yet been developed for this GPI education domain, *GPIAtlantic* found emerging data sources and considerable new research in these areas that suggest future development of indicators in the following categories:

1. 'Self-regulated' learning has been found to be an excellent predictor of the propensity for lifelong learning and could be systematically assessed at a pan-Canadian level using existing instruments that could be readily adapted to population-wide surveys in order to develop the necessary data for this indicator.

2. Nonformal learning includes work-related nonformal learning, personal interest nonformal learning, and apprenticeship or learning of skilled trades—all of which can be tracked systematically.
3. Informal learning involves the processes by which people acquire and accumulate knowledge, skills, attitudes, and insights from daily experiences and exposures at home, work, or play; from family and friends, libraries, museums, or cultural activities; from travel, books, television, or newspapers; and so on. Potential indicators in some of these areas were explored in detail by *GPIAtlantic*.

4.4 Quality of information in the learning environment

Effective education is clearly a matter of quality rather than quantity. And yet, the *quality* of much of the information available in the public domain is questionable, since a great deal of it is composed of irrelevant, unclear, and erroneous data fragments. Observers and critics of this phenomenon have noted that it takes time, energy, skill, and experience to weed out the irrelevant, redundant, and low-quality information from the vast amount of available information from which to choose.

Developing indicators that assess the quality of information in the public domain, including changes over time, and that address the wide array of problems concerning the quality of information currently available to the public is essential since this directly affects how the public forms its knowledge of important issues. The authors consider this a vitally important area for future development, as good indicators of an educated populace must consider contextual issues such as *how* the public is educated, where it gets its knowledge and information from, the degree to which unsubstantiated information holds sway, and the degree to which the public is capable of distinguishing fact from fiction.

As well, the reliability and authenticity of information on the one hand, and its use for manipulation to sway public opinion on the other, are also crucial to monitor for the purpose of delineating and tracking the complex relationships between learning outcomes and social outcomes. This is because such information and its manipulation are designed to influence actual behaviour, including spending patterns and health behaviours. For all these reasons, new and effective education indicators must attempt to address and assess the degree to which contrived and unsubstantiated opinions hold sway in the public arena, and the degree to which existing learning systems effectively teach students to identify and see through such opinions. Potential indicators in this important area were explored in some detail by *GPIAtlantic*.

4.5 Social outcomes

In addition to this education component, the GPI is composed of 19 other domains or areas of interest that affect wellbeing. Since these social, economic, and environmental outcomes are the subject of investigation in the other GPI components, this education analysis has not emphasized the social outcomes section of the domain framework (summarized in Section 1.3 of this summary report and in Figure 1 above). However, to complete this framework properly, it is recommended that future GPI research and development link the learning outcomes assessed in this domain—particularly those related to the eleven forms of literacy examined—with the social outcomes described in the other GPI domains.

For example, relationships have been demonstrated in the literature to exist between education on the one hand and health, living standards, work, crime and Ecological Footprint on the other hand. As well, to illustrate the importance of these linkages, this summary report—as noted—references a special study assessing, for the first time, the Ecological Footprints of Canadians by educational level. In passing, we have also referenced other relationships between learning and social outcomes whenever they have been clearly indicated by the evidence presented, like the link between health literacy and health status for example. Future work should undertake a more systematic integration between such learning and social outcomes.

In presenting the GPI to Nova Scotians, the intention is not simply to present 20 stand-alone components. On the contrary, one of the most important purposes of the GPI is to demonstrate the links and relationships between its component parts. From that perspective, education, in its broadest sense, is a key determinant of societal wellbeing, and all of the learning outcomes explored in the research for this report are determinants of societal health, wellbeing, and sustainability. Because learning outcomes do directly influence social outcomes, this education domain can serve as valuable connective tissue between the various GPI domains.

4.6 Canadian Knowledge Survey (CKS) and other data sources

Based on three years of extensive research and exploration of data sources, the authors of this report strongly recommend the development of a new Canadian Knowledge Survey (CKS) that would indicate levels of knowledge and lifelong learning in the Canadian populace 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, and statistical literacy. Administered regularly, the proposed new survey would assess whether or not knowledge in these areas is improving, deepening, and expanding. As such, its results would be of great interest to Statistics Canada and to educators, educational institutions, and policy audiences nationwide as well as to the general public. Such a survey would effectively constitute an important and highly practical outcome of this education research.

Presently, indicators of broader literacies and knowledge areas beyond basic adult literacy are not systematically tracked in Canada, although these new directions are being explored within individual disciplines. GPIAtlantic found that there are currently excellent surveys and research initiatives in place or under development designed to assess knowledge in these multiple literacy areas. As well, other jurisdictions like the U.S. and some European countries have good data on science literacy, civic literacy, ecological literacy, and other areas for which data are unfortunately unavailable in Canada.

The proposed CKS could therefore draw on these and many other international initiatives, and bring them together in a systematic and integrated way to create a comprehensive instrument that could address some of the many information gaps in assessing learning outcomes. The new survey could begin to re-orient education indicators and data in this field towards actual learning outcomes at the population level, and away from the much more limited input and output data that currently dominate the education indicators field and that are confined largely to the formal education context.

Indeed, such a CKS could begin to assess the effectiveness of formal education processes in improving the knowledge of the populace at large. As noted above, there is presently a serious disconnect in this area, as a result of which both Statistics Canada and the Canadian Council on Learning have expressed surprise that higher levels of formal educational attainment have failed to improve basic literacy levels in the adult population. As well, we have noted that higher levels of formal educational attainment have not been correlated with higher levels of political knowledge, particularly among the young. A well-designed Canadian Knowledge Survey could begin to address some of these relationships and existing gaps, and thereby provide essential information to education planners that would in turn affect curriculum design and teacher training.

As a preliminary first step, it is recommended that a survey template of potential questions be prepared that will then need to be circulated among a wide range of interest groups, educators, and experts for commentary and feedback on content and substance. At a later stage, the draft Canadian Knowledge Survey itself would need to be carefully designed and tested—potentially by Statistics Canada’s Social Survey Methods Division—before it is ready for administration. However, we are certain that this initiative would fill critical existing data gaps and contribute to Statistics Canada’s reputation as one of the world’s best and most innovative statistical agencies. We are also confident that such a survey would provide the country, as well as policy makers, with vital information required to improve Canadian learning processes and educational systems, and thereby to enhance the wellbeing and prosperity of Canadians.

4.7 Recommended comprehensive indicators for the education indicators report

Accompanying this summary report is a comprehensive list of potential indicators that provides examples of the types of indicators recommended to create a broader and more meaningful assessment of knowledge and learning in the populace than is presently possible. For most of these indicators, data do not presently exist, and new data sources will need to be developed as explored by *GPIAtlantic*. The attached indicator list (see Appendix) is based on the GPI education component framework described above in section 1.3, and it illustrates a potential ideal and comprehensive education indicator set that could effectively indicate levels of lifelong / life-wide learning in the populace if data were available.

ENDNOTES

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⁹ 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.

¹⁰ Ibid., accessed. pp. 2-3.

¹¹ Ibid., accessed. p. 3.

¹² Formal education includes primary, secondary, and postsecondary schooling. Informal learning is the process of learning outside formal school settings: through friends, colleagues, or relatives; in a variety of places, such as the workplace, community, library, cultural events, and home; through a variety of activities, including leisure (such as reading books or using the Internet) and physical activities. Nonformal learning includes taught courses or lectures that do not lead to a formal qualification in the educational system. It can refer to courses taken for personal interest to enrich one's life or to courses taken to upgrade skills or otherwise contribute to employment-related initiatives.

¹³ McMurtry, John, Professor of Philosophy, University of Guelph, personal communication with Karen Hayward, reviewer comments, email correspondence, July 27 and August 23, 2006..

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¹⁵ Special Study Panel on Education Indicators. *Education Counts: An Indicator System to Monitor the Nation's Educational Health*, Washington, D.C.: National Centre for Education Statistics, 1991.

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¹⁷ Bowers, C. A. *Mindful Conservatism: Rethinking the Ideological and Educational Basis of an Ecological Sustainable Future*, New York: Rowman & Littlefield Publishers, Inc., 2003.

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¹⁹ Center for Ecoliteracy. *Competencies*, Center for Ecoliteracy, 2005; accessed February 2005; available from <http://www.ecoliteracy.org/education/competencies.html>.

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²¹ In addition to the education component, the other GPI components include: sustainable transportation, energy, population health, solid waste, forests, soils and agriculture, air quality, water quality, work time, crime, income distribution, ecological footprint, fisheries and marine environment, civic and voluntary work, leisure time, unpaid housework and childcare, debt and assets, economic security index, and greenhouse gas emissions. For more information on these including reports please refer to <http://www.gpiatlantic.org>.

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²⁸ 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.

²⁹ Maritime Provinces Higher Education Commission. 2008. *Intentions of Maritime University Students Following Graduation: A Survey of the Class of 2007. Executive Summary*. Available from <http://www2.mphec.ca/english/pdfs/Intentions2007En.pdf>

³⁰ Maritime Provinces Higher Education Commission. 2007. *2005 Survey of 2003 Maritime University Graduates: Selected Provincial Statistics*. MPHEC. Available from <http://www2.mphec.ca/english/pdfs/GFU2003in2005ProvEng.pdf>. Table 1.11a. Data are for all graduates and refer to the average amount borrowed from all sources for the 2003 degree, post-2003 education, or both, by province of graduation. Unfortunately, no time series pan-Canadian data are available for combined public and private debt loads, and therefore provincial comparisons outside the Maritimes are not currently possible.

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APPENDIX

IDEAL COMPREHENSIVE INDICATORS

Education Component – Genuine Progress Index Atlantic

The following list of indicators has emerged from the background work conducted by GPI Atlantic for its education indicators report. The list is an example of the types of indicators recommended to create a broader and more meaningful assessment of knowledge and learning in the populace than is presently possible. It is based on the framework described in section 1.3 of the accompanying Summary. It illustrates a potential ideal and comprehensive indicator set that could effectively indicate levels of lifelong / lifewide learning in the populace if data were available.

Unfortunately data for most of these indicators are not presently available. So the following list actually represents a potential summary template for longer-term development this domain, indicating the types of data that will need to be collected and assembled in the future to populate the following recommended indicators.

For reference, the framework chart—which integrates the following indicators into a coherent whole—is included as Figure 1 in the Summary Report. The sections below include a brief explanation of the rationale for the indicator and/or key elements that comprise the main comprehensive indicator for each knowledge area or literacy. All of these areas, including potential data sources, are discussed further in the background research. The following is therefore simply a summary list.

Educated Populace Framework

A. POPULACE

1. Wisdom

- Extent of wisdom in the populace based on an accepted wisdom scale

Wisdom scales have been designed by various researchers to indicate dimensions of wisdom such as: commitment to the common good; the ability to think holistically; the ability to discern whether or not something is beneficial or harmful to society; and attitudes of openness, caring, compassion, and respect for all life forms. Four such wisdom scales are explored in the background materials.

2. Values

- Prevalence of values in the populace that positively affect human wellbeing and ecosystem health

Values can illuminate a vision for a healthy and sustainable society and help discriminate between what is beneficial to the wellbeing and sustainability of society and what is detrimental. Broad values that have been identified in the literature as positively affecting human and ecosystem wellbeing include equity, compassion, concern for the common good, and ecocentrism, among others. In Canada, it is widely accepted that such values are more likely to lead to socially valuable outcomes than values based more strongly on individualism and self-interest. Because values are learned, it is important—as part of the GPI education indicators report—to assess the prevalence of particular values in the Canadian populace, to examine how these values are learned, and to determine whether or not these values are changing over time. Because learning systems play an important role in questioning and potentially provoking shifts in values, the effectiveness of these learning systems can be assessed in part by the extent to which they successfully teach and transmit values that enhance social wellbeing and ecosystem health.

B. CONTEXT 1: Learning environments

3. Quality of the informal learning environment in the public commons

- Effects of popular culture and mass media on knowledge and learning

The quality of the informal learning environment in the public commons includes, in part, the effects of television viewing or other entertainment, omnipresent advertising, and noise levels in the public commons on learning (e.g., ability to concentrate), knowledge (e.g., ability to detect misinformation), and behaviour (e.g., violent / empathetic behaviour, stress / anxiety levels, and consumerism).

4. Quality of information in the learning environment / influence of the media as a key instrument of informal learning

- Extent of:
 - Media independence: censorship and bias in news reporting
 - Misinformation / disinformation / propaganda
 - Information availability and information overload

The *quality* of information in the media directly affects how the public forms its knowledge of important issues. Observers and critics of this phenomenon have noted that it takes time, energy, skill, and experience to weed out irrelevant, redundant, and low quality information from the vast amount of available information from which to choose. Therefore, it is important to assess the reliability, independence, and authenticity of information, and to consider *how* the public is educated by its exposure to the media, where it gets its knowledge and information from, the degree to which unsubstantiated information holds sway, and the degree to which the public is capable of distinguishing fact from fiction.

5. Educational systems and learning processes (nonformal / informal / formal)

Lifelong and lifewide learning

Characteristics of lifelong learners

- Extent to which individuals exhibit the characteristics needed to be lifelong learners—particularly self-regulated learning skills

Characteristics of lifelong learners that need to be assessed include interest and participation levels, learner conceptions of knowledge and learning processes, learning styles, and skills needed to self-regulate learning. Self-regulated learning skills include cognitive learning strategies (critical reasoning and thinking skills), metacognitive skills (ability to reflect on and regulate one's own learning, good management skills), affect skills (low test anxiety, persistence, confidence in learning), and motivation to learn.

Mental health influences on the ability to be lifelong learners

- Extent of mental health factors in the populace that affect learning capacity, educational attainment, and the ability to be lifelong learners

Mental health influences on the ability to be lifelong learners include factors such as stress, depression, anxiety, and attention deficit hyperactivity disorders (especially in children). The prevalence of these and other afflictions that may adversely affect learning can mostly be assessed through existing instruments and data sources.

Nonformal learning

Work-related nonformal learning

- Participation in adult education programs for work-related skill development
- Extent of match / mismatch between worker skills and job requirements

Work-related nonformal learning involves areas such as: the need for skill development; the incidence, frequency, duration, and place of work-related adult education and training participation; sources and types of support for training; access and barriers to increasing participation; motivations of participants; past and future expectations of participation; subject matter of courses taken and the self-perceived usefulness of the courses; and outcomes of adult nonformal learning. Some of these areas are included in the Adult Education and Training Survey conducted by Statistics Canada in partnership with Human Resources and Social Development Canada.

Apprenticeships / learning skilled trades

- Learning outcomes of apprenticeship programs
- Success of apprenticeship graduates in entering related skilled trades

Potential indicators to assess the effectiveness of learning through apprenticeships and learning of skilled trades include learning outcomes of apprenticeship programs; trends in numbers of registered apprentices; program completion rates; incentives, support, and regulations for apprenticeship programs; and public attitudes toward apprenticeship training and skilled trades.

Personal interest nonformal learning

- Extent of participation in nonformal courses and programs for personal interest

Potential indicators in the field of personal interest nonformal learning include learning outcomes, interest in and rates of participation in courses and programs, venues of courses, and types of courses taken.

Informal learning

- Extent of participation in informal learning and learning outcomes

All of the multiple literacy areas listed below contain elements of informal learning. Informal learning also includes participation in and outcomes related to learning in cultural environments—such as libraries, museums and galleries, natural parks and botanical gardens, zoos and aquaria, performing arts venues and festivals; through the media (e.g., periodicals, books, films, television, or the Internet); in the workplace and home; through community volunteer activities; and through other general interest areas (e.g., sports and recreation, cultural traditions and customs, leisure and hobby skills, health and wellbeing activities, etc.).

Formal learning

Safety and security in schools

- The frequency of teacher / student victimization or bullying in Canadian schools

The degree to which students and teachers are physically safe and secure in Canada's elementary and secondary schools influences the quality of the learning environment and the ability of teachers and students to attend fully to the tasks of teaching and learning. The 21 indicators of school violence, crime, and safety tracked regularly by the U.S. National Center for Education Statistics could serve as a model for Canada.

Positive classroom climate

- Extent of positive classroom climate in Canadian schools

Positive classroom climate, which has been found to have a large and positive affect on the knowledge and skills of students, is measured in the International Association for the Evaluation of Educational Achievement (IEA) Civic and Citizenship Education Study. The IEA defines positive classroom climate as a classroom that encourages critical thinking, freedom of expression, and open discussion.

Service learning in schools

- Extent to which Canadian schools incorporate service learning into their curricula

Service learning in schools, which is assessed in the IEA Civic and Citizenship Education Study, is measured as the extent to which schools integrate classroom instruction with community service activities for which academic credit is given.

Independence: Commercialism in education

Corporate influences on formal education: K–12

- Prevalence of corporate funding in the form of advertising, sponsorships / partnerships, and corporate-sponsored educational materials in K–12 schools

The 2003/04 Canadian Teachers' Federation survey on commercial activities in Canadian public schools provides the first pan-Canadian evidence in this area.

Corporate influences on formal education: Higher education

- Public versus private share of sponsored research at Canadian universities
- Prevalence of privately funded research independent of the sponsor
- Research and development funds for basic or curiosity-driven research
- Research and development expenditures by major field of study

Educational analysts tend to agree that anything which restricts or limits the educational horizons of students or prevents them from an unhindered pursuit of truth and knowledge is counter to what the role of the education system should be. The literature on this

subject indicates that, when funding comes from the corporate sector, potential conflicts may arise between educational and corporate goals, since conditions tied to funding are intended to benefit the funder and may or may not benefit the students.

C. CONTEXT 2: Formal education structural elements

6. Early childhood education

- Degree to which Canadian learning processes and systems effectively develop empathy in young children

This includes the percentage of time young children are engaged in co-operative play and make-believe play. Research in the field of family literacy and literacy in children has found that creative play and make-believe play are not only important building blocks in developing literacy in children, but they also help build a child's capacity for empathy towards others, which is in turn a key sign of effective emotional and social development. Statistics Canada's National Longitudinal Survey of Children and Youth broaches the subject of co-operative play, and this question could possibly be expanded to produce data required for this indicator in future.

It is highly recommended that a more complete set of indicators for early childhood development (ECD) be developed that recognizes the social, community, economic, and health influences on ECD. The Early Development Instrument (EDI) is an excellent model for assessing children's readiness for school, but data are presently only available for three provinces (Manitoba, Ontario, and British Columbia).

7. Elementary and secondary education

Structure

- Average number of students in each classroom

Class size—particularly in the early grades—has many influences on the educational outcomes of students, the learning environment, and teachers' workloads. It has also been strongly associated with student achievement. Presently a number of provinces, including Saskatchewan, Ontario, and Alberta collect and report data on this indicator, but these data are currently not comparable.

- Degree to which concepts of sustainability and ecology, Indigenous knowledge, arts, civics, multiculturalism, media literacy, science, health, and physical activity are integrated into elementary and secondary school curricula

The content of school curricula is one of the most important ways that public schools, as state institutions, “reproduce the existing culture” and reinforce the “modern mind set.”¹⁵⁰ For this reason, while it is exceedingly difficult to measure, content analysis of school

curricula should assess 1) the extent to which ecology and other key literacies are part of the existing elementary and secondary school curricula, and 2) how they are presented—e.g., from an economic resource / anthropocentric perspective or from an ecocentric one. The incorporation of sustainability goals, principles, and practices into school curricula is a priority of the United Nations Decade of Education for Sustainable Development (DESD: 2005-2014). Within Canada, Manitoba has taken the lead in this area.

- Extent to which teachers have been specifically trained to teach the subjects they are teaching

The success of any school program depends on the quality of the teachers, which includes their level of knowledge and understanding of the subjects they teach, and the training they are given to develop this expertise.

- Extent to which schools specifically incorporate elements of transformative and holistic learning

Transformative or holistic learning relates to education of the whole person, or in the words of the Centre for Ecoliteracy, education for the spirit, heart, head, and hands.¹⁵⁰ Ontario Institute for Studies in Education (OISE) educator John P. Miller notes that holistic learning seeks to integrate the personal with the social, linear thinking with intuition, mind with body, expert with lay knowledge, and the economy with the environment.¹⁵⁰ It includes a sense of the sacred in the world and the need that humans have to transcend narrow and overly specialized boundaries.

Access and opportunities

- Extent of elementary and secondary student enrolment in private schools or home schooling programs

This indicator may point to a potential gap in access to quality education in Canada, as the public school system continues to face increased competition for scarce financial resources. Growing enrolment in private schools may indicate greater inequities and may threaten equal access to quality education. As well, both private school enrolment and home schooling may signal dissatisfaction with the quality of education offered in the public school system.

- Extent to which public schools engage in fundraising

The use of private fundraising initiatives to finance public school-based activities raises serious concerns about access and equity issues in the public school system and can potentially be a form of exclusion.

- Prevalence of user fees for a variety of services and programs in public schools

The charging of user fees threatens equitable access to public education, particularly when students are required to purchase supplies and materials and to pay for activities formerly provided for free. The charging of user fees sharpens disparities between different schools in different neighbourhoods, making the quality of public education increasingly dependent on income and ability to pay. The 2003/04 Canadian Teachers' Federation survey on commercial activities in Canadian public schools provides the first pan-Canadian evidence on fundraising and user fees in Canadian public schools.

Financial investment in learning and education

- Total public expenditures on elementary and secondary education for each full-time equivalent student, per capita, and in relation to GDP

Financing of the education system is a key proxy measure for assessing basic issues such as independence and access. However, the limitation of input indicators, such as funding, is that they cannot directly assess educational outcomes. Nevertheless, there is a definite and proven link between what is put into a system and what comes out of it. Thus, the resources invested in public education can reasonably be expected to influence the extent and quality of school library resources, computers, athletic facilities, the availability of art and music supplies, extra-curricular activities and school trips, and other more basic conditions of educational quality including class size, teacher training, adequate staffing, and safe and hygienic facilities.

- Household spending on educational needs, such as textbooks, school supplies, and tuition costs

Trends in household spending on education can help to indicate whether there is a widening gap in access to educational resources in Canada based on the capacity to pay.

Motivation and satisfaction with learning

- Prevalence of elementary and secondary students who are positively stimulated by, satisfied with, and engaged in their learning

Active student engagement typically denotes that the school work has stimulated the student's curiosity and creativity and has resulted in more meaningful learning. It is also an important outcome measure of the relevance and quality of education systems, as well as an indicator of the degree to which learners are likely to participate voluntarily in lifelong learning upon completion of their formal schooling. Questions on student satisfaction appear in the School Achievement Indicators Program (SAIP) written assessments, but results are not presently published. Statistics Canada's National Longitudinal Survey of Children and Youth (NLSCY) is also developing a new indicator of student engagement.

8. Postsecondary education

Structure

- Average number of students in each class section at universities and colleges

Reducing class size at the postsecondary level may increase student learning as well as the level of student participation in and satisfaction with the classroom experience. Presently pan-Canadian data are available on faculty-student ratios (which include non-teaching faculty) but not on class size.

- Extent to which universities close or merge research units, departments, and faculties in the liberal arts

Critics have argued that funding for university research has increasingly been targeted at specific kinds of research programs, which frequently involve private sector partnerships with a potential for commercial application or projects that are more practical and that deal with matters of social policy. A changing focus given to the research awards and funding of the liberal arts at universities may imperil units and departments that are seen as having less commercial or practical utility, can indicate shifting public policy priorities, and may have profound implications for the fabric, nature, shape, and future of Canadian society. Closures or mergers of research units and departments may indicate the extent to which such trends are in fact occurring.

Access

- Average amount of government postsecondary student debt at graduation
- Average amount of total and private postsecondary student debt at graduation
- Effect of student debt on post-graduation quality of life
- Average undergraduate university tuition fees
- Participation in postsecondary education based on family characteristics
- Average hours full-time postsecondary students with jobs work per week during the school year
- Time stress levels among postsecondary students

Socially constructed barriers to participation in postsecondary education may include gender, class, socioeconomic status, and ethnicity. While there has been limited success at dismantling some barriers, evidence indicates that financial, socioeconomic, and class barriers persist and have possibly worsened as student tuition fees and debt levels have skyrocketed. Students who work long hours for pay during the school year may experience severe time stress and be disadvantaged by reduced study time compared with students who do not work long hours. As well, high levels of accumulated debt may contribute to continuing financial stress after graduation.

Student satisfaction and engagement

- Proportion of postsecondary students who are positively stimulated by, satisfied with, and engaged in their learning

The degree to which students are engaged in their studies reflects the quality of their learning as well as the quality of their overall educational experience. Student satisfaction and engagement is also an important outcome measure of the relevance and quality of educational systems, as well as an indicator of the degree to which students are likely to participate voluntarily in lifelong learning after completing their formal schooling. Some postsecondary institutions in Ontario, Alberta, and British Columbia currently assess student satisfaction and engagement using questions from the U.S. National Survey of Student Engagement (NSSE), which has been administered annually since 2000.

Financing postsecondary education

- Total public versus private share of university and community college revenues
- Public postsecondary education funding per student

There are many different influences on formal education quality and outcomes, including level of funding. Government funding levels also affect the extent of reliance on tuition fees and therefore have implications for access. As well, an increasing share of private rather than public funding may potentially compromise the independence and academic integrity of postsecondary institutions. In Canada, there are marked inter-provincial differences in government funding commitments to postsecondary education, so it is important to report this indicator by province.

D. LEARNING OUTCOMES

It is recommended that comprehensive, composite indicators be developed for each of the following literacies or knowledge areas. For example, ideally it would be desirable to have a composite score for Canadians' scientific literacy, civic literacy, ecological literacy, etc. that is the aggregate of a range of assessments or survey responses. Since competence in each of the literacies or knowledge areas described below involves more than just the acquisition of knowledge, these comprehensive indices should include four essential elements—knowledge, values, attitudes / beliefs, and action / behaviour—for each of the literacies. These four elements correspond to the four Delors pillars of learning: to know, to be, to live together, and to do, respectively.¹⁵⁰

The individual indicators listed after each of the recommended composite indices below are actually all components of the potential comprehensive, composite literacy index for each knowledge area. However, they are listed separately because—in the absence of a composite, comprehensive index for each literacy—these separate indicators represent a few concrete steps that can be taken toward the eventual development of that ideal set of composite indices. Also, key elements of the comprehensive indices are described after the individual indicator lists.

In addition, although this learning outcomes section focuses on multiple literacy outcomes in the adult populace, these outcomes also reflect and include formal schooling outcomes.

9. Basic adult literacy

- Extent to which the Canadian adult populace has attained adequate levels of basic literacy (Level 3 in the prose, document, numeracy, and problem solving scales)
- Average prose literacy scores
- Average document, numeracy, and problem solving scores
- Degree to which the distribution of literacy scores is narrowing (thus reducing basic literacy inequalities)

The accumulated evidence points to the central role of basic adult literacy as a key determinant of both social and economic wellbeing.

10. Ecological literacy

- Extent of ecological literacy in the Canadian populace based on a composite index
- Basic knowledge of local and bioregional ecological issues
- Emotional and / or spiritual connectedness to the natural world
- Proportion of Canadian secondary school students who are ecologically literate based on a composite index of school-age ecological literacy

Ecological literacy includes having knowledge and general awareness of significant ecological concepts, facts, problems, and issues, including an understanding of biodiversity; of the connections between consumption patterns, extraction of the Earth's resources, and sustainability; of the interconnections between people / societies and natural systems, including causes of climate change and species loss; of the ecological processes of local bioregions and ecosystems; and of the principles and practices of sustainability. Ecological literacy also includes environmental sensitivity, ecological values, attitudes conducive to environmental protection, and environmentally responsible behaviour.

11. Arts literacy

- Extent of arts literacy in the Canadian populace based on a composite index
- Personal engagement in creative leisure activities
- Importance that individuals place on the arts in terms of enhancing their quality of life
- Extent to which the populace shows depth of creativity and aesthetic experience
- Effectiveness of Canadian formal arts education in enabling and encouraging students to engage in the creative, expressive, and responsive processes of the arts throughout their lives and in developing high levels of arts literacy

Arts literacy is concerned more with the extent and depth of arts literacy within the general populace than with professional artists and art, per se. It includes learning, valuing / appreciating, understanding, and creating a broad range of arts, including (but not limited to) visual arts, crafts, music, drama and other spoken arts, dance, literature,

and film. It also includes the incorporation of arts activities and appreciation into daily life and culture, rather than confining arts participation to a set of elite activities to be witnessed and experienced as separate from daily life.

12. Indigenous knowledge literacy

- Degree to which the Canadian populace is literate in Indigenous knowledge based on a composite index
- Extent to which the Canadian populace understands the basic principles and values of Indigenous knowledge and worldviews
- Extent to which Indigenous knowledge is effectively integrated with Western science and education in Canada
- Extent to which Indigenous knowledge and languages are flourishing and enduring

Indigenous knowledge literacy includes the strength and protection of Indigenous knowledge and languages, and is also assessed by the extent of its influence on conventional educational systems, structures, and processes, as well as the degree and extent of its penetration into the larger Canadian society. Considerations in the protection of Indigenous knowledge that are also amenable to indicator development include the extent to which the role and work of Indigenous elders is adequately resourced and receives sufficient support. In relation to formal education structures, indicators can potentially assess the extent to which Indigenous knowledge and worldviews are incorporated into mainstream educational curricula and learning systems. A study by the International Development Research Centre in Ottawa was also concerned to assess the extent of inclusion of grassroots indicators in conventional decision-making processes as a marker of the use of traditional knowledge systems.

13. Scientific literacy

- Extent of scientific literacy in the Canadian populace based on a composite index
- Extent to which the public understands scientific concepts and processes that enable them to participate fully in personal, economic, social, cultural, and environmental arenas

Scientific literacy involves understanding the nature (norms and methods) of scientific inquiry, key scientific terms and concepts, attitudes toward and interest in science and technology, and contextual issues such as awareness of the moral, social, economic, and environmental impacts of science and technology on society. The U.S. National Science Foundation (NSF) survey on Public Attitudes Toward Science and Technology, which has been conducted in the U.S. every two years since 1979, and which forms the basis of the multi-national Eurobarometer survey that is regularly conducted in the European Union countries, could potentially be a model for a similar survey in Canada.

14. Health literacy

- Extent of health literacy in the Canadian populace based on a composite index
- Degree to which the populace understands the social determinants of health and acts on community health concerns

- Extent to which the public has access to reliable health information
- Proportion of Canadian high school students who are health literate based on a composite index of school-age health literacy

Health literacy includes the extent to which the public 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. It also includes the ability to discriminate between accurate health information and health information that may be misleading, outdated, or biased. In addition, it involves public understanding of how broad determinants of health—for example, social, economic, environmental, and lifestyle factors—affect health status and health outcomes, both individually and in the larger community. Public knowledge of specific issues such as the precautionary principle, biotechnology, nanotechnology, and basic pharmacology are also considered part of health literacy.

15. Food and nutrition literacy

- Extent of food and nutrition literacy in the Canadian populace based on a composite index
- Extent to which the public knows and understands the sources, ingredients, quality, and impacts of the food that is consumed on a daily basis
- Extent to which the public understands and uses labels on food products to find out specific information about issues such as nutritional content, additives, growing methods, or manufacturing processes

Food and nutrition literacy includes awareness of one's own nutritional behaviour and an understanding of the relationship between nutrition, food production, and one's own health, as well as the health of the environment and society as a whole. In addition, it involves knowledge not only of where food comes from, but also of the impacts of the entire food system on personal, social, and environmental health.

Some particular knowledge issues in the assessment of food and nutrition literacy include: food safety and regulatory systems, the implications of long-distance transportation of food products, the nature and impact of food additives, the actual nutritional values of foods, the implications of agri-business production for local and global farmers and economies, the treatment of farm animals, and the environmental impacts created by food production systems, including understanding of the toxic residues of chemical farming and potential soil degradation resulting from intensive agriculture practices. Knowledge of topical issues, such as genetically engineered food products and organic foods, is also considered integral to food and nutrition literacy.

16. Civic literacy

- Extent of civic literacy in the Canadian populace based on a composite index
- General political knowledge based on age cohort
- Extent of understanding of the complexity of social, economic, and ecological policy issues as a global citizen

Four areas of civic literacy are commonly distinguished by analysts in this field—the civil, political, socioeconomic, and cultural or collective dimensions. Ideally, the most valid and useful indicator of civic literacy would be a composite measure based on all four of these elements. However, because such a measure would involve considerable overlap with the other 19 GPI domains, the main focus here is on the political area, which still includes a knowledge and understanding of policy issues in a wide range of areas.

In this more restrictive definition, civic literacy involves, in part, the extent to which citizens are interested in and informed about political and other issues, understand civic and political processes, and participate in civic or political activities. Indicators of civic literacy also need to distinguish between citizens who are uninformed (e.g., about political actors, political facts and concepts, and political party stands on key issues) from those who are *misinformed* on basic policy issues (like income distribution, crime rates, pollution, and the living standards of Aboriginal peoples).

17. Multicultural literacy

- Extent of multicultural literacy in the Canadian populace based on a composite index
- Extent of public knowledge, appreciation, and understanding of key intellectual, social, and cultural contributions of the world's diverse cultures
- Prevalence of Canadians who are fluent in both English and French
- Prevalence of Canadians who are multilingual

Multicultural literacy includes the extent to which the populace has knowledge, understanding, and appreciation of the diversity of cultures in Canadian society and of their respective contributions to Canadian society, as well as an understanding of issues of equity, access, social cohesion, racism and discrimination, and other social justice issues that are particularly relevant to a multicultural society. Multicultural literacy also involves indications of the extent to which cultural heritages and knowledge are being saved or lost, which is sometimes measured by the effective transmission of mother tongues to the descendants of immigrants, and the use and retention of mother tongues by these descendants. Also important as a key component of multicultural literacy is the ability to critically analyze the values and attitudes of the dominant culture and to view issues from the perspectives of diverse cultural groups rather than from the perspective of the dominant culture alone.

18. Media literacy

- Extent of media literacy in the Canadian populace based on a composite index
- Degree to which Canadians are critically aware of the promotional practices and influences of advertising in the media
- Extent to which the public can recognize bias and misinformation in the media and avoids acting based on erroneous information
- Effectiveness of formal media literacy education to enhance the media literacy skills of school-age children and youth

Media is the term used to refer to any medium or method that communicates, including (but not limited to) books, newspapers, magazines, computers and the Internet, video, art, music, television, radio, film, and billboards. Media literacy includes public understanding of the ways in which the media represent reality, the techniques they employ, and the ideologies embedded within their representations.

19. Statistics literacy

- Extent of statistics literacy in the Canadian populace based on a composite index

Statistics literacy involves the ability to understand statistical data, including how they are constructed, how to interpret statistical validity, and how to use statistics in daily life to understand matters such as medical advice, crime rates, population growth, disease incidence, or energy use. In addition to understanding key statistical issues such as distribution, association, and sampling, statistical literacy also requires specific knowledge and skills such as mathematical knowledge, context / world knowledge, and critical questioning and reasoning skills that enable the use of statistics in daily life.

E. SOCIAL OUTCOMES

Although there is no direct path from learning to actual use of knowledge and to particular social outcomes, the GPI education indicators, in common with the Canadian Council on Learning's Composite Learning Index (CLI) recognizes that linkages between learning and social outcomes do exist and will ideally explore the extent to which learning outcomes in each of the areas examined are effectively translated into desired social outcomes. In the GPI framework, these social outcomes will be reflected in the results of the other 19 GPI domains or areas of interest.

F. ECOLOGICAL INTEGRITY AND SUSTAINABILITY

Because human and social wellbeing are dependent on the health of the encompassing ecosystem, ecological integrity and sustainability represent the desired outcome of all of the domains—not just those concerned with the natural environment. Thus, it forms the outermost concentric circle in the GPI education populace framework depicted in Figure 1. Learning systems teach behaviours that either support or undermine ecosystem health, sustainability, and human wellbeing. Ideally, therefore, a comprehensive set of indicators for the GPI education indicator report, will therefore assess the degree to which existing learning processes and educational systems in Canada contribute to maintaining and enhancing ecological integrity and sustainability and thereby to enabling the needs of the present to be met without jeopardizing the ability of future generations to meet their own needs.