

POST-SECONDARY EDUCATION IN CANADA

Meeting our Needs?

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The Canadian Council on Learning is an independent, not-for-profit corporation funded through an agreement with Human Resources and Skills Development Canada. Its mandate is to promote and support evidence-based decisions about learning throughout all stages of life, from early childhood through to the senior years.

MESSAGE FROM THE CHAIR



Robert Giroux
Chair

This report is the Canadian Council on Learning's (CCL) third in-depth study of the state of post-secondary education (PSE) in Canada. As with previous reports, CCL's goal is to inform Canadians of how well the post-secondary education sector is meeting Canada's social and economic objectives and how Canada's approach to higher education compares with that in other developed countries.

Post-secondary Education in Canada: Meeting our Needs? draws on the latest research to create the most comprehensive portrait of post-secondary education this country has ever produced. It is the only report that links the many elements of PSE to provide a national overview of the sector and how it affects the well-being of individual Canadians, the resilience of the labour market and the private sector's capacity for innovation.

This publication also underscores the value the Canadian Council on Learning (CCL) brings to our country by acting as a catalyst for lifelong learning in Canada. CCL monitors and reports on our country's strengths and deficiencies in all areas of learning, providing the evidence base for public discussion and collective action on these vital issues. No other organization currently has the mandate to monitor and report independently to Canadians. CCL helps not just to inform but also to empower Canadians to develop more effective approaches to learning across the lifespan.

The Canadian Council on Learning is not content simply to outline the challenges facing post-secondary education. It is committed to being part of the solution. It is our hope that offering this valuable tool to the country's learners, educators, employers and policy-makers will help to ensure that Canada's post-secondary sector continues to play a pivotal role as our country addresses the challenges and opportunities of the 21st century.

A handwritten signature in black ink, appearing to read 'Robert Giroux'.

Robert Giroux
Chair
Canadian Council on Learning

MESSAGE FROM THE PRESIDENT AND CEO



Paul Cappon
President and CEO

POST-SECONDARY EDUCATION IN CANADA: MEETING OUR NEEDS?

There is a standard caution made by financial advisors that past performance does not predict future returns. This same advice should also be applied to post-secondary education (PSE) in Canada.

For several generations we have benefitted from a fine cadre of PSE institutions and faculty, and have had one of the highest rates of participation in the world. But this does not guarantee future success in a world where PSE's reach is increasing dramatically.

Successful societies deliberately and coherently set the conditions for the future they desire. They do not rest on their laurels, or assume that past achievement will ensure future success. Clerk of the Privy Council Kevin Lynch implies this in the title of his 2006 Policy Options article, "Canada's success is no accident, and it isn't a given," in which he argues for the importance of education and training.

Retaining a leading position in PSE requires national direction that is supported by strong information systems to guide decision-making. Through its annual reports on PSE—of which *Meeting our Needs?* is the third—the Canadian Council on Learning (CCL) provides a comprehensive analysis of the state of PSE in Canada, including the sector's ability to respond to the country's social and economic objectives, today and in the future.

Our purpose is not to issue a report card that ranks individual institutions or makes province-by-province comparisons. Nor is it our intent to point fingers or assign blame for any weaknesses or failings. Rather, these reports assess the progress and performance of Canada's PSE sector over time, presenting its areas of strength and those where it is vulnerable—all in the context of emerging new models of PSE, such as polytechnics. They also describe how Canada is doing in comparison to other countries. In short, our annual reports on PSE are meant to illuminate the important contributions that post-secondary education makes to our country and to identify issues requiring attention.

What does the 2008–2009 report tell us about post-secondary education and its capacity to respond to Canada's social and economic objectives?

On the surface, the story appears positive. The proportion of the working-age population (ages 25 to 64) with PSE qualifications now exceeds 60% (among Canadians aged 25 to 34, that figure rises to 66%), placing Canada well above the Organisation for Economic Co-operation and Development (OECD) average. Equally encouraging is research indicating that more than eight out of 10 Canadian youth expect to pursue post-secondary studies. However, dig deeper and it becomes apparent that Canada's education advantage is not equally shared across our population. Furthermore, there is no long-term strategy to ensure that educational requirements can be met, whether for individuals or the country.

Post-secondary Education in Canada: Meeting our Needs? reveals numerous areas of concern regarding PSE. For example, parents have some unrealistic expectations about the financing of their children's PSE, compared to the realities experienced by college and university students. Also, little is known about why students choose a particular PSE program or a particular subject to study, decisions that have a direct impact on the skill sets available in the workforce. Over the last two decades, university enrolment in Canada increased at three times the rate of increases in full-time faculty. While we boast the highest PSE attainment of any OECD country (in terms

of working-age population), in 2006 Canada ranked 20 out of 30 countries in its proportion of science and engineering graduates. And Canada lacks a thorough approach to quality assurance that would ensure future generations the high standards of education in place today for university, college and apprenticeship programs.

We must not let the current economic context obscure the fact that labour and skill shortages exist in numerous occupations and sectors today, and that demographic projections continue to predict labour shortages in the future.

In 2008, the OECD released a sweeping study, *Tertiary Education for the Knowledge Society*, based on in-depth reviews of the PSE sector in 24 countries. In its summary, the OECD states: "A first priority for countries should be to develop a comprehensive and coherent vision for the future of tertiary education, to guide policy development ... in harmony with national social and economic objectives."

In light of the findings of this report, can we assert that Canada is fulfilling that "first priority?"

A coherent vision is not an abstract concept. It requires that we create and share a sound base of information for decision-making. That is why CCL's 2007 report put forward a comprehensive data strategy for PSE. CCL identified the types of information that learners need to help make the best decisions to shape their careers and lives. We outlined how sound evidence about higher education and training would benefit employers, workers, institutions, governments, educators and parents—ask any parent trying to help a teenager considering study and career prospects in a bewildering array of facts and figures.

Adequate and coherent information is especially critical in tempestuous economic times. We cannot afford, through dearth of transparent information and analysis, to have people without jobs and jobs without people. Investments in "human infrastructure"—building our talent—can offer even more powerful and lasting benefits than investments in roads, buildings and equipment.

The members of the European Union (EU), for example, have set detailed objectives for education and training. Public annual reports chart the progress of the EU as a whole, as well as of each member country. These reports enable countries to learn from examples of strength and to address areas of weakness.

Even though the EU is not a country, Europe's member states have undertaken co-ordinated and convergent assessment and planning for PSE.

Is Canada reinforcing and building on its strong foundation in order to meet its future needs in training and post-secondary education? If, like the EU, Canada can agree on indicators, targets or benchmarks for the PSE sector, this would be a vital first step toward collecting and communicating information that will:

- better support student decisions about fields of study, and labour-force transitions and mobility, both between occupations and across regions;
- better connect the interests and passions of Canadians to lifelong learning opportunities, whether through skills training, PSE programs or work-related learning;
- better coordinate workforce adjustment programs with PSE opportunities, skills training and technical upgrading; and
- better identify emerging opportunities for learning, employment and fulfilling people's potential.

There is no doubt that Canada has a strong and well-respected PSE sector, which includes its community colleges, universities and apprenticeship programs. Canadians also have a deep appreciation for the value of education. But these alone will not be enough to assure our place internationally, nor to fulfil tomorrow's needs of learners and industry. As it is with individuals, businesses and the country, so it is with PSE: better information and coherent planning are critical in charting the path most likely to bring success.

A time of economic challenge reinforces the imperative to invest energy and resources in human infrastructure, in ways of assessing progress in PSE and in making joint decisions about priorities. PSE is of fundamental importance to Canadian society. As in the financial sector, only if we exercise due diligence now can we hope that future returns on our investments in PSE may be equal to past successes.



President and CEO

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Post-secondary Education in Canada: Meeting our Needs?

EXECUTIVE SUMMARY

OVERVIEW

As the world struggles with the uncertainty of a major economic downturn, the need to ensure that Canadians have the right skills and knowledge for a sustainable economy—now and in the future—is suddenly thrown into high relief.

With jobs becoming vulnerable or disappearing, many Canadians are being forced to rethink their future. They are asking themselves, “What can I do now? Do I have the skills I need?”

Post-secondary education (PSE) plays a key role in developing people’s potential and cultivating Canada’s human infrastructure, both of which are necessary for the country’s success.

Post-secondary education (PSE) refers to the skills and knowledge acquired through academic, technical and vocational courses and programs provided by universities, colleges and trade schools, including apprenticeships. Each component of the PSE sector makes a vital contribution to Canada’s social and economic development. All three are necessary to ensure Canada’s continued progress and must be valued equally.

The current downturn coincides with a rising demand for post-secondary graduates in Canada’s labour market—roughly two-thirds of all job openings in this country now require some type of post-secondary credential. Add to this mix the following two factors: Canada’s population of children (younger than 15 years old) has declined over the last decade, and the Baby Boom generation is entering retirement.

The sum result of this is that even as thousands of workers in the manufacturing sector are losing their jobs, thousands of jobs in other sectors sit unfilled. It is unclear whether Canada will have sufficient college graduates to meet demand by 2015. Without appropriate action, we will continue to have jobs without people and people without jobs. These converging circumstances make issues related to PSE access, participation and completion even more pertinent to Canada’s future as a prosperous, vibrant and equitable democracy.

The Canadian Council on Learning’s third annual report on the state of PSE in Canada offers a much-needed perspective for informed public discussion about the future of PSE in this country and how the sector can best help Canadians to find success.

Below is a summary of some key findings from *Meeting our Needs?*

KEY FINDINGS

Chapter 1: From Access to Attainment

Chapter 1 provides data and discussions on access, persistence and completion of PSE in Canada. Included is an examination of financial planning, barriers to participation and reasons for not completing PSE.

Highlights:

- 85% of 15-year-old Canadians expect to attend university or college.
- 80% of parents with children under the age of 18 had either saved or were intending to save for their children’s post-secondary education.
- Parents of potential PSE students (under the age of 18) do not have a realistic picture of how PSE is financed:
 - 40% of parents expected their children to receive scholarships based on academic performance, while only 15% of PSE students actually received this type of funding; and
 - the proportion of students who relied on financing from banks, personal loans or credit cards is 2.5 times higher than parents expected.
- Among 24 OECD countries, Canada had the third-highest proportion of 20- to 24-year-olds who were either attending school or had completed PSE.
- Yet, more than one million Canadians aged 25 to 44 have not completed high school and approximately 1.6 million 16- to 25-year-olds have less than Level 3 literacy, the standard considered the minimum to function effectively in a knowledge-based society such as Canada.

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Chapter 2: Under-representation and Gender Disparities in PSE

Chapter 2 examines PSE access, participation and completion through the multiple lenses of under-represented populations (rural, Aboriginal, low income, low parental education levels) and gender difference.

Highlights:

- In 2006–2007, the high-school dropout rate for 20- to 24-year-olds living in small towns and rural areas was almost twice the rate for the same age group living in large cities (14.9% versus 8.3%).
- Students from low-income families are less likely to pursue a post-secondary education. Only 58.5% of 18- to 24-year-olds from families earning less than \$25,000 annually participated in PSE in 2006, compared to 80.9% of youth of the same age from families with an income over \$100,000.
- The 2006 Census found that almost half of the Aboriginal population in Canada is under the age of 25. Among the 20- to 24-year-old Aboriginal population, 40.3% had not completed high school, compared to 12.5% in the non-Aboriginal population.
- The Census results show an improvement in the overall levels of post-secondary educational attainment within the Aboriginal population.
- Aboriginal people were as likely as their non-Aboriginal counterparts to have obtained a college or trade qualification.
- 7.7% of the Aboriginal population had attained a university credential, while 23.4% of the non-Aboriginal population had university attainment.
- Clear differences are evident between the genders in their PSE behaviours: 90% of trades registrations and graduates are male, while 61% of university undergraduate completions are female. In the population aged 25 to 34 with any type of PSE completed, 54% are female and 46% are male. This is the reverse of the figures for the population aged 55 to 64.

Chapter 3: Lifelong Learning and PSE

Chapter 3 focusses on PSE programs and courses—or formal education—within the context of the lifelong learning continuum. It examines adult participation in education taken through PSIs, seniors in PSE, adult literacy, withdrawals from Canada's Lifelong Learning Plan and the partnership role of PSIs in workplace learning.

Highlights:

- Canada's seniors are becoming lifelong learners. A 2006 survey by the Canadian Network on Third Age Learning revealed that more than 60,000 Canadians over the age of 65 had participated in credit and non-credit courses, seminars, workshops and learning tours being offered by colleges, universities and other educational institutions in Canada.
- Withdrawals from Canada's Lifelong Learning Plan, a federal program established to encourage adult Canadians to participate in formal education by using RRSP savings for learning, increased by 17.5% between 2002 and 2004.
- Although Canadians are more educated than ever before, numerous surveys of business leaders indicate that employers are dissatisfied with their employees' so-called soft skills (including teamwork, communication skills and self-motivation) and with some of the skills necessary for their jobs (including the management of information, use of numbers and problem solving). As a solution, many businesses are turning to post-secondary institutions for specific courses that meet these particular needs. This presents an opportunity for growth in the PSE sector.
- The participation rate and number of hours spent in formal job-related training are both on the rise in Canada, particularly among middle-aged and older workers. Between 1997 and 2002, participation rates in formal job-related learning among adults aged 45 to 54 rose by six percentage points to 33.8%. In addition, the average number of hours that 55- to 64-year-olds spent in job-related training more than doubled. In 2002, 4.8 million employed adults between the ages of 25 and 64 (35% of the workforce) took part in job-related education or training.
- Approximately 28% of the working-age population wanted to pursue training in 2002 but could not due to financial constraints.
- If adult participation in post-secondary learning is to be enhanced, the PSE sector must be responsive to the needs of the labour market. To accomplish this requires ongoing and effective research and communication with the labour market. In addition, adult learners have life circumstances and attitudinal perspectives that are different from the average 18- to 24-year-old student and need to be taken into account.

Post-secondary Education in Canada: Meeting our Needs?

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Chapter 4: Affordable and Sustainable PSE

Chapter 4 addresses the financial aspects of PSE (affordability) and the sector's capacity to meet demand for PSE (sustainability). In particular, this chapter includes an examination of public and private investments in PSE, student debt, student fees, student debt repayment, and the sector's capacity (i.e. institutional capacity and the availability of teaching staff).

Highlights:

- In 2005, Canada placed 22nd of 26 reporting countries in the share of public expenditures on PSE. At 55.1%, Canada's share was well below the OECD average of 73.1% and the EU average of 82.5%.
- In 2005-2006, nearly 350,000 full-time students received close to \$2 billion in financial aid from the Canada Student Loans Program.
- Undergraduate tuition fees increased 36.4% between 2000-2001 and 2008-2009. Since 1996-1997, the rise in undergraduate tuition costs has exceeded the rise in the Consumer Price Index every school year except 2005-2006.
- Both the number of students borrowing and the average amounts they borrowed have increased substantially in recent years.
- Nearly half (49%) of full-time university educators were over the age of 50 in 2004-2005, compared to 25% of Canada's total workforce.

Chapter 5: Innovation, Knowledge Creation and Knowledge Transfer

Chapter 5 recognizes the increasing importance of research and development (R&D) as a fundamental support for competitiveness and economic growth, which in turn affect the well-being of individuals and the society in which they live. This chapter looks at the pivotal role the PSE sector plays in carrying out Canada's R&D, from funding and activity expenditures to R&D personnel and the knowledge they create.

Highlights:

- Funding of R&D in the higher education sector increased by 149.8% between 1996 and 2007, reaching \$4.8 billion in 2007.
- One-third of all R&D activity expenditures in Canada occurs in the PSE sector.

- Expenditures related to R&D activities performed in the higher education sector are more than double the OECD average (36% vs. 17.1%) and surpass the EU average of 22.1%.
- At 47.8%, the business sector provides the highest level of funding for R&D within Canada, but is well below the OECD average of 62.7% for that sector.
- The overall number of Canadians graduating from university with advanced degrees has increased in recent years, with attainment of master's degrees rising by 54.5% and doctoral degrees increasing by 13% between 1995 and 2005. However, over this same period there was a decline in the number of doctoral degrees in engineering and computer science, and in both master's and doctoral degrees in math and physical sciences as a share of total degrees.
- In 2006, Canada ranked 20th out of 30 OECD countries in the proportion of science and engineering degrees relative to all new degrees. Canada also ranked 20th in the proportion of PhD graduates in science and engineering.

Chapter 6: Active, Healthy Citizenry

Available data show that individuals with post-secondary education are more likely to be healthy, active and engaged in their community. To assess the direct effects of post-secondary education, researchers are developing indicators to measure the extent to which PSE promotes health, civic and social engagement, and standard of living—but this is a long and rigorous process. In the absence of agreed-upon indicators, Chapter 6 must reiterate some information from earlier CCL reports—supplemented with recent studies and projects, notably the OECD project, "Social Outcomes of Learning (SOL)".

Highlights:

- In 2004, for every 100 voters with a university degree, there were 94 voters with high school and 88 with less than high school.
- In 2004, 74% of individuals without a high-school diploma made a charitable donation, compared with 93% of those with a university degree.
- In 2005, 66.9% of Canadians with a PSE qualification reported being in excellent or very good health versus 42.9% of those without a high-school diploma.
- On measures of life satisfaction in 26 OECD countries, there was an average spread of 10 percentage points between individuals with low levels of educational attainment and those with high levels of attainment. In Canada, the difference was five points.

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Chapter 7: A Skilled and Adaptable Workforce

Canada's prosperity is dependent on its ability to produce a workforce with the skills that society needs. To help understand how Canada is meeting this challenge, Chapter 7 examines the labour-market outcomes for PSE graduates, how the supply of PSE graduates matches the labour-market demand for PSE attainment, and how PSE credentials are distributed according to field of study (e.g., are too many or too few teachers being trained to meet the expected demand?).

Highlights:

- Between 1990 and 2007, the number of jobs requiring PSE graduates almost doubled. Only half as many jobs were available for those who had not completed high school.
- In the decade leading up to 2015, 5.5 million job openings will result from new job creation and retirements. Approximately 1.42 million university graduates will be required, while 2.02 million graduates will be needed from the college sector or apprenticeships.
- Younger generations are increasingly choosing university as their preferred PSE option; 28.9% of the population aged 25 to 34 (new entrants to the labour force) had university education in 2006, compared with 18.3% of the population aged 55 to 64.
- Younger Canadians are less likely to pursue post-secondary studies in the trades. In 2006, 10.4% of those aged 25 to 34 had a trade certificate, compared with 13.1% of the population aged 55 to 64.
- According to the 2006 Census, 7.2% of the trades' population and 8.2% of the college-educated population were not born in Canada and did not earn their certificates or diplomas in Canada. In 2006, 21.5%—or more than one in five university graduates living in Canada—were immigrants with foreign credentials.
- 20% of the university-educated population in Canada had prose literacy skills below Level 3, the internationally accepted level required to cope in a modern society.
- Unemployment rates for individuals without a high-school diploma were three times higher than for those with a university degree.
- In 2005, individuals aged 40 to 59 with a university degree earned, on average, twice the income of those who had not completed high school.

Chapter 8: Quality Assurance in PSE

Quality assurance is a process to assess the quality of a course, program or PSE institution. Understanding quality in Canada's \$30-billion PSE sector is an issue of accountability to students, families and all levels of government with investments in the sector. It is also important for identifying where improvements are needed in order to maintain quality for future generations of students. Chapter 8 defines quality assurance and discusses current approaches to its measurement and existing indicators, including student surveys, which are often used to assess the quality of the PSE experience. The chapter also addresses international advances in the field of quality assurance.

Highlights:

- Quality assurance is a serious concern at the international level. For example, the Bologna Process—a collaborative effort among 46 countries, including all 27 European Union members and extending to countries such as Norway, Switzerland, and the Russian Federation—has the goal of establishing a European Higher Education Area (EHEA) by 2010, which will address issues of quality and mobility in the PSE sector of those countries.
- Even though all three elements of publicly funded PSE in Canada (colleges, trades and universities) are engaged in evaluating and measuring aspects of quality in education, Canada does not have a comprehensive and coherent approach to quality assurance that has the confidence of all PSE stakeholders.
- Results from the National Survey of Student Engagement show that Canadian universities that participated in the survey trail U.S. counterparts in student–faculty interaction, which includes measures such as discussing grades with instructors, receiving prompt feedback, talking about career plans with faculty members and discussing ideas with faculty outside class.
- In 2005, 78% of college students who responded to an online survey believed that all faculty members demonstrated an interest in helping students, while 73% reported that faculty members were available to meet outside of class.
- More than 80% of all apprentices report that they were supervised by a journeyman at all times throughout their workplace training and found that their supervisor took the time required to explain their training and tasks clearly.
- Between 1987 and 2006, university enrolment in Canada increased at three times the rate of faculty increases, 56% versus 19%.

INTRODUCTION

Meeting our Needs? is the third detailed portrait of post-secondary education (PSE) in Canada issued by the Canadian Council on Learning (CCL). As in previous years, our goal is to provide Canadians with the most current information about the sector's capacity to contribute to the achievement of Canada's social and economic goals. More than simply raising awareness of the state of PSE, these reports alert the country's decision-makers to serious challenges that may prevent the sector from advancing the public interest.

Meeting our Needs? builds on CCL's two earlier studies of PSE in Canada. Each report uses as its framework eight goals derived from the individual strategic plans developed by Canada's provinces. The 2006 report, *Canadian Post-secondary Education: A Positive Record—An Uncertain Future*, highlighted the strengths of PSE educators and institutions and Canada's enviable standing as a global leader in PSE. Nevertheless it noted that fundamental data gaps, the absence of pan-Canadian objectives and the lack of cohesion among the various facets of PSE create uncertainty about the sector's future contributions to Canada's economic and social progress. The report observed that Canada lags behind other jurisdictions in addressing these issues—most other developed countries are actively implementing post-secondary agendas to enhance their prosperity and international competitiveness.

The 2007 report, *Post-secondary Education in Canada: Strategies for Success*, went beyond identifying current learning realities to propose avenues to help Canadians optimize their investments in PSE. The second report identified the key elements of a comprehensive pan-Canadian data strategy that would provide the necessary information to strengthen Canada's post-secondary sector. It also included a detailed analysis of PSE strategies adopted by other countries, to provide insight into successful approaches being applied elsewhere.

Meeting our Needs? provides the most comprehensive overview of post-secondary education in Canada to date. It presents the latest available data (up to December 2008) on the sector's performance and progress, drawing on new national and international data sources, and offers an in-depth analysis of the findings. This high-level analytical framework, the only one of its kind in the country, points both to strengths and weaknesses in the sector and draws conclusions about their implications for Canada's long-term welfare.

The structure of this report is very different from earlier editions. It retains the eight core chapters that have characterized previous years' studies of Canadian PSE, and reinforces that Canada needs high performance in all eight areas. However, the order of the 2008 report has been re-organized.

The first three chapters focus on PSE processes and inputs—the 'what' and 'who' in PSE. The report begins by examining the link between access and attainment. It then moves on to explore barriers to and gender disparities in PSE, as well as consequences for under-represented groups. This section ends by examining the role of PSE in lifelong learning.

The next portion of the report assesses how PSE functions: the affordability and sustainability of PSE, the balance between government and student financial contributions, and the factors affecting institutional capacity.

The three chapters that follow this section concentrate on the outputs, or outcomes, of PSE. This part of the report looks at the role of PSE in nurturing an active, healthy citizenry, supporting the creation of an adaptable workforce, and fostering innovation in the economy and in society.

The final chapter of the report looks forward and questions what PSE will look like in Canada a decade from now, in light of the emergence of new PSE models. It asks how current high standards can be carried forward so that the next generation can optimize the benefits of PSE.

Each chapter of *Meeting our Needs?* begins with an overview of the key findings, identifying areas where Canada enjoys "Positive Performance," as well as "Troubling Trends" with potentially adverse consequences for our country's future. The chapters conclude with a section entitled "Summary: Opportunities and Future Directions," which summarizes Canada's PSE advantages and shortcomings and points to potential solutions to the challenges identified. This analysis is enriched with pertinent findings from the 2008 Organisation for Economic Co-operation and Development (OECD) study, *Tertiary Education for the Knowledge Society*, which provide an international perspective. The OECD study includes a compilation of PSE strategies adopted in other countries and makes recommendations for continued improvement. The inclusion of this material provides a benchmark against which Canada can measure its present performance and offers best practices that Canada may borrow as it develops strategies for the future.

Note: This report does not contain data made available after Dec. 1, 2008.

An Overview: Key Findings

Positive performance

In recent decades, post-secondary education (PSE) participation has risen considerably throughout the world. This trend has been particularly evident in Canada, where over the last 15 years the proportion of the working-age population with post-secondary qualifications increased significantly—from 42.8% in 1993 to 60.3% in 2007. The level of educational attainment is even higher among young Canadians. According to the 2006 Census, two-thirds of new labour-force entrants, aged 25 to 34, had completed some type of PSE.

Canada's performance in PSE is well above the international average. In 2005, 58.1% of young Canadians aged 20 to 24 had either completed a college, Collège d'enseignement général et professionnels (CEGEP) or university program or were attending school—placing Canada third among 24 countries and well above the Organisation for Economic Co-operation and Development (OECD) average of 48.7%. Canada placed second only to Ireland in the proportion of 20- to 24-year-olds with a completed college or university education. With so many completions, Canada ranked 10th in the proportion still attending.

This high rate of participation underlines the importance of financial planning by parents of students aged 18 and younger for their children's PSE. Analysis indicates that most Canadian parents are playing an active role in helping their children achieve PSE. In 2002, 80% of parents who expected their children aged 18 and younger to complete at least high school were either planning to save or had already put aside money for their children's PSE.

Troubling trends

While Canadian participation in PSE is high, there remains considerable room for improvement. The significant decline in Canada's high-school dropout rate over the last 15 years is tempered by the more than one million individuals between the ages of 25 and 44 identified by the 2006 Census as having not completed high school. Thus, more than 10% of Canada's youngest workers are without the most basic level of education. A strong economy, coupled with increasing labour shortages—where the prospect of well-paying jobs lures high-school students from completing their studies—has been considered the principal cause. However, as demand for post-secondary graduates continues to increase, those who have entered the labour market without a high-school diploma may soon see their job prospects disappear.

Labour-market forecasters have noted that until 2015, demand for PSE graduates will be highest for trades and college graduates. However, while younger Canadians are generally more educated than their older counterparts, the trades and colleges have not experienced the same growth in completions as have universities. Registrations in apprenticeship programs have increased significantly since 1991. However, completions of the journeyman certificate or certificate of qualification exam have not increased. In 2005, the proportion of apprentices who had completed their studies was down to 7% compared with 10.2% in 1991. This raises questions as to whether trades completions will meet labour-market demands, and whether there will be sufficient qualified personnel in the trades to teach the next generation of registered apprentices.

Similar declines have occurred in the college sector, which includes colleges, CEGEPs, polytechnics and like institutions. The participation rate of 20- to 24-year-olds in college peaked in 2001 at 13.5% and the rate has since declined slowly—down to 11.5% in 2007. There has been a consistent lack of data, making trends in this sector difficult to identify and follow. In particular, data identifying participation by gender or field of study have been unavailable for almost a decade and graduation data has been incomplete since 1998. Without more comprehensive data, it is impossible to assess whether Canada can meet future labour-market demand for graduates at this level of study.

Many young Canadians are participating in and completing post-secondary programs along different pathways than students from previous years. Some students still follow the traditional linear path in PSE, while many follow less direct routes, which can include attending more than one post-secondary institution or switching programs of study. A 2008 study indicates that just slightly more than half of college and university students actually graduate from the program and school in which they initiated their post-secondary studies. Given the increasing number of students involved in this new model of PSE, the concept of credit transfer and prior learning assessment and recognition (PLAR) acquires greater importance within the PSE sector.

Although most parents are planning for their children's PSE, it appears that many parents are misinformed about the financial realities of PSE. Assumptions about the extent of PSE financing that is available are often incorrect. For example, more than twice as many parents expected their child to receive funding, in the form of a scholarship or an award based on academic performance, from a post-

secondary institution as those who actually received this funding. Similarly, the proportion of parents who expected their children to receive grants and bursaries based on financial need was twice as high as the proportion of students who received this type of financing. Perhaps as a result of the misinformation on the previous two items, parents' expectations for how their children's PSE will be financed contrast sharply with the financing situation for

current students. The proportion of students who turned to financing from banks, personal loans or credit cards was 2.5 times higher than the proportion of parents who foresee their children using those forms of financing.

Parents and high-school students do not have a clear understanding of how PSE financing works. Better information needs to be disseminated at the high-school level so prospective PSE students are appropriately prepared.



FROM ACCESS TO ATTAINMENT

Introduction

Post-secondary education (PSE) and PSE attainment levels are widely recognized to be determining factors of a country's economic position, its social standards and the quality of life of its citizens. A skilled workforce is linked to higher productivity, innovation and economic growth. An educated citizenry is tied to stronger communities with higher civic engagement and social cohesion. Individual benefits include better wages and job satisfaction, fewer periods of unemployment, and improved health and quality of life. Canada and Canadians benefit when the individual education potential of its citizens is realized.

Over the last 10 years in Canada, declines in the population younger than 15 years of age¹ have coincided with increasing labour-market demand for post-secondary graduates. At the same time, an aging population means that Canada faces declines in the availability of experienced and knowledgeable workers in the labour force. These converging factors have made issues related to PSE access, participation and completion even more pertinent to Canada's future as a prosperous, vibrant and equitable democracy.

PSE completion is a complex, long-term undertaking that requires careful planning, preparation and commitment. This chapter presents indicators that reflect the various stages of this process. The chapter also examines factors—such as family characteristics and literacy—that can impact each stage.

The sections covered in this chapter include:

- planning and preparation for PSE
- choosing to go on to PSE
- participation in PSE
- persistence in PSE
- completion of PSE
- attainment profile of the Canadian working-age population
- summary: opportunities and future directions

What is Post-secondary Education?

In Canada, the term post-secondary education (PSE) refers to academic, technical and vocational courses and programs taken beyond the secondary school level and provided by colleges, Collèges d'enseignement général et professionnels (CEGEPs), universities and university colleges. While most of these institutions are public, some are private. Graduates from these programs receive diplomas, certificates, or undergraduate or graduate degrees.

PSE in Canada also includes registered apprenticeship trades programs. These programs typically require high-school completion for entry and include in-class components (often taken in the college setting) and workplace apprenticeship training. On completion, trades graduates receive journeyman certificates or certificates of qualifications.

Programs taken beyond the secondary level are defined as tertiary education by the Organisation for Economic Co-operation and Development (OECD). Tertiary type B programs are equivalent to college or CEGEP programs in Canada. Tertiary type A and advanced research programs are equivalent to university-level programs in Canada. OECD typology classifies Canadian registered apprenticeship and trades programs as "post-secondary non-tertiary education."

Planning and Preparation

Access to post-secondary programs in Canada usually requires the completion of prerequisites, the most fundamental of which is a high-school certificate or diploma. However, as a U.S. Department of Education report indicates, the process is more complex and consists of a series of somewhat sequential steps:

First, students must decide that they want to pursue post-secondary education and what type. Second, they must prepare academically for college-level work. Third, if they want to attend a four-year institution, they must usually take the SAT or ACT entrance examinations. Fourth, they must choose one or more institutions and file applications. Finally, they must gain acceptance and make the financial and other arrangements necessary to enrol.²

Students in Canada face similar challenges when preparing for PSE. They begin this process at about age 15 (equivalent to Grade 10 in most provinces and territories), at which time they first have the option to drop or add particular courses. Course-selection decisions during high school will significantly impact students' future ability to meet PSE prerequisites. Ideally, students complete a high-school program that leaves open as many PSE options as are possible. Unfortunately, not all students succeed in doing so. Parents and high-school guidance counsellors can help students make appropriate decisions that will improve students' prospects for admission to post-secondary programs.

To participate in and complete PSE requires students to make many decisions over a number of years. The path to completion of PSE is not necessarily linear. Students make a number of decisions en route to completing their post-secondary education and there can be considerable movement in and out of the education sector. Students may leave the education system to work, both during high school and PSE (sometimes for extended periods of time) and then return to further their studies. As well, students can switch fields of study while in PSE, or even the type of PSE program (from college to university, for example). The following sections contain indicators that highlight the complexity of the PSE completion process.

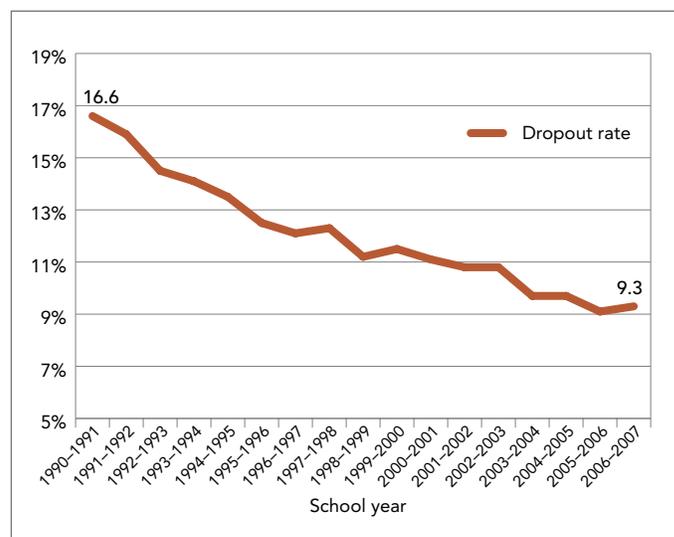
High-school dropouts

Learners need the academic knowledge and skills developed in high school for successful entry to post-secondary. Few post-secondary programs in Canada are available to students with less than a high-school diploma. High-school dropout rates are an important indicator in PSE discussions for two reasons. First, they reflect the high-school system's level of success in preparing students for post-secondary. Second, fluctuations in dropout patterns affect the size of the potential pool of PSE participants, which in turn influences the demand for PSE.

Students in Canada are legally required to stay in high school until the age of 16 (18 in New Brunswick). Many high-school dropouts return before the age of 24 to finish their high-school diplomas or equivalencies. Therefore, to identify high-school dropout rates more accurately, the international standard is to look at the proportion of the 20- to 24-year-old population who have not yet completed high school and who are not attending school.

Between the 1990–1991 and 2006–2007 academic years, the percentage of young Canadians aged 20 to 24 who had not finished high school decreased from 16.6% to 9.3%.

Figure 1.1
Proportion of Canadians aged 20–24 who had not completed high school and were not attending school, Canada, 1990–1991 to 2006–2007



Source: Statistics Canada, Labour Force Survey. Special data run for the Canadian Council on Learning.

FROM ACCESS TO ATTAINMENT

Despite this significant decline in high-school dropout rates, the most recent Census indicates that more than one million individuals between the ages of 25 and 44 had not completed high school by 2006. More than one in 10 of the youngest working-age population in Canada, therefore, do not have the most basic level of educational attainment. Typically, the strong economy was seen as a driving factor in this choice—with the availability of a well-paying job overriding the opportunity to finish high school. As numerous data sources have indicated (see Chapter 7 of this report, “A Skilled and Adaptable Workforce,” for information on labour-market demand for PSE graduates), demand for post-secondary graduates in Canada is increasing and those who make the choice to enter the labour market without completing high school may soon see their job opportunities dissolve.

The return to a traditional high-school setting for those between the ages of 25 to 44 is a difficult and unlikely prospect. As a result, several jurisdictions in Canada have established high schools devoted to the adult population (over the age of 18). Most colleges have basic education or upgrading programs that enable adults to complete their high-school equivalency or improve high-school marks in specific courses.

Table 1.1
Population that had not completed high school, ages 25–64, Canada, 2006

	Age group				
	Total aged 25–64	25–34 years	35–44 years	45–54 years	55–64 years
Total count	17,382,120	3,987,075	4,794,100	4,951,415	3,649,530
Population without high school	2,683,510	433,940	603,605	811,240	834,725
% of total	15.4	10.9	12.6	16.4	22.9

Source: Statistics Canada, *Highest Certificate, Diploma or Degree (14), Age Groups (10A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census - 20% Sample Data* (Ottawa: Released March 4, 2008), Catalogue no. 97-560-XCB2006007.

While high-school dropout rates in Canada have declined—increasing the pool of potential PSE participants—the country’s standing on this indicator in 2004 lagged well behind that of other member countries of the OECD, including Norway (3.7%), Poland (6.5%), the United Kingdom (7.3%) and Denmark (8.8%). Canada ranked 10th out of the 26 OECD countries for which data were available in 2004, its placement unchanged relative to 2002. However, in 2002 and 2004, Canadian high-school dropout rates were lower than those of several large industrialized nations, such as France (14.6%), Germany (13.1%) and the United States (12.6%).

Table 1.2
High-school dropout rates, OECD countries, ages 20–24, 2002 and 2004

	Dropout rates	
	2002 (%)	2004 (%)
Norway ^a	4.6	3.7
Czech Republic	5.9	6.4
Poland	8.4	6.5
Slovak Republic	5.5	6.6
United Kingdom	8	7.3
Denmark	11.9	8.8
Finland	10.1	9.1
Sweden	8.6	9.3
Switzerland	8.4	9.4
Canada	10.9	9.7
Austria	9.9	11.7
United States	12.3	12.6
Hungary	12.5	13.2
Germany	14.2	13.1
Ireland	14.4	13.5
France	14.5	14.6
Belgium	15	14.3
Netherlands	15.1	18.2
Greece	17.9	16.4
Australia	18.3	16.9
Luxembourg	19.2	missing
Iceland	30.6	22.4
Italy	26.6	23.4
Spain	30.5	34.4
Portugal	48.8	42.5
Turkey	missing	54.3
Mexico	missing	66.8

Sources: Data for 2004 from OECD, INES-Network B, Transition database 2006, special data run for Canadian Council on Learning. Data for 2002 from OECD INES-Network B, special YALLE data collection, presented in Patrice de Broucker, *Without a Paddle: What to Do about Canada’s Young Dropouts* (Ottawa: Canadian Policy Research Networks, 2005).

^a 2003 and 2004

High-school graduation

High-school graduation is considered an indication of young people's preparedness for PSE. Since high-school graduates comprise the potential pool of post-secondary participants, fluctuations in Canada's high-school graduation rates inform participation trends at the post-secondary level.

High-school graduation rates—the ratio of graduates (at the typical age of graduation) to the total population at that age—reflect the assumption that students proceed through school at the same pace and graduate at an expected “typical” age. The most recent data indicate a slight decline in Canada's typical-age graduation rates, from 73% in 1999–2000 to 72.1% in 2005–2006.

Provincial and territorial graduation rates varied significantly throughout this period, particularly in Ontario, where the elimination of Grade 13 contributed to a double cohort of graduates in 2002–2003. Slow- and fast-tracking double cohort students increased graduation rates in Ontario the year prior to 2002–2003 and for two years after. In provinces or territories with strong economies, such as Alberta and Yukon, the strong job market likely diverted high-school students from completing their studies, which contributed to poor high-school graduation rates in that province and territory. Nunavut stands out from other provinces and territories with an exceptionally low high-school graduation rate throughout the 1999–2000 to 2005–2006 time period (28.4% in 2005–2006). Saskatchewan, Prince Edward Island and New Brunswick all had graduation rates higher than 80% in 2005–2006.

Table 1.3
High-school graduation rates,^a Canada, provinces and territories, 1999–2000 to 2005–2006

	Canada	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont. ^b	Man. ^c	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nvt.
1999–2000	73	82.8	88.1	79.8	86	72.5	73.5	72.8	82.8	63.6	72.3	53.8	45.6	27.5
2000–2001	72	74.7	85.4	79.8	82.3	72.2	72	71.3	80.6	64.3	71.7	58.5	50	25
2001–2002	73.3	76.9	81	79.1	82.8	71.1	75.8	69.8	79.3	64.6	73.1	55.7	41.6	25.2
2002–2003	77.6	78.6	81.9	80.9	81	70.5	85.9	72.7	77.4	66.5	75	55.3	48.4	24.3
2003–2004	74	78.8	81.6	82.1	80.1	74.8	74.2	74.5	76.3	68.7	73	67.9	53.1	22.5
2004–2005	75.6	80.9	83.2	82.9	84.2	76.5	75.6	74.7	83.7	68.1	75.2	68.1	55.1	28.6
2005–2006	72.1	79.4	86	82.3	85.7	76.4	70.4	74.6	83.9	67.9	73.9 ^d	66.8	62.2	28.4
% point change 1999–2000 to 2005–2006	-0.9	-3.4	-2.1	2.5	-0.3	3.9	-3.1	1.8	1.1	4.3	1.6	13	16.6	0.9

Source: Patric Blouin, *Summary Public School Indicators for the Provinces and Territories, 1999/2000 to 2005/2006*. (Ottawa: Statistics Canada, 2008), Catalogue no. 81-595-M—No. 067.

- ^a The number of graduates is as of the end of a school year. Population estimates are as of July 1 of the corresponding school year. Late graduates are included in the calculations, but graduates from private schools are not. For this reason, this methodology underestimates the “final” graduation rate and should not be used to infer dropout rate.
- ^b Data exclude students who completed their high school while in a publicly funded hospital, a provincial school, or in a care, treatment or correctional facility. Ontario provincial schools are operated by the Ministry of Education and provide education for students who are deaf or blind, or who have severe learning disabilities.
- ^c Historical revisions have been made to this table to exclude students who graduated from Adult Learning Centres registered under the *Adult Learning Centres Act*, effective July 2001.
- ^d The graduation rate in the final year is slightly understated because some schools did not submit course information before the data collection cut-off period for the publication of the report.

High-school graduation rates are a key indicator in the 2008 OECD report, *Education at a Glance 2008*. Although Canadian data were not available for the most recent OECD reporting year (2006), the Canadian graduation rate in 2005 as reported

by Statistics Canada to the OECD (80%) was below the OECD average of 82% and the EU average of 86% for that year. This 2005 figure placed Canada in 16th place with Iceland out of the 24 OECD countries for which data were available (see Table 1.4).

Table 1.4
Trends in graduation rates at upper-secondary level, OECD countries, 1995–2006

	Typical age at graduation	1995	2000	2001	2002	2003	2004	2005	2006
OECD average		77	76	77	77	78	80	82	83
EU19 average		78	77	78	77	80	82	86	86
Greece	18	80	54	76	85	96	93	102	100
Germany	19–20	101	92	92	94	97	99	100	103
Finland	19	91	91	85	84	90	95	94	95
Japan	18	91	94	93	92	91	91	93	93
Korea	17	88	96	100	99	92	94	93	93
Norway	18–20	77	99	105	97	92	100	93	91
Ireland	18–19	missing	74	77	78	91	92	91	86
Czech Republic	18–19	78	missing	84	83	88	87	89	90
Switzerland	18–20	86	88	91	92	89	87	89	89
Poland	19–20	missing	90	93	91	86	79	86	80
Denmark	19	80	90	91	93	87	90	86	86
United Kingdom	16	missing	missing	missing	missing	missing	missing	86	88
Hungary	19	missing	missing	missing	missing	missing	missing	84	85
Slovak Republic	19–20	85	87	72	60	56	83	84	82
Italy	19	missing	78	81	78	m	82	82	86
Canada^a	17–18	missing	missing	missing	missing	missing	missing	80	missing
Iceland	20	missing	67	67	79	79	84	80	90
Sweden	19	62	75	71	72	76	78	78	76
Luxembourg	18–19	missing	missing	missing	69	71	69	76	72
United States	18	74	74	70	72	75	74	76	77
Spain	17	62	60	66	66	67	66	72	72
New Zealand	17–18	72	80	79	77	78	75	72	74
Turkey	16	37	37	37	37	41	55	48	51
Mexico	18	missing	33	34	35	37	39	40	42

Source: OECD, *Education at a Glance 2008: OECD Indicators*, Table A2.2 (Paris: 2008).

^a Canada figures include public and private graduation rates.

Notes:

- Upper-secondary graduation is equivalent to high-school graduation in Canada.
- Table ordered using 2005 data.

Student expectations for PSE

Regardless of Canada's relatively poor showing in high-school dropout and graduation rates, Canadian 15-year-olds have very high expectations for their academic futures. Results from the OECD's 2003 Programme for International Student Assessment (PISA) indicated that 85% of Canadian 15-year-olds expected to pursue PSE, placing Canada third among the 30 participating countries, and well above the OECD average of 57%.

Almost two-thirds (63%) of Canadian 15-year-olds indicated that they planned to attend university, and another 23% reported that they would attend college. Canada's ranking among OECD countries in these two categories was high—sixth and fourth place respectively (trades and apprenticeship information is not included in these results).

Table 1.5
Percentage of 15-year-old students expecting to complete tertiary education, by level expected to complete, OECD countries, 2003

	ISCED 5B: College	ISCED 5A, 6: University	Total
OECD member countries	(%)	(%)	(%)
OECD average	13	45	57
Korea	17	78	95
Turkey	9	77	86
Canada	23	63	85
Greece	19	65	84
United States	12	64	76
Japan	22	51	73
Australia	8	63	71
Ireland	14	54	68
Mexico	13	49	62
Hungary	9	53	62
Spain	12	48	60
Belgium	23	35	58
Sweden	24	33	58
Italy	4	52	56
Luxembourg	13	43	56
Norway	30	26	56
Portugal	NA	52	52
New Zealand	13	39	52
France	17	35	52
Iceland	16	36	52
Finland	NA	52	52
Slovak Republic	6	43	49
Czech Republic	11	37	48

	ISCED 5B: College	ISCED 5A, 6: University	Total
OECD member countries	(%)	(%)	(%)
Poland	14	30	44
Denmark	18	26	43
Austria	17	24	41
Netherlands	NA	41	41
United Kingdom ^a	7	32	39
Switzerland	7	18	25
Germany	2	19	21

Source: OECD PISA 2003, in *Education at a Glance 2007: OECD Indicators*, Table A4.1a (Paris: 2007).

^a Response rate too low to ensure comparability.

Notes:

- OECD tertiary education includes college, vocational and university. It does not include the trades or registered apprenticeships.
- ISCED = International Standard Classification of Education (for OECD countries)
- Row values may not sum to the totals shown due to rounding.
- NA = Data is not applicable because the category does not apply, according to the OECD Reader's Guide for *Education at a Glance 2007*.

Savings and financial planning

Meeting PSE costs is fundamental to attendance. University fees increased 36.4% over the academic years 2000–2001 to 2008–2009, from \$3,464 to \$4,724 (see Chapter 4 of this report, "Affordable and Sustainable Post-secondary Education," for information on university tuition fees). Planning for PSE costs is a critical step in the preparation process and can involve parents, students, financial institutions and post-secondary institutions. Early financial planning for PSE has also been shown to have a positive impact on attendance. Results from the 2002 Post-Secondary Education Participation Survey (PEPS) showed that Canadian youth whose parents had saved for their PSE were more likely to continue their studies beyond high school than those youth whose parents had not saved (74% compared with 50%).³

Also in 2002, the Survey of Approaches to Educational Planning (SAEP) showed that 30% of parents who expected their children aged 18 and younger to complete at least high school were planning to save, while another 50% had already put money aside for their children's PSE.⁴ In addition to saving, most parents (98%) with children aged 13 to 18 years in 2002⁵ indicated that they expected to use other methods to help defray PSE costs. These financial plans included: contributing from their earned income while their child was in PSE (84.3%); providing room/board/use of a car to reduce living expenses (70.5%); and taking out personal loans in their name for their child's education (27.6%).

Table 1.6
Methods (other than savings) parents planned to use to meet their child's post-secondary education costs, Canada, 2002

Method	Parents reporting they would use the method
	%
Parent will contribute from parent's earned income at the time	84.3
Parent will provide room/board/use of a car to reduce living expenses	70.5
Parent will take out loans (in parent's name)	27.6
Parent will sell assets	12
Other	2.1

Source: Lisa Shipley et al., *Planning and Preparation: First Results from the 2002 Survey of Approaches to Educational Planning* (Ottawa: Statistics Canada, Nov. 20, 2003), Catalogue no. 81-595-MIE2003010.

Note: This table contains methods planned to be used by parents of children who were aged 13–18 years in 2002.

The PEPS and SAEP surveys—both conducted in 2002—enable comparisons between parents' financing expectations (for their 13- to 18-year-old children) with the actual financing used by 18- to 24-year-olds already in PSE that year. The SAEP data indicate that parents expected their children to use a number of financing methods prior to and during their PSE, some of which were not realistic when compared with the financing methods in use by PSE students in 2002 (PEPS).

Working while going to school—at both the high-school and post-secondary levels—has become the norm in Canada. More than three-quarters (79.8%) of parents of 13- to 18-year-olds expected their children to work during high school to save for PSE. Indeed, more than three-quarters (77%) of post-secondary students had worked during high school to save for PSE. Nearly two-thirds of 13- to 18-year-olds were expected to work during post-secondary studies (65.9%) and 64.3% of PSE students in 2002 were actually working during their post-secondary studies.

The proportion of parents who expected their children to take out government loans was roughly equivalent to the proportion of PSE students who were actually using that method of financing in 2002 (29.7% and 26.4% respectively). In all other areas of financing, there were notable differences between

Combining School and Work: Striking a Balance

Working while going to school has several advantages. It introduces students to labour force practices and is an initial step in the school-to-work transition process. However, the amount of time worked can have an impact on student grades at both the high-school level and through PSE studies. It can affect the ability to meet PSE academic prerequisites and may influence persistence in post-secondary studies. It appears that a maximum of about 20 hours per week can be undertaken without affecting grades. Students working less than 20 hours per week generally had similar grades as those students who did not work. High-school students who worked more than 20 hours per week were less likely to pursue PSE than those who worked less than 20 hours per week or not at all.⁶

parents' expectations and what actually occurred for students in PSE. Parental expectations of funding from post-secondary institutions (in the form of scholarships or awards based on the students' academic performance) were more than twice what PSE students were actually receiving (39.6% versus 15%). As well, 28.8% of parents expected their children to receive grants and bursaries based on financial need, while only 15% of PSE students received this type of financing.

Parents also underestimated the level of financing their children would access through banks or personal loans taken out in the child's name. While only 10.8% of parents expected their children to use this method of financing, 27% of post-secondary students in 2002 obtained bank or personal loans from family or friends to finance their education. These disparities are likely related to unrealistic planning practices during the pre-PSE years. Inaccurate financial planning can leave PSE students with few last-minute options for bridging the financial gap. Analysis of the potential impact of these misperceptions on the decision to attend or not attend post-secondary is not available.

Table 1.7
Methods children were expected to use, or were using, to finance post-secondary studies, Canada, 2002

Method	Methods children were expected to use (parents of children aged 13–18 years)	Method used (18- to 24-year-olds attending a post-secondary institution)
	(%)	(%)
Work before starting post-secondary	79.8	77
Work during post-secondary	65.9	64.3
Receive scholarships or awards based on academic performance	39.6	15
Take out government student loans	29.7	26.4
Receiving grants or bursaries based on financial need	28.8	15
Receive gifts or inheritances	12.5	-
Take loans from financial institutions or from family, friends or spouse	10.8	27
Interrupt post-secondary to work	8.2	-

Sources: Lisa Shipley et al., *Planning and Preparation: First Results from the 2002 Survey of Approaches to Educational Planning* (Ottawa: Statistics Canada, Nov. 20, 2003), Catalogue no. 81-595-MIE2003010; and Lynn Barr-Telford et al., *Access, Persistence and Financing: First Results from the Postsecondary Education Participation Survey (PEPS)* (Ottawa: 2003). Statistics Canada Catalogue no. 81-595-MIE—No. 007.

Table 1.8
Proportion of the population with at least a high-school education, by age group, Canada 2006

	Total age, 25 years and older	25–34 years	35–44 years	45–54 years	55–64 years	65–74 years	75 years and older
	Count						
Total population with at least a high-school education	17,037,095	3,553,130	4,190,490	4,140,170	2,814,805	1,393,035	945,465
	Percentage						
With high school only	29.5	25.3	26	31.3	31	34.8	40.7
With an education beyond high school	70.5	74.7	74	68.7	69	65.2	59.3

Source: Statistics Canada, Highest Certificate, Diploma or Degree (14), Age Groups (10A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census - 20% Sample Data (Ottawa: Released March 4, 2008), Catalogue no. 97-560-XCB2006007.

Choosing to Go on to PSE

On completion of high school, students choose whether to pursue post-secondary studies or enter the labour market. A number of factors affect this decision, including the lure of employment in a strong economy, perceived barriers to participation in PSE, and distance from a post-secondary institution.

According to the 2006 Census, the proportion of the population that graduated from high school and went on to complete PSE has shifted noticeably, with nearly three-quarters (74.7%) of 25- to 34-year-olds in this group having completed some form of PSE, compared with 60% of the population over the age of 74. Although this is a very positive trend, one-quarter of high-school graduates aged 25 to 44 in 2006, or two million individuals, had chosen not to complete any form of PSE up to 2006. This is of concern as the proportion has not changed over the last two decades.

FROM ACCESS TO ATTAINMENT

Factors that affect the decision to attend PSE

Several factors have an impact on the decision to pursue PSE studies. These include parental attitudes about PSE, high-school academic performance and engagement, literacy skills, geographic location and perceived barriers to PSE.

Parental attitudes

Students' expectations for their academic futures do not develop in isolation. Parental attitudes toward PSE and parental levels of educational attainment play an important role. A 2002 study indicated that young Canadians who felt that their parents expected them to complete PSE were more likely to have enrolled in a post-secondary program than youth who felt their parents did not have that expectation (67% and 34% respectively).⁷

High-school academic performance

Results from Statistic Canada's Longitudinal Survey of Youth in Transition (YITS-Cycle 4)—which tracks students from the age of 15 onward—show that in 2003, high-school students who were both academically and socially engaged at school were more likely to continue on to post-secondary studies than other high-school students. The majority of high-school students (93%) with an overall high-school average of 80% or more continued on to post-secondary, compared with 34% of high-school students with an overall academic average of less than 60%.⁸

Literacy skills

The OECD's international survey of 15-year-old students' reading, science and math skills—known as the Programme for International Student Assessment (PISA)—is conducted in Canada at the same time as YITS, which follows students from the age of 15 through their mid- to late-20s. These concurrent studies enable analysis of the relationship between young Canadians' reading skills (prose literacy) and other behaviours—such as completion of high school and participation in PSE.

PISA's assessment of reading skills entails five levels of competency. Level 3 is considered the lowest level required to function normally in a knowledge-based society such as Canada. Of the 15-year-old students who had completed PISA in 2000 and whose literacy score was below Level 3, the proportion that had completed high school by the age of 19 was 77% or less (depending on the level, see Table 1.9) and 14% or more had dropped out of high school. In comparison, 98% of 15-year-old students who had the highest level of literacy (Level 5) had completed high school four years later, while only 1% had dropped out.

Table 1.9
High-school status at age 19 in 2004, by PISA prose literacy level at age 15 in 2000, Canada

High-school status at age 19 (2004)			
	Completed high school %	Still in high school %	Dropped out of high school %
Reading proficiency at age 15 (2000)			
Level 1 or below	62	15	22
Level 2	77	9	14
Level 3	89	5	7
Level 4	95	2	3
Level 5	98	1	1

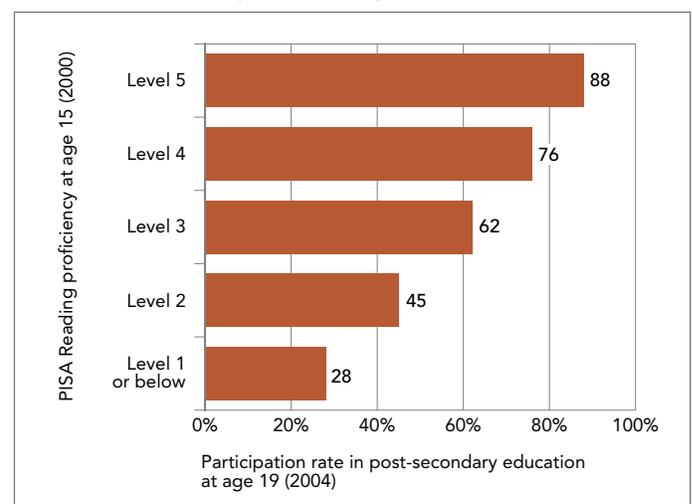
Source: Tamara Knighton and Patrick Bussière, *Educational Outcomes at Age 19 Associated with Reading Ability at Age 15*, Culture, Tourism and the Centre for Education Statistics research papers no. 43, Table A3 (Ottawa: Statistics Canada, 2006), Catalogue no. 81-595-MIE2006043, p. 21.

Notes:

- High-school status data from Statistics Canada's Youth in Transition Survey.
- PISA = Programme for International Student Assessment
- PISA documentation contains information on how reading proficiency levels were determined, available at www.pisa.oecd.org.

These large differences are carried forward into post-secondary participation. Slightly more than one-quarter (28%) of 15-year-olds with the lowest level of prose literacy participated in some type of PSE by age 19. In contrast, 88% of 15-year-olds with the highest level of literacy participated in PSE by age 19.

Figure 1.2
Post-secondary participation by age 19 in 2004, by PISA prose literacy level at age 15 in 2000, Canada



Source: Tamara Knighton and Patrick Bussière, *Educational Outcomes at Age 19 Associated with Reading Ability at Age 15*, Culture, Tourism and the Centre for Education Statistics research papers no. 43, Table A6 (Ottawa: Statistics Canada, 2006), Catalogue no. 81-595-MIE2006043, p. 24.

Note: PISA = Programme for International Student Assessment

The 2003 International Adult Literacy and Skills Survey (IALSS) is the Canadian component of the OECD's international assessment of the literacy skills of the population aged 15 and older. Like PISA, the IALSS defines five levels of literacy. Level 1 indicates very poor literacy skills—an individual at this level may be unable to determine from a package label the correct amount of medicine to give a child—while Levels 4 and 5 indicate strong literacy skills. According to the OECD, Level 3 on the IALSS scale is considered the level needed to cope adequately with the demands of everyday life and work in today's society.⁹

Poor literacy skills at age 15 can become a chronic problem. In 2003, almost 1.6 million individuals (37.8%) aged 16 to 25 years were functioning at literacy levels 1 and 2. Although low literacy is not the same as illiteracy—in reality, very few Canadian adults are truly illiterate (unable to read or write)—evidence suggests that literacy skills decline with age.¹⁰ The number of young adults with low levels of literacy is, therefore, of particular concern given the social and economic implications for individuals and the country as a whole.

Table 1.10
Distribution of prose literacy levels, ages 16–25,
Canada excluding territories, 2003

	Count	%
Total	4,176,939	100
Level 1	394,761	9.5
Level 2	1,181,233	28.3
Levels 3, 4 and 5	2,600,945	62.3

Source: Adapted from S. Grenier et al., *International Adult Literacy Survey, Learning Literacy in Canada: Evidence from the International Survey of Reading Skills*, Table C.2.1 (Ottawa: Statistics Canada, January 2008), Catalogue no. 89-552-MIE—No. 19.

The information presented above shows a negative relationship between low literacy levels and PSE participation. Having more than one million individuals aged 16 to 25 at the lowest of literacy levels—who are also in the prime age group for post-secondary attendance—negatively impacts PSE participation rates. While not all individuals with low literacy levels bypass PSE (see *Figure 1.2*), it is not clear whether literacy levels influence decisions about the type of PSE—and even the field of study—to pursue. Nor is it clear whether the larger proportion of individuals who choose to leave post-secondary before completion is predominantly from among the low-literate population.

Geographic location

Proximity to a post-secondary institution can substantially impact the costs associated with obtaining PSE and can therefore influence the decision to pursue PSE. Public universities are concentrated in Canada's larger urban centres and several of the largest cities have a number of universities. For the urban population in these areas, the university choices are varied and the costs of attending can be limited to tuition, books, ancillary costs (educational costs) and transportation. For university students living away from home, university expenditures must necessarily include rent, food and other related costs (non-educational costs). Indeed, university students who live away from home more than double their post-secondary expenditures. In 2002, the median total amount spent by full-time university students on education costs was about \$5,000. The non-educational costs for university students living away from home including rent, food, telephone and other non-educational expenses totalled \$8,160 for that year.¹¹

Compared with university locations, college locations in Canada are much more geographically diverse. PSE costs for those living in less urban areas but within commuting distance to a college are also limited to tuition and transportation costs. For college students who lived away from home in 2002, the median amounts were \$3,100 for educational costs and \$8,100 in non-educational costs.¹²

Large regions of Canada—particularly in northern Quebec, Ontario, Manitoba and the Northwest Territories—do not have a university or college within commuting distance. The financial obligations for students living in these areas must necessarily include accommodation costs.

In 2006, 17.3% (728,960) of young Canadians aged 15 to 24 lived in rural areas compared with just over three million youth of the same age who lived in urban areas.¹³ (See Chapter 2 of this report, "Under-represented Groups and Gender Disparities in PSE," for a discussion of rural–urban differences in post-secondary attendance.) According to the Canadian Council on Learning's Composite Learning Index, residents of large cities (such as Toronto, Montreal, Vancouver and Calgary) live, on average, within 11 minutes of a post-secondary institution, compared with about 22 minutes for residents of smaller towns and cities, and more than 30 minutes for residents of rural communities.

Perceived barriers to PSE

Results from YITS suggest that individuals perceive financial barriers as the most significant factor influencing their decision to attend PSE. In 1999, 18- to 20-year-old high-school dropouts and high-school graduates who had not pursued PSE were asked why they had chosen not to pursue PSE. Students at that age who were still in high school (high-school continuers) were also asked if they perceived any barriers to pursuing further studies once they had completed their high-school education. Survey participants were able to identify up to three barriers.

In all three groups, a sizeable share indicated that they perceived barriers to going as far in school as they would like to go. Six in 10 high-school dropouts felt that they faced barriers to PSE, while 42.6% of high-school continuers and 51.3% of high-school graduates felt there were barriers. For those who stated that there were barriers, all three categories of students identified financial barriers as a primary concern. For dropouts, where one might expect poor grades to be the highest barrier, only 9.4% cited factors related to their grades as detrimental to continuing their studies. Yet more than half of dropouts (53.1%) cited financial barriers. This suggests a possible link between perceived financial barriers to PSE and patterns of dropping out of high school.

A difficult financial situation was also the most frequently occurring response (56.6%) in the group of high-school continuers who perceived barriers to continued education. They also cited poor academic qualifications more frequently than the two other groups (19.5% compared with 12.8% for graduates and 9.4% for dropouts), which may help explain why they were still in high school at the later age.

Of the 18- to 20-year olds who had completed high school, 22.7% had chosen not to pursue PSE. More than half (51.3%) of the high-school graduates who did not go on to PSE stated that they faced barriers to pursuing PSE. Of these, 12.8% had poor grades or were not able to get into a post-secondary program. However, a significantly higher percentage (70.7%) stated that they faced financial barriers to PSE.

Table 1.11
Barriers to pursuing post-secondary education (PSE) by 18- to 20-year-old non-PSE participants, by high-school status, Canada, 1999

	High-school dropouts, no PSE	High-school continuers	High-school graduates, no PSE
	(%)	(%)	(%)
Percentage of 18- to 20-year-olds by high-school and PSE status	10.4	13	22.7
Percentage reporting barriers to going as far in school as would like to go	60.7	42.6	51.3
Of those reporting barriers			
Financial situation	53.1	56.6	70.7
Not able to get into program, marks too low or not accepted	9.4	19.5	12.8
Not enough interest/motivation	11.5	12.3	6.8
Not sure what I want to do	2.5 ^a	2.6 ^a	5.8
Want to stay close to home	1.3 ^a	1.0 ^a	1.7 ^a
Want to work	15.4 ^a	3.9 ^a	4.8
Takes too long	5.6 ^a	3.3 ^a	5.3 ^a
Other	14.2 ^a	14.3 ^a	9.6

Source: Geoff Bowlby and Kathryn McMullen, *At a Crossroads: First Results for the 18- to 20-year-old Cohort of the Youth in Transition Survey* (Ottawa: Statistics Canada, Jan. 23, 2002), Catalogue no. 81-591-XIE.

^a Use with caution. Because the coefficient of variation is between 16.6% and 25%, results are less reliable. A coefficient of variation is a measure of data quality—how much certainty there is that if the survey were to be conducted 100 more times with different samples you would get the same results. High coefficients of variation (CVs) indicate that there is less certainty in the results. CV values above 16% indicate enough uncertainty that the results require a cautionary note.

PSE Participation

Participation rates: An overview

More than ever before, Canadian youth are recognizing the value of going on to PSE. This is a positive trend for Canadian society. Results from the 2005 YITS indicate that, by the time they had reached 24 to 26 years of age, 79% of the survey participants had enrolled in a post-secondary program. In just six years, from the ages of 18 to 20, the participation rate for this cohort had increased by 25 percentage points. A 19 percentage-point increase in university attendance drove most of the overall increase in PSE participation rates.

Table 1.12
Post-secondary participation rates, Canadian youth,
December 1999 and December 2005

	PSE participation rates		Percentage-point change from 1999 to 2005
	December 1999, aged 18–20 years	December 2005, aged 24–26 years	
	(%)	(%)	(%)
Total	54	79	25
Type of institution attended			
University	21	40	19
College/CEGEP	23	26	3
Other post-secondary	10	13	3

Source: Danielle Shaienks and Tomasz Gluszynski, *Participation in Postsecondary Education: Graduates, Continuers and Drop Outs, Results from YITS Cycle 4* (Ottawa: Statistics Canada, November 2007), Catalogue no. 81-595-MIE2007059, p. 28.

The Canadian participation rate for 20- to 24-year-olds ranks high compared with that of other countries. International comparisons on this indicator reflect the variation in educational structures and practices across countries. For example, youth in Canada attend and often complete their PSE at earlier ages than in some European countries, particularly in the college sector. A meaningful international comparison of participation rates must take these differences into account. The international standard for comparison includes two components for this age group: individuals who had already completed PSE by the year in question (because they had in fact participated in PSE); and those who were in school for the year of comparison.

In 2005, 58.1% of Canadian youth aged 20 to 24 had already completed a tertiary education or were attending some type of school. This placed Canada in third position among the 24 countries for which data were presented. Canada ranked second behind Ireland in the proportion of the population aged 20 to 24 that had already completed their education and held 10th position in the proportion still in education. These figures highlight the impact of varying educational structures on participation rates at the post-secondary level. Programs at college and CEGEP institutes in Canada are normally less than three years in duration. With high-school graduation occurring at approximately age 17 in Canada, most college and CEGEP participants will have graduated by the age of 21.

Table 1.13
Proportion of 20- to 24-year-olds with tertiary education complete or attending any type of school, OECD countries, 2005

OECD countries	Not in education and with tertiary education	In any education	Total
	(%)	(%)	(%)
Country mean	7.3	41.4	48.7
Poland	1	62.7	63.7
France	11.5	47.4	58.9
Canada	16.5	41.6	58.1
Denmark	3.5	54.2	57.7
Netherlands	8	49.2	57.2
Finland	3	52.8	55.8
Ireland	27.4	28	55.4
Luxembourg	6.5	47.4	53.9
Hungary	4.6	46.6	51.2
Spain	10	40.7	50.7
Belgium	13.8	36.1	49.9
Greece	6.6	42.6	49.2
United States	12.7	36.1	48.7
Norway	5.2	41.5	46.7
Germany	2.5	43.9	46.5
United Kingdom	14.4	31.6	46
Sweden	2.7	41.6	44.4
Portugal	5.1	37.4	42.5
Australia	4.2	38.3	42.5
Switzerland	4.4	37.3	41.7
Italy	1.6	38.6	40.2
Czech Republic	2.5	35.9	38.4
Slovak Republic	4	31	35
Austria	4.2	30.4	34.6

Source: OECD, INES-Network B, Transition database 2006, special data run for the Canadian Council on Learning.

Notes:

- Tertiary education, as understood within the OECD, includes college, vocational and university programs. It does not include trade and registered apprenticeship students or graduates.
- Observations with missing values for level of education or educational attendance status have been excluded from the calculations.

Participation in registered apprenticeship programs

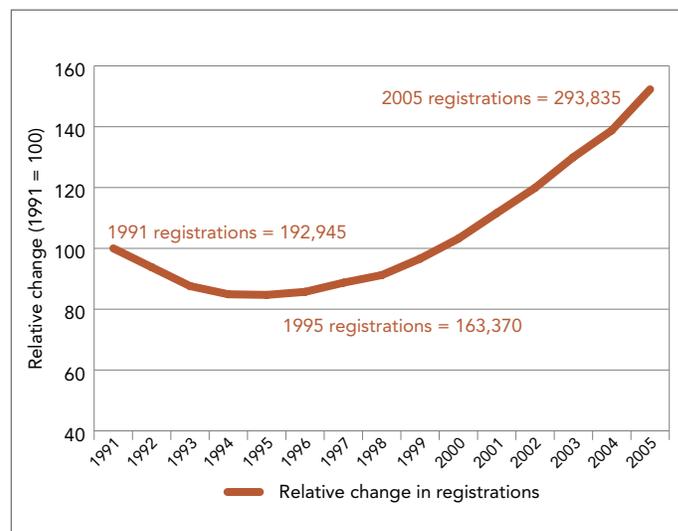
Trades and registered apprenticeship programs play a significant role in supplying the Canadian labour market with skilled and trained workers. Each province and territory is responsible for apprenticeship training and governs their own training and certification policies, through either a provincial ministry of education or an industry stewardship. There are about 300 trades in Canada according to the Ellis Chart—a comparative chart of apprenticeship programs in Canada maintained by Human Resources and Skills Development Canada (HRSDC) in partnership with the Canadian Council of Directors of Apprenticeship (CCDA).¹⁴

Apprenticeship training is typically composed of an in-class component—normally provided in a college or CEGEP setting—and paid employment overseen by a qualified tradesperson. On average, 80% of an apprenticeship program occurs at the workplace. The length of programs varies across trades and provinces, but completion of the apprenticeship certificate normally involves successful completion of an exam. For some trades, the exam is compulsory—without it, the individual cannot work in the trade. On successful completion of the exam, the individual is issued a journeyman’s certificate or a certificate of qualification, depending on the trade, province or territory.¹⁵ Only individuals who have passed the exam can oversee and sign off on the work of apprentices learning a trade. (See “Apprenticeship completions” section on page 33 of this chapter.)

To support the interprovincial mobility of skilled workers, the Red Seal Program was established in 1966. In each of the 49 designated Red Seal trades, the program establishes a standardized exam that is used across all provinces and territories and taken at the end of the apprenticeship program. This exam is not mandatory, unless specified in a particular province or territory. However, the Red Seal allows qualified people to practise their trade in any Canadian province or territory where the trade is designated.

Following a decline in the number of registered apprentices between 1991 and 1996, several provincial governments instituted programs to boost the number of people entering registered apprenticeship programs within their jurisdictions. Recent changes to the federal tax system allow registered apprentices to receive a tax credit for tools and equipment purchased to complete a trades program, much like the federal tax credit for college and university programs that permits students to claim tuition costs and a monthly allowance for living expenses. Between 1995 and 2005, the number of registered apprentices in Canada increased 79.8%, from 163,000 to almost 300,000.

Figure 1.3
Relative change in trade registrations, 1991–2005
(1991 = 100)



Source: Statistics Canada, Registered Apprenticeship Information System (RAIS), CANSIM Tables 477-0051.

From 1992 to 2005, growth in registrations was uneven across the major trade groups. The three largest trade groups (building and construction trades; metal fabricating trades; and trades related to motor vehicle and heavy equipment) each experienced increases of more than 20,000 registrations between 1992 and 2005, representing at least a 50% increase in each sector.

During the same period, the number of registered apprentices in the food and services trades—not nearly as large a sector as the three mentioned above—increased by more than 16,000, or 148.5%.

Table 1.14
Registered apprenticeship training registrations by major trade group, Canada, 1992 and 2005

	1992	2005	Change in count from 1992 to 2005	Percentage change from 1992 to 2005
	Count			%
Total	180,965	293,835	112,870	62.4
Major trade groups				
Building construction trades	43,705	68,710	25,005	57.2
Electrical, electronics and related trades	34,400	49,435	15,035	43.7
Food and services trades	11,055	27,470	16,415	148.5
Industrial and related mechanical trades	15,055	21,055	6,000	39.9
Metal fabricating trades	36,625	60,370	23,745	64.8
Motor vehicle and heavy equipment	37,460	57,750	20,290	54.2
Other ^a	2,670	2,130	-540	-20.2

Source: Statistics Canada, "Registered apprenticeship training programs, 2005," *The Daily*, Nov. 15, 2007.

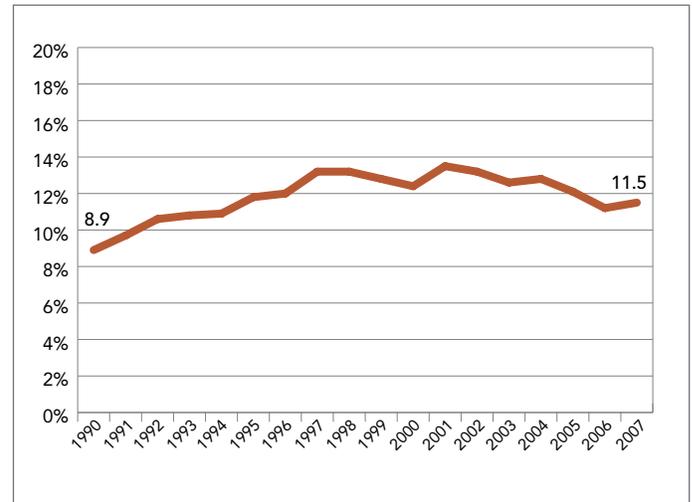
^a The trade group "Other" consists of miscellaneous trades and occupations not classified elsewhere. Many of the apprenticeship trades and occupations that have been introduced since the 1990s are included in this group.

Note: Column counts may not sum to the totals shown due to rounding.

Participation in college or CEGEP

Although college and CEGEP attendance for 20- to 24-year-olds increased from 8.9% to 11.5% during the period 1990 to 2007, the increase was not steady. In fact, the participation rate peaked at approximately 13% between 1997 and 2001, declining slowly and steadily ever since.

Figure 1.4
Population aged 20–24 attending a community college, CEGEP or apprenticeship program, Canada, 1990–2007



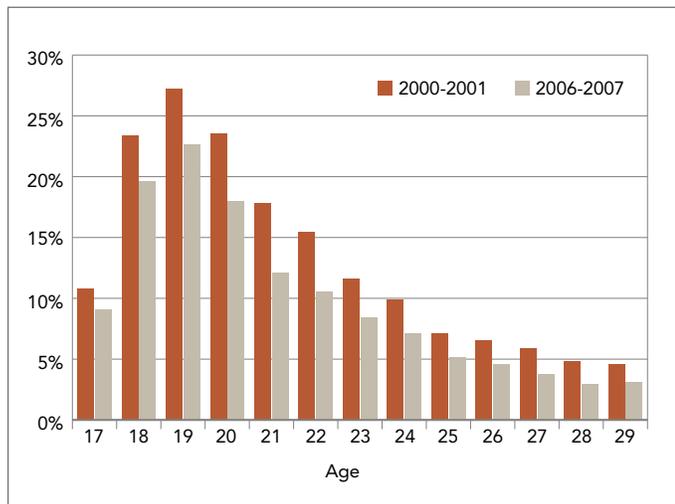
Source: Statistics Canada, *Labour Force Historical Review 2007*, CD-ROM (Ottawa: Feb. 19, 2008), Catalogue no. 71F0004XCB.

Notes:

- The trades figures include only the "in-class" component of the trades program, usually taken in the college setting.
- These figures do not include 20- to 24-year-olds who had already completed their post-secondary education.

College and CEGEP participation rates are generally the highest for youth aged 18 to 20. In 2000–2001, college participation rates for youth aged 18, 19 and 20 ranged from 23.4% to 27.2%. In 2006–2007, those participation rates had declined to between 18% and 22.6%. Overall, participation rates at this level for each single year of age from 17 to 29 were lower than they had been in 2000–2001.

Figure 1.5
College and CEGEP participation rate, by age, 17–29 years, Canada, 2000–2001 and 2006–2007



Data Source: Statistics Canada, Labour Force Survey.

Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007* (Ottawa: Statistics Canada, December 2007), Table E.1.1, updated June 16, 2008, Catalogue no. 81-582-XIE.

Participation in university

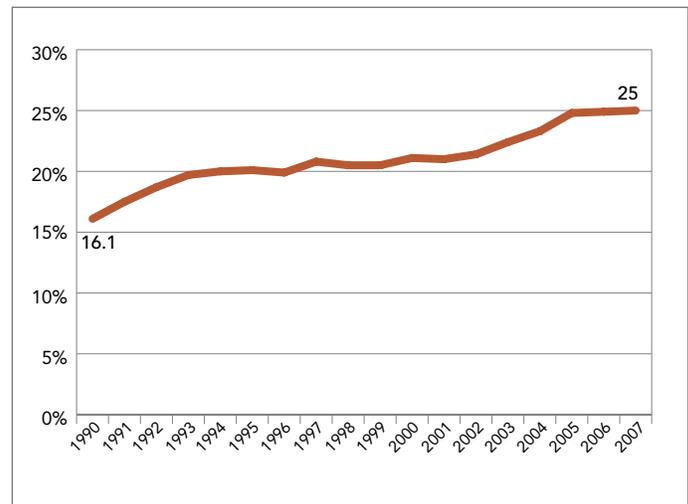
Between 1990 and 2007, higher university attendance accounted for most of the increase in the post-secondary attendance rate for 20- to 24-year-olds. University attendance rates reached 25% in 2007, compared with 16.1% in 1990.

Table 1.15
University enrolment by program level, Canada 1999–2000 and 2005–2006

	1999–2000		2005–2006		Percentage change from 1999–2000 to 2005–2006
	Counts	Distribution	Counts	Distribution	
		%		%	
Total	847,500	100	1,047,700	100	24
Status					
Undergraduate	650,400	77	803,500	77	24
Graduate	116,300	14	153,600	15	32
Not specified	80,800	10	90,600	9	12

Source: Statistics Canada, "University enrolment, 2005/2006," *The Daily* (Feb. 7, 2008), www.statcan.ca/english/dai-quo/.

Figure 1.6
Population aged 20–24 attending a university, Canada, 1990–2007

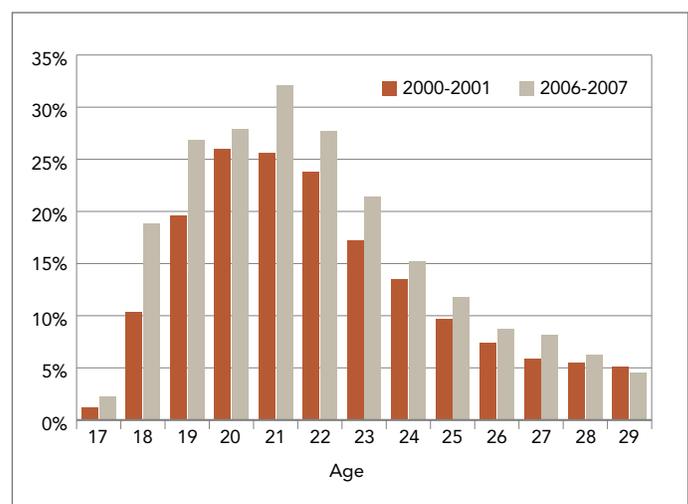


Source: Statistics Canada, *Labour Force Historical Review 2007*, CD-ROM (Ottawa: Feb. 19, 2008), Catalogue no. 71F0004XCB.

Note: These figures do not include 20- to 24-year-olds who had already completed their post-secondary education.

In contrast to participation rates for college and CEGEP, university participation rates increased for every age but 29-year-olds between the 2000–2001 and 2006–2007 academic years. University participation rates are generally the highest for youth aged 19 to 23. In 2006–2007, 21-year-olds had the highest university participation rate (32.1%).

Figure 1.7
University participation rate, by age, 17–29 years, Canada, 2000–2001 and 2006–2007



Data Source: Statistics Canada, Labour Force Survey.

Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007* (Ottawa: Statistics Canada, December 2007), Table E.1.1, Catalogue no. 81-582-XIE."

FROM ACCESS TO ATTAINMENT

By the 2005–2006 academic year, undergraduate and graduate enrolments had increased 21% and 32% respectively from the 1999–2000 levels. Notably, enrolments at Canadian universities in 2005–2006 had passed the one-million mark for the third year in a row.

The share of students enrolled in the major fields of study did not change substantially between 1999–2000 and 2005–2006. Three areas of study accounted for almost one-half (49%) of all enrolments: social and behavioural sciences and the law (17.4%); business management and public administration (16.2%); and the humanities (15.4%). The next most popular subject areas were health, parks, recreation and fitness at 9.9%, followed by physical and life sciences and technologies at 9.4%.

Table 1.16
University enrolment by fields of study, 1999–2000
and 2005–2006

	1999– 2000	2005– 2006	Distribution 1999–2000	Distribution 2005–2006
	(Count)	(Count)	(%)	(%)
Total	847,500	1,047,700	100	100
Personal improvement and leisure education	0	400	0	0
Education	66,300	73,500	7.8	7
Visual and performing arts and communications technologies	25,400	37,200	3	3.6
Humanities	119,400	161,100	14.1	15.4
Social and behavioural sciences and law	132,400	182,800	15.6	17.4
Business, management and public administration	134,400	169,300	15.9	16.2
Physical and life sciences and technologies	79,400	98,400	9.4	9.4
Mathematics, computer and information sciences	41,600	36,600	4.9	3.5
Architecture, engineering and related technologies	67,400	85,600	8	8.2
Agriculture, natural resources and conservation	16,400	15,200	1.9	1.5
Health, parks, recreation and fitness	74,800	104,200	8.8	9.9
Personal, protective and transportation services	400	1,800	0	0.2
Other	89,700	81,700	10.6	7.8

Source: Statistics Canada, "University enrolment, 2005/2006," *The Daily* (Feb. 7, 2008), www.statcan.ca/english/dai-quo/.

E-learning: An alternative method of learning

E-learning provides learners with the opportunity to acquire educational knowledge in a flexible and non-traditional format. It is a tool that can improve Canadians' access to and participation in PSE, particularly for individuals who would otherwise be excluded from mainstream educational venues (such as rural students).

Results from a 2005 OECD study that assessed the impact of e-learning on tertiary education among selected OECD countries demonstrated that e-learning activities can take many forms—ranging from web-dependent courses to courses conducted entirely online (see text box). However, the study found that most campus-based institutions offered relatively few courses that were fully online.¹⁶

Types of E-learning

The OECD notes that e-learning in tertiary education can take many forms. While each is offered by a campus-based institution, the extent to which such activities are tied to the internet or other online networks can vary.

Web-supplemented courses focus on classroom-based teaching but include online elements such as course outlines and lecture notes, the use of e-mail, and links to online resources.

Web-dependent courses require students to use the internet for key elements of the program—including online discussions, assessment or project collaboration—but without significant reduction in classroom time.

Mixed-mode courses entail the replacement of some face-to-face teaching and learning with e-learning elements such as online discussions, assessment or project collaboration. However, significant campus attendance remains part of the mix.

Courses offered entirely online enable students to follow courses offered by a PSE institution, regardless of their geographic location or time zone.

Adapted from OECD, "E-learning in tertiary education: Where do we stand?" Policy Brief, 2005, www.oecd.org/dataoecd/55/25/35961132.pdf (accessed Sept. 15, 2008).

The OECD study suggests that compared with other countries, Canada has been slower to incorporate significant online components in its programs and has a lower proportion of web-dependent courses. On the other hand, the proportion of courses fully conducted online in Canada is among the highest of countries studied, perhaps reflecting Canada's long history of providing distance education. It may also reflect Canada's geographic realities, in that universities and colleges are predominantly located in larger communities. Although post-secondary campuses are typically located in larger communities, universities and colleges can broaden their accessibility for other populations by providing e-learning options.

Table 1.17
Proportion of current programs or courses offered with online components, selected countries, 2004

	None or trivial (%)	Modest (%)	Significant (%)	Web-dependent (%)	Conducted online (%)
United Kingdom	41	34.8	15.5	5.8	2.8
Canada	43.4	32	14.5	3.7	6.4
Australia	36.5	29	18.4	11.7	4.5
South Africa	52.5	32.5	7.4	4.7	2.9
Asia-Pacific	33.4	31.8	21.8	9.5	3.5

Source: Adapted from OECD, *E-Learning in Tertiary Education: Where Do We Stand?*, Table 1.2 (Paris: 2005).

Note: Web-dependent is defined as students being required to use the internet for key active elements of the program: online discussion, assessment, etc., as opposed to conducted online where the entire course, lectures, materials, etc., are available online from the instructor.

Internet use and e-learning

In 2007, one out of every two internet users in Canada used it for education, training or school-related purposes.¹⁷ Analyses have shown that students were generally more likely than the rest of the population to use the internet for education-related reasons. Indeed, nearly 80% of all full- and part-time students reported going online for education, training or to complete school work.¹⁸

Canadians living in rural areas and small-town communities were more likely to use the internet for distance education, self-directed learning or correspondence courses (29%) than Canadians living in urban areas (25%).¹⁹ This suggests that an increase in e-learning opportunities could improve rural Canadians' access to PSE.

While students have incorporated the use of the internet into their day-to-day learning activities (research, scheduling, report preparation and project development), the growth of e-learning has not, thus far, challenged the fundamental way that institutions organize or deliver learning. As noted in a 2005 OECD report on e-learning in PSE, "e-learning has not really revolutionized learning and teaching to date. Far-reaching novel ways of teaching and learning, facilitated by information and communications technology (ICT), remain nascent or still to be invented."²⁰

Prior learning assessment and recognition (PLAR): Enhancing participation in PSE

Recognition of prior learning acknowledges the full range of skills and knowledge gained by individuals over the course of their lives. It is based on the premise that learning can occur in many settings—at home, in school and at the workplace—and through a range of life experiences.

Prior learning assessment and recognition (PLAR) involves the identification, assessment, documentation and recognition of previously acquired knowledge. In circumstances where formal credentials do not clarify the extent of acquired knowledge and training, assessment of prior learning through a variety of tools can help learners gain admission, avoid duplication of learning and help them to prepare for examinations for professional designation.

Many jurisdictions have adopted policies to "encourage the practice of reviewing, evaluating and acknowledging the information, skills, and understanding that adult learners have gained through experiential or informal or non-formal learning."²¹ In 2001, colleges adopted a pan-Canadian protocol on mobility and transferability to maximize the recognition and transfer of learning acquired through formal education, workplace training and life experience.²² However, jurisdictional standards are limited and a common framework to both measure progress and facilitate coordination across the country has yet to be developed.

A substantial body of research on current initiatives and best practices in this area is forming. The Council of Ministers of Education, Canada (CMEC) has compiled an inventory of existing PLAR policies, practices and programs in Canada's post-secondary institutions.²³

Canadian Council on Learning's PLAR Framework Project

CCL understands the importance of creating more effective mechanisms to serve non-traditional adult learners in the community and in the workplace. To address this need, CCL commissioned the PLA Centre to develop a comprehensive picture of the state of prior learning assessment and recognition (PLAR) in Canada.

The major elements of the report include:

- a review of the research and policy literature
- an analysis of learner demand for PLAR services and of the socio-economic trends that shape that demand
- an examination of the state of PLAR in Canada and internationally
- the presentation of a strategy for moving forward with PLAR in Canada

*The final report, *Achieving Our Potential: An Action Plan for Prior Learning Assessment and Recognition (PLAR) in Canada*, was released in October 2008, and is available at www.ccl-cca.ca.*

Persistence in PSE

PSE participation rates provide only a limited portrait of the post-secondary process. Not all students who enrol in a post-secondary program complete their studies. Understanding factors that lead to non-completion is important to maintaining Canada's post-secondary graduation rates at their maximum.

The YITS survey indicates that most students (85%) who embark on PSE complete it.²⁴ However, that means that 144,000 of the 963,000 PSE students aged 18 to 20 in 1999 had dropped out by December 2005.²⁵

Factors that impact persistence in PSE

The likelihood of dropping out of post-secondary studies was influenced by socio-economic factors ranging from geographic location to family characteristics to the first-year experience in PSE.

Students from rural communities were more likely to drop out of PSE (20%) compared with students from urban communities (14%). Students whose parents did not value PSE were more likely to discontinue their studies than were students whose parents did value PSE—21% compared with 14%.

The first-year experience in PSE also plays an important role. Students who were more engaged with their post-secondary program, had higher grades and spent more time on their studies were less likely to drop out.

Table 1.18
Post-secondary education status of 24- to 26-year-olds in December 2005, selected characteristics, Canada

	Graduates who were continuing with their education (%)	Graduates who had left post-secondary education (%)	Continuers (not yet graduated) (%)	Dropouts (%)
All	16	60	9	15
Type of community				
Rural	11	63	7	20
Urban	17	59	10	14
Parent's opinion on the importance of pursuing education after high school				
Important	17	60	9	14
Not important	10	59	10 ^a	21
Attitude and sense of belonging during first year of post-secondary education				
I never or rarely miss deadlines	90	87	72	70
There were people at school I could talk to about personal things (agree/strongly agree)	82	81	71	72
I felt I had found the right program for me (agree/strongly agree)	76	79	69	62
Grade average during first year of post-secondary education				
90% or above	11	11	7 ^a	5
80% to 89%	33	31	23	15
70% to 79%	43	41	39	41
60% to 69%	11	14	26	25
50% to 59%	2 ^a	2	4 ^a	7
Average weekly hours spent studying				
Less than 3 hours	10	14	14	26
4 to 14 hours	53	55	57	59
15 to 30 hours	31	27	26	12

Source: Danielle Shaienks and Tomasz Gluszynski. *Participation in Postsecondary Education: Graduates, Continuers and Drop Outs, Results from YITS Cycle 4* (Ottawa: Statistics Canada, Nov. 20, 2007), Catalogue no. 81-595-MIE2007059.

^a Use with caution. Because the coefficient of variation is between 16.6% and 25%, results are less reliable. A coefficient of variation is a measure of data quality—how much certainty there is that if the survey were to be conducted 100 more times with different samples you would get the same results. High coefficients of variation (CVs) indicate that there is less certainty in the results. CV values above 16% indicate enough uncertainty that the results require a cautionary note.

Note: Numbers may not add to 100 as data with high coefficients of variation have been removed.

A 2004 Statistics Canada report indicated that one in three dropouts cited “lack of program fit” as the major reason for discontinuing PSE—without identifying any intent to change programs. In comparison, about 1 in 10 youth identified “lack of money” as a barrier to continuing their studies.²⁶

Table 1.19
Reasons 20- to 22-year-olds left post-secondary studies, Canada, 2001

Reasons for leaving post-secondary studies	%
Didn't like it/not for me	32
Other	24
Not enough money	11
To change school or program	9
Wanted to work	7
Marks too low	6
Wanted a break	4

Source: Mylène Lambert et al., *Who Pursues Postsecondary Education, Who Leaves and Why: Results from the Youth in Transition Survey, Culture, Tourism and the Centre for Education Statistics research paper* (Ottawa: Statistics Canada, November 2004), Catalogue no. 81-595-MIE2004026.

Credit transfers: Improving persistence in PSE

Increasingly, learners pursue their post-secondary studies by accessing learning opportunities at more than one post-secondary institution. Just over half of college (56.5%) and university (52.1%) students follow the traditional linear path in PSE, graduating from the program and school in which they initiated their post-secondary studies. The remainder follow less direct routes. This can include attendance at more than one post-secondary institution; switching across programs or subject areas; and leaving school and then returning at a later date (stopping-out). A significant number of learners transfer between universities or between universities and colleges, during or on completion of their educational program.²⁷

A proper protocol or mechanism to recognize previous academic performance is essential to ensure a full range of student mobility options. Given the fluidity of the PSE sector, credit-transfer systems are a vital element to support students along educational pathways and enable movement between programs and institutions. Credit-transfer systems can eliminate unnecessary student tuition and educational costs (mitigating borrowing for some students) and can reduce post-secondary non-completion rates.

First- and second-year university credits are transferable among nearly all Canadian post-secondary universities as a result of CMEC's Pan-Canadian Protocol on Credit Transfer (1995).²⁸ In jurisdictions where colleges or CEGEPs offer university transfer courses, the protocol also applies and can encourage universities' recognition of these courses for transfer credit. However, there are few mechanisms in place to facilitate inter-provincial transfer for students in non-university programs.

In Canada, the Pan-Canadian Consortium on Admissions and Transfers has recently emerged. Following an inaugural meeting in June 2006, the consortium drafted terms of reference, which includes the goal “to facilitate the implementation of policies and practices that support student mobility both within and among provinces and territories and granting of transfer credit in order to improve access to post-secondary education in Canada.”²⁹

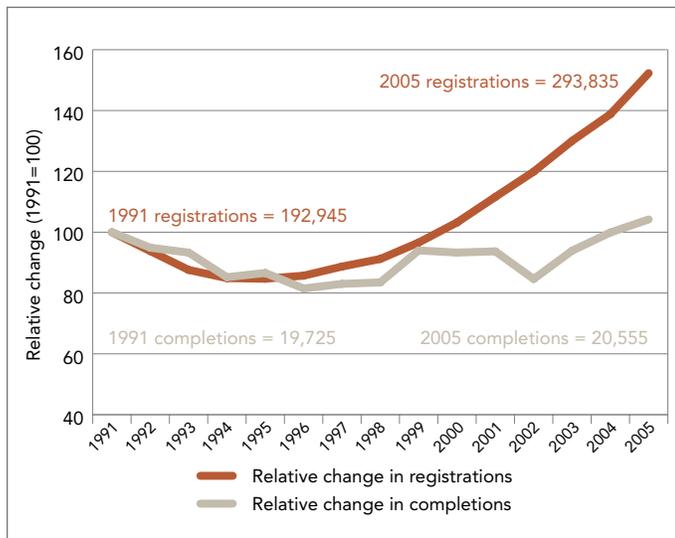
Completing PSE

Completion rates—or graduation rates as they are normally referred to—are closely monitored by post-secondary institutions, governments and international organizations for comparative purposes, as evidence of students' commitment to completion and of the effectiveness of the PSE sector itself.

Apprenticeship completions

Although registrations in apprenticeship programs have increased significantly since 1991, there have been no similar increases in the completion of the journeyman certificate or certificate of qualification exam. In 1991, 19,725 (or 10.2% of registered apprentices) had completed the qualifying exam. In 2005, this figure had increased by only 830, while the number of registrations had increased by more than 100,000. In 2005, the proportion of completions relative to registrations was less than in 1991—down to 7% of all registered apprentices. This raises concerns given the number of trades workers required in the labour market over the coming years (see Chapter 7, “A Skilled and Adaptable Workforce”). Registered apprentices are dependent on qualified personnel—individuals with journeyman certificates or certificates of qualifications—to oversee and sign off their work. Given Canada's aging workforce, particularly in the trades,³⁰ it is important to develop a younger generation of qualified personnel who can continue to offer the required instructional expertise and maintain the flow of highly qualified trades' personnel into the labour market. The 2009 federal budget includes a tax incentive for apprentices to complete their programs in full.

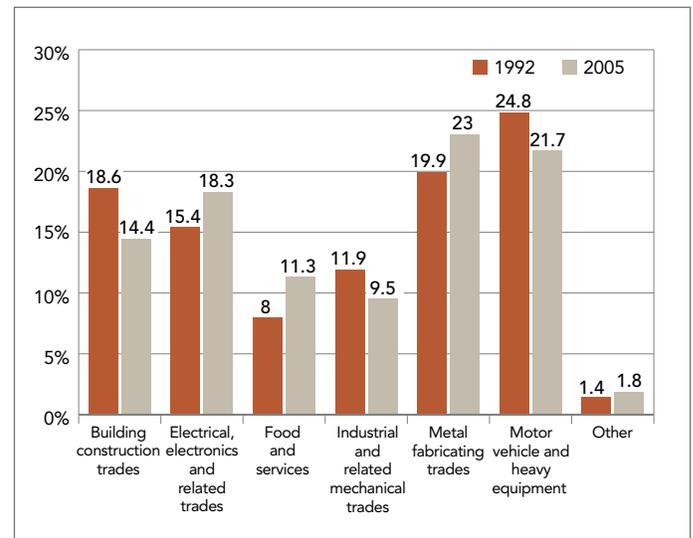
Figure 1.8
Relative change in trade registrations and trade completions, 1991–2005 (1991=100)



Source: Statistics Canada, Registered Apprenticeship Information System (RAIS) 2005, CANSIM Tables 477-0051 and 477-0052 (Ottawa).

The distribution of apprenticeship completions across the trade groups has varied over the years. In 2005, the highest number of apprentices who had completed their qualifying exams came from the metal fabricating trades, accounting for 23% of all completions. An additional 21.7% were in the motor vehicle and heavy equipment trades and 18.3% in the electrical, electronics and related trades. Building and construction trades made up 14.4% of apprenticeship completions in 2005. Relative to 1992, there was a decrease in the proportion of completers from the building and construction trades, the motor vehicle and heavy equipment trades, and the industrial and related mechanical trades. In contrast, there was an increase in the proportion of completers from the electrical, electronics and related trades, the food and services trades, and the metal fabricating trades.

Figure 1.9
Distribution of registered apprenticeship completions, by major trades group, Canada, 1992 and 2005

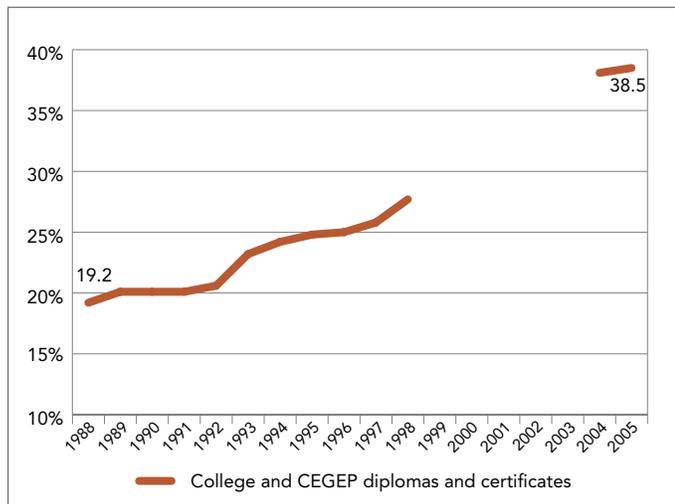


Sources: Statistics Canada, "Registered apprenticeship training programs, 2005," *The Daily* (Nov. 15, 2007), and "Registered apprenticeship training programs, 2004," *The Daily* (Nov. 17, 2006), www.statcan.ca/english/dai-quo/.

College or CEGEP graduation

College, CEGEP and university graduation rates are calculated by dividing the count of the population for the typical age at graduation (as defined by the OECD)—21 years old for college—by the number of graduates. Unfortunately, Canada does not currently have complete data on graduation rates for this type of PSE. Since 1988, it appears that the graduation rate for college and CEGEP has increased from 19.2% to 38.5%. However, inconsistent monitoring of these graduation rates limits our understanding of whether future labour-market needs in this area will be met.

Figure 1.10
Proportion of 21-year-olds graduating from college and CEGEP, by year, Canada, 1988–2005



Source: Data for 2004 and 2005 were calculated by the Canadian Council on Learning. Population counts for 21-year-olds are from Statistics Canada CANSIM table 051-000111. Data on college graduates for 2004 and 2005 are from the Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table D.2.5 (Ottawa: Statistics Canada, December 2007), Catalogue no. 81-582-XIE. Data on college graduates for 1988–1998 are from the Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table D.2.3 (Ottawa: Statistics Canada, December 2007), Catalogue no. 81-582-XIE.

Note: College graduation data are not available for 1999, 2000, 2001, 2002 and 2003.

University graduation

The typical age at university graduation is higher than at college, given the longer duration of university programs. For bachelor’s and first professional degrees (pre-medicine, for example), the normal age of completion is 22 years. This rises to 24 for the master’s degree and to 27 for the earned doctorate.

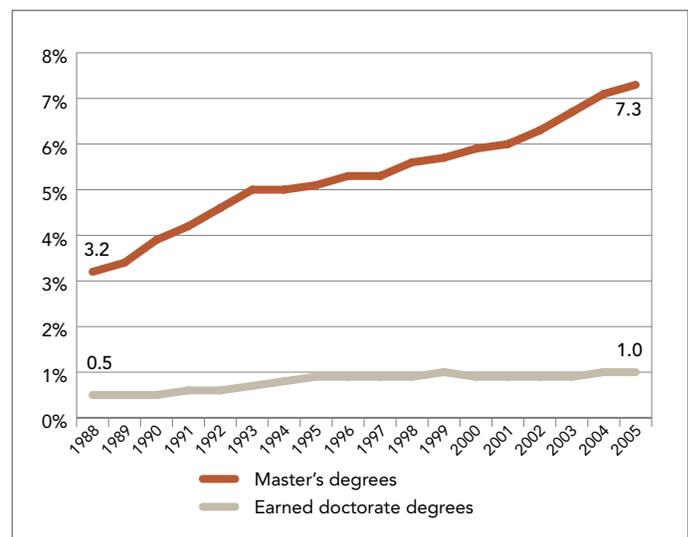
Over the last two decades, university graduation rates have increased substantially. For bachelor’s and first professional degrees, the graduation rates rose from about 23.2% in 1988 to 33.8% in 2005. At the master’s level, the graduation rates more than doubled—from 3.2% in 1988 to 7.3% in 2005. The proportion of the population aged 27 graduating with an earned doctorate increased from 0.5% in 1988 to 1% in 2005.

Figure 1.11
Proportion of 22-year-olds graduating from university with a bachelor’s or first professional degree by year, Canada 1988–2005



Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table D.2.3 (Ottawa: Statistics Canada, December 2007), data updated June 16, 2008. Catalogue no. 81-582-XIE.

Figure 1.12
Proportion of 24-year-olds graduating with a master’s degree and proportion of 27-year-olds graduating with an earned doctorate, by year, Canada 1988–2005



Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table D.2.3 (Ottawa: Statistics Canada, December 2007), data updated June 16, 2008. Catalogue no. 81-582-XIE.

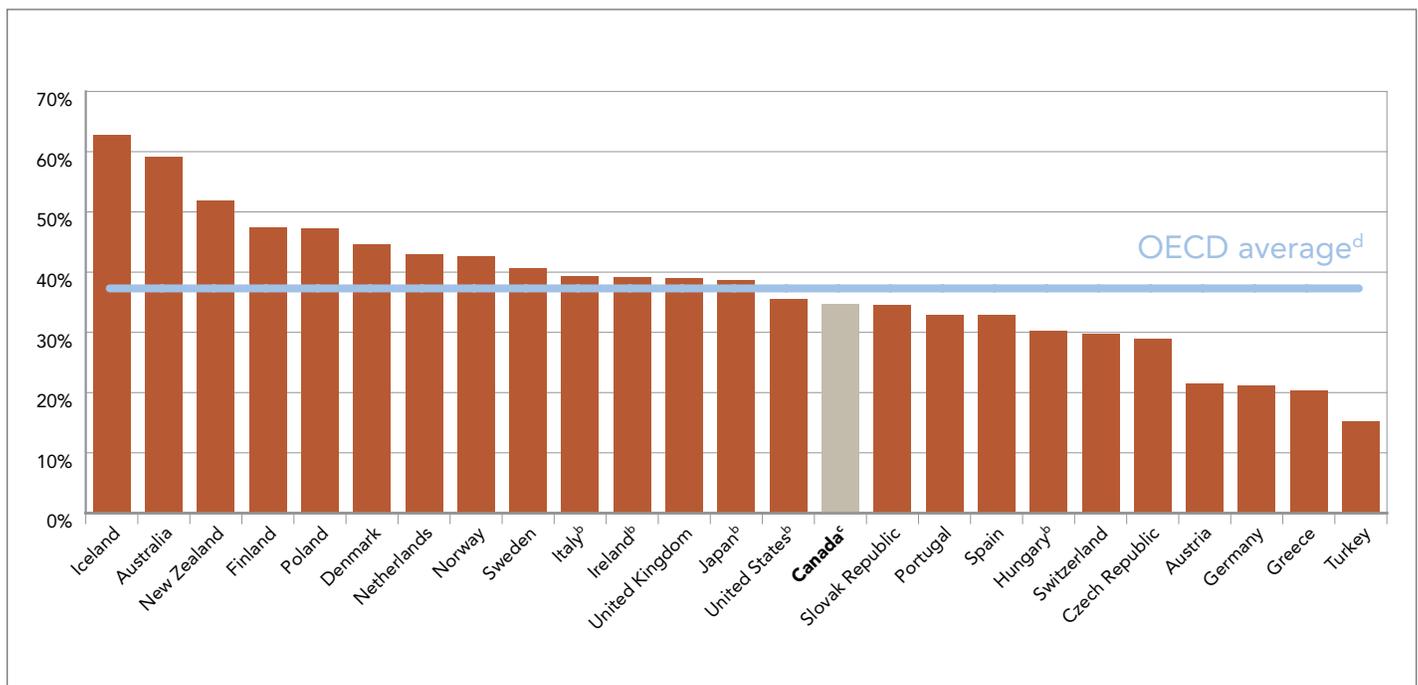
FROM ACCESS TO ATTAINMENT

University graduation rates: An international perspective

The OECD's most recent release of *Education at a Glance 2008* contains information on university graduation rates for 25 member countries. For type A tertiary-level programs (bachelor's and master's level in Canada), Canada placed 15th at 34.7%, just below the OECD average of 37.3% and equal to the EU average of 35.2%. These university graduation rates reflect the strength of Canada's college and CEGEP systems.

In 2005, Canada's graduation rate for college and CEGEP was 38.5% (see Figure 1.10). All OECD countries that had college graduation rates at about 15% or higher in 2006 had university graduation rates near the OECD average. Countries with weaker college graduation rates had university graduation rates that were higher than the OECD average. New Zealand's high college (24.3%) and university (51.9%) graduation rates were the exception.

Figure 1.13
Graduation rates in tertiary type A programs^a (first-time graduation), OECD countries, 2006



Source: OECD, *Education at a Glance 2008: OECD Indicators*, Table A3.1 (Paris: 2008).

^a Tertiary type A programs in the OECD are equivalent to bachelor's and first professional degrees (e.g., law) and master's degrees in Canada.

^b Gross graduation rate is calculated for tertiary type A.

^c Year of reference is 2005.

^d Average for all countries that reported.

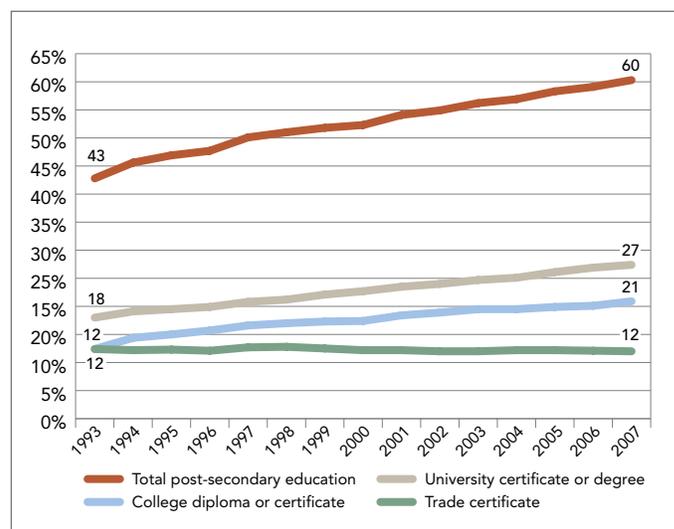
Note: The graduation rate is the total of all first-time graduates (regardless of age) divided by the total population aged 22 and 24 in 2006.

Attainment Profile of the Canadian Working-age Population

Since 1993, Canadians' increasing commitment to post-secondary studies has significantly raised the education profile of the working-age population aged 25 to 64. Immigrants have also contributed to the attainment profile in Canada, although the recognition of foreign credentials has proven to be a difficult process, in light of the high quality associated with Canadian certificates, diplomas and degrees. (further discussion on the recognition of foreign credentials appears in Chapter 7, "A Skilled and Adaptable Workforce").

Over the last 15 years, the share of the working-age population in Canada with post-secondary qualifications increased significantly, from 42.8% in 1993 to 60.3% in 2007. University and college qualifications each increased by about nine percentage points over the same period, while the trades remained unchanged. A comprehensive discussion about levels of educational attainment in the Canadian population—as related to labour-market demands and labour-market outcomes for PSE graduates—appears in Chapter 7, "A Skilled and Adaptable Workforce."

Figure 1.14
Post-secondary educational attainment, ages 25–64, Canada, 1993–2007



Source: Statistics Canada, Labour Force Survey. Special data run for Canadian Council on Learning.

Summary: Opportunities and Future Directions

The process of completing PSE is a long-term undertaking that involves careful planning, numerous decisions and commitment. Canadian youth have expressed a high degree of interest in pursuing PSE and their parents are taking this intent seriously by planning for the costs associated with their children's post-secondary studies. Nevertheless, evidence shows that information for parents and youth on the financing realities of PSE needs to be clearer.

Concerted efforts in a number of areas related to access and attainment could improve the participation and success of Canadian learners in PSE. More than one million individuals aged 25 to 44 do not have a high-school diploma—limiting the pool of potential PSE participants, a situation that needs to be improved. An additional two million high-school graduates between the ages of 25 and 44 chose not to pursue PSE, yet there is limited information on why eligible students choose not to pursue PSE. When young high-school graduates who chose not to go on to PSE were asked what they perceived as barriers to continued studies, the greatest majority cited financial barriers.

As of 2003, 1.6 million individuals aged 16 to 25 had literacy levels below the accepted standard of Level 3. People below this level tend not to participate in PSE, further limiting the potential pool of PSE participation. In combination, high-school dropouts, high-school graduates who choose not to go on to PSE and the population with low levels of literacy represent an enormous untapped pool of PSE participants.

Incomplete data limit the ability to understand the trends in the college sector. If a comprehensive portrait of PSE access, persistence and completion in Canada is to be derived, more detailed information is required on the college and CEGEP programs available in Canada.

Non-linear pathways through PSE have made credit transfer and PLAR important issues for discussion. Recognizing the accumulated knowledge of learners through credit transfer or PLAR processes increases the likelihood for successful participation and completion of PSE.

Canada's international strength in PSE participation rates and levels of attainment is a testament to its well-developed PSE sector—a sector that remains integral to this country's standard of living and quality of life. However,

the evidence shows us that Canada is not maximizing the education potential for a substantial number of its citizens. This is at a time when there are increased demands for a highly educated adult population that can adapt readily to a world of constant change and technological advances. Canada's progress on issues related to access, participation and completion will be fundamental to Canada's social and economic future.

Future Directions: An International Perspective

The OECD's *Tertiary Education for the Knowledge Society* (2008)³¹ is a sweeping 750-page report that investigated the state of PSE in 24 countries worldwide. It includes a compilation of strategies and recommendations to address issues of access, persistence and completion of PSE in its member countries. Canada did not take part in the study.

The following is a selection of strategies from the report that are applicable to the Canadian situation. The following sections provide the Canadian context, followed by the strategies or recommendations outlined in the OECD report that are pertinent.

Information to parents and students through the high-school years

Strengthen career guidance and counselling services at the high-school level.

Strengthening the role of career guidance and counselling services in secondary schools could offset the information gap on PSE. These services could provide pre-PSE students and their parents with information about the many benefits of PSE, which could raise student interest in PSE.

Strengthen the integration of planning between secondary and tertiary education systems (as key to successful transitions between secondary education and PSE).

- Do secondary students receive sufficient guidance and career counselling services to understand the benefits of PSE?
- Are the number and type of study offerings within PSE adequate to accommodate the demand of high-school graduates?
- Do secondary students have adequate access to information that will enable them to assess the labour-market outcomes of different study options?

- To what extent do curricula and assessment processes at the secondary level provide a good basis for successful tertiary study for all school graduates?
- Is institutional diversity within tertiary education closely aligned with curricular diversity in upper-secondary school? (Upper-secondary is equivalent to high school in Canada.)

Explore the potential of a national qualifications framework.

Establish a national qualifications framework that could coordinate the demands of employers, the expectations of students and the offerings of post-secondary institutions (PSIs). This formal arrangement would enable employers to specify competencies required of employees and enable institutions to design educational programs accordingly. As well, students would be informed about the competencies required to gain employment.

High-school dropouts and low literacy populations

Consider alternative ways of acquiring eligibility for tertiary education.

- Give recognition and accreditation of prior learning and work experience for those who do not have a high-school diploma or the prerequisites.
- Provide an assessment examination that tests aptitude for PSE.
- Enable prospective PSE students to participate in foundation, bridging or preparatory programs designed to develop the necessary skills for successful progression through PSE.

Credit transfer and PLAR

Establish sound instruments for steering tertiary education.

- Strengthen credit transfer and the communication of information that fosters mobility between institutions.
- Recognize new and different forms of post-secondary institutions.
- Allow students to have portability of institutional subsidies and/or support.
- Improve transfers between different types of institutions within tertiary education.

- 1 Statistics Canada, *Age and Sex, 2006 Census* (Ottawa: July 17, 2008), Catalogue no. 97-551-XIE.
- 2 Susan Choy, *Students Whose Parents Did Not Go to College: Postsecondary Access, Persistence, and Attainment* (NCES 2001-126) (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 2001), p. 9. Note that SAT and ACT are standardized entrance exams taken by U.S. high-school students applying to colleges, and are not required in Canada.
- 3 Lynn Barr-Telford et al., *Access, Persistence and Financing: First Results from the Post-Secondary Education Participation Survey (PEPS)*, Culture, Tourism and the Centre for Education Statistics, research papers no. 7 (Ottawa: Statistics Canada, September 2003), Catalogue no. 81-595-MIE—No. 7.
- 4 Lisa Shipley, S. Ouellette and F. Cartwright, *Planning and Preparation: First Results from the Survey of Approaches to Educational Planning (SAEP) 2002*, Culture, Tourism and the Centre for Education Statistics, research papers no. 10 (Ottawa: Statistics Canada, November 2003), Catalogue no. 81-595-MIE2003010.
- 5 Shipley, Ouellette and Cartwright, *Planning and Preparation*.
- 6 Tracy Bushnik, *Learning, Earning and Leaving: The Relationship Between Working While in High School and Dropping Out*, Culture, Tourism and the Centre for Education Statistics research papers no. 4 (Ottawa: Statistics Canada, May 26, 2003), Catalogue no. 81-595-MIE2003004.
- 7 Barr-Telford et al., *Access, Persistence and Financing*.
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- 11 Barr-Telford et al., *Access, Persistence and Financing*, p. 11.
- 12 Barr-Telford et al., *Access, Persistence and Financing*, p. 11.
- 13 Statistics Canada, *Labour Force Activity (8), Aboriginal Identity (8), Highest Certificate, Diploma or Degree (14), Area of Residence (6), Age Groups (12A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces and Territories, 2006 Census – 20% Sample Data* (Ottawa: March 4, 2008), Catalogue no. 97-560-X2006031.
- 14 Canadian Council of Directors of Apprenticeship [online], *Comparative Chart of Apprentice Training Programs*. Available at www.ellischart.ca (accessed July 11, 2008).
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- 16 OECD, *E-learning in tertiary education: Where do we stand?* Policy brief (Paris: 2005). Available at www.oecd.org/dataoecd/55/25/35961132.pdf (accessed Sept. 15, 2008).
- 17 Statistics Canada, "Canadian Internet Use Survey, 2007," *The Daily* (June 12, 2008), www.statcan.ca/english/dai-quo/.
- 18 Larry McKeown and Cathy Underhill, *Learning online: Factors associated with use of the internet for education purposes*, no. 4 (Ottawa: Statistics Canada, Oct. 30, 2007), Catalogue no. 81-004-XIE.
- 19 McKeown and Underhill, *Learning online: Factors associated with use of the internet for education purposes*.
- 20 OECD/Canada/Alberta Conference on E-Learning in Post-Secondary Education: Policies, Practices and Research, *Report on Conference Proceedings*, Calgary, Alta., June 26–28, 2005 (Calgary: June 2005).
- 21 Christine Wihak, *State of the Field Review: Prior Learning Assessment and Recognition* (Ottawa: Canadian Council on Learning, 2006). Available at www.ccl-cca.ca
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- 24 Shaienks and Gluszynski, *Participating in Postsecondary Education: Graduates, Continuers and Drop Outs*.
- 25 Shaienks and Gluszynski, *Participating in Postsecondary Education: Graduates, Continuers and Drop Outs*.
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- ²⁷ R. Finnie, *The Patterns of Persistence in Post-Secondary Education in Canada: Evidence from the YITS-B Dataset* (Toronto: MESA Project, 2008).
- ²⁸ CMEC, *Pan-Canadian Protocol on the Transferability of University Credits* (Ottawa: February 1995). Available at www.cmec.ca/postsec/transferabilit.en.stm.
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- ³⁰ Statistics Canada, *Education in Canada: Raising the Standard, 2001 Census* (Ottawa: March 11, 2003), Catalogue no. 96F0030XIE2001012.
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An Overview: Key Findings

Positive performances

According to the 2006 Census, almost half of the Aboriginal population in Canada* is under the age of 25. This means a large portion of the population is of prime school age. Education, therefore, is an important issue for First Nations, Inuit and Métis communities. Aboriginal peoples' engagement pattern in mainstream education differs considerably from that of the non-Aboriginal population. A higher proportion of Aboriginal people leave high school during the teen years, but a higher proportion also complete their high-school education after the age of 24. This is not the case with the non-Aboriginal population where the high-school non-completion rate changes very little after the age of 24. As a consequence, post-secondary education (PSE) readiness and the transition to PSE occur at a later age for a sizeable share of the Aboriginal population. Many enrol in Indigenous Institutes of Higher Learning (IIHL) that offer programs designed to meet their specific needs, including completing high school well beyond the typical age of completion.

The 2006 Census results show an improvement in the levels of post-secondary educational attainment within the Aboriginal population. Aboriginal people were as likely as their non-Aboriginal counterparts to have obtained a college or trade qualification.

Troubling trends

Rates for non-completion of high school are exceptionally high for on-reserve First Nations and Inuit aged 20 to 24 years. The 2006 Census results for these two populations indicated that six in 10 individuals in this age group had not completed high school. As well, although university participation levels are increasing for Aboriginal people,

their rate of university completions is one-third that of the non-Aboriginal population. Surveys of First Nations on-reserve youth show that they face a number of barriers—including financial and cultural—that limit their participation in PSE.

Gender differences in educational attainment are evident from the high-school level onward. Despite a significant decline in Canada's high-school dropout rate over the last several years, male high-school dropout rates are consistently higher than female high-school dropout rates. Consequently, PSE opportunities for the young male population are more limited than they are for females. In addition, PSE dropout rates are higher for males than females, resulting in a shift in Canada's PSE attainment profile by gender.

Males and females are making different choices in their academic careers. In 2005, males made up the great majority—nine out of 10—of all apprenticeship completions, while at Canada's universities, females made up six in 10 undergraduate completions. Master's graduates were fairly evenly split between males and females, while 57% of doctoral graduates were male.

Disparities in PSE participation are also related to family income. There was a 21-percentage-point difference in university participation between students from the lowest income group and those at the highest income level in 2006. College and CEGEP participation rates were closer across income groups—40% of the lowest income group participated in college or CEGEP, compared with 44.3% of students from the highest income group.

* For the purposes of this report, the term Aboriginal people encompasses First Nations, Inuit and Métis, as defined by Section 35 of the *Constitution Act, 1982* (Ottawa: Justice Canada, 1982).



UNDER-REPRESENTED GROUPS AND GENDER DISPARITIES IN PSE

Introduction

The positive social and economic returns of PSE for individuals and society as a whole have been widely documented (see Chapter 6 of this report, “Active, Healthy Citizenry” and Chapter 7, “A Skilled and Adaptable Workforce”). Consequently, identifying groups considered to be at risk—those whose opportunities for post-secondary access, participation and completion are considerably less compared with the general population—and the factors that contribute to such disparities, is critical if Canada is to maximize the education potential of all its citizens. This is important for several reasons: to remain competitive, innovative and productive; to improve the standard of living of all citizens; and to foster the conditions that contribute to greater social cohesion.

According to the Organisation for Economic Co-operation and Development (OECD), equity in education has two dimensions. “The first is fairness, which implies ensuring that personal and social circumstances—for example, gender, socioeconomic status or ethnic origin—should not be an obstacle to achieving educational potential. The second is inclusion, which implies ensuring a basic minimum standard of education for all—for example, that everyone should be able to read, write and do simple arithmetic.”¹

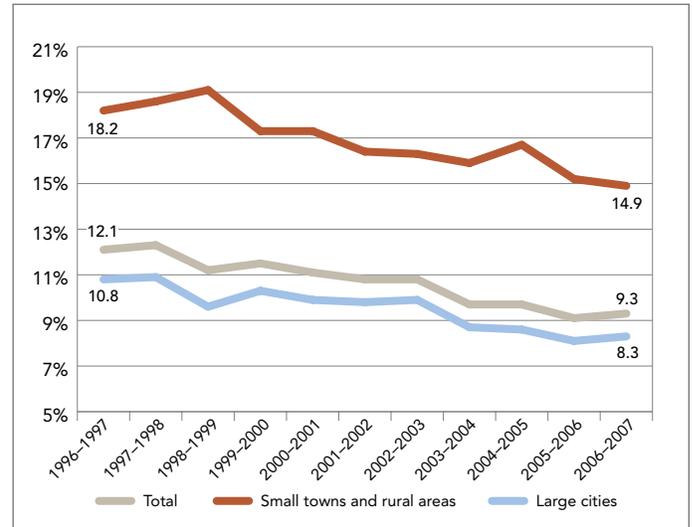
The previous chapter examined issues of PSE access, persistence and completion for the general population in Canada. This chapter identifies factors that contribute to disparities in PSE participation for specific populations. The sections covered in this chapter include:

- rural and urban differences in post-secondary participation
- variation in participation according to parental levels of educational attainment and income
- Aboriginal access to, participation in and completion of PSE
- gender differences in PSE
- summary: opportunities and future directions

Rural and Urban Differences in PSE Participation

Non-completion of high school impedes many rural students’ access to a post-secondary education. While the Canadian high-school dropout rate has declined overall, the dropout rate for those living in small towns and rural areas has consistently been higher than the rate for those living in large cities. In 2006–2007, the dropout rate for 20- to 24-year-olds living in small towns or rural areas was 14.9%—almost twice the rate (8.3%) for 20- to 24-year-olds in large cities.

Figure 2.1
High-school dropout rates, 20- to 24-year-olds, by type of community, Canada, 1990–1991 to 2006–2007



Source: Statistics Canada, Labour Force Survey. Special data run for Canadian Council on Learning.

Canada’s post-secondary institutions, particularly universities, are concentrated in medium- to large-sized urban settings. Analysis indicates that distance from a post-secondary institution is one of several factors that impact the decision to pursue PSE—in part, because distance increases the cost of attendance. By necessity, students from smaller towns or rural settings must factor in accommodation and other non-educational costs when considering attendance at a post-secondary institution (see the section “Geographic location” on page 23 of this report for a comparison of tuition and non-tuition related costs at college and university).

Marc Frenette’s analysis² of results from Statistics Canada’s 1999 Longitudinal Survey of Youth in Transition (YITS) show that a much higher proportion of students (37.6%) who, while in Grade 10 had lived within 80 km of a university or college—or a college only (34%)—pursued a post-secondary education. This compares with 20.5% of students who had neither type of institution nearby. When both college and university options were within 80 km, students were more inclined to choose university (22.9%) over college (14.6%). When only college was nearby, students chose college (20.4%) over university (13.6%). Interestingly, when neither option was nearby, twice as many students (13.6%) chose university over college (7%).

Table 2.1
University and college participation, two years after Grade 10, by distance from a post-secondary institution, all provinces except Quebec, 1999

Type of institution nearby (less than 80 kilometres)	Proportion attending		
	University	College	University or college
	(%)	(%)	(%)
University and college	22.9	14.6	37.6
College only	13.6	20.4	34
Neither	13.6	7	20.5

Source: Marc Frenette, *Access to College and University: Does Distance Matter?* (Ottawa: Statistics Canada, 2003), Catalogue no. 11F0019MIE—No. 201.

Notes:

- Data for Ontario are two years after Grade 11.
- The article from which this table was taken points out that, in Quebec, attendance at a CEGEP (Collège d'éducation général et professionnel, the community college system in Quebec) is required for university admission. This confounds the data for college attendance compared with university attendance when Quebec students are included. The original table in the Marc Frenette article presents data for all provinces including Quebec, and all provinces with Quebec excluded. Only the data for all provinces with Quebec excluded are presented here.

PSE Participation by Parental Education and Family Income

In general, parents who have completed a higher level of education are likely to enjoy the social and economic benefits associated with further education. In addition, parents' post-secondary experience can benefit their children as they prepare for PSE. Parents can assist with decisions about PSE academic prerequisites, provide guidance during the often complicated application process and advise their children about what they can expect once accepted into a PSE program.

In 2002, Canadian youth who had at least one parent with some post-secondary education were more likely to have participated in post-secondary than were 18- to 24-year-olds with parents who had not taken any post-secondary studies.³ Results from the Survey of Labour and Income Dynamics (SLID, 2006) show that parental levels of educational attainment can have a differential impact—as high as 25 percentage points—on their 18- to 24-year-old children's participation in PSE. When at least one parent had a university education, 88.4% of their children aged 18 to 24 in 2006 had participated or were participating in some form of post-secondary education. In comparison, when parents had education levels of high school or less, 62.6% of their 18- to 24-year-old children chose to enrol in PSE.

SLID results also suggest a close link between parental levels of education and their 18- to 24-year-old children's choice of PSE level: 57.6% of children who had at least one parent with a university degree participated in university; 54.1% of children with a parent who had a college or trades certificate or diploma also chose to follow in the trades or college; and 47.6% of children who had parents with high school or less chose to attend trades or college programs, while only 23% of this group chose to attend university.

Table 2.2
Post-secondary participation of 18- to 24-year-olds, by parental education, Canada, 2006

Highest level of parental education	18- to 24-year-olds		
	Ever enrolled in university	Ever enrolled in trades, apprenticeship or college	Ever enrolled in post-secondary
	(%)	(%)	(%)
University	57.6	47.4	88.4
Post-secondary certificate or diploma	35.2	54.1	76.5
High school or less	23	47.6	62.6
Parental education unknown	7.6	14	19.2

Source: Statistics Canada, Survey of Labour and Income Dynamics (SLID), 2006. Special data run for Canadian Council on Learning.

Note: The sum of the values in the first two columns exceeds the value of the third column because some students participate in more than one kind of post-secondary education.

Historically, Canadian students from lower-income families have been less likely to pursue PSE. In 2006, only 58.5% of 18- to 24-year-olds from families earning less than \$25,000 per year participated in PSE, compared with 80.9% of this age group from families with an income of over \$100,000. Variation in university participation accounts for most of this difference. Students from the lowest income group participated in university at a rate of 27.5% compared with 48.6% of students from the highest income group.

Parental income of more than \$75,000 per annum seems to constitute the critical turning point for participation in university. Students with annual family incomes of more than \$75,000 had participation rates that were eight percentage points higher compared with students with family incomes of \$75,000 or less.

The differences were much smaller in the college sector, with college participation of 18- to 24-year-olds in the lowest income group at 40%, compared with 44.3% for students within the highest income group.

Table 2.3
Post-secondary participation of 18- to 24-year-olds, by annual parental income, Canada, 2006

Before-tax parental income range (2006 constant \$)	18- to 24-year-olds		
	Ever enrolled in university	Ever enrolled in college	Ever enrolled in post-secondary
	(%)	(%)	(%)
Less than \$25,000	27.5	40	58.5
\$25,001–\$50,000	21.7	45.5	60.8
\$50,001–\$75,000	30.6	45.2	64.9
\$75,001–\$100,000	40.9	44	73.1
More than \$100,000	48.6	44.3	80.9

Source: Statistics Canada, Survey of Labour and Income Dynamics (SLID), 2006. Special data run for Canadian Council on Learning.

Note: Data include only youth still living with at least one parent in the reference year and who were not attending high school or elementary school.

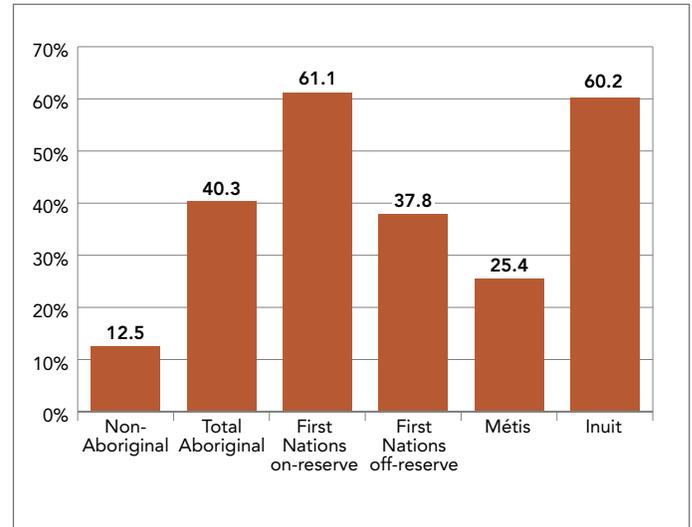
Aboriginal Participation in PSE

According to the 2006 Census, 48% of Aboriginal people (560,895 individuals) were under the age of 25, compared with 31% of non-Aboriginal people.⁴ As nearly half of all Aboriginal people in Canada are of school age, education is an important issue for First Nations, Inuit and Métis communities. Of particular concern over the last several decades has been the consistent under-representation of Aboriginal people in PSE, especially at university.

High-school completion rates

Aboriginal participation in post-secondary education, as for all Canadian students, necessarily follows completion of high school. In 2006, more than 40.3% of Aboriginal youth aged 20 to 24 had not completed a high-school education. This figure was more than three times higher than the proportion for non-Aboriginal youth (12.5%) at this age. More than 60% of Inuit and First Nations youth living on reserve had not completed their high-school diploma by 2006.

Figure 2.2
Proportion of the population aged 20–24 years with no high-school diploma, Canada, 2006



Source: Statistics Canada, Aboriginal Identity (8), Highest Certificate, Diploma or Degree (14), Major Field of Study – Classification of Instructional Programs, 2000 (14), Area of Residence (6), Age Groups (10A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces and Territories, 2006 Census – 20% Sample Data 2006 Census of Population (Ottawa: March 4, 2008), Catalogue no. 97-560-XWE2006028.

However, Aboriginal people are more likely to complete high school as young adults, when compared to the rest of the population. In the 2001 and 2006 Censuses, there was a 0.8 and a 2.5 percentage point decline, respectively, in the proportion of the non-Aboriginal population who had not completed high school, when comparing 20- to 24-year-olds with 25- to 34-year-olds. In contrast, for the Aboriginal population, there was a 9.1 percentage point decline across the two age groups in the 2001 Census and an 8.4 percentage point decline in the 2006 Census. Within the Aboriginal groups, the drop in high-school non-completion rates ranged from 5.1 percentage points for the Métis population (2001 and 2006) to 12 percentage points for the Inuit population after the age of 24 years (2006).

Clearly, a larger proportion of Aboriginal people return to complete their high-school education at a later age than is found in the non-Aboriginal population. This means that for a large share of Aboriginal young adults, high-school participation occurs in early adulthood rather than through the teen years, and PSE readiness can occur at a later age.

Table 2.4
Proportion of the population aged 20–24 and 25–34 years who had not completed high school, by Aboriginal identity, Canada, 2001 and 2006

Census Year	Age group	Non-Aboriginal population	Aboriginal population	First Nations (on-reserve)	First Nations (off-reserve)	Métis	Inuit
		(%)					
Census 2001	20–24	15.2	43.4	58.4	41	32.3	54
	25–34	14.4	34.3	46.9	29.6	27.2	43.4
Percentage-point change between 20- to 24-year-olds and 25- to 34-year-olds		0.8	9.1	11.5	11.4	5.1	10.6
Census 2006	20–24	12.5	40.3	61.1	37.8	25.4	60.2
	25–34	10	31.9	50.9	28.3	20.3	48.2
Percentage-point change between 20- to 24-year-olds and 25- to 34-year-olds		2.5	8.4	10.2	9.5	5.1	12

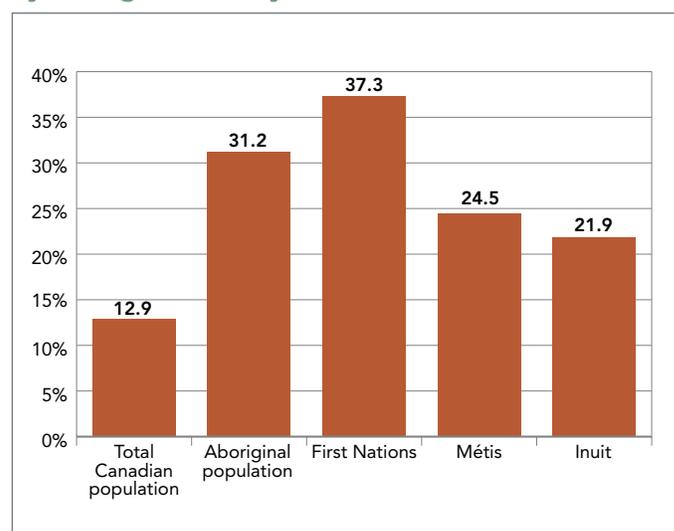
Sources: Statistics Canada, Aboriginal Identity (8), Highest Certificate, Diploma or Degree (14), Major Field of Study – Classification of Instructional Programs, 2000 (14), Area of Residence (6), Age Groups (10A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces and Territories, 2006 Census – 20% Sample Data 2006 Census of Population (Ottawa: March 4, 2008), Catalogue no. 97-560-XWE2006028; Census 2001 data adapted from Statistics Canada special request DO0570.

Factors that impact Aboriginal participation in PSE

As is the case with other Canadian youth, the decisions of Aboriginal youth regarding the pursuit of PSE are affected by factors such as family income, parental education, parental expectations for their children's PSE, high-school performance, proximity to a PSE institution and financial planning.

Results from the 2001 Census show that a higher proportion (31.2%) of Aboriginal families were living in low-income situations, compared with the average for all Canadian families (12.9%). As noted earlier in this chapter, children from low-income families are less inclined to attend post-secondary institutions than children from higher income families.

Figure 2.3
Incidence of families living in low-income households, by Aboriginal identity, Canada, 2001



Source: Statistics Canada, Selected Income Characteristics (35A), Aboriginal Identity (8), Age Groups (6), Sex (3) and Area of Residence (7) for Population, for Canada, Provinces and Territories, 2001 Census – 20% Sample Data (Ottawa: Dec. 10, 2003), Catalogue no. 97F0011XCB2001046.

Note: Family in this chart refers to the Census 2001 definition for economic family, which is "a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law or adoption."

As highlighted in two recent studies, Aboriginal youth experience unique social, cultural and economic barriers to participation in PSE that include:

- historically determined distrust of educational institutions (legacy of residential schools and institutionalized practices of assimilation);
- lack of preparation at the secondary level (due to weak performance, high dropout rates and limited funding for on-reserve and remote schools);
- poverty of Aboriginal communities;
- feelings of social discrimination at mainstream institutions and in mainstream society; and
- difficult and expensive relocation (often necessary), which separates the individual from family and community ties and obligations.⁵

A recent series of focus groups that explored why First Nations youth do not pursue PSE identified the following funding issues as barriers to PSE access:

- First Nations youth living on-reserve often have less knowledge or understanding of the range of financial assistance programs available to them.
- Many First Nations youth return to their education after a period of working, caring for family members or pursuing other activities, and may be disconnected from informational supports that can provide advice on funding, such as high-school guidance teachers.

- First Nations youth often do not feel motivated to seek out information about PSE funding because of lack of confidence in their ability to qualify for scholarships or loans, a sense of disconnection from institutional and bureaucratic systems, and concerns about incurring debt to pay for PSE.⁶

Indigenous Institutes of Higher Learning

Indigenous Institutes of Higher Learning (IIHLs) are Aboriginal-controlled educational institutions. They emerged in response to the need for post-secondary programs that meet the specific learning requirements of Aboriginal people.⁷ IIHLs offer students (predominantly Aboriginal) an alternative to provincial colleges and universities. As required by legislation and policies in Canada, most IIHLs partner with provincial post-secondary institutions in order to grant diplomas, degrees and certificates.⁸ In 2007, there were 45 IIHLs across Canada,^{*} with enrolments of approximately 10,000 students.[†]

Programs and curricula are developed from an indigenous perspective to facilitate learning and successful completion of programs. They are designed to enhance personal development skills and include learning about one's Aboriginal identity and language.⁹

IIHLs are often located within Aboriginal communities to increase access for students living in remote locations, but they are also found in larger urban centres (see *map on following page*). The Aboriginal and community-focussed approach of IIHLs also provides learning opportunities for students who may not otherwise attend provincial post-secondary institutions—including older students, women, single parents and students with family responsibilities. The role of IIHLs is not to duplicate what provincial post-secondary institutions are doing well, but to reach those students who would otherwise not participate in, or complete, PSE.¹⁰

Holistic approach to measuring Aboriginal learning

Although it is important to report on structured learning that leads to a recognized credential, this information is often presented without recognizing broader measures of success in learning from an Aboriginal perspective. As the State of Learning in Canada: No Time for Complacency (2007) concluded, existing information does not convey a comprehensive picture of the state of First Nations, Inuit and Métis learning in Canada. There is an urgent need to broaden the current indicators to reflect the holistic, lifelong nature of Aboriginal learning, and the values and aspirations of Aboriginal communities.

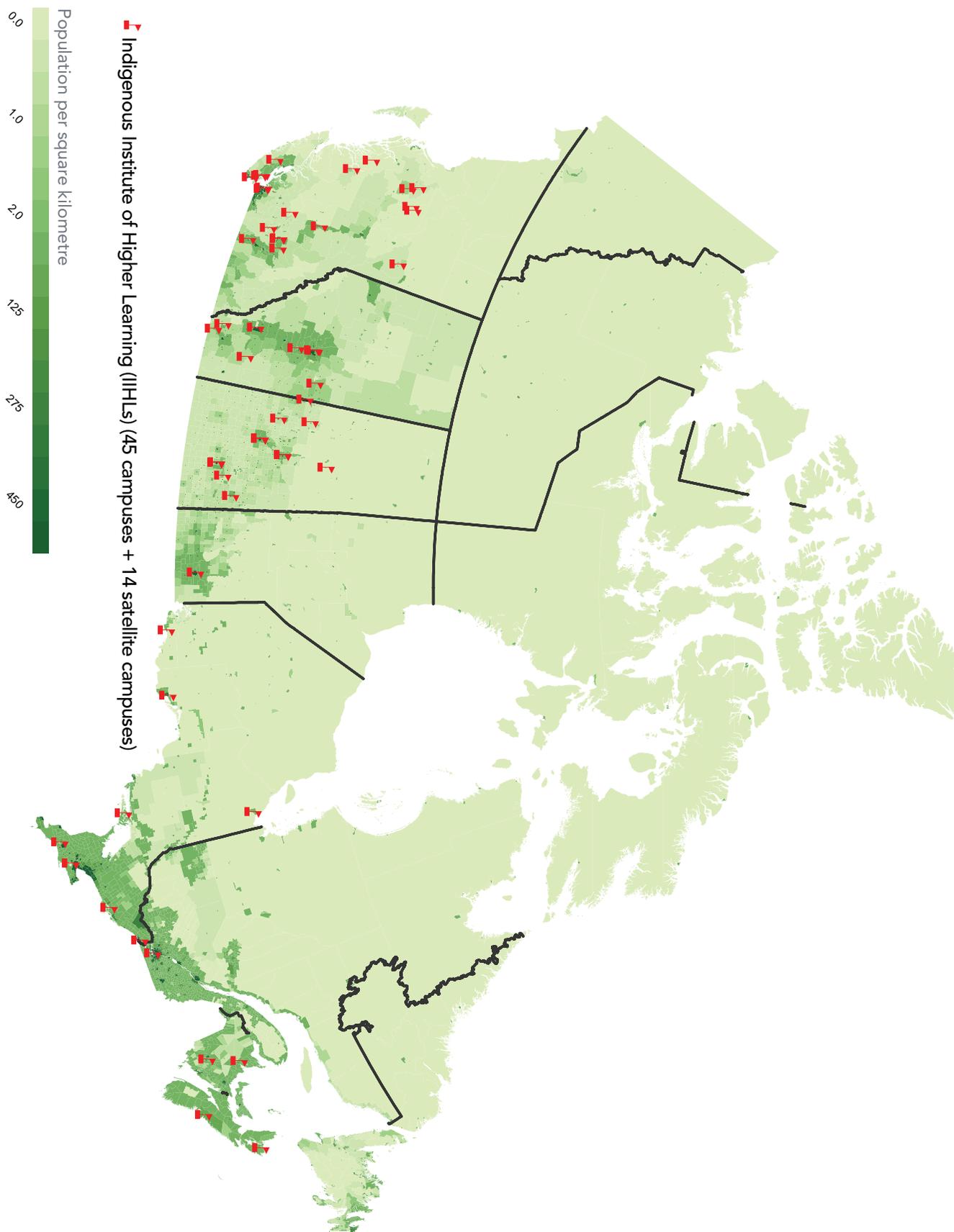
To this end, CCL and the Aboriginal Learning Knowledge Centre launched an initiative called "Redefining How Success is Measured in Aboriginal Learning." Through partnerships and consultations with First Nations, Inuit and Métis learning professionals, community practitioners, researchers and governments, three draft Holistic Lifelong Learning Models were developed to be used as the basis of a national and holistic framework to measure lifelong learning for Aboriginal people.

A report on this initiative, Redefining How Success is Measured in First Nations, Inuit and Métis Learning, is available online at www.ccl-cca.ca/RedefiningSuccess.

* List provided by the National Association of Indigenous Institutes of Higher Learning and updated to reflect those institutions that offer post-secondary programs.

† Enrolment figures estimated using information from Indigenous Associations reports (such as the Indigenous Association of Higher Learning in British Columbia and the Aboriginal Institutes' Consortium in Ontario) as well as annual reports from individual institutions.

Access to Post-secondary Institutions: Indigenous Institutes



Aboriginal completion of post-secondary education

In 2006, an estimated 44.5% of Aboriginal people aged 25 to 64 had completed a post-secondary certificate, diploma or degree. Although this rate was well behind that of the non-Aboriginal population (61.2%), Aboriginal people were on an equal footing with their non-Aboriginal counterparts for both college (18.7% vs. 20.4%) and trade (14.4% vs. 12.3%) attainment. The wide gap in university degree attainment between the Aboriginal (7.7%) and non-Aboriginal populations (23.4%) accounts for most of the difference in overall PSE attainment.

From 2001 to 2006, university degree attainment within the Aboriginal population increased by 1.8 percentage points. First Nations living on-reserve and Inuit showed the lowest attainment rates across all types of PSE. At the university degree level, attainment rates fell to 4.3% or less for these two groups. Results from the 2001 Census indicated that 40% of Status Indians* were attending or had completed a post-secondary education program, compared to 23% in 1986.¹¹ By 2006, approximately 132,000 First Nations adults (42%) were post-secondary graduates.

Table 2.5
Aboriginal and non-Aboriginal populations aged 25–64 years, by level of PSE attainment, Canada, 2001 and 2006

Census Year	2006							2001
	Total Canadian population	Non-Aboriginal population	Aboriginal population	First Nations (on-reserve)	First Nations (off-reserve)	Métis	Inuit	Aboriginal population
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Total with PSE	60.6	61.2	44.5	34.9	46.3	49.6	36.1	— ^a
Level of PSE attainment								
• Trades	12.4	12.3	14.4	12.8	13.7	16.2	13.1	— ^a
• College	20.3	20.4	18.7	14	19.6	21.1	16.9	— ^a
• University certificate or diploma below bachelor level ^b	5	5	3.6	3.9	3.8	3.4	2.2	— ^a
• University Degree (Total)	22.9	23.4	7.7	4.3	9.1	8.9	3.9	5.9
Undergraduate	17.7	18	6.5	3.9	7.7	7.4	3.4	5.1
Graduate	5.3	5.4	1.2	0.4	1.5	1.5	0.5	0.8

Sources: Statistics Canada, *Aboriginal Identity (8), Highest Certificate, Diploma or Degree (14), Major Field of Study – Classification of Instructional Programs, 2000 (14), Area of Residence (6), Age Groups (10A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces and Territories, 2006 Census – 20% Sample Data 2006 Census of Population (Ottawa: March 4, 2008)*, Catalogue no. 97-560-XWE2006028; Statistics Canada, *Selected Educational Characteristics (29), Aboriginal Identity (8), Age Groups (5A) and Sex (3) for Population 15 Years and Over, for Canada, Provinces, Territories and Census Metropolitan Areas, 2001 Census – 20% Sample Data (Ottawa: Nov. 19, 2003)*, Catalogue no. 97F0011XIE2001043.

^a Census data are not comparable between 2001 and 2006.

^b The 2006 Census results for this category should be treated with caution.

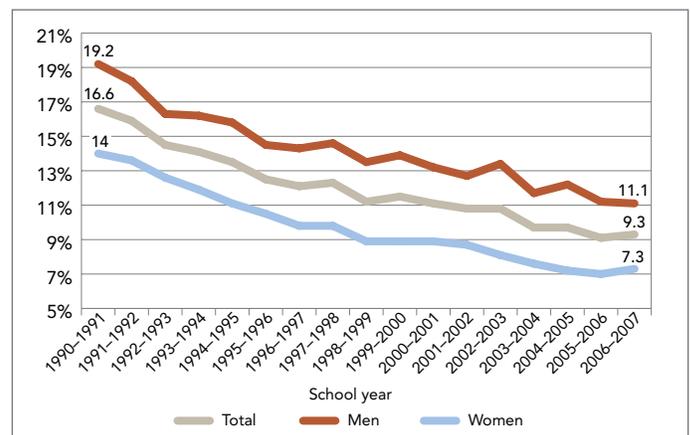
Gender Disparities in Education

Gender disparities exist across all levels of education. However, the underlying factors that drive these differences over the longer term have not been clarified.

High-school dropout rates by gender

Gender disparities in educational attainment are apparent during the secondary school years. Since the early 90s, male high-school dropout rates have been consistently higher than female dropout rates. In the 1990–1991 academic year, 19.2% of 20- to 24-year-old males had not completed high school and were not in school, compared with 14% of females. By 2006–2007, these figures had dropped to 11.1% for males and 7.3% for females. In spite of these overall declines, the male dropout rate for the last 15 years has been consistently four to five percentage points higher than female high-school dropout rates.

Figure 2.4
Proportion of Canadians aged 20–24 years who had not completed high school and were not attending school, by sex, Canada, 1990–1991 to 2006–2007

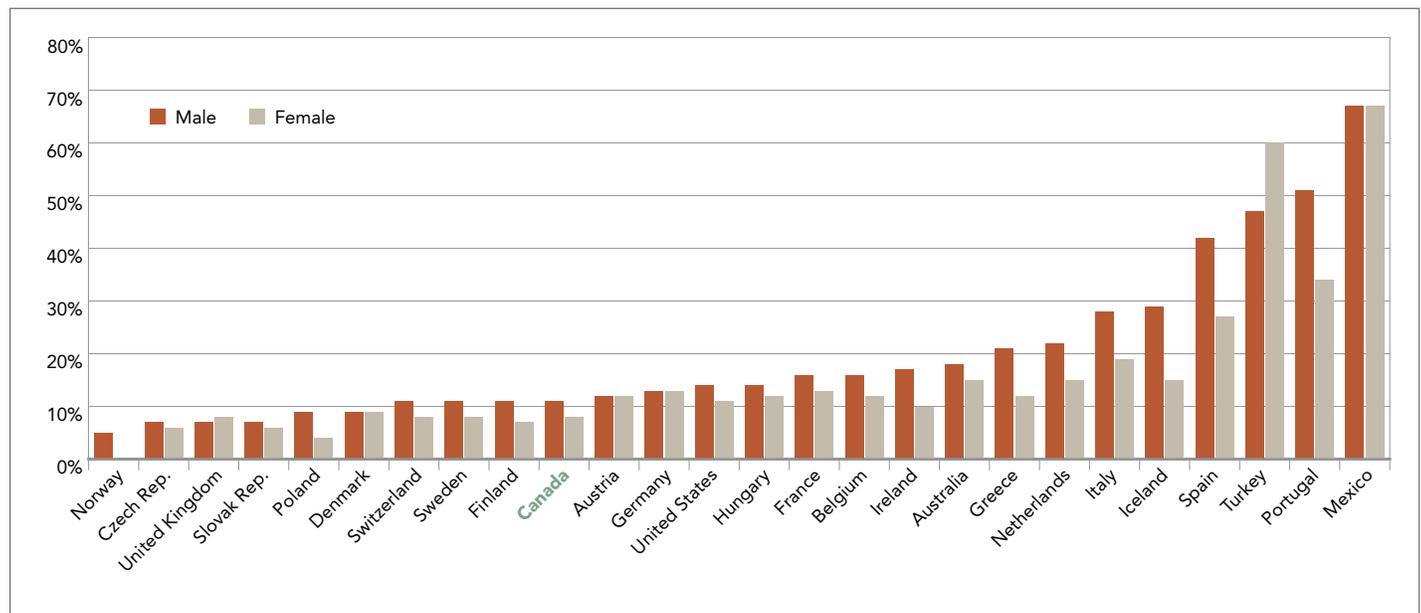


Source: Statistics Canada, Labour Force Survey. Special data run for Canadian Council on Learning.

* According to Statistics Canada, “the majority of First Nations people are Status Indians, meaning they are registered under the *Indian Act*. The [2006] Census enumerated 564,870 people who reported they were Registered Indians, 81% of the total First Nations population. An estimated 133,155 First Nations people were not registered under the *Indian Act*.”

This gender difference in high-school dropout rates is not unique to Canada. In all OECD countries, except the United Kingdom and Turkey, male dropout rates were equal to or higher than female dropout rates.

Figure 2.5
Percentage of 20- to 24-year-olds not in education and without upper-secondary education, by gender, OECD countries, 2004



Source: OECD, INES-Network B, Transition database, 2006, special data run for Canadian Council on Learning.

Notes:

- Upper-secondary in OECD countries is equivalent to high school in Canada.
- Observations with missing values for level of education or educational attendance status have been excluded.

High-school graduation rates by gender

Similar gender differences are apparent in the high-school graduation rates—the ratio of graduates to the total population at the typical age of graduation. For 2002–2003, there was an eight percentage point difference between graduation rates of males and females (70% and 78%, respectively). On the other hand, more males than females returned to school at a later age to complete their high-school education. Although 8% of males completed high school by 2002–2003 at an age later than the typical age of completion, relative to 6% for females, these additional numbers did not equalize the overall high-school completion rates of males and females.

Table 2.6
High-school graduation rates, overall, at typical age and after typical age of graduation, Canada, 1997–1998 and 2002–2003

	1997–1998			2002–2003		
	Both sexes	Male	Female	Both sexes	Male	Femal
	(%)					
Overall graduation rate	72	67	77	74	70	78
Typical-age graduation rate	62	57	67	67	62	72
After typical-age graduation rate	10	10	9	7	8	6

Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007* (Ottawa: Statistics Canada, December 2007), Table C.3.1, Catalogue no. 81-582-XIE.

Notes:

- The typical age of high-school graduation in Canada is 17 or 18, depending on the province.
- Column values may not sum to overall rates due to rounding.

International high-school graduation rates by gender

Although male and female high-school graduation rates have improved since 1997–1998, Canada ranks below the OECD average for males and females on this indicator. In 2006, the OECD average (for the 24 reporting countries) was 79% for males and 87% for females, compared with Canada’s rate of 77% for males and 84% for females.

Also in 2006, higher graduation rates for females were evident across all reporting OECD countries, except Switzerland and Turkey. The average difference for higher female to male graduation rates was eight percentage points across OECD countries. In Canada, the gender difference was seven percentage points.

Table 2.7
Upper-secondary graduation rates, OECD countries, 2003–2006

	2003			2004			2005			2006		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
OECD average	78	75	82	81	77	86	82	78	87	83	79	87
EU19 average				83	79	88	87	82	91	86	82	90
Germany	97	95	99	99	97	101	100	98	102	103	102	104
Greece	96	87	105	missing	missing	missing	102	99	106	100	96	104
Finland	84	77	92	90	84	96	95	89	101	95	91	100
Korea	missing	missing	missing	96	96	96	93	94	92	93	92	94
Japan	91	90	93	91	90	92	93	92	94	93	92	93
Norway	92	82	102	100	86	114	93	82	104	91	80	103
Iceland	79	68	90	84	72	96	80	68	92	90	81	100
Czech Republic	88	86	90	87	85	88	89	88	91	90	88	92
Switzerland	90	90	91	89	89	90	89	90	88	89	90	89
United Kingdom	missing	missing	missing	missing	missing	missing	86	83	90	88	85	92
Ireland	91	85	97	92	86	99	91	84	98	86	81	93
Denmark	86	81	91	90	81	100	86	77	96	86	78	96
Italy	81	79	83	81	80	83	82	80	83	86	84	88
Hungary	87	84	91	86	82	90	84	81	87	85	81	90
Slovak Republic	56	57	55	83	81	85	84	81	86	82	80	85
Canada	missing	80	77	84								
Poland	86	86	85	79	70	88	86	81	92	80	76	84
United States	73	72	75	75	72	79	76	70	82	77	75	79
Sweden	76	73	79	78	75	81	78	74	81	76	73	79
New Zealand	missing	missing	missing	75	65	85	72	61	83	74	63	85
Spain	67	59	75	66	58	75	72	65	80	72	64	80
Luxembourg	71	66	75	69	66	73	76	70	82	72	69	74
Turkey	41	44	37	53	57	49	48	51	44	51	55	47
Mexico	36	33	39	38	34	41	40	37	44	42	38	46

Source: Data derived from OECD, *Education at a Glance: OECD Indicators* (Paris) for the years 2004, 2005, 2006, 2007 and 2008, Table A2.1.

Notes:

- Upper-secondary graduation in OECD countries is equivalent to high-school graduation in Canada.
- Percentages are calculated by dividing the number of graduates by the count for the total population at the typical age of graduation. However, many graduates will be either older or younger than typical age. Therefore percentages can exceed 100.

PSE participation by gender: An overview

The 2006 YITS indicated that PSE participation increased by 25 percentage points between 1999 (when survey respondents were 18- to 20-years-old) and 2005 (when they were four years older), for males and females alike. However, the 11-percentage-point difference in participation rates between males (49%) and females (60%) in 1999 did not diminish over the six-year survey period. In 2005, male participation rates (74%) remained below female participation rates (85%). Higher levels of high-school dropout rates among males would account for some persistence in this difference.

In 1999, a higher proportion of 18- to 20-year-olds were participating in college (20% males and 26% females) than in university (19% males and 24% females). By 2005, at age 24 to 26, this proportion was reversed—25% of males and 28% of females participated in college, compared with university participation rates of 36% for males and 44% for females.

Table 2.8
Post-secondary participation rates, Canadian youth, December 1999 and December 2005

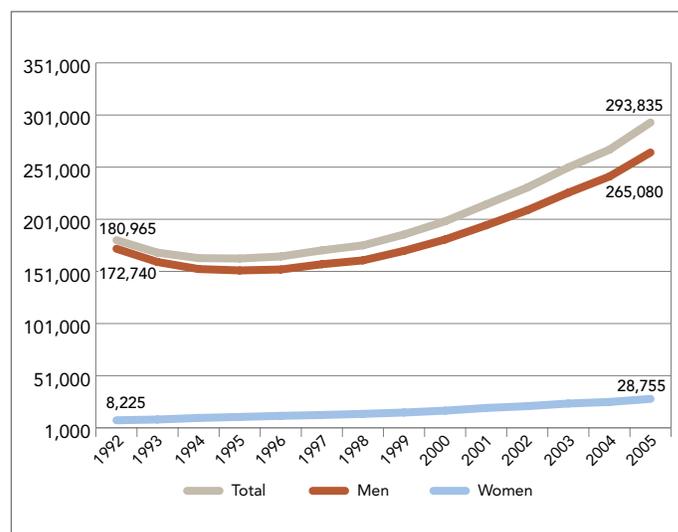
	Post-secondary participation rates		Percentage-point change from 1999–2005
	December 1999, aged 18–20 years	December 2005, aged 24–26 years	
	(%)	(%)	(%)
Total	54	79	25
Type of institution attended			
University	21	40	19
College/CEGEP	23	26	3
Other post-secondary	10	13	3
Males			
Total	49	74	25
University	19	36	17
College/CEGEP	20	25	5
Other post-secondary	10	14	4
Females			
Total	60	85	25
University	24	44	20
College/CEGEP	26	28	2
Other post-secondary	10	13	3

Source: Danielle Shaienks and Tomasz Gluszynski, *Participation in Postsecondary Education: Graduates, Continuers and Drop Outs, Results from YITS Cycle 4* (Ottawa: Statistics Canada, Nov. 20, 2007), Catalogue no. 81-595-MIE2007059.

Apprenticeship programs

Males continued to comprise the majority of registered apprentices in 2005 (90%), although the number of females in registered apprenticeship programs more than tripled between 1992 and 2005, from 8,225 to 28,755—an increase from about 4.5% to 9.8% of all apprentices. During the same period, the number of males in registered apprenticeship programs increased by over 90,000, from 172,740 to 265,080.

Figure 2.6
Number of registered apprentices, by sex, Canada, 1992–2005



Source: Statistics Canada, Registered Apprenticeship Information System (RAIS) 2005, (Ottawa: 2007), CANSIM Table 477-0051.

Most of the growth in female registrations occurred in the food and services trades or in the category of “other” trades. In the more traditional trades—such as building construction, motor vehicle and heavy equipment, electrical, industrial, and metal fabricating—females represented 3% or less of enrolments in 1992 and 2005.

Table 2.9
Registered apprenticeship training: registrations by gender, Canada, 1992 and 2005

	1992			2005		
	Women	Men	Women	Women	Men	Women
	Count		%	Count		%
Total trades^a	8,225	172,740	4.5	28,755	265,080	9.8
Building and construction trades	770	42,935	1.8	2,035	66,675	3
Electrical, electronics and related trades	465	33,935	1.4	1,205	48,230	2.4
Food and services trades	5,350	5,705	48.4	17,530	9,940	63.8
Industrial and related mechanical trades	160	14,895	1	385	20,670	1.8
Metal fabricating trades	360	36,265	1	1,325	59,045	2.2
Motor vehicle and heavy equipment trades	585	36,875	1.6	1,360	56,390	2.4
Other trades ^b	540	2,130	20.2	4,915	4,125	54.4

Source: Statistics Canada, "Registered apprenticeship training programs, 2005," *The Daily* (Nov. 15, 2007), www.statcan.ca/english/dai-quo/.

^a Column values may not sum to totals due to rounding.

^b The trade group "Other" consists of miscellaneous trades and occupations not classified elsewhere. Many of the apprenticeship trades and occupations that have been introduced since the 1990s are included in this group.

College and CEGEP

Data on college and CEGEP (Collège d'enseignement général et professionnels) enrolments indicate a higher proportion of female enrolments in recent years. In 2004–2005, 53% of full-time students were female, compared with 47% for male. This proportion has remained relatively stable since 1999–2000, when 54% of enrolments were female and 46% were male. However, this situation may soon change. Male enrolments in college and CEGEP programs increased 27.1% during the period 1999–2000 to 2004–2005—almost 51,000 more enrolments—compared with a 20.5% increase of just more than 45,000 for females.

Table 2.10
Full-time college enrolment by gender, Canada, academic years 1999–2000 and 2004–2005

	1999–2000		2004–2005 ^a		Change in count, 1999–2000 to 2004–2005	Growth rate
	Count	(%)	Count	(%)	Count	(%)
	Male	188,202	46	239,116	47	50,914
Female	220,579	54	265,869	53	45,290	20.5

Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007* (Ottawa: Statistics Canada, December 2007), Catalogue no. 81-582-XIE.

^a Does not include numbers from the province of Saskatchewan.

University

While an increasing number of males, compared with females, are attending apprenticeship and college programs, the opposite is occurring at universities. Between 1999–2000 and 2005–2006, 25.1% more women (120,000) enrolled at university—at both the undergraduate and graduate levels. Male enrolments increased as well, but only by 21.6% (or 79,000). In 2005–2006, 58.5% of undergraduate enrolments and 51.8% of graduate enrolments were female.

Table 2.11
University enrolment by gender, Canada, academic years 1999–2000 and 2005–2006

	1999–2000		2005–2006 ^a		Change in count, 1999–2000 to 2005–2006	Growth rate
	Count	(%)	Count	(%)	Count	(%)
Total	847,500	100	1,047,700	100		
Male	363,800	42.9	442,400	42.2	78,600	21.6
Female	483,600	57.1	604,900	57.7	121,300	25.1
Status						
Undergraduate	650,400	100	803,500	100		
Male	273,900	42.1	333,200	41.5	59,300	21.7
Female	376,400	57.9	470,200	58.5	93,800	24.9
Graduate	116,300	100	153,600	100		
Male	57,700	49.6	73,900	48.1	16,200	28.1
Female	58,700	50.5	79,500	51.8	20,800	35.4
Other or not specified	80,800	100	90,600	100		

Source: Statistics Canada, "University enrolment, 2005/2006," *The Daily* (Feb. 7, 2008), www.statcan.ca/english/dai-quo/.

^a Does not include numbers from the University of Regina.

Persistence in PSE by gender

Studies based on the YITS survey show that male students are more likely to drop out of post-secondary education compared with female students.^{12,13} A 2008 study of three cycles of YITS data (2000, 2002, 2004) indicates that male students were 1.62 times more likely than female students to leave post-secondary education: for every 16 males who chose to leave their PSE studies, there were 10 females.¹⁴

PSE completions by gender

Apprenticeship programs

The gender disparities in apprenticeship completions reflect the disparities found in enrolments. Female participation and completion in the trades increased between 1992 and 2005, but only in very specific categories. In 2005, three-quarters of completers in the food and service trades and 56.6% in the “other” trades were women. However, less than 2% of completions in the remaining more traditional trades were female, reflecting their much lower participation in these trades in general. In 2005, 89.2% of all apprenticeship completers were male.

Table 2.12
Registered apprenticeship completions, by gender,
Canada, 1992 and 2005

	1992			2005		
	Women	Men	%	Women	Men	Women
	Count		%	Count		%
Total^a	1,030	17,690	5.5	2,225	18,330	10.8
Building and construction trades	25	3,450	0.7	45	2,920	1.5
Electrical, electronics and related trades	25	2,855	0.9	60	3,695	1.7
Food and services trades	845	650	56.5	1,735	580	74.9
Industrial and related mechanical trades	20	2,215	0.8	30	1,930	1.4
Metal fabricating trades	25	3,695	0.6	80	4,655	1.7
Motor vehicle and heavy equipment trades	45	4,605	0.9	70	4,395	1.6
Other trades ^b	45	220	17.6	205	160	56.6

Source: Statistics Canada, “Registered apprenticeship training programs, 2005,” *The Daily* (Nov. 15, 2007), www.statcan.ca/english/dai-quo/.

^a Column values may not sum to totals due to rounding.

^b The trade group “Other” consists of miscellaneous trades and occupations not classified elsewhere. Many of the apprenticeship trades and occupations that have been introduced since the 1990s are included in this group.

College and CEGEP

Analysis of gender disparities in the college sector is limited due to incomplete data on completions. Data on college completions have not been consistently available in Canada since 1998, making it difficult to assess whether completions by gender reflect—or differ from—trends in universities or apprenticeships.

University

From 1998 to 2005, the overall growth rate in the number of university completions was 25.2%, primarily because of the increased number of women completing a university education (28,500) in 2005—almost double the number of completions for males (14,800). Most of this growth occurred at the undergraduate level—where 19,700 more females graduated in 2005 than in 1998. This compares to an increase of 7,300 male graduates over the same period.

In 2005, 61.4% of all bachelor’s and first professional degrees were awarded to females, an increase from 58.9% in 1998. The share of male (48%) and female (52%) completions at the master’s level changed little from 1998 to 2005 (less than one percentage point each). However, the share of doctoral completions awarded to females over this period increased from 35% to 42.9%. Notably, male doctoral completions were the only category to show a decline in numbers in 2005 relative to 1998, although males still accounted for 57.1% of doctoral degrees awarded.

Table 2.13
University qualifications awarded by program level and gender, Canada 1998 and 2005

	1998	Distribution 1998 (%)	2005 ^a	Distribution 1998 (%)	Change in count, 1998 to 2005	Growth rate (%)
Total university qualifications	172,100	100	215,400	100	43,300	25.2
Male	71,900	41.8	86,700	40.3	14,800	20.6
Female	100,100	58.2	128,600	59.7	28,500	28.5
Bachelor's and first professional degrees	124,900	100	151,900	100	27,000	21.6
Male	51,300	41.1	58,600	38.6	7,300	14.2
Female	73,600	58.9	93,300	61.4	19,700	26.8
Master's degree	22,000	100	33,000	100	11,000	50
Male	10,500	47.7	15,900	48.2	5,400	51.4
Female	11,500	52.3	17,100	51.8	5,600	48.7
Earned doctorate	4,000	100	4,200	100	200	5
Male	2,500	62.5	2,400	57.1	-100	-4
Female	1,400	35	1,800	42.9	400	28.6
Undergraduate and graduate certificates and diplomas	20,600	100	25,000	100	4,400	21.4
Male	7,300	35.4	9,200	36.8	1,900	26
Female	13,300	64.6	15,800	63.2	2,500	18.8

Source: Statistics Canada, "University degrees, diplomas and certificates awarded, 2005," *The Daily* (Feb. 7, 2008), www.statcan.ca/english/dai-quo/.

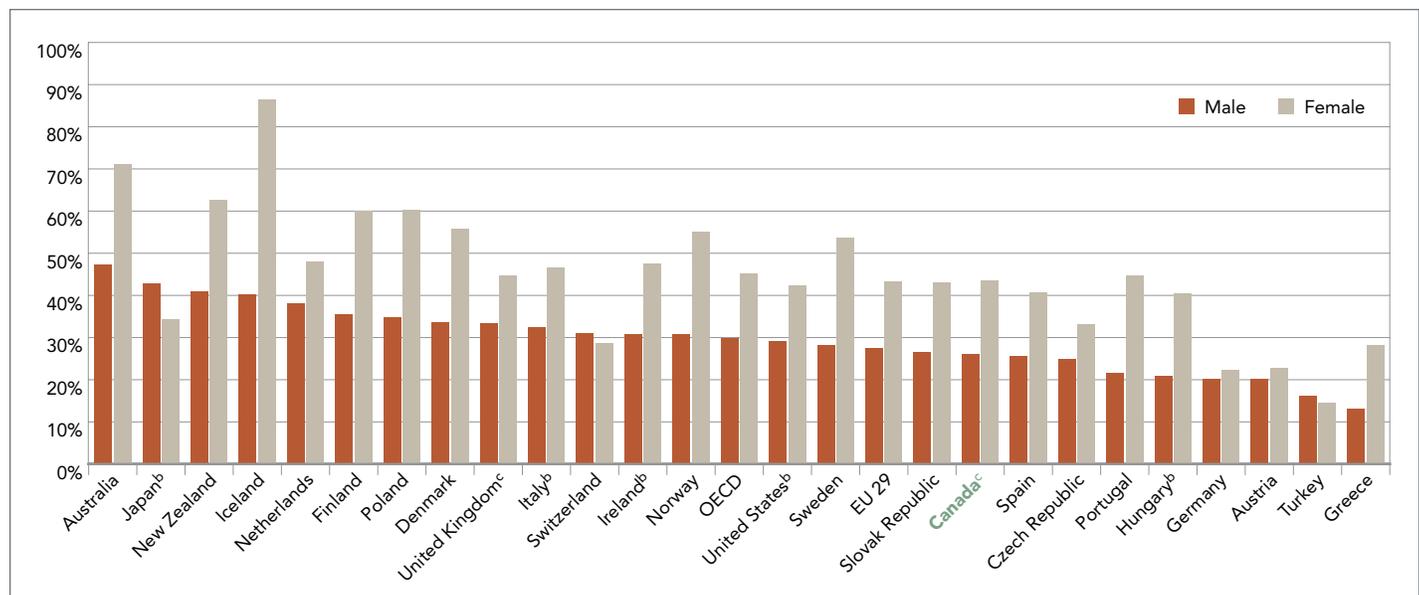
^a Qualifications for 2005 figures do not include the University of Regina.

Note: Totals may not sum for two reasons: 1) rounding; 2) totals include counts for sex unknown in the administrative data.

PSE completions by gender: An international perspective

In 2006, in all OECD countries except Japan, Switzerland and Turkey, females had higher graduation rates at the university undergraduate and master's level (tertiary type A in the OECD classification). On average, female graduation rates were 15.4 percentage points higher than male graduation rates across both the OECD and European Union countries, while in Canada the difference was 17.5 percentage points.

Figure 2.7
Graduation rates in tertiary type A programs^a (first-time graduation), by gender, OECD countries, 2006



Source: OECD, *Education at a Glance 2008: OECD Indicators*, Table A3.1 (Paris: 2008).

^a Tertiary type A programs in OECD countries are equivalent to bachelor's degrees, first professional degrees (e.g., law) and master's degrees in Canada.

^b Gross graduation rate is calculated for tertiary type A.

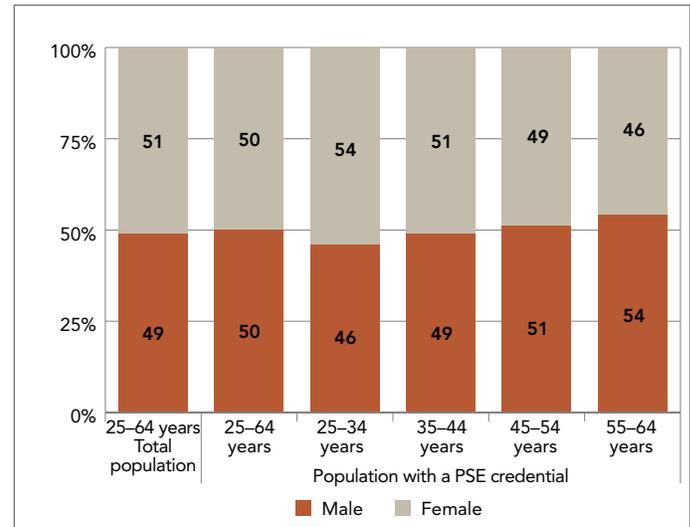
^c Year of reference is 2005.

Note: The graduation rate is the total of all first-time graduates (regardless of age) divided by the total population aged 22 and 24 in 2006 for each gender.

PSE attainment levels: The working-age population by gender

The differing educational choices of males and females over time are reflected in the educational attainment of the working-age population. In 2006, 49% of the general working-age population (25 to 64 years) were male and 51% were female. In the overall population with PSE, the distribution was 50% male and female. However, the distribution of PSE completers by gender shifts across the age groups. In the older population (55 to 64 years) with PSE, 54% were males, while 46% were females. This reflects participation patterns in the 1970s, when a higher proportion of males than females completed a post-secondary education. For the younger population (25 to 34 years), the reverse is true—54% are female, compared with 46% male. If males are to retain their share of the post-secondary graduate population, they must decrease their high-school dropout rates, increase their frequency of participation in PSE and reduce their PSE dropout patterns.

Figure 2.8
Total population aged 25–64 years and population aged 25–64 years with a PSE credential, by gender, Canada, 2006



Source: Statistics Canada, Major Field of Study - Classification of Instructional Programs, 2000 (13), Highest Postsecondary Certificate, Diploma or Degree (12), Age Groups (10A) and Sex (3) for the Population 15 Years and Over With Postsecondary Studies of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census - 20% Sample Data (Ottawa: March 4, 2008), Catalogue no. 97-560-XCB2006005.

Summary: Opportunities and Future Directions

Canada must develop the educational potential of its entire population in order to remain competitive, innovative and productive, and to improve the standard of living of all citizens. However, certain groups—notably, Aboriginal people and individuals from lower income families and of parents with lower educational attainment—face social, cultural, geographic and economic barriers that limit their access to and participation in PSE. Gender disparities in PSE are also evident, for reasons that are not clear. More females than males participate in university education, while males dominate the trades. It would appear that gender disparities in education take root at the high-school level and are later manifested in the working-age population with PSE.

If Canada is to achieve equity in access, persistence and completion of PSE, then it must develop clear strategies to address the barriers to PSE for populations that are currently not as likely to pursue post-secondary studies. Some of these strategies must be directed to the high-school

level of education in order for Canada to enlarge the pool of PSE participants. A more comprehensive understanding of issues related to decision-making about whether to attend PSE, the type of PSE to pursue and the motivations related to staying in school or dropping out is also needed, particularly when considering male and female differences in PSE behaviours.

Future Directions: An International Perspective

The OECD's *Tertiary Education for the Knowledge Society* (2008)¹⁵ is a sweeping 750-page report that investigated the state of PSE in 24 countries worldwide. It includes a compilation of strategies and recommendations to address issues of access, persistence and completion of PSE in its member countries. Canada did not take part in the study.

The following is a selection of strategies from the report that are applicable to the Canadian situation.

Improved equity in access, persistence and completion for at-risk populations

Assess extent and origin of equity issues.

The OECD recommends developing a coherent and systematic approach to addressing equity of access. The first step is determining the origin of access issues. This would require analyzing barriers to access, such as family income constraints, insufficient financial support for students, inequity of opportunities during secondary school, admissions issues, and lack of information about the benefits of post-secondary education.

Extensive student data is needed, including socio-economic background, family background, region of origin, work status, and the social and economic conditions of student life. An empirical performance indicator system could be used to monitor access, participation, retention and success rates for students identified as at risk for participation or completion of PSE. To accomplish this, an effective system of student tracking and cohort analysis would be needed.

Rural access and participation

Improve access to tertiary education in remote areas by expanding distance learning and regional learning centres.

To improve access for learners in remote regions, the OECD recommends promoting distance education and establishing learning centres that provide remote links to post-secondary institutions. Regional campuses could offer programs requiring practical work and could help to meet regional or local labour-market skill requirements. PSIs could increase support to students in remote areas by providing funding for living accommodations, therefore making it more affordable for these students to study away from home.

Access, persistence and completion in Aboriginal populations

An excellent example of progress in this area in Canada is through the Indigenous Institutes of Higher Learning (IIHLs). However, many more geographically remote Aboriginal communities still have low levels of PSE participation. The OECD recommendations add to the experience and example set by Canada's IIHLs.

Consider alternative types of provision that respond to cultural diversity.

The OECD affirms the importance of responding to the particular needs of individuals from diverse cultural backgrounds. The opening up of tertiary education institutions (TEIs) to all citizens, regardless of cultural background, is to be encouraged. Furthermore, it is essential to recruit more teachers from underserved minority groups, as well as academics from these groups, into mainstream tertiary education to raise the tertiary aspirations within these communities. A further channel for improving the aspirations of cultural minorities is to enhance partnerships between remote Aboriginal communities, TEIs run by these communities, and mainstream TEIs.



- 1 Organisation for Economic Co-operation and Development (OECD), *No More Failures: Ten Steps to Equity in Education*, prepared by the Directorate for Education (Paris: September 2007).
- 2 Marc Frenette, *Too Far to Go On? Distance to School and University Participation* (Ottawa: Statistics Canada, 2002), Catalogue no. 11F0019MIE—No. 191.
- 3 Lynn Barr-Telford et al., *Access, Persistence and Financing: First Results from the Postsecondary Education Participation Survey (PEPS)*, Culture, Tourism and the Centre for Education Statistics, research papers no. 7 (Ottawa: Statistics Canada, September 2003), Catalogue no. 81-595-MIE—No. 7.
- 4 Elisabeth Cloutier et al., *Aboriginal Peoples in Canada in 2006: Inuit, Métis and First Nations, 2006 Census* (Ottawa: Statistics Canada, Jan. 15, 2008), Catalogue no. 97-558-XWE2006001.
- 5 Robert Malatest, *Best Practices in Enhancing Aboriginal Participation in Post-Secondary Education: Canadian & International Perspectives* (Victoria, B.C.: R. A. Malatest and Associates Ltd., April 6, 2002).
- 6 R. A. Malatest and Associates Ltd. and Blair Stonechild, *Factors Affecting the Use of Student Financial Assistance by First Nations Youth* (Montreal: The Canada Millennium Scholarship Foundation, June 2008).
- 7 Katenies Research and Management Services and Chignecto Consulting Group Inc., *Review of the Indian Studies Support Program Component of the PSE Program* (Ottawa: Assembly of First Nations, 2006).
- 8 Aboriginal Institutes' Consortium, *Aboriginal Institutions of Higher Education: A Struggle for the Education of Aboriginal Students, Control of Indigenous Knowledge, and Recognition of Aboriginal Institutions: An Examination of Government Policy* (Ottawa: Canadian Race Relations Foundation, August 2005).
- 9 Katenies Research and Management Services and Chignecto Consulting Group Inc., *Review of the Indian Studies Support Program Component of the PSE Program*.
- 10 Katenies Research and Management Services and Chignecto Consulting Group Inc., *Review of the Indian Studies Support Program Component of the PSE Program*.
- 11 Jeremy Hull, *Post-Secondary Education and Labour Market Outcomes Canada, 2001* (Ottawa: Indian and Northern Affairs Canada, 2005)
- 12 Xin Ma and George Frempong, *Reasons for Non-Completion of Postsecondary Education and Profile of Postsecondary Dropouts* (Ottawa: Human Resources and Social Development Canada, May 2008).
- 13 Danielle Shaienks and Tomasz Gluszynski, *Participating in Postsecondary Education: Graduates, Continuers and Drop Outs, Results from YITS Cycle 4* (Ottawa: Statistics Canada, November 2007), Catalogue no. 81-595-MIE2007059.
- 14 Ma and Frempong, *Reasons for Non-Completion of Postsecondary Education and Profile of Postsecondary Dropouts*.
- 15 Paulo Santiago et al., *Tertiary Education for the Knowledge Society: OECD Thematic Review of Tertiary Education: Synthesis Report* (Paris: OECD, April 2008). Available at www.oecd.org/dataoecd/20/4/40345176.pdf.

An Overview: Key Findings

Positive performance

Although most post-secondary education (PSE) students in Canada are within the traditional age for PSE students (between the ages of 18 and 24), there has been an encouraging shift in the participation rate of older learners. Between 1997 and 2002, participation rates in formal job-related learning among adults aged 45 to 54 rose by six percentage points to 33.8%. In addition, the average number of hours that 55- to 64-year-olds spent in job-related training more than doubled.

Further evidence of the interest that older Canadians are taking in post-secondary learning is suggested by the gaining popularity of the federal government's Lifelong Learning Plan (LLP). An increased number of tax-free RRSP withdrawals in the three-year period since the beginning of the program attests to Canadians' interest in learning past the typical age of formal schooling. Both the number of withdrawals and the amount withdrawn increased from 2001 to 2004.

Canada's senior population will soon be the country's most well-educated group of seniors in history. Given that participation in adult learning is closely tied to levels of educational attainment, it can be expected that participation in adult learning for seniors will increase over the next 10 years. This represents a new and potentially large market for Canada's post-secondary institutions (PSIs).

Troubling trends

Rapid technological change, global competitive pressures and new patterns of work are demanding a more sophis-

ticated set of transferable skills, such as problem-solving, communications, decision-making, teamwork, leadership, entrepreneurship and adaptability. Despite the fact that Canada's working-age population has more education than ever before, many employers indicate that their employees are lacking these essential "soft" skills, which are highly desirable in today's ever-changing economy.

The ability of Canadians to learn across the lifespan and apply new skills is instrumental to Canada's productivity and competitiveness. Post-secondary institutions (PSIs) play an important role in the re-skilling or re-tooling of workers during economic downturns, but course and program offerings must be responsive to the needs of the labour market. This requires ongoing and effective research, and communication between the labour and PSE sectors. As well, adult learners have lifestyle circumstances and attitudinal perspectives that are different from the average 18- to 24-year-old student. These must be addressed if adult participation in post-secondary learning is to be enhanced.

More than eight million education and training activities pursued by Canada's working-age population did not occur in PSIs. This represents a large untapped market for Canada's PSIs and a missed opportunity for better linkages between PSIs and Canada's labour market.

Financial concerns and balancing job and family responsibilities are the most frequently cited reasons adults do not pursue education or training. PSIs must be responsive and adaptable to the particular lifestyles of the adult population in order to meet their learning needs.

This chapter focuses on the role of post-secondary institutions, as well as post-secondary courses and programs, in supporting lifelong learning in Canada. The 2006 and 2007 Canadian Council on Learning (CCL) reports on PSE present more general information on lifelong learning, including workplace learning and job-related training that occur outside the PSE sector.

Two of CCL's five knowledge centres—the Adult Learning Knowledge Centre and the Work and Learning Knowledge Centre—explore aspects of learning as an adult in Canada and have contributed articles to CCL's Lessons in Learning series, including:

"Canada's biggest economic challenge: Improving workplace learning in Canada" points out that non-formal

job-related training in Canada falls far short of that of other OECD countries. Furthermore, levels of employer-supported job-related training have been stagnant in recent years. With looming skills shortages, this situation is cause for concern.

"Can workplace learning create healthier employees?" documents and analyzes innovative workplace health and safety programs in 12 organizations across Canada, encompassing large and small firms in a variety of sectors. These wellness learning programs are aimed at reducing employee absenteeism and increasing workplace satisfaction.

Additional Lessons in Learning articles are available at www.ccl-cca.ca/LessonsInLearning.

LIFELONG LEARNING AND PSE

Introduction

The lifelong learning perspective acknowledges that people learn at different rates and have different learning needs throughout their lives—from early childhood into retirement. International organizations such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Organisation for Economic Co-operation and Development (OECD) have long promoted the lifelong learning perspective as an organizing principle for the education sector. This perspective shifts the traditional view of learning—that a person is “all schooled up” once formal education is complete—to a more holistic view of learning as a process that continues throughout a person’s lifetime¹. Post-secondary education institutions (PSIs) play an important role in promoting the lifelong learning perspective and in meeting the learning needs of the adult population.

Recent demographic shifts, rapid advancements in technology and increased global competitive pressures are transforming the way Canadians live, work and plan for the future. Individuals as well as communities benefit from higher levels of education: health, life satisfaction, volunteering, donating, employment stability and income all increase as levels of educational attainment increase. These benefits can be enhanced throughout the lifespan by participation in adult learning.

From a more economic perspective, as demands for certain skills increase or decrease in response to labour-market changes, lifelong learning enhances re-tooling of the labour market and enables individuals to maximize their potential throughout their working lives. In 2007, the OECD observed that “as firms respond to a more volatile market and shorter product cycles,” the shelf-life of skills is shortened, necessitating the continuous renewal and updating of skills.² The benefits to Canadians and Canada of engaging adults in learning are clearly far-reaching.

The 2006 Canadian federal budget, *Advantage Canada*, highlighted the importance of PSIs in building and maintaining an economically and socially vibrant country. It also underscored the need for PSIs to respond to the specific learning requirements of the adult learner:

Canada’s colleges and universities need to look to the future and position Canada and themselves for long-term success. Our colleges and universities must continue to adapt to changing skills requirements and technological advances, and help meet the needs of adult learners.³

Advancing the lifelong approach to learning in Canada will require that PSIs and the general population view learning through PSIs as more than an activity for the young. It will entail a shift in perception for a variety of purposes, including job-related and personal interest, from the traditional “all schooled up” perspective to an appreciation of PSE as an opportunity to be realized throughout a person’s lifespan.

Types of Adult Learning

Adult learning can occur in a variety of ways throughout the life cycle. In 2000, Eraut outlined a three-point typology for classifying learning activities, all of which are applicable to the lifelong learning perspective.⁴

Formal learning: *learning typically provided by an education or training institution, structured in terms of learning objectives, learning time or learning support, and leading to certification. Formal learning is intentional from the learner’s perspective. In Canada, formal programs include high school completion programs, registered apprenticeships, trade and vocational programs, college, CEGEP and university programs that lead to a certificate, diploma or degree. Any individual course that can be used as credit toward the completion of one of these programs is considered to be formal learning.*

Non-formal learning: *learning that is not provided by an education or training institution and typically does not lead to certification. It is, however, structured in terms of learning objectives, learning time or learning support. Non-formal learning is intentional from the learner’s perspective. In Canada, non-formal learning includes seminars, workshops and conferences attended for training purposes, as well as courses that are taken for reasons other than credit in a program.*

Informal learning: *learning resulting from daily life activities related to work, family or leisure. It is not structured in terms of learning objectives, learning time or learning support, and typically does not lead to certification. Informal learning may be intentional, but in most cases it is non-intentional (i.e., incidental or random).*

LIFELONG LEARNING AND PSE

This chapter focuses on PSE programs and courses—or formal education—within the context of the lifelong learning continuum. The sections covered in this chapter include:

- withdrawals from Canada’s Lifelong Learning Plan
- adult participation in education taken through PSIs
- seniors and PSE
- literacy and PSE in Canada
- PSIs as partners in workplace learning
- PSIs: re-skilling of the labour force
- summary: opportunities and future directions

PSIs and Adult Participation in Formal Education

In Canada, young learners are the primary focus of data collection, analyses and policy language about learning. Although most post-secondary students in Canada are between the ages of 18 and 24, participation rates for older learners in education—especially PSE—must be reviewed and considered if Canada is to move forward on the lifelong learning approach.

Lifelong Learning Plan (LLP) Withdrawals

Evidence of increasing interest in post-secondary learning by adults past the typical age of formal schooling is supported by the number of withdrawals from Canada’s LLP. The LLP was established at the turn of the millennium to encourage older adults to participate in formal education. It enables adults with investments in Registered Retirement Savings Plans (RRSPs) to make annual withdrawals to pay for their own education or the education of a spouse at a recognized school, as stipulated in the list of schools maintained by the Canada Student Loan Program of Human Resources and Skills Development Canada.*

The LLP appears to be gaining in popularity. In 2002, 11,000 individuals made withdrawals under the LLP. In 2004, this figure rose to 12,300—a 12.1% increase—and total withdrawals increased from \$60 million to \$71 million, a 17.5% increase. Given that most RRSP investors are also labour-force participants, monitoring withdrawals under this program would provide another indication of the level of adult participation in learning in Canada’s PSIs.

Table 3.1
Lifelong Learning Plan, participants and withdrawals, Canada, 2002–2004

Year	Number of participants	Total value of RRSP withdrawals	Average withdrawal
(thousands)			
2002	11,030	\$60,359	\$5,472
2003	12,100	\$67,670	\$5,593
2004	12,370	\$70,916	\$5,733

Sources: Chantal Collin and Kevin Kerr, *Recent Federal Investment in Post-secondary Education and Training* (Ottawa: Library of Parliament, September 2006); and Canada Revenue Agency (unpublished).

Participation in Learning by the Working-age Population

In 2002, just over one-third of employed adults (34.7%) aged 25 to 64 participated in job-related education or training. This was an increase of six percentage points over the 29% participation rate in 1997.⁵ In total, the adult participants in 2002 engaged in more than 9 million education or training activities (see Table 3.3). More than 1.4 million participants undertook education activities considered formal learning (see sidebar on previous page titled “Types of Adult Learning” for a definition of formal learning).

Table 3.2
Participation in job-related education or training programs, ages 25–64, Canada, 2002

	Count	%
Number of participants in job-related education programs^a	5,179,961	100
Number of program participants	1,419,447	27.4
Programs only	938,489	18.1
Programs and courses	480,958	9.3

^a This figure represents the weighted number of participants, which is greater than 4.8 million because some participants engaged in more than one activity

Source: Valerie Peters, *Working and Training: First Results of the 2003 Adult Education and Training Survey*, Table 3 (Ottawa: Statistics Canada, 2004), Catalogue no. 81-595-MIE—No. 015.

In 2002, all types of public education institutions in Canada provided job-related programs and courses to adult learners aged 25 to 64. In total, more than one million activities, or 11.5% of all adult job-related learning activities in 2002, took place in one of Canada’s public education institutions. The largest share was taken at a university (5.5%), followed by colleges and CEGEPs (3.8%). The remaining 2.2% were completed in a trade/vocational school or a high school.

* These withdrawals do not jeopardize the income-tax deferral already accrued under the RRSP plan, although the amount withdrawn must be repaid to the RRSP within a certain time frame.

Table 3.3
Public education institutions as providers of job-related education activities, population aged 25–64, Canada, 2002

	Count	%
Number of job-related education or training activities	9,035,305	100
Total activities provided at public education institutions	1,039,135	11.5
University / University college	495,265	5.5
Community college or CEGEP	343,070	3.8
Trade or vocational school, publicly funded technical institute, high school, or adult high school	200,800	2.2

Source: Valerie Peters, *Working and Training: First Results of the 2003 Adult Education and Training Survey*, Table 5 (Ottawa: Statistics Canada, 2004), Catalogue no. 81-595-MIE—No. 015.

Data from Statistics Canada's 2003 Adult Education and Training Survey (AETS) also indicate an increase in learning activities for older workers, with formal and informal activities having been pursued through providers that were public and private (such as employers). In 2002, one-third of employed 35- to 54-year-olds engaged in job-related education or training. For those aged 45 to 54, this represented a six-percentage-point increase in participation since 1997. Notably, workers aged 55 to 64 had the largest increase in participation—from 14.9% in 1997 to 22.9% in 2002.

CCL's Composite Learning Index, lifelong learning and communities

Using the model and framework of the Composite Learning Index (CLI), it is possible for cities, towns and regions to measure the effect of their community learning strategies and policies. CCL applies the CLI's conceptual framework as an organizing principle for discussions with communities to help them arrive at evidence-based decisions aimed at enhancing and promoting a local culture of learning.

CCL uses Ron Faris's definition of "learning communities," which is:

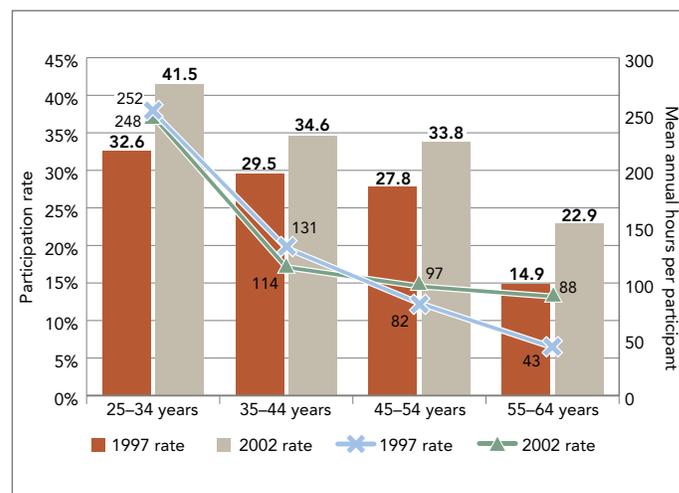
"Neighbourhoods, villages, towns, cities or regions that explicitly use lifelong learning as an organizing principle and social/cultural goal in order to promote collaboration of their civic, economic, public, voluntary and education sectors to enhance social, economic and environmental conditions on a sustainable, inclusive basis."

—Ron Faris, "Learning Communities: Webs of Life, Literacy and Learning," presented at the Halifax Symposium on Learning Communities, Halifax, October 2007.

More on learning communities and the CLI is available at www.ccl-cca.ca/LearningCommunities.

The number of hours invested in training by the older working-age population has shown increases as well. In 1997, 45- to 54-year-old workers who took training spent an average of about 82 hours in training. By 2002, this was up to 97 hours. Again, the oldest workers, aged 55 to 64, had the largest increase, with more than double the time spent training—from 43 hours in 1997 to 88 hours in 2002.

Figure 3.1
Participation rate and mean annual number of hours of formal, job-related training per participant, by age, 1997 and 2002



Source: Valerie Peters, *Working and training: First results from the 2003 Adult Education and Training Survey* (Ottawa: Statistics Canada, 2004), Catalogue no. 81-595-MIE—No. 015.

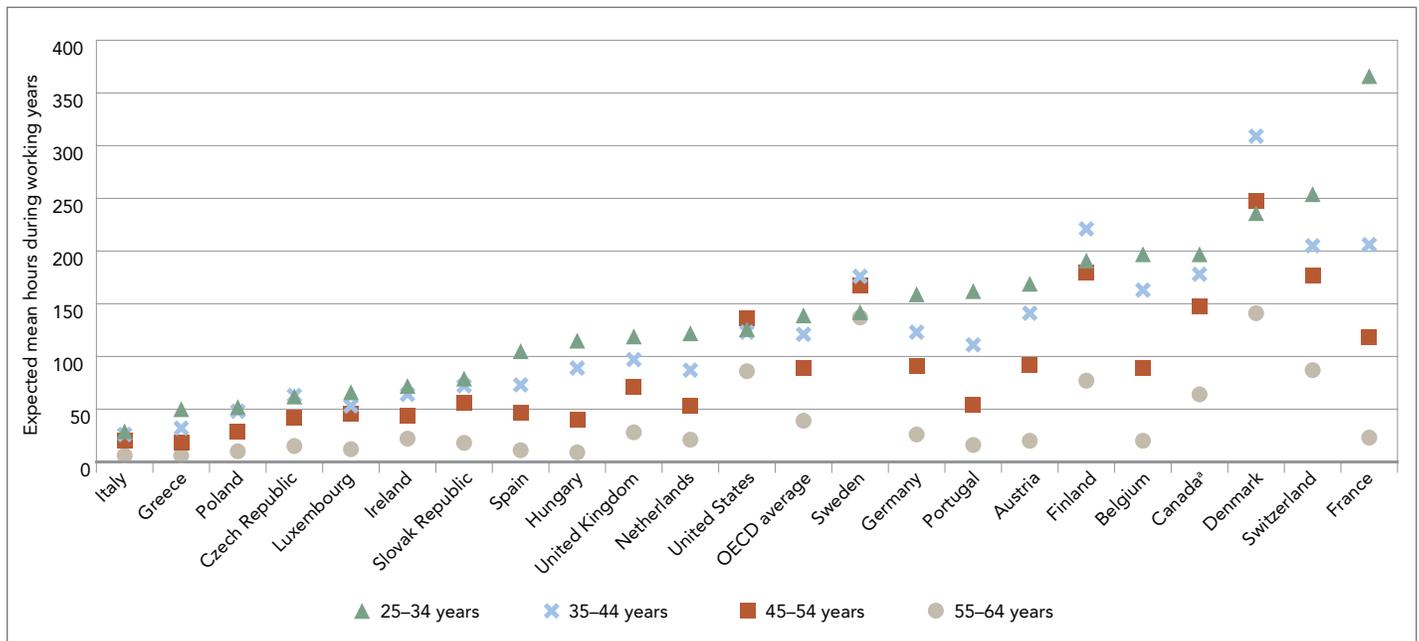
Note: Formal, job-related training in the Adult Education and Training Survey combines programs, workshops, seminars, conferences and courses taken (whether or not the course was taken for credit).

Canada's working-age population (25 to 64) placed seventh of 22 OECD countries on the adult participation rate in non-formal, job-related education and training. The Canadian participation rate of 25% was above the OECD average of 18%, but below the participation rate for other industrialized nations such as Sweden (40%), Denmark (39%), the United States (37%) and the United Kingdom (27%).⁶

The OECD publication *Education at a Glance 2007*⁷ compares the performance of 22 countries in the anticipated number of hours adults would spend during their working years (ages 25 to 64) on non-formal job-related education and training. Although the data focus on non-formal educational activities that are not normally taken at a PSI, they suggest that the number of hours invested by adults in job-related learning in Canada is strong compared with that of other countries.

Canadians aged 55 to 64 placed sixth with an expected 64 hours, well below the approximate 150 hours expected for adults of the same age in Denmark and Sweden. Canada's 35- to 44-year-olds also placed sixth, with 178 hours; again, Denmark stood out, with 309 hours.

Figure 3.2
Expected hours in non-formal job-related education and training, ages 25–64, by selected age group, OECD countries, 2003



Source: OECD, *Education at a Glance 2006: OECD Indicators, Table C5.1b* (Paris: 2007). See Annex 3 for notes. www.oecd.org/edu/eag2007.

* Year of reference is 2002.

Note: Countries are ranked in ascending order of the expected hours in non-formal job-related education and training of the 25–34 age group.

Why adults pursue job-related PSE

Analysis from the 2003 AETS shows that as adults become older and more experienced in the labour force, their reasons for pursuing formal job-related education change. Not surprisingly, the 25- to 34-year-olds were most likely to pursue PSE in order to find or change jobs—62.1% compared with 42.4% for workers aged 45 to 54. The same age group of younger workers were also more likely to pursue PSE to increase their income (48.5%) compared with older, more experienced workers (33.8% for 45- to 54-year-olds). In contrast, pursuing PSE in order to improve job performance increased as adults became older: the highest proportion occurred in the oldest age group (45 to 54)—those with the most labour-force experience and the highest relative incomes.

Table 3.4
Reasons for taking a post-secondary program, by age groups, ages 25–54, Canada, 2002

	25–34 years	35–44 years	45–54 years	All, 25–54 years
Increase income	48.5	37.5	33.8	43
Keep job	9.5	11.7	14.4	10.9
Promotion	18.2	18.8	20	18.7
Do job better	43.5	52.5	55.7	48.1
Own business	20.9	11.4	6.8	15.8
Find/change jobs	62.1	41.4	42.4	52.6
Other	11.8	13.1	14.9	12.7

Source: Karen Myers and Patrice de Broucker, *Too Many Left Behind: Canada's Adult Education and Training System*, Research report W34 (Ottawa: Canadian Policy Research Networks, 2006). Calculations by Myers and de Broucker.

Barriers to participation

In 2002, about 28% of working adults indicated that there was education or training that they wanted to pursue, but could not.⁸ Like younger learners, there are a number of barriers that adults face in obtaining the education or training they believe they need.

Adults who had, and those who had not, participated in some form of education or training in 2002 cited financial barriers most frequently. This response occurred slightly more often for workers who had not participated in education or training that year. On the other hand, workers who had participated in education or training in 2002 were more likely than those who had not participated to indicate that work responsibilities were preventing them from pursuing additional training. Also frequently indicated as barriers by both groups were family responsibilities and the inconvenient timing of training. The frequency with which the barriers of workload, family responsibilities and poor timing of training were stated—ranging from about 25% to 45% of survey respondents—highlights the difficult balance between work, family and education or training that adults believe they must find in order to pursue their unmet learning needs.

Participation by Seniors

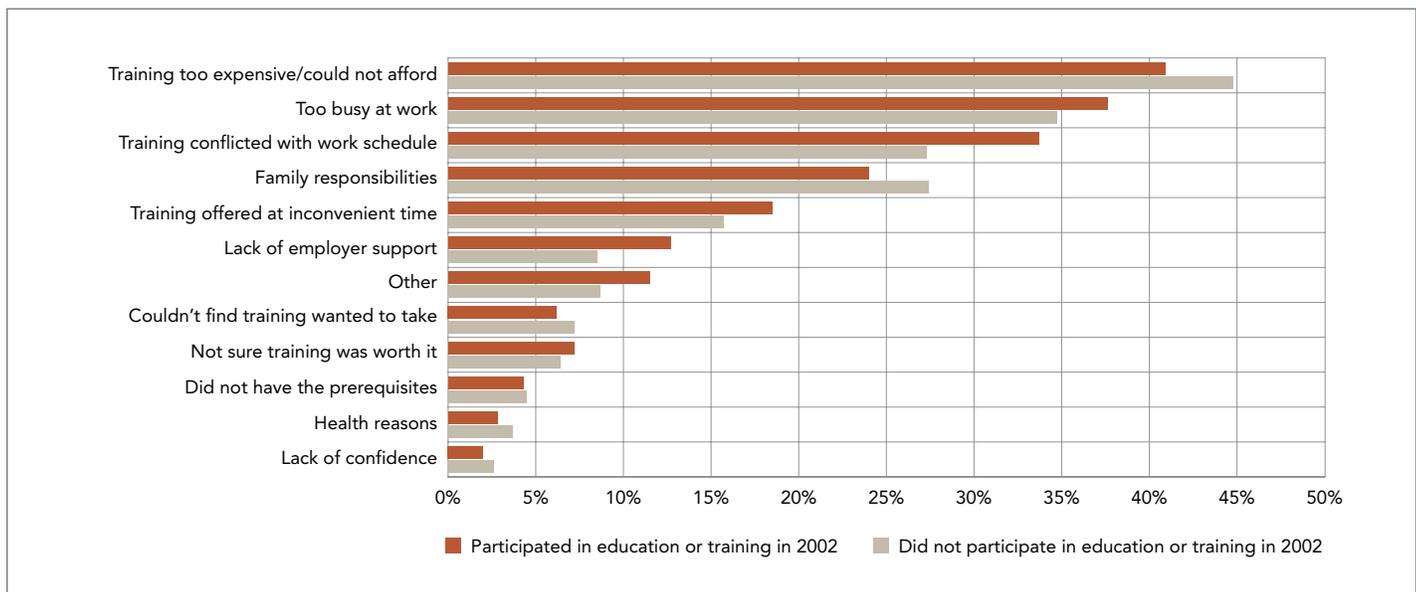
Canada's baby boomers will be the most educated group of seniors this country has ever experienced. Numerous studies have shown a strong relationship between levels of education and participation in education and training across the lifespan.⁹ Canadian seniors who are past the age where work and family exert considerable time and financial pressures have much more opportunity to pursue learning activities.

A poll by the Canadian Network on Third Age Learning¹⁰ revealed that more than 60,000 Canadian adults older than 65 years are actively involved in lifelong learning programs. Many colleges, universities and other educational institutions across Canada are responding to the learning needs of the growing population of seniors by offering credited and non-credited courses, seminars, workshops and learning tours.¹¹

Literacy and PSE in Canada

Literacy levels and the erosion of literacy skills are pressing issues in Canada. In 2003, more than 1.6 million Canadians aged 16 to 25 years—or 37.8% of Canada's young adults—were functioning below Level 3 on the prose literacy scale (see Chapter 1, "From Access to Attainment"). Literacy levels also

Figure 3.3
Barriers to pursuing education or training, ages 25–64, Canada, 2002



Source: Valerie Peters, *Working and training: First results of the 2003 Adult Education and Training Survey*, Table A.7b (Ottawa: Statistics Canada, 2004), Catalogue no. 81-595-MIE—No. 015.

decline with age¹² and, given Canada's aging population projections, this indicates a decline in general population literacy over the next two decades. Of particular note is the expected increase in the proportion of the PSE population falling below Level 3 on the prose literacy scale through 2031. In 2006, the proportion of university graduates below Level 3 was 20%. By 2031 it is expected to increase to 24%—almost one in four. For non-university PSE graduates, these figures are 38% and 45% respectively (see Chapter 7, "A Skilled and Adaptable Workforce," Table 7.7).

High levels of educational attainment are not sufficient to realize the social and economic benefits of learning or to meet the demands of a changing labour market. Literacy is fundamental to understanding, participating and contributing fully to society. PSIs have a considerable opportunity to intercede in this area. Many colleges and CEGEPs already have skills upgrading, bridging programs or specific literacy programs that assist those who need improvement in the area of literacy. Importantly, exposure to the PSE environment that comes from pursuing these types of programs in the college or CEGEP setting helps adults become accustomed to the PSE environment, which may increase the likelihood of continued participation. Prior learning assessment and recognition (PLAR) activities help adult Canadians view themselves as learners and encourage their greater participation in the labour force.¹³

The fact that a well-educated senior population is more likely to seek out learning experiences could be an important factor in maintaining maximum literacy levels in an aging population. Engagement with learning, particularly in the PSE context, necessitates the use of literacy skills. Promoting adult learning in PSE past retirement enhances the personal life of the participants and may well serve to interrupt or delay the loss of literacy skills.

PSIs: Partners in Workplace Learning

Increasingly, employers and firms are seeking workers with a more sophisticated array of capabilities. Highly skilled workers are sought after because of their adaptability within the changing labour market. Demand for such workers is expected to intensify as employers strive to develop niche markets, refine their business needs, improve their innovative capacity and replace workers ready for retirement.

Although Canadians are more educated than ever before, employers point to significant gaps in the skill set of their workers. Business leaders and employers are seeking employees with an array of capabilities that go beyond basic job requirements. These skills include decision-making, teamwork, problem-solving, self-motivation, and the ability to manage information, use numbers and communicate well.

Employers also highly prize an aptitude and an appetite for learning, due to the rapid rate of change that occurs in virtually all settings However, in a recent survey by the Canadian Federation of Independent Business, just 47% of employers expressed satisfaction with the competencies of high-school graduates, while satisfaction levels rose to just 65% for college grads and 64% for holders of university degrees.¹⁴

Post-secondary teaching staff already possess the knowledge and experience required to design, present and lead learning activities. These can be directed toward the creation of course content that will fill "soft skill" learning gaps. However, developing content that responds to labour-market needs is dependent on strong collaboration between businesses and PSIs. While employers and businesses identify workplace learning needs, post-secondary teaching professionals can provide innovative pedagogical approaches and relevant content. Such collaborative efforts are mutually beneficial, giving post-secondary institutions a non-traditional source of revenue while ensuring that course content remains pertinent to labour-market needs and requirements.

Colleges in particular are committed to partnering with the business community. Indeed, the mission statement of the Association of Community Colleges of Canada (see Chapter 8, "Quality Assurance in PSE") advocates this type of collaborative effort. Nova Scotia Community College (NSCC) provides but one example of collaboration between colleges and business. NSCC designed a two-year diploma program to meet the skills and labour needs of a local company, Dexter Construction. The company was experiencing a period of growth and was adopting new technologies, while also facing skill shortages and a lack of qualified applicants. Key features of the partnership included the following:

- mix of classroom learning, practical experience and paid work
- guarantee of employment on graduation and tuition reimbursement for those who stay with the company
- strong senior management support for the initiative and buy-in from supervisory staff
- use of relevant training materials and a flexible design in the training program
- demonstrable benefits for both the company and students¹⁵

PSIs: Re-skilling of the Labour Force

PSIs provide an avenue through which re-skilling and re-tooling of workers can occur in response to shifts in labour-market requirements—especially after large losses in a particular

sector, as has recently occurred in manufacturing. However, a number of factors have to be in place for this to occur. PSIs must have information on, and offer programs in, subject areas that speak to current or anticipated worker shortages. Keeping abreast of changes and anticipating change in the labour market requires considerable research and analysis, and efficient communication networks between labour and post-secondary institutions. That information, in turn, needs to be communicated to potential adult learners.

For PSIs the diversity of the adult learner population is a challenge, as outlined by Craig Weidemann, the vice-president of outreach for Penn State University.

“The real challenge with adults is that they’re so diverse When we’re educating people with such varied backgrounds—one is a bank vice president who wants to pursue a credentialing program, another is a GED graduate [high-school equivalency graduate] with no postsecondary education—it’s hard to serve them all effectively. We’re trying to figure out how to do that.”¹⁶

Summary: Opportunities and Future Directions

The information on LLP withdrawals and participation in adult learning activities by the working-age population and seniors suggest that, whether or not the concept of lifelong learning has been integrated fully into the public dialogue on education in Canada, the activity itself is becoming increasingly popular. A growing, well-educated senior population will soon be evident in every community in Canada, and the responsiveness by PSIs to the learning needs of this group will support and enhance a culture of learning across the lifespan.

As workers age, their reasons change for pursuing job-related, formal education. Older workers are more likely to pursue PSE in order to improve job performance. While this is important to innovation, productivity and efficiency in the labour market, it calls for different course content than is typically found in most PSE programs. Developing course content that reflects labour-market requirements and learning needs of experienced, already educated learners also requires that PSIs be responsive and adaptable.

Adult education and training delivered through partnerships between business and PSIs keeps learning responsive

and adaptable to specific skill demands in the business sector. This is an activity that requires strong and ongoing communication between PSIs and the business sector.

From a student perspective, barriers to adult learning, as described earlier in this chapter, must be effectively addressed to facilitate adult participation in higher education. In particular, financial support programs must be attentive to the particular needs of the adult population. While adult students may only be able to pursue part-time studies because of family responsibilities or part-time work, their financial requirements may be greater than those of younger students. As well, the adult population must see participation in post-secondary education as a viable activity beyond the age of 25. In addition, their attitudinal concerns, such as “fitting in” with the younger crowd,¹⁷ must be resolved.

Ministries of education and training across Canada are indeed expanding the information and learning opportunities available to adult learners (see for example, the Second Career program from Ontario’s Ministry of Education and Training).^{*} Nevertheless, re-tooling of workers is a highly complex process that requires informed and effective communication between the labour market, PSIs and adult learners, as well as program support that meets the unique needs of adult learners.

Education and training that is aimed at re-skilling or re-tooling of laid-off workers in times of cut-backs—which may involve complete career changes—requires appropriate research and analysis, and effective communication between the labour market, PSIs and adult workers. The particular circumstances of the adult lifestyle can create a unique combination of barriers that need to be addressed in order to increase adult participation in post-secondary education.

PSIs have an opportunity to address the pressing issue of literacy in Canada. Through skills upgrading and literacy programs, PSIs can improve literacy levels for young adults. And for an aging population, opening doors to senior participation in PSIs may be a means of interceding on the projected declines in literacy.

In promoting a culture of learning across the lifespan, PSIs have an enormous opportunity and much to offer. Adapting courses and programs to meet the interests and needs of older learners, such as taking into account the specific circumstances of adult life, requires that PSIs be innovative in their program and course offerings. By doing so they can help to enhance and realize the benefits of

^{*} The website for this program is www.edu.gov.on.ca/eng/tcu/secondcareer/.

education throughout adulthood—a goal that is clearly in the best interests of Canada and is crucial for maximizing opportunities for lifelong learning in this country.

Future Directions: An International Perspective

Lifelong learning is an important focus for the OECD's education group. Several research and policy-oriented papers are available on lifelong learning through the OECD website (www.oecd.org). The OECD's Tertiary Education for the Knowledge Society (2008)¹⁸ includes a compilation of strategies and recommendations to address issues of lifelong learning and the culture of learning across the lifespan in its member countries. The following is a selection of pertinent strategies and recommendations from the OECD report that are applicable to the Canadian context.

Adult lifestyle, obligations and experience, and lifelong learning

Encourage institutions to be more responsive to the needs of adult learners.

The OECD outlined a number of initiatives to improve the provision of PSE for mature students, including the following:

- ensure that mature students can easily access information, advice and guidance about returning to formal education or, in some cases, about entering for the first time to earn a degree
- consider alternative entrance requirements for mature students—such as acquired competencies and experience—rather than academic qualifications

- provide more flexible program offerings—such as part-time enrolment and extended periods to complete programs—that consider the particular circumstances of learners with work and family responsibilities
- broaden the range of program offerings in order to meet the needs of mature students with labour-market experience

Labour-market demands and lifelong learning

Explore the potential of a National Qualifications Framework.

Establish a national qualifications framework that could co-ordinate the demands of employers, the expectations of students and the offerings of PSIs. This formal arrangement would enable employers to specify competencies required of employees and enable institutions to design educational programs accordingly.

Coordinate labour market and education policies.

The OECD noted that consistently low levels of integration between tertiary (post-secondary) education and the labour market are linked with insufficient lifelong learning opportunities and flexible study options.

Foster the engagement of institutions with surrounding regions and communities.

Introduce incentives and reward mechanisms to encourage PSIs to engage with local industries, and communities and their surrounding regions.



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- ⁵ Valerie Peters, *Working and training: First results of the 2003 Adult Education and Training Survey* (Ottawa: Statistics Canada, 2004), Catalogue no. 81-595-MIE—No. 015.
- ⁶ OECD, *Education at a Glance 2008: OECD Indicators*, Table C5.1a (Paris: 2008).
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- ⁹ OECD, *Beyond Rhetoric: Adult Learning Policies and Practices* (Paris: 2003); and P. Belanger and A. Tuijnman, ed., *New Patterns of Adult Learning: A Six-Country Comparative Study* (New York, NY: Elsevier Science Inc., 1997).
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An Overview: Key Findings

Positive performance

Public expenditures on post-secondary education (PSE)—as a proportion of overall social spending—have remained stable despite heightened demand for funding from health care and other competing sectors. Between 1995–1996 and 2006–2007, all levels of government increased their spending on education, health, social programs and non-social programs. The second highest rate of increase in government investments went to PSE.

The federal, provincial and territorial governments have established programs to assist students with tuition fees and other costs. Typically this support is in the form of a loan provided on the basis of need. The federally supported Canada Student Loans Program, administered by Human Resources and Skills Development Canada (HRSDC), is benefitting more students than ever before. Almost 350,000 full-time students received close to \$2 billion in financial aid in 2005–2006. This program is clearly important to Canadians who wish to pursue post-secondary education and are having difficulty meeting their education costs. However, it is not possible to determine whether the increases in loans have improved access for previously marginalized populations or reflect increased tuition costs.

Troubling trends

The scarcity of information on trades and college programs makes it difficult to assess the performance and progress of these important components of PSE. In particular, there are insufficient data on education costs to students, staffing profiles and factors related to students' program choices. A comprehensive portrait of PSE in Canada requires inclusion of these important elements.

In 2003–2004, public and private expenditures on post-secondary education in Canada totalled almost three-quarters of that spent on elementary and secondary education.

While expenditures on PSE have increased, the sector's position on the list of government priorities has remained unchanged over the last decade.

Recent increases in spending on education have been unevenly distributed across the various types of PSE. Most of the increases went to universities. Colleges experienced a considerably smaller funding increase. It is especially noteworthy that the trades were confronted with a decline in public and private investments.

Increases in tuition fees have slowed in recent years, yet the annual rate of increase in tuition remains higher than increases in the Consumer Price Index (CPI).^{*} The rise in tuition costs has exceeded the rise in the CPI every year since 1996–1997, except the 2005–2006 academic year.

A higher proportion of university undergraduate students from the class of 2000 borrowed than did undergraduates from the class of 1995. There was a considerable increase in the average amount borrowed—a difference that exceeds the average cost of tuition for a full year. Students at the graduate level (master's degrees and PhDs) in 2000 also had a greater propensity for borrowing than their counterparts from 1995. Not only were greater proportions of students borrowing, but the amounts borrowed also increased.

Although expenditures in the form of student loans have increased in the last several years, the increasing number of students who borrow and the average debt load at completion of school raise questions about the affordability of PSE in Canada. The majority of Canadian college and university graduates from the class of 2000 who had borrowed for their studies had repaid their debt between two and five years after graduating. However, graduates who had not completed their payments five years after completion were still carrying considerable debt loads. The university graduates who were still carrying loans after five years owed, on average, more than \$14,000, and the average remaining debt of college graduates was close to \$9,000.

^{*} As defined by Statistics Canada, the Consumer Price Index is an indicator of changes in consumer prices over time. It compares the cost of "a fixed basket" of commodities (products and services) purchased by consumers. As the basket contains commodities of unchanging or equivalent quantity and quality, the index reflects only pure price movements.

AFFORDABLE AND SUSTAINABLE POST-SECONDARY EDUCATION

Introduction

The responsibility for financing Canada's public post-secondary education system is shared by those with a vested interest in its benefits—various levels of government and the learners themselves. Federal, provincial and territorial governments support post-secondary education because they recognize the social and economic benefits—an active and healthy citizenry, and a skilled and continually replenished pool of labour-force participants. Students pursue PSE for the personal, social and economic benefits that result from the increase in knowledge and skills (see *Chapter 6, "Active, Healthy Citizenry,"* and *Chapter 7, "A Skilled and Adaptable Workforce,"* in this report).

Balancing the distribution of PSE costs is a difficult undertaking. Governments must consider investments in public education against other important demands on their financial resources—such as health care, social welfare programs and infrastructure. Tuition and related costs to students, however, must not be prohibitive as they may contribute to declines in PSE participation.

As the demand for post-secondary education has increased, so too have the costs of providing it. Some of these costs are transferred to the PSE student. In 2006–2007, university students contributed a larger share to total university revenues than in the past—19.7% compared with 18.5% in 1999–2000.¹ Some of this increase is associated with increased tuition fees, but also with the increased number of students who are choosing to go on to PSE.

Philanthropic donations also help finance public post-secondary education. However, they are inconsistent over the long term and typically target a specific post-secondary institution's departments or faculties. Few statistics are available on the contribution that philanthropy makes to an affordable and sustainable post-secondary education sector in Canada. Data on philanthropic donations, therefore, are not included in this report.

Ideally, a successful post-secondary education system in Canada finely balances issues of affordability and sustainability. Affordability is tied to issues of access and equity in attendance, as discussed in this report in Chapter 1, "From Access to Attainment," and Chapter 2, "Under-representation and Gender Disparities in PSE." The issue of affordability necessarily focuses on the financial aspects of PSE, such as public and private funding of PSE, student fees, student financial aid programs and student debt. The issue of sustainability concerns

the importance of addressing immediate and long-term needs in order to sustain a viable post-secondary education sector in the years to come. Issues include capacity (the number of students who can be taught), building infrastructure, campus locations and the availability of appropriate teaching staff. Affordability and sustainability are closely linked. For example, the availability of qualified teaching staff and the number of seats available to students will be, to a certain extent, a reflection of expenditures by governments on PSE.

This chapter includes the following sections:

- affordability: public and private investments in PSE; student fees, loans and debt; and student debt repayment
- sustainability: meeting future student demand in government financing, teachers, programs and institutional capacity
- summary: opportunities and future directions

Affordability

Public investments in post-secondary education

Federal, provincial, territorial and local governments all invest in public education to provide social and economic benefits to their citizens and to ensure there are qualified workers for their local economies. These investments must be balanced against the funding demands of other sectors. In particular, demands on the health-care system have placed exceptional pressure on government resources in recent years.

Between 1995–1996 and 2006–2007, all levels of government increased their total expenditures on education, health, social programs and non-social programs by 14.4%—from \$425.8 billion to \$487.1 billion. Expenditures related to health programs increased by 61.5%, representing the largest increase in expenditures during this period. The second-largest increase (53.1%) went to post-secondary education—from \$20.9 billion in 1995–1996 to \$32.1 billion in 2006–2007.

Table 4.1
Public expenditure on education, health, social services and non-social programs,
Canada, 1995–1996 to 2006–2007 (2001 constant dollars)

	Elementary and secondary education	Post-secondary education	Other education	Health	Social services	Non-social programs	Total expenditure
	(expenditure in billions of 2001 constant dollars)						
1995–1996	37.6	20.9	3.6	59.3	108.6	195.8	425.8
1996–1997	36.7	20.1	2.9	58.7	108.1	182.0	408.5
1997–1998	36.2	20.6	3.1	61.4	107.5	174.4	403.2
1998–1999	36.2	22.0	3.9	63.6	109.8	179.7	415.3
1999–2000	36.1	23.1	4.5	67.8	110.7	180.9	423.0
2000–2001	36.7	24.2	4.3	72.3	113.0	185.0	435.4
2001–2002	37.0	25.2	4.3	76.9	114.8	179.3	437.6
2002–2003	37.8	26.7	4.6	81.5	114.5	180.5	445.5
2003–2004	38.2	27.9	4.5	85.2	115.2	180.8	451.8
2004–2005 ^r	38.6	29.0	4.4	88.3	117.1	177.8	455.3
2005–2006 ^r	41.1	30.1	4.4	90.6	120.3	183.4	469.9
2006–2007 ^r	41.1	32.1	4.6	95.8	124.7	188.7	487.1
	% change over the period 1995–1996 to 2006–2007						
	9.4	53.1	29.6	61.5	14.8	-3.6	14.4

Sources: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table B.2.1 (Ottawa: Statistics Canada, December 2007), data updated Dec. 16, 2008. Catalogue no. 81-582-XIE. Current dollar figures extracted from Statistics Canada, Public Institutions Division, CANSIM Table 385-0001, version updated June 24, 2008; constant dollar conversion performed by Statistics Canada, Culture, Tourism and the Centre for Education.

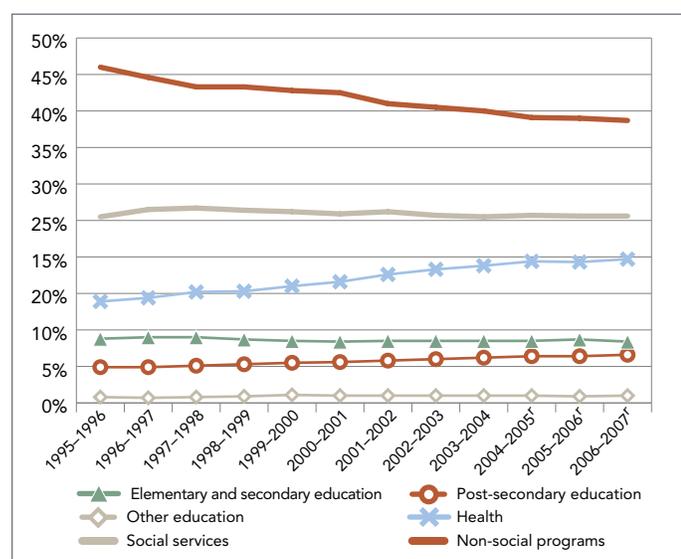
^r Revised

Notes:

- Includes expenditure by federal, provincial, territorial and local levels of government.
- Data in this table allow comparisons across government programs, but are not directly comparable with the data on public expenditure in education presented in other tables.
- Fiscal year ending March 31 for federal, provincial and territorial governments, and ending with the calendar year for local governments. For example, 2003–2004 data refer to federal, provincial and territorial government expenditure for the period between April 1, 2003, and March 31, 2004, and local government expenditure for the period between Jan. 1 and Dec. 31, 2003.
- 2001 constant dollar calculation based on Consumer Price Index (CPI) from Statistics Canada CANSIM table 326-0002.
- Social services include: social assistance; workers' compensation benefits; employee pension plan benefits and changes in equity; veterans' benefits; motor vehicle accident compensation; and other social services.
- Non-social programs include: general government services; protection of persons and property; transportation and communication; resource conservation and industrial development; environment; recreation and culture; labour, employment and immigration; housing; foreign affairs and international assistance; regional planning and development; research establishments; general-purpose transfers to other government subsectors; debt charges; and other expenditures.

Other sectors exert pressure on how public expenditures are distributed. In 2006–2007, the greatest share of government expenditure went to non-social programs (38.7%), followed by spending on social programs (25.6%). For the same period, 19.7% of government expenditures went to health. In contrast, 6.6% of government expenditures went to post-secondary education, just behind elementary and secondary education at 8.4%. Despite overall increases in public expenditures on PSE, the share of total public expenditures on post-secondary education has changed little since 1995–1996.

Figure 4.1
Distribution of public expenditure on education, health, social services and non-social programs, Canada, 1995–1996 to 2006–2007 (2001 constant dollars)



Sources: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table B.2.1 (Ottawa: Statistics Canada, December 2007), data updated Dec. 16, 2008. Catalogue no. 81-582-XIE. Current dollar figures extracted from Statistics Canada, Public Institutions Division, CANSIM Table 385-0001, version updated June 24, 2008; constant dollar conversion performed by Statistics Canada, Culture, Tourism and the Centre for Education.

† Revised

Notes:

- Includes expenditure by federal, provincial, territorial and local levels of government.
- Data in this table allow comparisons across government programs, but are not directly comparable with the data on public expenditure in education presented in other tables.
- Fiscal year ending March 31 for federal, provincial and territorial governments, and ending with the calendar year for local governments. For example, 2003–2004 data refer to federal, provincial and territorial government expenditure for the period between April 1, 2003, and March 31, 2004, and local government expenditure for the period between January 1 and December 31, 2003.
- 2001 constant dollar calculation based on Consumer Price Index (CPI) Statistics Canada CANSIM table 326-0002.
- Social services include: social assistance; workers’ compensation benefits; employee pension plan benefits and changes in equity; veterans’ benefits; motor vehicle accident compensation; and other social services.
- Non-social programs include: general government services; protection of persons and property; transportation and communication; resource conservation and industrial development; environment; recreation and culture; labour, employment and immigration; housing; foreign affairs and international assistance; regional planning and development; research establishments; general-purpose transfers to other government subsectors; debt charges; and other expenditures.

Combined public and private investments in post-secondary education

In 2003–2004, combined public and private expenditures on post-secondary education in Canada was almost three-quarters (\$30.8 billion) of expenditures on elementary and secondary education (\$43.5 billion). Public and private expenditures (in constant dollars) on pre-elementary, elementary and secondary education increased by 8.2% from 1997–1998 to 2003–2004, compared with 26.2% for PSE. However, recent increases in expenditures were distributed unevenly across the various types of PSE, with universities receiving an increase of nearly \$7 billion. During the same period, public and private expenditures for colleges increased by just over \$450 million, while the trades experienced a decline of more than \$1 billion.

Table 4.2
Combined public and private expenditure on education, by level of education, Canada, 1997–1998 to 2003–2004 (2001 constant dollars)

	Pre-elementary, elementary, secondary	Trade-vocational	College	University	All post-secondary	All levels combined
	(millions of 2001 constant dollars)					
1997–1998	40,209	6,168	5,066	13,214	24,448	64,657
1998–1999	41,545	6,909	5,099	13,778	25,786	67,332
1999–2000	41,501	5,587	5,757	15,316	26,660	68,160
2000–2001	41,304	5,808	5,667	16,580	28,055	69,359
2001–2002	42,295	5,632	5,824	17,466	28,921	71,216
2002–2003	42,717 [†]	5,240 [†]	5,593	18,798	29,631 [†]	72,347 [†]
2003–2004	43,504 ^e	5,126	5,519	20,205	30,849	74,353 ^e
% change 1997–1998 to 2003–2004	8.2	-16.9	8.9	52.9	26.2	15.0

Sources: Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table B.1.1 (Ottawa: Statistics Canada, December 2007), data updated Dec. 16, 2008. Catalogue no. 81-582-XIE.

^e Estimate [†] Revised

Notes:

- These data include Canada’s spending on education in foreign countries (e.g., Department of National Defence schools) and undistributed expenditure.
- Expenditures on private business colleges are not included.
- Large year-to-year variations in public and private funding to school boards result from accounting adjustments to prior-year surpluses and deficits. Therefore, trends should be observed over a period of years, instead of from one year to the next.

The proportion of private expenditures—which includes student tuition fees—for college and university in Canada (known as tertiary education in the OECD) was higher in 2005 (44.9%) than in 2000 (39%). Of the 26 OECD countries for which 2005 data were available, 19 experienced the same trend. Increased worldwide student demand for PSE may account for some of this shift and for the consistency of this trend across OECD countries.

In 2005, Canada placed 22nd among 26 reporting countries in the share of public expenditures on PSE. Canada’s 55.1% share was well below the 73.1% average for the OECD and the 82.5% average for the European Union.

Table 4.3

Relative proportions of public and private expenditure on educational institutions for tertiary education, OECD countries, 2000 and 2005

	Tertiary education				
	2000		2005		Percentage point change in private funding 2000–2005
	Public sources	All private sources ^a	Public sources	All private sources ^a	
(%)					
OECD average	78	22	73.1	26.9	4.9
EU19 average^b	85.3	14.7	82.5	17.5	2.8
Denmark ^c	97.6	2.4	96.7	3.3	0.9
Greece	99.7	0.3	96.7	3.3	3
Finland	97.2	2.8	96.1	3.9	1.1
Austria	96.3	3.7	92.9	7.1	3.4
Iceland ^c	94.9	5.1	91.2	8.8	3.7
Belgium	91.5	8.5	90.6	9.4	0.9
Sweden	91.3	8.7	88.2	11.8	3.1
Germany	88.2	11.8	85.3	14.7	2.9
Ireland	79.2	20.8	84	16	-4.8
France	84.4	15.6	83.6	16.4	0.8
Czech Republic	85.4	14.6	81.2	18.8	4.2
Hungary	76.7	23.3	78.5	21.5	-1.8
Spain	74.4	25.6	77.9	22.1	-3.5
Netherlands	78.2	21.8	77.6	22.4	0.6
Slovak Republic ^c	91.2	8.8	77.3	22.7	13.9
Poland	66.6	33.4	74	26	-7.4
Italy	77.5	22.5	69.6	30.4	7.9
Mexico	79.4	20.6	69	31	10.4
Portugal	92.5	7.5	68.1	31.9	24.4
United Kingdom	67.7	32.3	66.9	33.1	0.8
New Zealand	missing	missing	59.7	40.3	missing
Canada^{c, d}	61	39	55.1	44.9	6
Australia	51	49	47.8	52.2	3.2
United States	31.1	68.9	34.7	65.3	-3.7
Japan ^c	38.5	61.5	33.7	66.3	4.8
Korea	23.3	76.7	24.3	75.7	-1
Norway	96.3	3.7	missing	missing	missing
Turkey	95.4	4.6	missing	missing	missing

Source: OECD, Education at a Glance 2008: OECD Indicators, Table B3.2b (Paris: 2008). Percentage changes were calculated by the Canadian Council on Learning.

^a Includes subsidies attributable to payments to educational institutions received from public sources.

^b EU19 = Average for the 19 OECD countries that are members of the European Union for which data are available or can be estimated.

^c Some levels of education are included with others.

^d Year of reference is 2004 instead of 2005.

Note: Tertiary education, as understood within the OECD, includes college, vocational and university programs. It does not include trade and registered apprenticeship students or graduates.

Student fees

A comprehensive portrait of the affordability of PSE in Canada is limited by lack of data. No data are available on the costs associated with completing apprenticeship programs in the trades, such as equipment costs or in-class tuition fees, and there has been no systematic collection of data on college tuition fees. As pointed out in the first two chapters of this report, financial concerns are more frequently cited as a barrier to participation in PSE than are other barriers (see “Factors that affect the decision to attend PSE” in Chapter 1 and “PSE Participation by Parental Education and Family Income” in Chapter 2). The lack of data on costs associated with trades and college programs makes analysis of efforts to reduce the perception of financial barriers difficult to accomplish.

Information on university tuition fees is available. Statistics Canada data indicate that undergraduate tuition fees increased 36.4% during the academic years 2000–2001 to 2008–2009 (in current dollars). Students who registered for the 2008–2009 academic year paid, on average, \$1,260 more per year than students who registered in 2000–2001. This continued the trend of yearly increases in undergraduate fees that began during the 1991 recession and post-recessionary years.²

Rates of increase in tuition fees vary considerably across the provinces—a result of substantially different tuition policies implemented across the country. Some provinces have imposed controls on tuition increases while others have let institutions set the rates. During the 2000–2001 to 2008–2009 academic years, undergraduate university tuition fees declined 22% (in current dollars) in Newfoundland and Labrador, while undergraduate students in British Columbia paid 93.8% more for tuition than their B.C. counterparts had paid seven years earlier.

Table 4.4
Average undergraduate university tuition fees for full-time students, Canada and provinces, 2000–2001 and 2008–2009

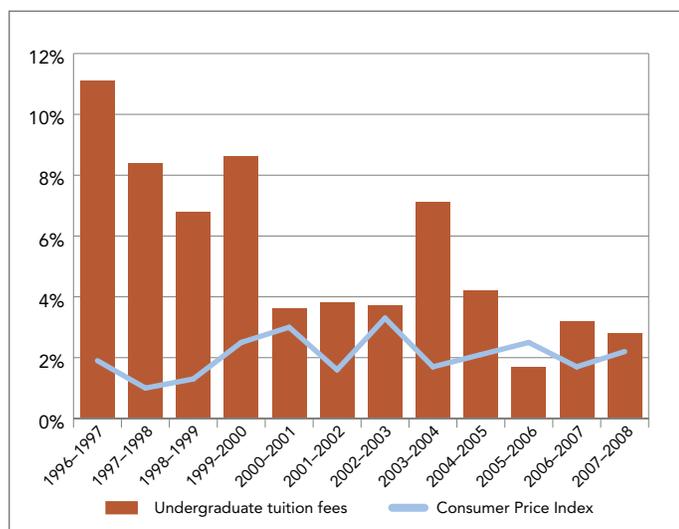
	2000–2001	2008–2009	Percentage change 2000–2001 and 2008–2009
	(current dollars)		(%)
Canada	3,464	4,724	36.4
Newfoundland and Labrador	3,373	2,632	-22
Prince Edward Island	3,513	4,530	28.9
Nova Scotia	4,640	5,932	27.8
New Brunswick	3,594	5,590	55.5
Quebec	1,828	2,167	18.5
Ontario	4,284	5,643	31.7
Manitoba	3,235	3,276	1.3
Saskatchewan	3,698	5,015	35.6
Alberta	3,909	5,361	37.1
British Columbia	2,601	5,040	93.8

Sources: Statistics Canada, “University tuition fees,” *The Daily* (Oct. 9, 2008); and Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table B.2.8 and Table B.2.9 (Ottawa: Statistics Canada, December 2007), Catalogue no. 81-582-XIE.

Note: Both in- and out-of-province students are included in the weighted average calculations; foreign students are not included.

Since the 1996–1997 academic year, the rise in undergraduate tuition costs has exceeded the rise in the Consumer Price Index (CPI) for every year except 2005–2006. Although increases in undergraduate fees have slowed in recent years, they still remain higher than increases in the CPI. Price increases for other standard items—such as food, clothing and transportation—were lower than increases in university undergraduate costs.

Figure 4.2
Undergraduate tuition increases (year over year) relative to increases in the Consumer Price Index, Canada, 1996–1997 to 2007–2008



Sources: Statistics Canada, "Survey of tuition and living accommodation costs," *The Daily* (Oct. 18, 2007); and "Consumer Price Index," *The Daily* (June 26, 2008), and previous years' releases.

Tuition fees for graduate students are also increasing. In the most recent comparison, they increased 7.2% in two years. Fees rose from an average of \$5,387 in 2006–2007 to \$5,777 in 2008–2009. Again, increases were not consistent across the provinces. Graduate students in Newfoundland and Labrador paid 75.9% more than graduate students paid two years earlier, and those in Nova Scotia paid 10.1% less.

Table 4.5
Average graduate university tuition fees for full-time students, Canada and provinces, 2006–2007 and 2008–2009

	2006–2007	2008–2009	Percentage change 2006–2007 to 2008–2009
	(current dollars)		(%)
Canada	5,387	5,777	7.2
Newfoundland and Labrador	2,096	3,686	75.9
Prince Edward Island	2,693	2,954	9.7
Nova Scotia	8,054	7,242	-10.1
New Brunswick	4,970	5,119	3
Quebec	2,059	2,488	20.8
Ontario	8,490	8,797	3.6
Manitoba	4,626	4,602	-0.5
Saskatchewan	2,837	3,535	24.6
Alberta	5,490	6,399	16.6
British Columbia	5,604	6,580	17.4

Sources: Statistics Canada, "University tuition fees," *The Daily* (Oct. 9, 2008); and Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table B.2.8 and Table B.2.9 (Ottawa: Statistics Canada, December 2007), Catalogue no. 81-582-XIE.

Note: Both in- and out-of-province students are included in the weighted average calculations; foreign students are not included.

Tuition costs vary considerably across subjects of study and between undergraduate and graduate levels. Little is known about how prospective fees and variation in fees (and perhaps associated debt accumulation) impact students' choices of subject area. It is difficult to assess, therefore, whether fee restructuring can stimulate or inhibit enrolment in subject areas tied to high labour-market demand or to labour-market surpluses.

Graduate fees are typically lower than undergraduate fees, except in the subject areas of education, architecture and business, management and public administration. Tuition fees increased for all subjects of study at the undergraduate and graduate levels in the last academic year (2008–2009). Undergraduate fees in architecture and related technologies had the highest increase (6.2%) from 2007–2008, followed by fees in law at 4.6%. Graduate fees in dentistry had the highest increase (5.2%) in one year, followed by graduate fees in pharmacy (5.1%).

Table 4.6
Average undergraduate and graduate university tuition fees for full-time students, by faculty,
Canada, 2007–2008 and 2008–2009

	2007–2008	2008–2009	Percentage change 2007–2008 and 2008–2009
	(current dollars)		(%)
Undergraduate faculty			
Architecture and related technologies	3,999	4,246	6.2
Law	7,382	7,720	4.6
Mathematics and computer and information science	4,746	4,947	4.2
Engineering	5,099	5,310	4.1
Business, management and public administration	4,637	4,828	4.1
Social and behavioural science	4,165	4,318	3.7
Medicine	10,029	10,392	3.6
Visual and performing arts and communications technologies	4,239	4,389	3.5
Other health, parks, recreation and fitness	4,400	4,551	3.4
Education	3,545	3,666	3.4
Veterinary medicine	4,296	4,441	3.4
Physical and life sciences and technology	4,534	4,682	3.3
Humanities	4,342	4,478	3.1
Dentistry	12,516	12,906	3.1
Agriculture, natural resources and conservation	4,064	4,181	2.9
Nursing	4,267	4,385	2.8
Pharmacy	4,215	4,298	2
Graduate faculty			
Dentistry	7,187	7,560	5.2
Pharmacy	1,909	2,006	5.1
Veterinary medicine	2,774	2,903	4.7
Physical and life sciences and technology	4,067	4,249	4.5
Nursing	4,286	4,469	4.3
Visual and performing arts and communications technologies	3,759	3,917	4.2
Engineering	4,287	4,447	3.7
Other health, parks, recreation and fitness	4,305	4,457	3.5
Regular master of business administration	14,545	15,053	3.5
Social and behavioural science	3,709	3,838	3.5
Humanities	3,460	3,578	3.4
Medicine	5,811	6,008	3.4
Business, management and public administration	5,225	5,395	3.3
Architecture and related technologies	4,068	4,194	3.1
Mathematics and computer and information science	4,042	4,166	3.1
Education	4,353	4,476	2.8
Agriculture, natural resources and conservation	3,873	3,967	2.4
Executive master of business administration	22,142	22,647	2.3
Law	3,813	3,874	1.6

Source: Statistics Canada, "University tuition fees," The Daily (Oct. 9, 2008).

Note: Both in- and out-of-province students are included in the weighted average calculations; foreign students are not included. Based on the eight-month academic year.

AFFORDABLE AND SUSTAINABLE POST-SECONDARY EDUCATION

For the 2004–2005 academic year, the average tuition costs for public PSE in Canada were equivalent to US\$3,464. (For international comparisons, the OECD converts tuition fees to U.S. dollars.) Canada's tuition costs were the fifth highest of

the 20 OECD countries reporting on tuition fees for that year. Although Canada's tuition costs were lower than in a number of other reporting countries, it is notable that eight countries had no tuition fees for tertiary education.

Table 4.7

Estimated annual average tuition fees charged by type A tertiary educational institutions for national students, selected OECD countries, academic year 2004–2005

OECD countries	Annual average tuition fees ^a charged by public type A tertiary institutions for full-time national students (US\$)	Comment
United States	5,027	Including non-national students.
Japan	3,920	Excludes admission fee charged by the school for the first year (US\$2,267 on average for public institutions, US\$2,089 on average for private) and subscription fee for using facilities (US\$1,510 on average) for private institutions.
Korea	3,883	Tuition fees in first degree program only. Excludes admission fees to university, but includes supporting fees. A student receiving a scholarship twice a year is counted as two students.
Australia	3,855	95% of national students in public institutions are in subsidized places and pay an average US\$3,595 tuition fee, including subsidies for the Higher Education Contribution Scheme of the Higher Education Loan Programme.
Canada	3,464	
New Zealand	2,671	
Italy	1,017	The annual average tuition fees do not take into account the scholarships/grants that fully cover tuition fees, but partial reductions of fees cannot be excluded.
Austria	837	
Spain	795	
Belgium (Fr.) ^b	661	
Belgium (Fl.)	574	
Turkey	276	For public institutions, only undergraduate and master levels.
France	From 160 to 490	University programs dependent from the Ministry of Education.
Czech Republic	No tuition fees	The average fee in public institutions is negligible because fees are paid only by students studying too long (more than standard length of the program plus one year): about 4% of students.
Denmark	No tuition fees	
Finland	No tuition fees	Excluding membership fees to student unions.
Iceland	No tuition fees	Excluding registration fees for all students.
Ireland	No tuition fees	The tuition fees charged by institutions are, on average, US\$4,470 [1,870 to 20,620] in public institutions and US\$4,630 [3,590 to 6,270] in private institutions, but the government gives the money directly to institutions and the students do not have to pay.
Norway	No tuition fees	
Poland	No tuition fees	
Sweden	No tuition fees	Excluding mandatory membership fees to student unions.
Mexico	missing	
Netherlands	n/a ^c	
United Kingdom	n/a ^c	

Source: OECD, *Education at a Glance 2008: OECD Indicators*, Table B5.1a (Paris: 2008).

^a Scholarships/grants that the student may receive are not taken into account. Tuition fees and associated proportions of students should be interpreted with caution as they result from the weighted average of the main type A tertiary programs and do not cover all educational institutions.

^b Tuition fees charged for programs are the same in public as in private institutions but the distribution of students differs between public and private institutions so that the weighted average is not the same.

^c n/a = Data is not applicable because the category does not apply. Public institutions do not exist at this level of education and most students are enrolled in government dependent institutions.

Note: Type A tertiary education in OECD countries is equivalent to university undergraduate and master's programs in Canada. It does not include college, vocational, trade and registered apprenticeship students or graduates.

Student loans and student debt

The federal, provincial and territorial governments have loan programs to assist students with tuition fees and other education-related costs (see Chapter 1, “From Access to Attainment,” for a discussion of the financing methods used by parents and students to meet PSE costs). Typically these loans are provided on the basis of need. The amount of the loan is determined according to a formula that sets the student’s financial resources against a particular program’s tuition fees and related costs. Often the loan consists of a repayment and a non-repayment (grant) portion that is calculated according to student need.

During the period 1996–1997 to 2004–2005, the federally supported Canada Student Loans Program (CSLP)* administered by HRSDC, increased its disbursement to university and college students by 2.8%, from \$1.58 billion to \$1.63 billion (in current dollars). Over that period, disbursements to students in Newfoundland and Labrador decreased by 49.2%, from \$91.5 million to just over \$46.5 million. Disbursements to Ontario also declined, from a high of \$880.8 million at the beginning of the period, to \$768.9 million by the end. CSLP disbursements increased in all other provinces excluding Quebec, which does not participate in the CSLP and is not presented in the table below.

Table 4.8
Total value of negotiated student loans under the Canada Student Loans Program, by province or territory of residence, 1996–1997 to 2004–2005

Loan Year	Total	Newfoundland and Labrador	Prince Edward Island	Nova Scotia	New Brunswick	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon
	(millions of current dollars)										
1996–1997	1,584	91.5	13.4	62.8	82.5	880.8	30.6	56.1	147.6	217.5	1.2
1997–1998	1,567.9	86.1	11.4	62.8	79.7	856	37.1	57.5	133.3	243	1
1998–1999	1,557.2	88.8	11.9	94.7	67.6	817.3	38.2	67.3	146.9	223.4	1
1999–2000	1,549.6	70	10.1	90.2	61.9	780.9	44.3	72.8	170.5	247.7	1.1
2000–2001	1,564.7	69.5	13.5	90.7	77.6	704.5	46.9	78.2	184.2	298.6	1.2
2001–2002	1,507.4	61.3	16.1	92.9	77.7	643.7	44.5	79	181.3	309.5	1.3
2002–2003	1,544.7	56.2	17	92.5	77.9	664.6	43.4	74.5	187.3	330	1.3
2003–2004	1,643	52	17.9	92.6	82.5	734.5	44.1	76	200.1	342	1.3
2004–2005	1,628.8	46.5	17.3	88.8	80	768.9	41.5	71.3	198.9	314.4	1.2
	% change 1996–1997 to 2004–2005										
	2.8	-49.2	29.1	41.4	-3	-12.7	35.6	27.1	34.8	44.6	0

Source: Canada Student Loans Program Publications, Annual Report 2004–2005 (Ottawa: Human Resources and Social Development Canada, 2007).

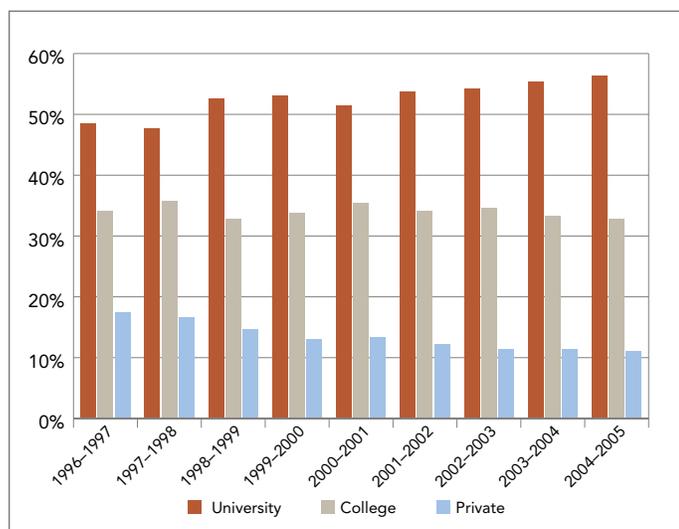
Note: Quebec, the Northwest Territories and Nunavut are not included because they do not participate in the Canada Student Loans Program.

In the 2005–2006 loan year, the CSLP provided loans to over 40% of full-time post-secondary students. A total of \$1.9 billion in loans was provided to 343,638 full-time students, while \$3.8 million was disbursed to 2,127 part-time students. The average loan for full-time students was \$5,631, while the average loan for part-time students was \$1,795. In addition, the federal government’s 2008 budget launched a new consolidated Canada Student Grant Program—an investment of \$350 million beginning in 2009–2010, which will increase to \$430 million by 2012–2013.³ (The 2008 budget’s chapter entitled “Investing in the Future”⁴ outlines a number of other changes to PSE funding.)

During the 1998–1999 to 2004–2005 period, university students comprised the largest and most-increasing proportion (from 48.4% to 56.3%) of PSE students who borrowed from the CSLP. College students consistently accounted for one-third of all students who borrowed during this period. Students attending private post-secondary institutions, as defined by the Canada Student Loan Program, made up the difference.

* Canada student loans are available only to students attending recognized post-secondary institutions that appear on a list maintained by HRSDC. This list includes all public and some private post-secondary institutions in Canada, as well as some international PSE institutions.

Figure 4.3
Proportion of Canada Student Loans Program borrowers (full-time students only), by type of institution, Canada, 1996–1997 to 2004–2005



Source: Canada Student Loans Program Publications, Annual Report 2004–2005 (Ottawa: Human Resources and Social Development Canada, 2007).

The federal government has established additional programs to assist students with the costs of PSE. The Apprenticeship Incentive Grant helps registered apprentices in Red Seal trades (see Appendix 1 for a list of the Red Seal trades) with the costs of tuition, travel and tools.⁵ Special loans and grants programs are also available for students with disabilities and for students with dependents.⁶ Registered Educational Savings Programs provide incentives for parents to save for their children's post-secondary education through tax relief on savings. Provincial and territorial governments have set up student loan programs that complement the federal loan program. Both levels of government offer tax deductions for tuition costs and a set monthly deduction for associated costs such as books, equipment and living expenses.

The OECD notes that, while tuition fees in Canada are relatively high for national students, there is a strong financial support system for students.⁷ Canada has one of the longest-standing loans programs among OECD reporting countries. The average annual gross amount is roughly equivalent to the average costs of tuition at the undergraduate level (see Table 4.4). This means that students in Canada must assume most of the additional costs, such as accommodation, food and transportation. In contrast, students in Iceland have no tuition costs and receive, on average, US\$6,900 in loans (figures are reported in U.S. dollars). In Norway, where there are no student tuition fees, 100% of students each receive loans of up to US\$8,900.

Table 4.9
Financial support through public loans to students in type A tertiary education, academic year 2004–2005, OECD countries

	Year of the creation of a public loan system	Proportion of students who have a loan (%)	Average annual gross amount of loan available to each student (US \$)
Mexico ^a	1970	1	10,480
Iceland	1961	58	6,950
United States	1970s	38	6,430
Japan ^b	1943	24	5,950
Netherlands	1986	28	5,730
United Kingdom ^c	1990	missing	5,480
Sweden	1965	80	4,940
New Zealand	1992	missing	4,320
Canada^d	1964	missing	3,970
Australia ^e	1989	79	3,450
Denmark ^f	1970	42	2,500
Turkey	1961	91	1,800
Hungary ^g	2001	missing	1,717
Belgium (Fr.) ^h	1983	1	1,380
Finland ^g	1969	26	Up to 2,710 per year
Norway	missing	100	maximum 8,960
Poland ^g	1998	26	maximum 3,250

Source: OECD, Education at a Glance 2008: OECD Indicators, Table B5.1e (Paris: 2008).

- a Average amount of loan for students in tertiary education.
- b Average amount of loan for students in type A tertiary first qualification program.
- c Annual gross amount of loan refers to students in England.
- d Does not include loans in Quebec, where there are only private loans, which are guaranteed by the government.
- e Including Commonwealth countries.
- f The proportion of students refers to all tertiary education. The calculation for average amount of loan includes loans to foreign students.
- g Loan guaranteed by the state rather than public loan.
- h Loan made by the parents of the student, and only the parents have to pay back the loan.

Note: Type A tertiary education in OECD countries is equivalent to university undergraduate and master's programs in Canada.

Student debt repayment

Research indicates that non-completion of post-secondary studies increases with higher student debt.⁸ Monitoring student debt load is important to understanding issues of persistence in PSE and in being able to assess the appropriate balance between public investments in PSE and tuition fees.

Upon completion of their education, students are required to repay their loans within a specified period. Statistics Canada's Follow-up Survey of Graduates, which asks college and university graduates about their debt load and repayment progress two and five years after graduation, suggests that student debt load is increasing. Between 1995 and 2000, there were increases in both the number of students who borrowed and in the average dollar amounts borrowed, particularly at universities.

Nearly half (47%) of college graduates from the class of 2000 took out loans, only one percentage point more than the 46% of graduates from the 1995 class. However, the average amount borrowed increased by 21%—from \$9,700 in 1995 to \$11,700 in 2000. With no available information on the costs of tuition for college students over time, it is difficult to contextualize these changes.

Of those who graduated from university with a bachelor's degree in 1995, 49% borrowed money for their education, compared with 51% of those from the class of 2000. The average amount borrowed to complete a bachelor's degree increased by 28%, from \$13,000 in 1995 to \$16,700 in 2000. The overall difference of \$3,700 exceeded the costs of one full year of tuition for the 2000–2001 academic year (\$3,464, as shown in Table 4.4).

At the graduate level, students in the 2000 graduating class also showed a greater propensity for borrowing than those who graduated in 1995. Of the 2000 class of master's graduates, 53% borrowed to finance their education, an increase of 11 percentage points from the class of 1995. Doctoral graduates showed the largest increase in the percentage who borrowed—from 32% of the 1995 class to 51% of the 2000 class.

Not only were more graduate students borrowing, but the amounts borrowed also increased—by 18% for master's students and 26% for doctoral students. However, it is not possible to identify the portion of undergraduate loan that was carried forward into the graduate years.

Table 4.10
Percentage of graduates who borrowed from government student loan programs and average debt at graduation, 1995 and 2000 graduates, Canada

Level of education	Percentage of graduates who borrowed		Average debt at graduation of those who borrowed		Percentage change in average debt at graduation of students who borrowed
	1995	2000	1995	2000	
	(%)		(2000 constant dollars)		(%)
College	46	47	9,700	11,700	21
Bachelor's	49	51	13,000	16,700	28
Master's	42	53	12,300	14,500	18
Doctorate	32	51	11,800	14,900	26
All university	48	51	12,900	16,200	26

Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report on the Pan-Canadian Education Indicators Project*, Table B.3.1 (Ottawa: 2007). Catalogue no. 81-582-XIE.

Data source: Statistics Canada, National Graduates Survey.

Notes:

- This table is the data for graduates who incurred government student loans and who reported data two years after graduation.
- The calculation for average debt at graduation includes graduates who had paid off government student loans completely at graduation.

Within two years of graduation, two-thirds of Canadian college and university graduates (class of 2000) who had borrowed for their studies had repaid their debt. Five years after graduation, this figure increased to 75.8% or higher, depending on the level of study. Master's and doctoral graduates were the quickest to repay their loans—81.3% within five years of graduation—but university graduates who had not completed payments five years after graduation still had over \$14,000, on average, left on their student loans.

Table 4.11
Profile of debt to government student loan programs for graduates owing at graduation, Canada, class of 2000

		All levels of study	College	Bachelor	Master and Doctorate
Graduates who had repaid within two years after graduation	%	66.8	66.8	64.3	74.3
Graduates who still owed two years after graduation	%	33.2	33.2	35.7	25.7
Graduates who had repaid within five years after graduation	%	77.4	77.5	75.8	81.3
Graduates who still owed five years after graduation	%	22.6	22.5	24.2	18.7
Average remaining debt for those who still owed five years after graduation	\$	12,000	8,900	14,400	14,300

Source: Statistics Canada, "Follow-up survey of graduates," *The Daily* (May 2, 2007).

Note: Graduates who pursued further education after 2000 are excluded from this table.

Although student loans have increased in the last several years, the rise in the number of students who borrow and in the average debt load at completion raises questions about the affordability of PSE in Canada. The data reported above can be interpreted in several ways. The increase in expenditures and in the number of students who borrow may mean that previously marginalized groups, such as low-income groups, are more willing to take on student debt in order to obtain a post-secondary education. Given the high numbers of Canadian youth enrolled in post-secondary education in recent years, the increased number of borrowers may indeed suggest that the Canada Student Loans Program is enhancing access for individuals with limited finances. On the other hand, the same increases may indicate that affordability is declining and those who previously did not need to borrow—such as students from middle-income families—now need to do so.

Sustainability

A forward-looking perspective on post-secondary education includes consideration of student demand in the future and the ability to meet that demand in key areas such as government financing, teaching staff, the availability of programs and campus locations. For all types of PSE, sufficient research and data on many of these areas are not available. Although available indicators do not fully address the complex issue of sustainability of Canada's PSE sector, they do provide insight into some significant factors.

Future demand

Predicting future demand for post-secondary education is a complex process, as suggested by two recent studies by Statistics Canada and the Association of Universities and Colleges of Canada (AUCC).

Statistics Canada's 2007 study, *Post-secondary Enrolment Trends to 2031: Three Scenarios*, elaborated three scenarios of future student enrolment.⁹ The first scenario predicted that current enrolments in Canadian colleges and universities will peak at around 2012–2013 and decline steadily up to 2025–2026, after which they will start to rise gradually. The second scenario (using linear projections) forecasted that enrolments will increase until 2016–2017, decrease until 2025–2026 and then remain stable until 2031. The final scenario anticipated that male participation rates will be similar to current female participation rates at colleges and universities (see Chapter 2, entitled "Under-represented Groups and Gender Disparities in PSE," in this report for further details on gender issues in PSE). In this scenario total enrolment will increase until 2010–2011, decline slightly until 2025–2026 and then remain stable until 2031.

The AUCC 2007 study, *Trends in Higher Education*,¹⁰ which also provided three scenarios of estimated university-enrolment growth until 2016, predicted relatively faster enrolment growth for students between the ages of 25 and 40 years. As the AUCC notes, this group is considered "the primary cohort that drives graduate-level program enrolments."¹¹

None of the projection scenarios outlined above include the possibility of increased access by under-represented groups, especially older learners. As noted in Chapter 3, entitled "Lifelong Learning," Canada's population of seniors is the most educated in history. Adult education analyses suggest that well-educated adults are more likely to continue their engagement in education than are less educated adults.¹² A well-educated senior population is an untapped potential market for post-secondary institutions (PSIs) and, given the demographics of this group, could have a substantial impact on enrolment patterns.

Accurate prediction of enrolment patterns at colleges and universities is a difficult and complex undertaking. Consequently, ensuring that the appropriate number of staff, programs and campuses are available is equally difficult. As a result, the efforts of post-secondary institutions and of ministries of education to address changes to enrolment patterns are often reactive, rather than proactive.

Institutional capacity

The growth scenarios presented above provide one perspective on sustainability in PSE—the demand side. In contrast, the supply perspective considers the capacity to offer PSE in the future. It entails elements of institutional capacity, such as the number of available student spaces within institutions and specific program areas, and the availability of qualified teaching staff.

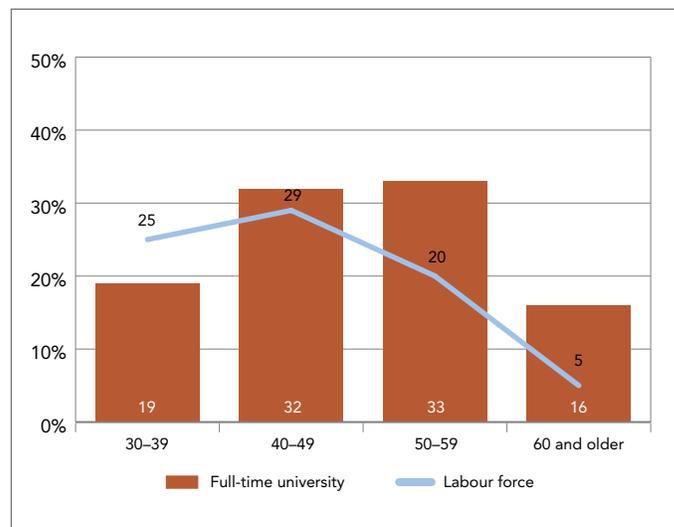
The demand and supply sides in PSE can differ substantially given that the supply side is closely tied to financing of PSE. As the AUCC points out, “The extent to which the enrolment growth ... will be realized still depends on the country’s ability to supply and finance the human and physical resources required to accommodate this growth Excess capacity allows institutions to reach out to new student groups. Constrained capacity forces universities to find ways to ration the limited number of seats available among a wider array of qualified applicants.”¹³

Hiring appropriate numbers of knowledgeable staff is both a capacity and a quality issue. As noted in this report’s first chapter, “From Access to Attainment,” the number of individuals who complete the journeyman’s certificates or certificates of qualifications in the trades is very low compared with the number of registrations. Consequently, the number of individuals qualified to oversee new apprentices and certify a new generation of tradespeople will decline as baby boomers retire. According to the 2001 Census of population, the trades have the oldest average age of workers of all post-secondary graduates.¹⁴ It is likely that this area of post-secondary education will be the first to experience a lack of qualified personnel to oversee a new generation of graduates.

Insufficient information on Canada’s college staff—their qualifications, age distributions and classification—hinders the ability to assess the impact of retirement and the availability of replacement staff. A 2008 report by Colleges Ontario suggests that the college sector is facing shifts in staff availability. Ontario colleges experienced a 7% decrease in the number of full-time staff between 1993–1994 and 2007–2008, while enrolments increased by 16%.¹⁵

More comprehensive information is available on staffing of universities in Canada. A comparison of university educators with the overall labour force reveals a disturbing trend. One-quarter (25%) of Canada’s labour force was over the age of 50 in 2004–2005, compared with 49% of full-time university educators, which represents almost double the overall labour force figure. In fact, fewer than one in five full-time university educators were below the age of 39 years in 2004–2005.

Figure 4.4
Age distribution of full-time university educators compared with that of the labour force, Canada, 2004–2005



Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report on the Pan-Canadian Education Indicators Project*, Table D.3.3 (Ottawa: 2007). Catalogue no. 81-582-XIE.

Note: Age distributions of educators and labour force are calculated as a percentage of the educator and labour force populations aged 30 and older.

Concurrently, substantial changes in the university educator population have occurred. From 1994–1995 to 2004–2005, the number of full university professors and associate professors declined. In comparison, the number of educators in the “other” category (sessional lecturers, part-time teaching staff, etc.) increased by 42.6%. In 1994–1995, 23.8% of all full-time faculty were from the “other” ranks, compared with 32% in 2004–2005. This may help to explain the low level of student–teacher interactions in Canadian universities relative to American universities, as described in Chapter 8, “Quality Assurance,” of this report. Staff members who are not on campus in a full-time capacity are not as accessible to students as more permanent staff.

Table 4.12
Number and salary of full-time educators in universities,
by rank, Canada, 1994–1995 and 2004–2005

Canada		
	1994–1995	2004–2005
(2001 constant dollars)		
All teaching faculty		
Count	35,718	37,908
Average salary	\$83,611	\$86,985
Full professors		
Count	14,649	13,848
Average salary	\$99,754	\$106,551
Associate professors		
Count	12,567	11,931
Average salary	\$79,624	\$84,564
Other ranks		
Count	8,505	12,132
Average salary	\$61,707	\$67,033

Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report on the Pan-Canadian Education Indicators Project*, Table D.3.4 (Ottawa: 2007). Catalogue no. 81-582-XIE.

Data source: Statistics Canada, University and College Academic Staff Survey

Notes:

- Excludes: staff who have been on unpaid leave; all religious and military personnel or similar staff paid according to salary scales lower than those applying to lay staff; and staff having a salary of zero or not reported.
- Data on average salaries for Saskatchewan does not include the University of Saskatchewan.
- To ensure the confidentiality of responses, a random rounding process is applied to the data. As a result, when these data are summed or grouped, the total value may not match the sum of the individual values, since the total and subtotals are independently rounded.

Summary: Opportunities and Future Directions

The importance of the PSE sector to Canada's economic and social well-being necessitates a clear understanding of the affordability and sustainability of the sector. Indicators related to these areas provide insight into participation patterns by today's students, the quality of education that they receive, government commitment to PSE and the future of PSE in Canada. The indicators presented in this chapter highlight a number of areas where there are opportunities for improvement.

Despite increasing allocations, investment in post-secondary education has not become a higher priority of government and continues to place well behind other governmental commitments. In addition, the allocation of government PSE expenditures is, for the most part, directed at universities, leaving colleges and trades programs with comparatively fewer dollars to meet operating expenditures.

Poor data collection on tuition costs, staffing and capacity—for trades and colleges in particular—hinders efforts to develop a comprehensive portrait of the affordability and sustainability of PSE in Canada. The increased levels of borrowing and the amounts borrowed need to be monitored carefully and better understood. If they result from increased access for under-represented groups (low-income students, for example), then loan programs are proving effective. If they are a consequence of more students needing to borrow than in the past, then the balance between public funding of PSE and student loan burden may have shifted.

The aging profile of university educators, the low number of tradespeople completing certification exams and the lack of information on staffing in the college sector make it difficult to discern the future profile of PSE educators. Individuals with a high level of knowledge and skills must be motivated to move into teaching positions to carry quality PSE into the future in Canada.

These issues need to be addressed if Canada is to have a strong PSE sector to answer the needs of future generations of students. The PSE sector is essential to producing Canada's next generation of skilled workers, thus ensuring Canada's future economic, social and international position.

Future Directions: An International Perspective

The OECD's *Tertiary Education for the Knowledge Society* (2008)¹⁶ is a sweeping 750-page report that investigated the state of PSE in 24 countries worldwide. It includes a compilation of strategies and recommendations to address issues of affordability and sustainability of PSE in its member countries. The following is a selection of strategies and recommendations from the report that are pertinent to the Canadian situation.

Expenditures on PSE

Develop a funding strategy that facilitates tertiary education's contribution to society and the economy.

An effective funding strategy should reflect tertiary education's goals and facilitate its contribution to social and economic well-being. This strategy should be long term and be capable of distinguishing between policies that will achieve short-term goals and those needed to meet more long-term objectives. The approach is more likely to succeed if it is transparent, flexible, predictable and fair. It should also ensure public accountability, encourage innovation, demonstrate sensitivity to institutional autonomy, be demand-driven, recognize institutional goals and be open to private institutions.

Improve cost-effectiveness.

Reducing inefficiencies throughout the post-secondary sector is a crucial step in the funding process. Funding should be closely linked to graduation rates, thereby reducing public subsidies to students who remain in the system for an extended period. It could also allow for instruction to be more responsive in terms of program offerings, faculty and resources, thus eliminating duplicate programs, reducing programs with low enrolment, expanding student mobility between institutions, facilitating the redistribution of academic staff across programs and increasing the use of shared facilities. The report also indicated that improved co-operation between institutions and better alignment with secondary-school learning standards, curricula and offerings could improve efficiency within the post-secondary sector.

Tuition and related costs of PSE

Consider tuition fee stabilization policies to ensure cost containment and moderation.

A fee stabilization policy would minimize the effects of institutional pricing strategies. It must be developed in light of student financial aid programs and reflect the total cost of attendance. This type of policy should prevent excessive fee increases, while also providing institutions with the flexibility they need to raise their own funds.

Back the overall funding approach with a comprehensive student support system.

While Canada performs very well in most areas there is still room for improvement. A comprehensive student support system would raise loan entitlements and student grant levels to adequately cover the full extent of education costs, i.e., tuition fees and living costs.

Institutional capacity and staffing

Enhance the attractiveness of the academic career.

Improve the attractiveness of the professions by:

- offering competitive salaries, especially for groups strategically important to the institution,
- providing a work environment that is both dynamic and rich in knowledge,

- ensuring opportunities exist for career growth,
- including provisions for stable and secure careers,
- establishing formal mechanisms that recognize academic work, and
- facilitating opportunities for mobility and collaboration with other institutions and external organizations.

Improve the entrance conditions of young academics.

The OECD notes that policies to encourage entry into academia will not likely succeed if positions are not available. Therefore, induction plans and a recruitment process should effectively match available positions with potential candidates. Career prospects should be properly defined and a supportive environment should be provided to reduce attrition rates of new academics. Provisions could include a reduced teaching load, senior academics as mentors, resources for research groups and training programs.



ENDNOTES

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- 2 Canadian Education Statistics Council, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 2007*, Table B.2.8.
- 3 Human Resources and Social Development Canada (HRSDC) [online], *Just the Facts – Students*. Available at www.hrsdc.gc.ca/en/corporate/facts/students.shtml (accessed June 28, 2008).
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- 8 Joseph Berger, Anne Motte and Andrew Parkin, *Price of Knowledge: Access and Student Finance in Canada – Third Edition* (Montreal: Canada Millennium Scholarship Foundation, 2007), p. 8.
- 9 Darcy Hango and Patrice de Broucker, *Postsecondary Enrolment Trends to 2031: Three Scenarios*, Culture, Tourism and the Centre for Education Statistics research papers no. 58 (Ottawa: Statistics Canada, 2007), Catalogue no. 81-595-MIE2007058. See also Chapter 5, "Access," in Part I of Canadian Council on Learning (CCL), *Post-Secondary Education in Canada: Strategies for Success, Report on Learning in Canada 2007* (Ottawa: 2007).
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- 16 Paulo Santiago et al., *Tertiary Education for the Knowledge Society: OECD Thematic Review of Tertiary Education: Synthesis Report* (Paris: OECD, April 2008). Available at www.oecd.org/dataoecd/20/4/40345176.pdf.

An Overview: Key Findings

Positive performances

In 2007, one-third of all expenditures related to research and development (R&D) activities in Canada were in the higher education sector, placing Canada second highest of all OECD countries who reported on R&D for that year. Additionally, when compared with other OECD countries, Canada had the largest increase in higher education R&D expenditures as a percentage of gross domestic product (GDP).

In a 2007 strategy titled *Mobilizing Science and Technology to Canada's Advantage*, the federal government identifies more private R&D as key to strengthening the country's economy. The strategy also aims to bolster enrolment in university science and engineering programs.

The number of baccalaureate degrees awarded in Canada rose between 1997 and 2005, increasing the pool of students qualified for graduate degrees. The number of master's degrees awarded during this period increased by 55%, more than four times the growth rate for doctoral degrees. The proportion of recent doctoral graduates who intended to work in research and development was comparable with the proportion who planned to teach. Most graduates who were continuing on to post-doctoral programs chose to focus on research and development.

There are signs that increased investments in R&D at Canadian post-secondary institutions may be yielding results. International bibliometric indicators, which include the volume and quality of scientific publications, show that the Canadian research community ranks competitively in the number of articles produced and with a high number of citations. Canada ranked eighth out of 30 countries in the number of articles published per one million population—well above the world production rate per million population, and the rates for the both the OECD and the European Union (EU).

Troubling trends

The proportion of GDP dedicated to R&D in Canada continues to decline. In addition, the distribution of R&D expenditures by sector in this country differs from that of other OECD countries. Although business contributes the highest level of funding to R&D within Canada, it falls behind the average funding from business for R&D in other OECD member countries and the EU.

Canada's community colleges, institutes and polytechnics are important players in Canada's research and development community. Skilled graduates who can address business sector challenges through applied research and technology development are essential to a productive, innovative and internationally competitive business sector. However, separate data are not available on the expenditures allocated to R&D at these types of post-secondary institutions, the number of staff involved, the types of R&D activities that occur and the number of graduates in these areas. The portrait of R&D in Canada is incomplete because of this absence.

The overall number of individuals with advanced degrees is an important general-level indicator. However, the number with advanced degrees in technical areas—such as science, technology, engineering or mathematics—is equally significant given R&D's critical role in driving innovation. Relative to other OECD countries, Canada ranked very low in 2006 in the share of science and engineering degrees as a percentage of new degrees and in the share of PhDs in these areas. Although the number of graduates earning master's and doctoral degrees has increased, graduation numbers at this level in math and physical sciences remain relatively weak. The number of master's degrees in these subject areas increased at a much lower rate than in the past and the attainment of doctoral degrees has declined.

Another concern is Canada's international standard with regard to patents. International data on triadic patents (patents filed in Europe, Japan and the U.S.) are considered good indicators of very strong patents. Canada placed eighth among the 30 countries for which OECD documentation of triadic patents was conducted in 2005. However, Canadian patents accounted for less than 2% of all triadic patents filed, compared with 31% from the United States and 28.8% from Japan. Although Canada's average annual patent-filing growth rate between 1995 and 2005 was positive, it was well below that of China, Turkey, India and Korea.

INNOVATION, KNOWLEDGE CREATION AND KNOWLEDGE TRANSFER

Introduction

Research and development (R&D) is increasingly important in modern economies and societies. It underpins competitiveness and productivity, and fuels economic growth. R&D also helps deepen the knowledge and understanding needed to protect public interests and advance responsive public policies in times of rapidly changing social, economic and environmental challenges. R&D in Canada—in such areas as science, engineering, the social sciences and the humanities—impacts on the economy and on our quality of life, and is of great import to both individuals and governments. Research and development at Canadian community colleges, institutes and polytechnics resolve industry challenges and help Canada's business sector remain innovative, productive and internationally competitive.

CCL's first two reports on post-secondary education (PSE) in Canada—*An Uncertain Future* (2006) and *Strategies for Success* (2007)—highlighted the important role of the PSE sector in the area of R&D in Canada. Post-secondary institutions (PSIs) produce the highly qualified personnel who work in R&D. They also engage in systematic research activities and in the publication and commercialization of new knowledge.

This report updates a number of the well developed international indicators used to track R&D. The sections covered in this chapter include:

- funding expenditures for R&D
- expenditures on R&D activities
- R&D expenditures as a share of GDP
- R&D activity in higher education
- personnel in the R&D sector
- knowledge creation and transfer (patent and bibliometric indicators)
- summary: opportunities and future directions

Little data are available on the funding or activity expenditures on R&D, staffing and graduates in specific R&D subject areas for community colleges or polytechnics. As a result, the portrait of R&D provided in the following sections is incomplete without this information.

Note: In this chapter, the terms "higher education," "post-secondary education" and "tertiary education" refer to colleges and universities. Trades information is not included.

Funding Expenditures for R&D

R&D intensity: definitions

The following terms describe indicators that are internationally recognized as important to a country's R&D intensity. They are usually expressed as a percentage of the GDP.

GERD: Gross expenditures on R&D—the total R&D expenditures from all sectors (business, government, post-secondary education and private non-profit)

HERD: Higher education expenditures on R&D

BERD: Business enterprise expenditures on R&D

The R&D sector is multi-faceted and its funding arrangements are complex. Achievement of the social and economic benefits of R&D requires continued strong financial investment from governments, business and the private sector. In 2007, almost \$29 billion (GERD) was invested in R&D in Canada—more than double the investment made a decade earlier. Most funding-sector participants (see *the funding-sector categories in the following table*) in R&D in Canada increased their contributions between 1996 and 2007. Funding expenditures on R&D increased by almost 100% or more during this period for each of the funding categories. The notable exception was in funding expenditures from foreign investment, which increased by only 52.8%. Funding of R&D by the post-secondary sector (HERD) increased by almost 150%, which represents the largest growth rate of all funding participants.

All funding bodies increased their financial support to R&D between 1996 and 2007, resulting in a fairly stable distribution of funding over the decade. Business enterprise expenditures (BERD) on R&D continued to account for almost half (47.8%) of all expenditures in 2007, while federal and provincial governments invested a combined 23.9%. Foreign investments made up 9% and private non-profit organizations accounted for 2.9% of total expenditures on R&D. Investments from the post-secondary sector (HERD) ranked third in the share of the total amount invested, accounting for more than \$1.6 billion of every \$10 billion spent (16.4%).

Table 5.1
National gross domestic expenditures on research and development in the total sciences (natural sciences, engineering, social sciences and the humanities), by funding sector, Canada, 1996, 2006 and 2007

Funding sector	1996	2006	2007	% change 1996–2007	% distribution 1996	% distribution 2007
	(millions of dollars)					
Total sciences (GERD)	13,817	28,067	28,984	109.8	100	100
Federal government	2,814	5,266	5,437	93.2	20.4	18.8
Provincial governments	629	1,428	1,482	135.6	4.6	5.1
Business enterprise (BERD)	6,395	13,463	13,840	116.4	46.3	47.8
Higher education (HERD) ^a	1,905	4,549	4,758	149.8	13.8	16.4
Private non-profit organizations	358	814	849	137.2	2.6	2.9
Foreign	1,714	2,548	2,619	52.8	12.4	9

Source: Statistics Canada, *Science Statistics*, Vol. 31, No. 8, Table 1-3 (Ottawa: December 2007), and Vol. 30, No. 7 (Ottawa: September 2006), Catalogue no. 88-001-X

^a Higher education refers to colleges and universities only (trades information is not included).

Expenditures on R&D Activities

Although the groups funding and undertaking R&D are the same, the distribution of expenditures according to the sector where R&D is carried out, or performed, differs substantially from that of the funding sector. In 2007, the business sector accounted for more than half (54.4%) of all expenditures related to R&D activities, down from their 57.9% share in 1996. The higher education sector (PSE) plays an increasingly important role in expenditures related to R&D activities. In 1996, the PSE sector accounted for just over one-quarter (26.8%) of R&D activity expenditures. By 2007, this had increased to 36%. Indeed, the gap in expenditures between business and higher education is narrowing. In 1996, for every \$100 that business enterprises spent in the performance of R&D, the PSE sector spent \$46. By 2007, the PSE sector's amount had increased to \$66. According to Statistics Canada projections,¹ the higher education sector will account for half (\$459 million) of the anticipated overall growth of \$917 million in R&D in 2008. The business enterprise sector will likely account for 45%, or \$413 million, of the increase.

Table 5.2
National gross domestic expenditures on research and development in the total sciences (natural sciences, engineering, social sciences and the humanities), by performing sector, Canada, 1996, 2006 and 2007

Performing sector	1996	2006	2007	% change 1996–2007	% distribution 1996	% distribution 2007
	(millions of dollars)					
Total sciences (GERD)	13,817	28,067	28,984	109.8	100	100
Federal government	1,792	2,298	2,338	30.5	13	8.1
Provincial governments	163	293	299	83.4	1.2	1
Business enterprise (BERD)	7,997	15,360	15,773	97.2	57.9	54.4
Higher education (HERD) ^a	3,697	9,974	10,433	182.2	26.8	36
Private non-profit organizations	89	116	116	30.3	0.6	0.4

Source: Statistics Canada, *Science Statistics*, Vol. 31, No. 8, Table 1-3 (Ottawa: December 2007), and Vol. 30, No. 7 (Ottawa: September 2006), Catalogue no. 88-001-X

^a Higher education refers to colleges and universities only (trades information is not included).

R&D: An international perspective

The distribution of funding and performance expenditures by sector in Canada differs from that of other OECD countries. Although the highest level of funding for R&D within Canada comes from business enterprise (47.8%), the average funding from this sector is much higher in other OECD member countries (62.7%) and the EU (54.1%). In contrast, Canada's post-secondary sector has a much higher level of expenditure for R&D activity compared with other OECD countries. At 36%, it is more than double the OECD average (17.1%) and far surpasses the EU average (22.1%). In terms of expenditures in the funding and performing of R&D, Canadian governments are within two to four percentage points of the averages for both the OECD and EU.

Table 5.3
Funding and performing expenditures for research and development, OECD countries, 2007

	Gross domestic expenditure on research and development (GERD), OECD ^a 2007 ^b					
	Total expenditures (millions of current \$PPP ^c)	% financed by		% performed by		
		Industry	Government	Industry	Higher education ^d	Government
Total OECD	817,768.9	62.7	29.5	68.8	17.1	11.4
European Union (27 member countries)	242,815.6	54.1	34.7	63	22.1	13.8
Australia	11,698.1	53	40.5	54.1	26.8	16
Austria	7,865.3	46.7	37.4	67.7	26.7	5.1
Belgium	6,472.4	59.7	24.7	67.9	22.3	8.6
Canada	23,838.9	47.8	32.8	54.4	36	9.2
Czech Republic	3,489.1	56.9	39	66.2	15.9	17.5
Denmark	4,651.6	59.5	27.6	66.6	26.1	6.7
Finland	6,283.3	66.6	25.1	71.5	18.7	9.7
France	41,436.2	52.2	38.4	63.3	18.2	17.3
Germany	66,688.6	67.6	28.4	69.9	16.3	13.8
Greece	1,734.6	31.1	46.8	30	47.8	20.8
Hungary	1,831.3	43.3	44.8	48.3	24.4	25.4
Iceland	293	48	40.5	51.5	22	23.5
Ireland	2,490.4	59.3	30.1	66.8	26.4	6.8
Italy	17,827	39.7	50.7	50.4	30.2	17.3
Japan	138,782.1	77.1	16.2	77.2	12.7	8.3
Korea	35,885.8	75.4	23.1	77.3	10	11.6
Luxembourg	542.1	79.7	16.6	84.9	2.4	12.6
Mexico	5,919	46.5	45.3	49.5	27.4	22.1
Netherlands	9,959	51.1	36.2	57.6	missing	14.1
New Zealand	1,189.3	41.2	43	41.8	32.5	25.7
Norway	3,686.2	46.4	44	54.1	30.2	15.7
Poland	3,110	33.1	57.5	31.5	31	37
Portugal	1,839.5	36.3	55.2	38.5	35.4	14.6
Slovak Republic	467.1	35	55.6	43.1	24.1	32.8
Spain	15,595.7	47.1	42.5	55.5	27.6	16.7
Sweden	11,815.3	65.7	23.5	74.9	20.4	4.5
Switzerland	7,479.2	69.7	22.7	73.7	22.9	1.1
Turkey	4,883.7	46	48.6	37	51.3	11.7
United Kingdom	35,590.8	45.2	31.9	61.7	26.1	10
United States	343,747.5	64.9	29.3	70.3	14.3	11.1

Source: OECD, *Main Science and Technology Indicators: 2008/1*, key figures (Paris: April 2008).

^a A number of data points have notations in the OECD tables. Explanations can be found in the OECD reports.

^b Or latest year.

^c PPP is Purchase Power Parity; expenditures have been standardized to the U.S. dollar for international comparisons; PPP is the purchasing power in the cited country of the equivalent in U.S. dollars.

^d Higher education refers to colleges and universities only (trades information is not included).

R&D Expenditures as a Share of GDP

Although the level of expenditure on R&D in Canada over the last decade almost doubled, the proportion of Canadian GDP allocated to R&D for the last several years has continued to decline—from 2.09% in 2001 to 1.88% in 2007. R&D would have received an additional \$3 billion in 2007 had the proportion of GDP spent on R&D for that year been similar to the 2001 level.

Table 5.4
Gross domestic expenditures on research and development as a percentage of gross domestic product, Canada, 1998–2007

Year	Domestic spending on research and development (\$ millions)	Gross domestic product (GDP)	Domestic spending on research and development as a % of GDP
1998	16,088	914,973	1.76
1999	17,638	982,441	1.8
2000	20,556	1,076,577	1.91
2001	23,132	1,108,048	2.09
2002	23,531	1,152,905	2.04
2003	24,719	1,213,175	2.04
2004	26,833	1,290,906	2.08
2005	28,142	1,372,626	2.05
2006 ^P	28,715	1,450,490	1.98
2007 ^P	28,881	1,535,646	1.88

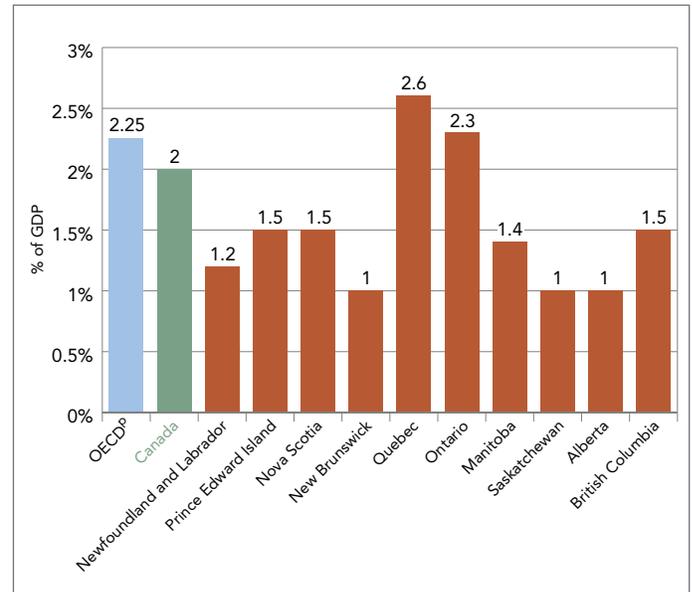
Source: Statistics Canada, CANSIM, tables (for fee) 358-0001 and 380-0017 and Catalogue nos. 88-001-XIE and 88F0006XIE. (Ottawa: Jan. 20, 2009)

^P Preliminary

Note: Gross domestic expenditures on research and development (GERD) refers to all monies expended for research and development performed within the country in a given year. The research and development funding may come from government, business enterprise, private non-profit, higher education or foreign sources. The performing sectors are divided into government, business enterprise, private non-profit and higher-education sectors.

Figure 5.1 provides a provincial breakdown of Canada’s R&D expenditures in 2005. Data reflect the industrial structure of the country. Activity is concentrated in Quebec and Ontario, the only provinces with expenditures above the Canadian and OECD average. As noted in CCL’s 2007 report on post-secondary education, the provincial R&D growth pattern was uneven between 1990 and 2004, and indicated that the number of provinces with R&D ratios of 1% (or less) of provincial GDP fell from five to three.

Figure 5.1
Expenditures on research and development as a percentage of gross domestic product, OECD, Canada and the provinces, 2005



Sources: Statistics Canada, *Science Statistics*, Table 1-2 and 2 (Ottawa: December 2007), Catalogue no. 88-001-X; and Statistics Canada, CANSIM Tables 384-0002 and 051-0005.

^P Preliminary

Note:

- Percentage for all of Canada includes Yukon, Northwest Territories and Nunavut.
- Quebec and Ontario figures exclude federal government expenditures on research and development performed in the National Capital Region. The private non-profit (PNP) sector appears in both the performing and funding sector for the gross domestic expenditure on research and development (GERD) for Canada. Commencing with reference year 2000, the data for the PNP sector performing research and development are not distributed by provinces, territories or the National Capital Region. The national totals of research and development by performing sector include the PNP sector. The data for the PNP sector funding research and development continue to be distributed by provinces, territories and the National Capital Region.

Overall, Canada’s total expenditures on research and development (as a percentage of GDP) were consistently below the OECD average despite significant gains over the last decade. For 2005, Canada ranked 11th out of the top 14 OECD countries, at 1.98% of GDP (as reported to the OECD). This compares with the average of 2.25% for all OECD countries. The 2006 data continue a 16-year trend, during which time Canada was below the OECD average for every year. Canada’s proportion of business enterprise expenditures (combined funding and activity expenditures) is low compared with that of other OECD countries, and is behind Canada’s position in the overall rankings (see *Table 5.5*).

While several countries have set national targets for R&D (as a percentage of GDP), Canada currently has no set targets for R&D expenditures (see *Table 5.6*).

Table 5.5
Gross domestic expenditures on research and development as a percentage of gross domestic product for selected OECD countries, 2001–2005

	2001	2002	2003	2004	2005 (preliminary)	2006 (preliminary)	Rank 2005
	(GERD as % of GDP)						
Total OECD	2.27	2.23	2.24	2.21	2.25	missing	
Sweden ^a	4.25	missing	3.95	3.71	3.89	3.82	1
Finland	3.3	3.36	3.43	3.45	3.48	3.45	2
Japan	3.12	3.17	3.2	3.17	3.33	missing	3
Korea	2.59	2.53	2.63	2.85	2.98	missing	4
Iceland	2.98	2.97	2.82	missing	2.78	missing	5
United States ^b	2.76	2.66	2.66	2.59	2.62	2.62	6
Germany	2.46	2.49	2.52	2.49	2.48	2.51	7
Denmark	2.39	2.51	2.58	2.5	2.45	2.43	8
Austria	2.03	2.12	2.23	2.22	2.41	2.45	9
France	2.2	2.23	2.17	2.15	2.13	2.12	10
Canada	2.09	2.04	2.01	2.01	1.98	1.97	11
Belgium	2.08	1.94	1.89	1.87	1.86	1.85	12
United Kingdom	1.83	1.83	1.79	1.73	1.78	missing	13
Italy	1.09	1.13	1.11	1.1	1.1	missing	14

Data Source: OECD, *Main Science and Technology Indicators: 2007/2*, (Paris: October 2007).

Source: Statistics Canada, Science Statistics, Vol. 31, No. 8, Table 1-2 (Ottawa: December 2007), Catalogue no. 88-001-X.

^a Underestimated or based on underestimated data.

^b Excludes most or all capital expenditures.

Note: For Canada, GERD as a % of GDP in this table differs from that presented in Table 5.4. OECD tables with up-dated Canadian data are not yet available.

Table 5.6
National research and development as a percentage of gross domestic product, selected OECD countries, 2006

Country/Region	Target	2006 GERD ^a to GDP (%)
Austria	2.5% by 2006	2.45
Canada	No targets	1.97
France	3% by 2010	2.12
Germany	3% by 2010	2.51
Korea	Double national R&D investments, 2003–2007	2.98 ^b
United Kingdom	2.5% by 2014	1.78 ^c
European Union (25 member countries)	3% by 2010	1.77 ^b

Source: Association of Universities and Colleges in Canada, *Momentum: The 2005 Report on University Research and Knowledge Transfer* (Ottawa: 2005), p 33; OECD, *Science, Technology and Industry Outlook 2004* (Paris: 2004). The GERD (Gross Domestic Expenditures on R&D) to GDP (gross domestic product) was updated by the Canadian Council on Learning.

^a GERD = gross expenditure on research and development.

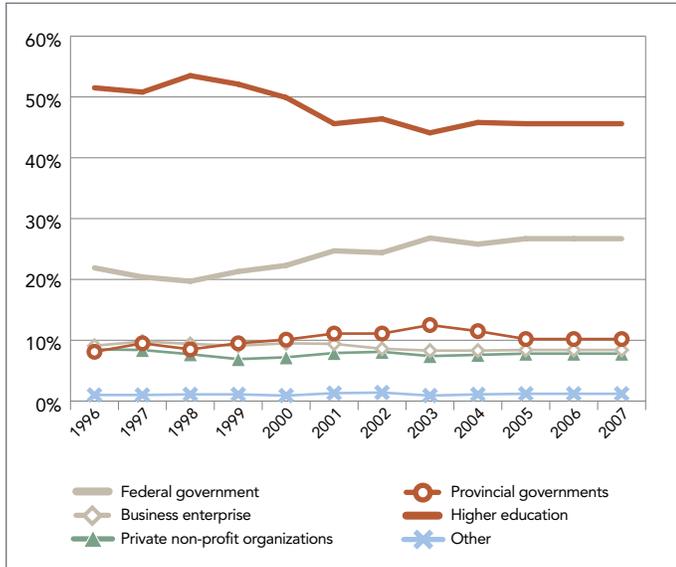
^b 2005

^c 2004

R&D Activity in Higher Education

More than 70% of funding expenditures for R&D activities performed by the higher education sector in 2007 originated from just two sources—higher education institutions (46%) and the federal government (27%). Over the last decade, the federal government's contribution increased by about five percentage points. In contrast, the share of funding from higher education institutions declined by about five percentage points. Business enterprises and provincial governments have provided funding at levels relatively similar to that of private, non-profit organizations. Over the current decade, these three sectors have provided fairly stable funding for R&D activities taking place in higher education, accounting for 26% of total funding in 2007.

Figure 5.2
Distribution of funding sources for research and development performed in higher education, Canada, 1996–2007

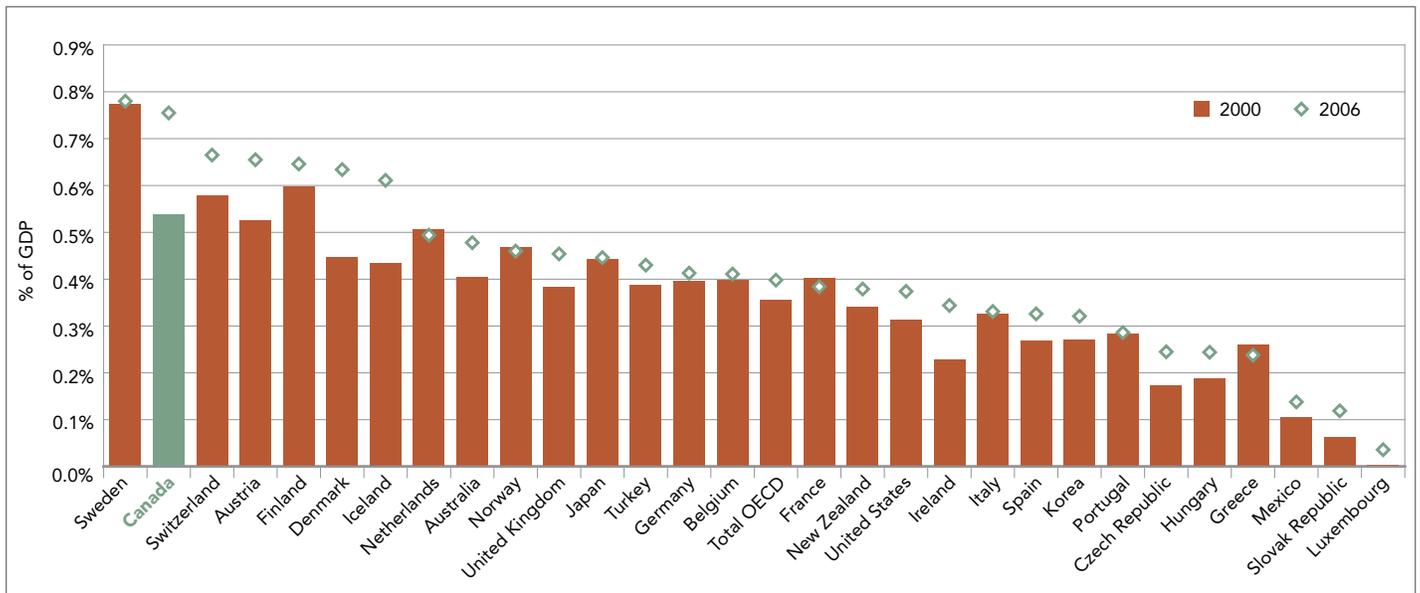


Source: Statistics Canada, *Science Statistics*, Vol. 31, No. 8, Table 1-3 (Ottawa: December 2007), Catalogue no. 88-001-X.

Note: Higher education refers to colleges and universities only (trades information is not included).

Canada’s reliance on the post-secondary environment for R&D activity is reflected in its high international standing in PSE expenditures to conduct research as percentage of the GDP. Canada placed second after Sweden, at 0.76% and 0.78% respectively. While all OECD countries increased their PSE R&D expenditures between 2000 and 2006, Canada had the largest increase (0.22 percentage points). The OECD *Thematic Review of Tertiary Education* (2008) notes that overall, higher education R&D expenditures had “risen steadily from an average of 0.36% to 0.40% of GDP across the OECD between 2000 and 2005.”²

Figure 5.3
Higher education research and development (HERD) as a percentage of GDP, OECD countries, 2000 and 2006



Source: OECD, *Main Science and Technology Indicators: 2007/2* (Paris: October 2007).

Notes:

- Higher education refers to colleges and universities only (trades information is not included).
- Several countries report data for years other than for 2000 or for 2006.

Personnel in the R&D Sector

Qualified R&D personnel are critical to developing Canada's potential for innovation and knowledge creation. Data on the number of personnel working in the R&D sector helps us understand changes in the number of patent submissions and changes in the area of commercializing new knowledge (which is measured by looking at the number of articles published in scientific journals and the number of publication citations).

In 2005, more than 200,000 individuals were working in R&D in Canada, a 48.8% increase from 1996. Within this group, almost two-thirds (64.4%) were working in the business sector. The federal government employed more than 15,000 individuals in research and development, which represents an increase of only 2.8% between 1996 and 2005. More importantly, however, the data for 2005 reverse a decline in the number of research personnel at the federal level between 1996 and 2004. Another 26.6% (57,000 people) were working in higher education—the second-largest location of R&D personnel in Canada.

Table 5.7
Personnel engaged in research and development, by sector of performance, Canada, 1996, 2004 and 2005

Funding sector	1996	2004 (revised)	2005	% change 1996–2005	% distribution 2005
Total	143,760	206,180	213,930	48.8	100
Federal government	14,840	13,720	15,250	2.8	7.1
Provincial governments ^a	2,880	2,560	2,620	-9	1.2
Business enterprise ^b	79,380	133,790	137,690	73.5	64.4
Higher education ^c	45,430	54,730	56,950	25.4	26.6
Private non-profit organizations ^d	1,230	1,380	1,420	15.4	0.7

Source: Statistics Canada, *Science Statistics*, Vol. 32, No. 1 (Ottawa: May 2008), Catalogue no. 88-001-X.

^a Provincial government data includes provincial research organizations data.

^b Natural sciences and engineering only.

^c Higher education refers to colleges and universities only (trades information is not included).

^d Private non-profit organizations' personnel counts may fluctuate due to these organizations' intramural research and development activities.

Note: Personnel counts are reported as full-time equivalents (rounded to the nearest 10).

Just over three-quarters (76.2%) of all staff working in R&D in the higher education sector were in research positions—a 28.5% increase over 1996. The number of researchers in the natural sciences and engineering sector increased by 39.4%

between 1996 and 2005, while the number of researchers in the social sciences and humanities increased by 17.4%. Technical and support staff tended to work in the fields of natural sciences and engineering (4,920) more than in the social sciences and humanities (1,750).

Table 5.8
Personnel engaged in research and development in the higher education sector, by occupational category, Canada, 1996, 2004 and 2005

Funding sector	1996	2004 (revised)	2005	% change 1996–2005	% distribution 2005
Total	45,430	54,730	56,950	25.4	100
Researchers	33,790	41,380	43,420	28.5	76.2
Technicians	6,090	6,580	6,670	9.5	11.7
Support staff	5,550	6,770	6,860	23.6	12
Natural sciences and engineering	24,790	31,330	32,670	31.8	57.4
Researchers	17,010	22,500	23,720	39.4	41.7
Technicians	4,420	4,850	4,920	11.3	8.6
Support staff	3,360	3,980	4,030	19.9	7.1
Social sciences and humanities	20,640	23,400	24,280	17.6	42.6
Researchers	16,780	18,880	19,700	17.4	34.6
Technicians	1,670	1,730	1,750	4.8	3.1
Support staff	2,190	2,790	2,830	29.2	5

Source: Statistics Canada, *Science Statistics*, Vol. 32, No. 1 (Ottawa: May 2008), Catalogue no. 88-001-X.

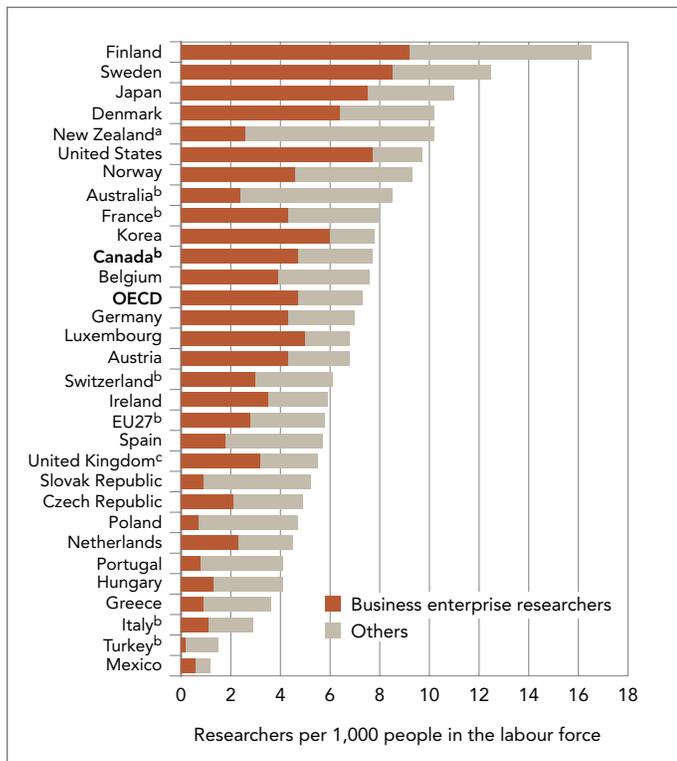
Notes:

• Higher education refers to colleges and universities only (trades information is not included).

• Personnel counts are reported as full-time equivalents (rounded to the nearest 10).

The OECD tracks the number of personnel in its member countries who are engaged in R&D. Although Canada's total number of research personnel increased by 48.8% between 1996 and 2005 (see Table 5.7), Canada placed 11th out of 29 OECD countries in the number of researchers per 1,000 people employed in the labour force in 2005. At 7.8 researchers per 1,000 employed (see Table 5.4), Canada was close to the OECD average (7.3) but well behind the two countries with the highest number of researchers per 1,000 people—Sweden (12.5) and Finland (16.5).

Figure 5.4
Researchers per 1,000 people in labour force, OECD countries, 2005



Source: OECD, *Science, Technology and Industry Scoreboard 2007*, Table B-8.1 (Paris: 2007).

^a Reference year is 2003.

^b Reference year is 2004.

^c Reference year is 1998.

Qualifying personnel for R&D

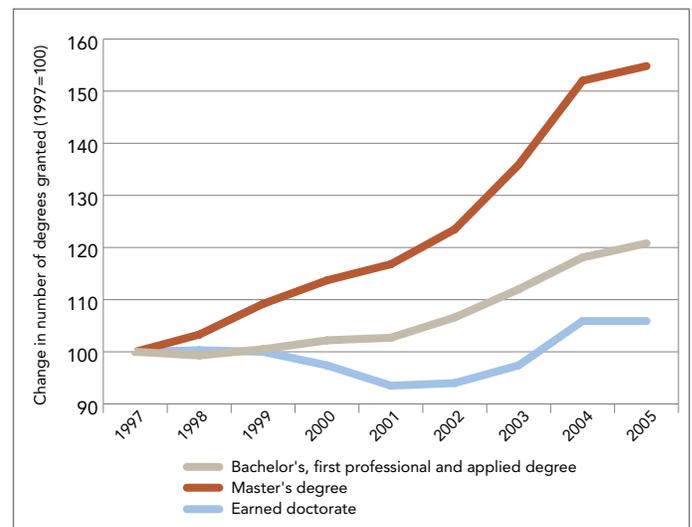
It is internationally acknowledged that a country's future success depends on the ability to produce, attract and retain the best and the brightest researchers. Consequently, these workers are becoming "the world's most sought-after commodity."³ Post-secondary institutions (PSIs) provide the forum where these personnel are educated. University graduate degrees are critical to producing the advanced knowledge and research skills needed for innovation. Graduate theses and dissertations expand the knowledge repertoire and help students to acquire the skills and techniques required for ethically and methodologically sound research.

Many countries track the number of degrees awarded as a proxy measure for educational institutions' responsiveness to the demand for knowledge workers. Between 1997 and 2005, the number of baccalaureate degrees awarded in Canada increased by 20%, thus enlarging the potential pool of graduate students. During this period, the number of master's degrees awarded in Canada increased 55%, from

21,318 to 33,000, representing the fastest growth rate of all degrees. The number of doctoral degrees increased by about 6%, from 3,966 to 4,200. According to the Survey of Earned Doctorates,⁴ almost 38% of doctoral graduates from the 2004–2005 academic year intended to work in research and development, while 33% planned to teach. Most graduates who were continuing their studies chose post-doctoral programs with a focus on research and development.

Doctoral graduates are also the next generation of professors. As professors of the current generation age, it is important that their cumulative and experiential knowledge is transferred to the next generation of university educators. According to Statistics Canada, "between 2000 and 2004, enrolment in doctoral programs grew at an average rate of almost 7% a year. In 2004–2005, more than 34,000 students were enrolled in all years of doctoral programs. This suggests there should soon be a commensurate increase in the number of earned doctorates."⁵

Figure 5.5
Change in number of degrees awarded, Canada, 1997–2005



Source: Canadian Education Statistics Council, *Education Indicators in Canada: Report on the Pan-Canadian Education Indicators Project*, Table D.2.3 (Ottawa: 2007), data updated June 16, 2008. Catalogue no. 81-582-XIE.

Note: The change in number of degrees granted (1997=100) was calculated by the Canadian Council on Learning.

Nearly 23% of doctorate earners in Canada were foreign or visa students in the 2004–2005 graduating year and a majority of these students planned to remain in Canada. Meanwhile, an equivalent percentage of doctoral graduates (23%) planned to live outside of Canada upon completing their degrees—a slightly higher proportion than in the previous year (21%).⁶

Subjects of study

While the overall number of individuals with advanced degrees is an important general indicator, the number with advanced degrees in technical areas—such as science, technology, engineering and mathematics—is equally significant given R&D's critical role in driving innovation. CCL's 2007 report on PSE, *Strategies for Success*, proposed that the production of graduates in these areas should be one of seven key benchmarks for post-secondary education in Canada.

Between 1995 and 2005, attainment of master's degrees increased by 54.5% overall. Master's degrees in engineering and computer science increased by 102.5%. While total doctoral degrees increased by 13%, doctoral degrees in engineering and computer science increased by only 1.2%.

Attainment rates were lower for math and physical sciences. While the number of master's degrees awarded in these subject areas increased by 24.3%, the number of doctoral degrees declined by 15.3%. Since 1995, the only increase in the total degrees awarded at the master's and doctoral levels was in master's degrees in engineering and computer science. In all other areas—doctoral degrees in engineering and computer science, and master's and doctoral degrees in math and physical sciences—the share of total degrees awarded at Canadian universities declined.

Women appear to be making small inroads into these traditionally male-dominated subject areas, particularly in master's degrees in math and physical sciences, where the share of male graduates dropped from 70.7% in 1995 to 58.6% in 2005.

Table 5.9
Master's and doctoral degrees awarded in specific subject areas, Canada, 1995 and 2005

Total master's and doctoral degrees awarded				
Master's degrees				
	1995 (count)			21,357
	2005 (count)			32,991
	% change 1995–2005			54.5
Doctoral degrees				
	1995 (count)			3,717
	2005 (count)			4,200
	% change 1995–2005			13
Total master's and doctoral degrees awarded in specific subject areas		Count	% of total degrees by level	% male
Engineering and computer science				
Master's degrees				
	1995	2,418	11.3	80.9
	2005	4,896	14.8	75.7
	% change 1995–2005	102.5		
Doctoral degrees				
	1995	732	19.7	91
	2005	741	17.6	83.8
	% change 1995–2005	1.2		
Math and physical sciences				
Master's degrees				
	1995	951	4.5	70.7
	2005	1,182	3.6	58.6
	% change 1995–2005	24.3		
Doctoral degrees				
	1995	570	15.3	82.1
	2005	483	11.5	70.8
	% change 1995–2005	-15.3		

Source: Statistics Canada, Post-secondary Student Information System, special request (Ottawa: 2006).

Note: Figures do not include the University of Regina.

The 2006 Census⁷ showed that the proportion of recent immigrants* to Canada with advanced degrees in technical areas was considerably higher than that of the general population aged 25 to 64 years old. Within this age group, 25% of recent immigrants had degrees in engineering compared with 6% of Canadian-born university graduates. An additional 6% of recent immigrants with a university degree had studied computer and information sciences and support services—triple the proportion of the Canadian-born population (2%). The proportion of recent immigrants with degrees in the physical sciences was twice that of the Canadian-born population (4% versus 2%).⁸

Despite having the highest ranking in 2006 among OECD countries for the proportion (47%) of the population having completed college and university, Canada ranked 20th out of 30 OECD countries in the proportion of science and engineering degrees to all new university degrees in 2004. Canada also ranked 20th in the proportion of PhD graduates in science and engineering (of all graduates in 2004).

Table 5.10
An international perspective on highly trained people in specific subject areas, OECD countries, 2004 and 2006

	Persons with PSE, as % of 25- to 64-year-olds (2006)		Share of science and engineering degrees, as % of new degrees (2004)		PhD's in science and engineering, as % of all graduates (2004)	
		Rank		Rank		Rank
Canada	47	1	19.4	20	0.3	20
Japan	40	2	25	12	0.32	12
United States	39	3	14.7	27	0.35	27
New Zealand	38	4	18.9	21	0.46	21
Finland	35	5	29.9	4	0.72 ^a	4
Denmark	35	6	18.3	22	0.62 ^a	22
Australia	33	7	21.4	19	0.63	19
Korea	33	8	38.6	1	0.41	1
Norway	33	9	16.2	25	0.44 ^a	25
Belgium	32	10	23	17	0.56	17
Sweden	31	11	31.7	2	1.64	2
Ireland	30	12	23.4	16	0.58	16
Netherlands	30	13	16.1	26	0.5	26
United Kingdom	30	14	27.9 ^a	6	0.87	6
Switzerland	30	15	25.1	11	1.02	11
Iceland	30	16	17	24	0.1	24
Spain	28	17	24.9	13	0.42	13
France	26	18	28.6	5	0.66 ^a	5
Germany	24	19	30.8	3	0.73	3
Greece	22	20	27.6	7	0.48	7
Poland	18	21	12.3	28	0.29	28
Austria	18	22	27	8	0.72	8
Hungary	17	23	11	29	0.15	29
Mexico	15	24	25.4	10	0.04	10
Slovak Republic	14	25	26	9	0.41	9
Czech Republic	14	26	24.5	14	0.55	14
Portugal	13	27	24.1	15	1	15
Italy	13	28	22.9	18	0.36 ^a	18
Turkey	10	29	17.3	23	0.07	23

Sources: OECD, *Science, Technology and Industry Scoreboard, Indicator B-1, 2007* (Paris: 2007); and OECD, *Education at a Glance 2008: OECD Indicators*, Table A1.1a (Paris: 2008).

^a Reference year is 2003.

* The 2006 Census defines recent immigrants as those who had arrived in Canada between Jan. 1, 2001 and May 16, 2006.

Knowledge Creation and Transfer

An important dimension of R&D is the commercialization of research, which is indicative of R&D's capacity for innovation, knowledge creation and knowledge transfer. To provide insight on this issue, organizations such as the OECD frequently report indicators related to success in obtaining a patent, in the number of scientific articles produced and frequency of journal citations. These measures attest to Canada's international reputation in research and may serve as a proxy measure of the quality of PSE in Canada, as discussed in Chapter 8, "Quality Assurance in PSE."

A 2005 report from the Association of Universities and Colleges of Canada⁹ demonstrated a pattern of increase in Canadian universities' commercialization activities, including patent applications, the creation of spin-off entities, licensing agreements and the value of industrial contracts. (For more details, see CCL's 2007 report on post-secondary education in Canada, *Strategies for Success*.)

Most patents filed from Canada came from the business sector (75% between 2000 and 2004).¹⁰ However, the proportion of Canadian patents owned by universities was 5.8%—above the OECD average of 4.3%, the EU average of 3.1%, and the share owned by Canadian governments at 4.5%. These figures affirm the importance and success of R&D conducted in Canada's higher education sector.

Table 5.11
Share of patents filed under the *Patent Cooperation Treaty* that are owned by universities, OECD countries, 2002–2004

	2002–2004 (%)
OECD	4.3
European Union (25 member countries)	3.1
Ireland	9.7
Spain	7.9
United Kingdom	7.7
Belgium	7.6
United States	6.9
Australia	6
Canada	5.8
France	5.3
Mexico	4.2
Poland	3.4
Italy	3.1
Denmark	2.5
Korea	2.3
New Zealand	2.3
Switzerland	2.1
Germany	1.6
Japan	1.6
Netherlands	1.3
Hungary	1.2
Austria	1
Turkey	0.9
Norway	0.5
Finland	0.3
Luxembourg	0.1
Sweden	0

Source: OECD, Patent Database (Paris: April 2007).

Notes:

- Patent counts are based on the priority date, the applicant's country of residence and fractional counts.
- Data represent patent applications filed under the *Patent Cooperation Treaty* (PCT), at international phase, designating the European Patent Office. Only countries with more than 300 PCT filings per period are included.
- PCT filings are attributed to institutional sectors using an algorithm developed by Eurostat.

Table 5.12
Share of patents filed under the *Patent Cooperation Treaty* that are owned by government, OECD countries, 2002–2004

	2002–2004 (%)
OECD	2.3
European Union (25 member countries)	1.3
France	5.5
Canada	4.5
Mexico	4.3
Australia	4.3
United Kingdom	3.8
United States	3.1
Japan	2.9
Ireland	2.1
Korea	1.6
Spain	1.3
Italy	1.2
New Zealand	0.8
Belgium	0.7
Denmark	0.6
Finland	0.1
Germany	0.1
Austria	0.1
Netherlands	0
Switzerland	0
Sweden	0
Hungary	0
Luxembourg	0
Norway	0
Poland	0
Turkey	0

Source: OECD, Patent Database (Paris: April 2007).

Notes:

- Patent counts are based on the priority date, the applicant's country of residence and fractional counts.
- Data represent patent applications filed under the *Patent Cooperation Treaty* (PCT), at international phase, designating the European Patent Office. Only countries with more than 300 PCT filings per period are included.
- PCT filings are attributed to institutional sectors using an algorithm developed by Eurostat.

International data on triadic patents¹¹ are considered good indicators of very strong patents. Patents are typically filed at three major patent offices—the European Patent Office (EPO), the U.S. Patent and Trademark Office (USPTO) and the Japan Patent Office (JPO). The filing of patents at all three offices constitutes the triadic patent family. Patents filed from the United States, Japan and Germany accounted for seven of 10 patents filed under the triadic patent family offices in 2005, compared with 1.6% of triadic patents filed

from Canada that same year. Canada ranked eighth among 30 countries for which the OECD documented triadic patents in 2005. Although Canada's average annual growth rate of 7.9% between 1995 and 2005 was positive, it was well below that of China (36.7%), Turkey (29.8%), India (27.6%) and Korea (25.6%). The research origins of triadic patents are not tracked here and, therefore, it is not clear what proportion of Canadian triadic patents originated from the higher education sector (as distinct from business research), or how those rates compare with those of other countries.

Table 5.13
Share of all triadic patents, by country, 1995 and 2005

	1995 (%)	2005 (%)	Average annual growth rate, 1995–2005 (%)
United States	34.4	31	3.1
Japan	27	28.8	4.9
Germany	13.5	11.9	2.8
Korea	0.9	6	25.6
France	5.4	4.7	2.7
United Kingdom	4.3	3	0.6
Netherlands	2	2.2	5.2
Canada	1.1	1.6	7.9
Switzerland	2.1	1.5	1
Italy	1.7	1.4	1.8
Sweden	1.9	1.2	-0.3
China	0.1	0.8	36.7
Australia	0.6	0.8	6.5
Israel	0.4	0.7	9.9
Belgium	1.1	0.6	-1
Austria	0.6	0.6	3.4
Finland	0.9	0.5	-1.4
Denmark	0.5	0.4	2
Spain	0.2	0.4	8.8
Chinese Taipei	0.1	0.3	19.7
India	0	0.2	27.6
Norway	0.2	0.2	2.6
Singapore	0.1	0.2	14.6
New Zealand	0.1	0.1	12.2
Ireland	0.1	0.1	8
Brazil	0	0.1	14.6
Russian Federation	0.1	0.1	-0.4
Hungary	0.1	0.1	4.1
South Africa	0.1	0.1	3.3
Turkey	0	0.1	29.8

Source: OECD, Patent Database (Paris: April 2007).

Note: Triadic patents are those that are filed at the European Patent Office, the United States Patent and Trademark Office and the Japan Patent Office, and that protect the same invention. Data from 1998 onward are OECD estimates.

Bibliometric measures

Although bibliometric measures—which include the volume and quality of scientific publications—should be used with caution, they are sometimes useful as proxy measures for research productivity. Canadian researchers are highly productive contributors to scientific journals. In 2003, they published, on average, 783 articles per one million population. Canada ranked eighth out of 30 countries included in a comparison of publication changes between 1993 and 2003, and was well above the world production rate per million population, as well as both the OECD and the EU. However, Canada's production rate decreased 5.7% between 1993 and 2003. Canada was one of only three countries to show a decline (United States at -4.3% and Czech Republic at -9.7%). Canada's international ranking in this area will not remain stable or improve if the production rate continues to decline.

Researchers from the United States, who produced 30.2% of the worldwide scientific articles in 2003, dominate the country distribution of production. Canada shared the sixth position with Italy, each country producing 3.5% of total scientific publications.

“Relative prominence” of citations in scientific literature is another indicator of the impact and quality of scientific articles. The prominence of citations reflects the number of times other researchers have referred to articles authored by Canadian scientific researchers, and indicates the value placed on Canadian research by the international research community; the greater the number of citations, the greater the value of the research that is cited. In 2003, Canada's ranking (seventh) was lower than that of the United States and the United Kingdom, but above the EU average (15th).

Table 5.14
Scientific articles and citations, 2003

	Scientific articles per million population, 2003 (count per million)	Change in number of articles per million population, 1993–2003 (%)	Country share in total world scientific articles, 2003 (%)	Relative prominence of cited scientific literature, 2003
World	110.9	not available	100	not available
OECD	440.5	0.4	72.9	not available
European Union (15 member countries)	573.2	27.5	31.5	0.74
Switzerland	1,153.5	17.3	1.2	1.15
Sweden	1,142.8	16.6	1.5	0.86
Finland	997.9	40.3	0.7	0.83
Denmark	981.6	25.2	0.8	0.94
Netherlands	830.6	11.8	1.9	0.97
United Kingdom	810.8	10.2	6.9	0.86
Australia	791.2	17.8	2.3	0.71
Canada	783.2	-5.7	3.5	0.85
New Zealand	751.1	19.8	0.4	0.62
Norway	731.4	19.6	0.5	0.72
United States	725.6	-4.3	30.2	1.03
Iceland	701.8	51.7	0	not available
Belgium	636.6	42.3	0.9	0.82
Austria	604.4	56.6	0.7	0.8
Germany	536.9	27.8	6.3	0.82
France	516.2	16.1	4.6	0.76
Japan	470.3	35.5	8.6	0.58
Ireland	440.5	57	0.3	0.76
Italy	428.7	59.5	3.5	0.7
Spain	400.6	61.2	2.4	0.6
Greece	342	105.3	0.5	0.47
Czech Republic	289.2	-9.7	0.4	0.42
Korea	287.3	481.3	2	0.44
Portugal	251.4	215.8	0.4	0.49
Hungary	247.1	48.1	0.4	0.49
Poland	177.2	77.2	1	0.36
Slovak Republic	175.3	not available	0.1	0.34
Luxembourg	102.2	84.9	0	not available
Turkey	88	346.8	0.9	0.28
Mexico	36.5	113.2	0.5	0.39

Sources: OECD, *Main Science and Technology Indicators: 2007/1* (Paris: June 2007); and National Science Foundation, *Science and Engineering Indicators 2006* (Arlington, VA: 2006).

Note: The relative prominence of cited science and engineering (S&E) literature is the ratio of a country's share of literature cited by the rest of the world to its world share of S&E articles (National Science Foundation, 2006).

Research performed in Canada covers a breadth of subject areas that can benefit Canadians on several levels. It advances knowledge and promotes innovation related to developments in business, health, science, the economy and other aspects of Canadian society. In 2003, 57.4% of journal publications produced by Canadian researchers were in the life sciences—above the overall share of OECD and EU member countries. Canada’s share of social and behavioural sciences publications was higher than the overall share of OECD and EU member countries, but its share of physical science publications was lower. Canada’s share of engineering technology and mathematics publications was relatively on par with the overall share of OECD and EU member countries.

Table 5.15
Distribution of scientific articles by subject area,
as a percentage of total scientific articles per
country, 2003

	Life sciences (%)	Physical sciences (%)	Engineering, technology and mathematics (%)	Social and behavioural sciences (%)
World	48.7	31.3	11.2	8.8
OECD	51.8	28.2	10.7	9.3
European Union (15 member countries)	52.1	30.1	9.6	8.2
Denmark	65.7	22.2	5.7	6.4
Austria	60.2	25.9	7.5	6.5
Finland	59.6	22.2	9.9	8.4
Sweden	59.4	22.9	9.3	8.5
Turkey	59.4	24.7	11.7	4.3
Norway	59.1	19.7	9.2	12
Netherlands	58.7	21.9	9.7	9.7
Iceland	58.7	25.3	6.3	9.8
New Zealand	58.3	19.6	9.9	12.3
Canada	57.4	21.6	10.3	10.6
Ireland	56.9	24.4	8.6	10.2
Luxembourg	55.8	20.8	8.7	14.7
United States	54.1	22.2	10.7	12.9
Belgium	53.7	29.4	9.6	7.3
Australia	53.5	22.2	12.5	11.6
Switzerland	53.4	33.6	7.5	5.6
United Kingdom	52.5	23.5	10.2	13.9
Italy	52	34.4	8.9	4.8
Germany	50.3	34.6	9.7	5.5
Spain	49.5	35.2	8.5	6.8
Greece	49.2	30.8	12.9	7.2
Japan	46.8	38.6	12.5	2
France	46.6	36.6	9.6	7.3
Hungary	46.2	39	8.4	6.4
Mexico	45.1	38.4	9.9	6.6
Czech Republic	40.9	44	9.5	5.7
Portugal	39.2	38.5	16.6	5.8
Slovak Republic	35.8	44.6	9.1	10.5
Korea	33.3	42	21	3.9
Poland	30.3	56.3	9.1	4.3

Source: National Science Foundation, *Science and Engineering Indicators 2006* (Arlington, VA: 2006).

Summary: Opportunities and Future Directions

The importance of post-secondary education to R&D in Canada is significant. The PSE sector accounts for one-third of all R&D activity expenditures in this country, produces graduates with the requisite skills and knowledge to conduct R&D, contributes significantly to scientific journals, and obtains international patents.

The proportion of Canada's GDP devoted to R&D and the number of students completing a graduate degree in math or the physical sciences have both declined. These circumstances may impact the future success of Canada's R&D to innovate and create knowledge over the long term—particularly in math and the physical sciences.

Compared with other countries, Canada's business enterprise sector plays a lesser role in the promotion of R&D in the higher education sector. Yet, business stands to benefit from the partnerships that could expand as a result of additional support. The innovation and knowledge creation that emerge from R&D can also be targeted to business.

Although Canada's total number of research personnel (per 1,000 people employed) increased substantially between 1996 and 2005, Canada's position showed little improvement in comparison with other OECD countries, indicating that other OECD countries were placing as much, or more, emphasis as Canada was on increasing their R&D personnel.

While Canada is doing well in many areas of post-secondary education, the expansion of graduate studies in vital subject areas will be a key challenge in the coming years. Between 1995 and 2005, attainment of master's degrees in Canada increased by more than 50%, while doctoral degrees increased much less. As well, increases in math and physical sciences degrees in Canada were less pronounced. The number of master's degrees in these areas increased at a much slower rate than in science and engineering, while the attainment of doctoral degrees declined in math and physical sciences, as well as in science and engineering.

Canadian experts have actively participated in international efforts to develop a broad range of robust performance indicators pertaining to research. They are focussed on the conditions needed for success and on developing indicators related to outcomes and impacts. These efforts show promise, but additional support would help achieve a better understanding of these important phenomena.

The ability to advance PSE's contribution to R&D in Canada depends on adequate support and on the graduation of appropriate numbers of students who possess the skills and knowledge needed by the R&D sector. If Canada is to maintain its internationally respected position in the R&D forum and ensure that R&D activity in this country is of benefit to Canada and Canadians, then national targets for R&D funding and personnel development must be established. These will guide future R&D activity and permit the evaluation of the benefits of R&D to Canada's social and economic situation.

Future Directions: An International Perspective

Canada is a respected player in the worldwide R&D community, as evidenced by the relative share of research publications, patents and journal citations outlined in this chapter. Nevertheless there are a number of areas that need to be addressed in order to improve and effectively advance Canada's R&D sector.

The OECD's *Tertiary Education for the Knowledge Society* (2008)¹² includes a compilation of strategies and recommendations to address issues of R&D funding and activities in PSE in its member countries. The following is a selection of strategies and recommendations from the report that are pertinent to the Canadian situation.

Knowledge creation and transfer

Improve and widen channels of interaction and encourage inter-institutional collaboration.

The OECD report identified a need to further develop formal strategic alliances and informal interactions or partnerships in order to improve knowledge diffusion. Post-secondary institutions and others involved in research and development, such as business and public research organizations, would be members of this alliance.

Improve knowledge diffusion instead of strengthening commercialization.

Although patenting and other commercialization activities provide needed revenue for PSIs, they are associated with a limited perspective on the nature of innovation and of the PSE's role in that process. The improvement of knowledge diffusion assumes that R&D initiates innovation and that innovation is

the outcome of the discovery process, prior to its commercialization. However, most innovation analysts recognize that innovation often has broader origins in the development of new products and services and that R&D is more of a problem-solving activity—rather than a departure point that occurs along the road to innovation.¹³ The use of methods and instruments should take into consideration the diffusion of capabilities and the interactive support activities of PSIs as important components of the discovery process.

Foster mobility across the research and innovation system.

Inter-sectoral mobility is a key component of knowledge diffusion. Encouraging more active mobility between firms, PSIs and public research organizations will enhance tacit knowledge flows and stimulate the circulation of ideas and the development of new capabilities. Even a short-term move can improve an individual's skills and expertise and thus increase the global stock of skills. The more efficient use of human capital would increase the global production of research results and of innovation. The report recommended the provision of incentives to facilitate mobility and to ensure the removal of barriers, such as inflexible pension schemes and restrictive leave-of-absence policies.

R&D personnel: Qualification and subjects of study

Improve research career prospects.

The report highlights that there has been no concentrated plan for expansion of post-secondary career opportunities for science and technology graduates. To maintain current levels of research staff, efforts must be improved to make research careers in PSIs more attractive to young researchers.

Monitor the supply and demand of human resources.

Flexibility and rapid response from PSIs, as well as greater institutional and market incentives for mobility, were identified as key to a successful match between the supply of and demand for individuals with advanced science and technology skills.

A variety of skills are needed for innovation.

A broad mix of skills and competencies are needed for innovation. While science and engineering graduates are a key component of R&D activities, individuals with technical skills and vocational training are also central to research and innovation.

Foster centres of excellence at the post-graduate level.

The OECD reports that countries with strong centres of excellence are better able to attract international post-graduate students. Students at this level tend to consider the research performance of a PSI when choosing an institute at which to continue their studies.



- ¹ Statistics Canada, "Spending on research and development" *The Daily* (Dec. 20, 2007), www.statcan.ca/english/dai-quo/.
- ² Paulo Santiago et al., *Tertiary Education for the Knowledge Society: OECD Thematic Review of Tertiary Education: Synthesis Report* (Paris: OECD, April 2008), p.137. Available at www.oecd.org/dataoecd/20/4/40345176.pdf.
- ³ Adrian Wooldridge, "The battle for brainpower," *The Economist* (Oct. 5, 2006). Available at www.leadershipreadiness.blogspot.com/2006/11/battle-for-brainpower.html.
- ⁴ Statistics Canada, "Survey of earned doctorates, 2004/2005," *The Daily* (April 28, 2008), www.statcan.ca/english/dai-quo/. Based on the Survey of Earned Doctorates 2006.
- ⁵ Statistics Canada, "Survey of earned doctorates, 2004/2005," *The Daily*.
- ⁶ Statistics Canada, "Survey of earned doctorates, 2004/2005," *The Daily*.
- ⁷ Statistics Canada, "Highest Certificate, Diploma or Degree (14), Age Groups (10A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census – 20% Sample Data," Census of Population 2006 (Ottawa: Released March 4, 2008), Catalogue no. 97-560-XCB2006007.
- ⁸ Statistics Canada, "Immigrant Status and Period of Immigration (9), Labour Force Activity (8), Highest Certificate, Diploma or Degree (7), Location of Study (16), Age Groups (9) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census – 20% Sample Data," *Census of Population 2006* (Ottawa: 2008), Catalogue no. 97-560-X2006025.
- ⁹ Association of Universities and Colleges of Canada, *Momentum, The 2005 Report on University Research and Knowledge Transfer* (Ottawa: 2005).
- ¹⁰ OECD, OECD Patent Database, online (April 2007), available at www.oecd.org/sti/ipr-statistics.
- ¹¹ OECD, *OECD Factbook 2007: Economic, Environmental and Social Statistics* (Paris: 2007).
- ¹² Paulo Santiago et al., *Tertiary Education for the Knowledge Society: OECD Thematic Review of Tertiary Education: Synthesis Report*.
- ¹³ A. Van de Ven et al., *The Innovation Journey* (New York: Oxford University Press, USA, 1999), in Santiago et al., *Tertiary Education for the Knowledge Society: OECD Thematic Review of Tertiary Education: Synthesis Report*, Vol. 2.

An Overview: Key Findings

Positive performances

Individuals, communities and society as a whole benefit from having a populace that is well educated. There is increasing evidence that education, including post-secondary education (PSE), can significantly impact individual well-being, and community and civic engagement. Although factors such as income and gender also play a major role, individuals with higher levels of educational attainment tend to have higher levels of life satisfaction and contribute more actively to the communities in which they live.

Individuals with more education are also more likely to exhibit healthier behaviour patterns and to report that they are in excellent or very good health. In 2005, two-thirds of individuals with post-secondary education perceived themselves to be in excellent or very good health, compared with less than half of those who had not graduated from high school. Health literacy* also increases with higher levels of education. In its 2008 report titled *Health Literacy in Canada: A Healthy Understanding*, the Canadian Council on Learning (CCL) examined factors influencing health literacy¹ and concluded that the most important factor predicting health literacy—after literacy practices at home—is educational attainment.

Troubling trends

Information on the relationship between educational attainment and civic and social engagement is meagre, and Canada is making limited progress in this direction. Participation in the Social Outcomes of Learning (SOL) project by the Organisation for Economic Co-operation and Development (OECD) would enhance the understanding of the impacts of education on social capital and be of benefit to Canada and Canadians.

There has been no increase in voter turnout, to parallel the rising levels of education, despite the fact that individuals with more education are more likely to participate in the voting process than those with less education. In Canada, as in many developed countries, there has been a progressive and continual decline in voter participation over the last two decades.²

ACTIVE, HEALTHY CITIZENRY

Introduction

The links between education, and social and economic well-being extend well beyond issues of employability and income. While historically researchers have focussed on inputs and participation rates, they are increasingly exploring the need to understand the entire range of education outcomes to individuals and civil society. To assess the social benefits of post-secondary education, current research is developing indicators to measure the extent to which PSE promotes health, civic and social engagement, and standard of living. However, given that outcomes are affected by the complex interactions

of multiple factors—such as education, income, gender and ethnic status—further study is needed before major conclusions about the direct effects of education are possible.

Progress in this area of research is relatively slow. The process requires rigorous exploration and establishment of concepts, definitions and research protocols. As this report's objective is to provide a comprehensive picture of PSE in Canada, some reiteration of information from earlier CCL reports is necessary—supplemented with work from recent studies and projects, notably the OECD project called Social Outcomes of Learning (SOL).

* Health literacy is defined as the ability to read and follow medical instructions, and to read medicine bottle information, medical package inserts, etc. It is scored on a scale of one to five, with three being the level associated with an ability to function effectively in a knowledge-based society.

The sections covered in this chapter include:

- the OECD’s SOL project
- active citizenship—voting and donating behaviour
- health outcomes
- life satisfaction
- summary: opportunities and future directions

The OECD Social Outcomes of Learning Project

Launched in 2005 with the participation of 13 countries, the OECD Social Outcomes of Learning (SOL) project examines linkages between learning and well-being. Intended to address knowledge gaps on the social benefits of learning, the

project’s goals³ are to:

- develop a framework that can be used to analyze the links between learning and well-being,
- foster the gathering and application of evidence,
- improve knowledge of the full extent of learning benefits for individuals and society,
- contribute to more integrated policies across education and other policy domains, and
- shed light on the broader effects of education practices.

The project’s 2007 report, *Understanding the Social Outcomes of Learning*, outlines the potential private and public non-monetary benefits of education—as adapted from W. McMahon’s (1998) analysis of the social benefits of lifelong learning.⁴ Some of the areas that benefit from improved levels of education are summarized below.

Private non-monetary benefits of education

- positive health effects
 - reduced infant mortality
 - lower illness rates
 - greater longevity
- human capital produced in the home
 - children’s education enhanced
- more efficient household management
 - higher returns on financial assets
 - more efficient household purchasing
- labour-force participation rates
 - higher female labour-force participation rates
 - reduced unemployment rates
 - more part-time employment after retirement
- lifelong adaptation and continued learning
 - use of new technologies within the household
 - reduced obsolescence: human capital replacement
 - investment
 - curiosity and educational reading; educational TV/radio
 - utilization of adult education programs
- motivational attributes
 - productivity of non-cognitive skills
- non-monetary job satisfaction
- pure current consumption effects
 - enjoyment of classroom experiences
 - leisure-time enjoyments while in school
 - child-care benefits to the parents
 - hot lunch and school-community activities

Public non-monetary benefits of education

- population and health effects (controlling for income)
 - lower fertility rates (developing countries)
 - lower net-population growth rates
 - public health
- democratization (controlling for income effects)
 - democratization
 - human rights
 - political stability
- poverty reduction and crime (controlling for income)
 - poverty reduction
 - lower homicide rates
 - lower property crime rates
- environmental effects (controlling for income)
 - less deforestation
 - less water and air pollution
- retirement (controlling for income)
 - later retirement
 - more work after retirement
- community service effects of education (controlling for income)
 - time volunteered to community service within income strata
 - generous financial giving within income strata
 - knowledge dissemination through articles, books, television, radio, computer and informal learning activities

Sources: McMahon, W., “Conceptual framework for the analysis of the social benefits of lifelong learning,” *Education Economics* (1998) Vol. 6, no. 3, pp. 309–346. Also, Campbell, David. “What is education’s impact on civic and social engagement?” in *Measuring the effects of education on health and civic engagement: Proceedings of the Copenhagen Symposium*, OECD, 2006; and Mainguet, Christine, and Bayne, Ariane, “Defining a framework of indicators to measure the social outcomes of learning,” in *Measuring the effects of education on health and civic engagement: Proceedings of the Copenhagen Symposium*. OECD, 2006.

The SOL project initially centred on the health, and civic and social engagement outcomes of learning. Work is currently underway to determine measurement issues and data requirements needed to develop meaningful and appropriate indicators for other social outcomes.

SOL research will provide a strong evidence-based framework across several international jurisdictions. International research has, in general, focussed on the impacts of varying levels of educational attainment on health and mortality. However, this topic requires more comprehensive analysis. The data sections of this chapter present Canadian and international information that suggest very strong links between education and determinants of health and mortality.

However, research on the social outcomes of education is highly complex, as highlighted by presentations at Denmark's 2006 *Symposium on Measuring the Social Outcomes of Learning*. Isolation of education's influence from other factors, such as social class, gender and ethnic status, presents numerous challenges. As well, the inter-relationships of these factors are not well understood.

Despite these challenges, the OECD's *Society at a Glance 2006*⁵ shows the progress that is possible for research in the area of the social impacts of education. The report includes social cohesion indicators for topics such as voting, perceptions of well-being, social isolation, numbers of prisoners per capita, suicides, and trust in political institutions. However, only some of these indicators are reported by level of education, which limits analysis of these variables' relationship with educational attainment.

Active Citizenship

The benefits of a well-educated population to civic society are numerous, as Robert Putnam points out in *Bowling Alone: The Collapse and Revival of American Community*:

Education is one of the most important predictors—usually, in fact, the most important predictor—of many forms of social participation—from voting to associational membership, to chairing a local committee, to hosting a dinner party, to giving blood. The same basic pattern applies to both men and women and to all races and generations. Education, in short, is an extremely powerful predictor of civic engagement.⁶

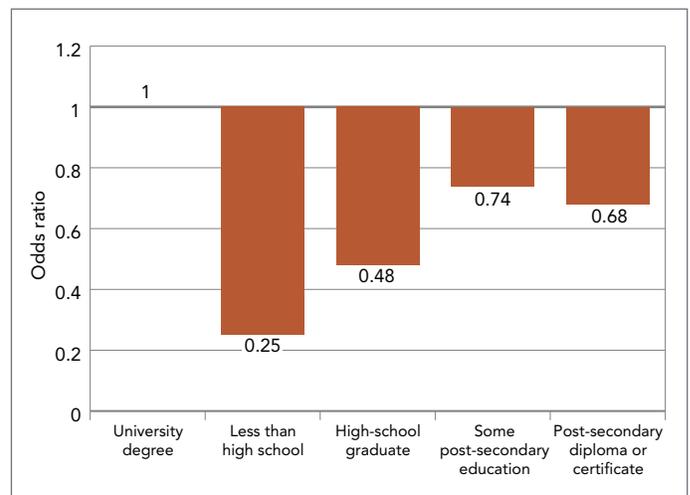
As the SOL project unfolds there will be an expansion of information on many of the items outlined by Putnam. At this point, data pertaining to civic engagement, especially trend data, are typically limited to voting and donating behaviours.

Voting behaviour

For many years, researchers have found positive associations between educational attainment and civic engagement and tolerance. Recent research sponsored by the International Association for the Evaluation of Educational Achievement has confirmed that student knowledge of civics is linked with interest in politics and active citizenship.⁷

Canadian data indicate that voting behaviour is strongly related to education. In 2003, individuals with high school and less than high school* were one-half and one-quarter as likely to vote as those with a university education.

Figure 6.1
Likelihood of voting in last election prior to 2003,
22- to 29-year-olds, Canada



Source: Anne Milan, "Willing to participate: political engagement of young adults," *Canadian Social Trends*, no. 79 (Winter 2005), Statistics Canada Catalogue no. 11-008—No. 70.

OECD data confirm that individuals with a university education are more likely to participate in the voting process than those with less education. In 2004, for every 100 voters in Canada with a university degree, there were 94 voters with high school and 88 with less than high school. Trends were similar in other countries—although in some instances the voter turnout was higher among individuals without high school than those with high school (see *Table 6.1*).

* For the purposes of this chapter, individuals "with high school" are those whose highest level of educational attainment is the completion of high school; individuals "with less than high school" or "without high school" are those who have not completed high school.

Table 6.1
Voter turnout by level of educational attainment, ratios relative to different groups

Country	Educational attainment	
	Ratio of university relative to:	
	Less than high school	High school
OECD (23 member countries)	0.88	0.92
Australia ^a	0.97	0.95
Canada^a	0.88	0.94
Finland ^a	1	1.02
France ^b	0.72	0.78
Germany ^c	0.88	0.95
Japan ^b	0.95	0.91
United Kingdom ^c	0.89	0.88
United States ^c	0.94	0.92

Source: OECD, *Society at a Glance: OECD Social Indicators*, 2006 Edition, Table CO1.2 (Paris: 2007).

^a 2004

^b 2003

^c 2002

Note: Estimates of the total voter turnout from these surveys may differ from those based on administrative data.

It should be noted that several researchers have observed no increase in civic engagement (some countries are experiencing observable declines in youth voting) despite rising levels of education in general. Analyses have concluded that influences other than education have direct impacts on civic engagement. A study on trends in the United States, for example, concludes that social status—rather than level of education—fosters political engagement.⁸ This contradictory evidence highlights the difficulty in isolating education from other factors that affect social behaviour.

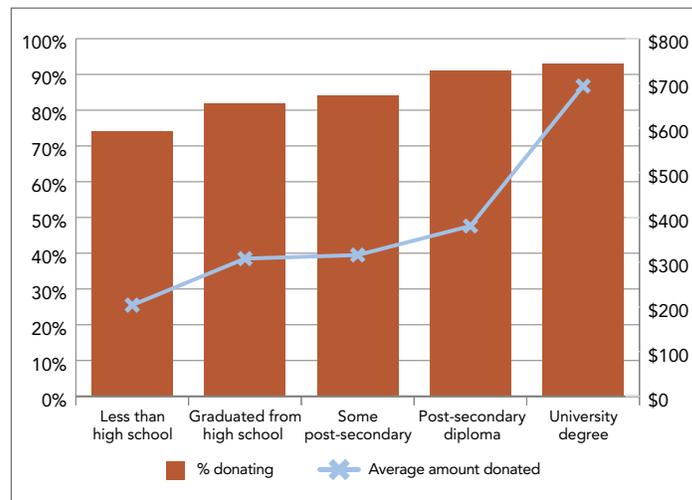
Donating behaviour

Statistics Canada's 2004 Survey of Giving, Volunteering and Participating demonstrates that the percentage of individuals who donate and the average amount donated rises with levels of education.[†]

In 2004, 74% of individuals with less than a high-school education donated, compared with 93% of those with a university degree. The amount donated also varied substantially. On average, those with less than high school donated \$204, while those with a university degree donated \$694. This is an area where confounding factors contribute to the data results.

People with lower levels of education typically have lower levels of income. This means that they will have less disposable income for such things as donations to charities. It is difficult, therefore, to say whether a smaller share of individuals donating and smaller amounts being donated are the result of lower levels of education or lower levels of income.

Figure 6.2
Percentage of the population donating and average amount donated, by level of education, Canada, 2004



Source: Michael Hall et al., *Caring Canadians, Involved Canadians: Highlights from the 2004 Canada Survey on Giving, Volunteering and Participating* (Ottawa: Statistics Canada, June 5, 2006), Catalogue no. 71-542-XIE.

Health Outcomes

Studies have found that individual health status, lifespan and quality of life increase with education. The Public Health Agency of Canada's second report (1999) on the health of Canadians⁹ indicated that individuals with higher levels of education had better access to healthy environments and were better able to prepare their children for school than people with low levels of education. Those with higher levels of education also tended to smoke less, be more physically active and eat healthier foods. The report also found a strong correlation between higher levels of educational attainment and individuals' contributions to the communities in which they live.¹⁰

[†] Income levels are associated with educational attainment levels and, therefore, also impact on these behaviours. For more on the relationship between income and attainment, see Chapter 7 of this report, "A Skilled and Adaptable Workforce."

The OECD's 2007 report, *Understanding the Social Outcomes of Learning*, notes the positive relationship between health behaviours and educational attainment:

Education is an important mechanism for enhancing the health and well-being of individuals because it reduces the need for health care, the associated costs of dependence, lost earnings and human suffering. It also helps promote and sustain healthy lifestyles and positive choices, supporting and nurturing human development, human relationships and personal, family and community well-being. In other words, education clearly has effects both on cost containment and on individual and collective well-being.¹¹

In 2005, 66.9% of Canadians with post-secondary education perceived themselves to be in excellent or very good health, compared with 42.9% of those with less than high school. However, age may be a factor in these results. The 2006 Census indicated that 58% of individuals with less than high school were over the age of 55 (20% over the age of 75).¹² Aging is associated with declines in health and may be influencing the results reported below.

Analyses from the Canadian Community Health Survey for the period 2001 to 2005 show a decline in the proportion of the population—at all levels of educational attainment—that reported being in excellent or very good health. Although this decline may be a consequence of population aging, individuals with higher levels of educational attainment, in all years, were consistently more likely to report excellent or very good health than were their less educated counterparts.

Table 6.2
Self-perceived health status by level of educational attainment, Canada, 2001, 2003, and 2005

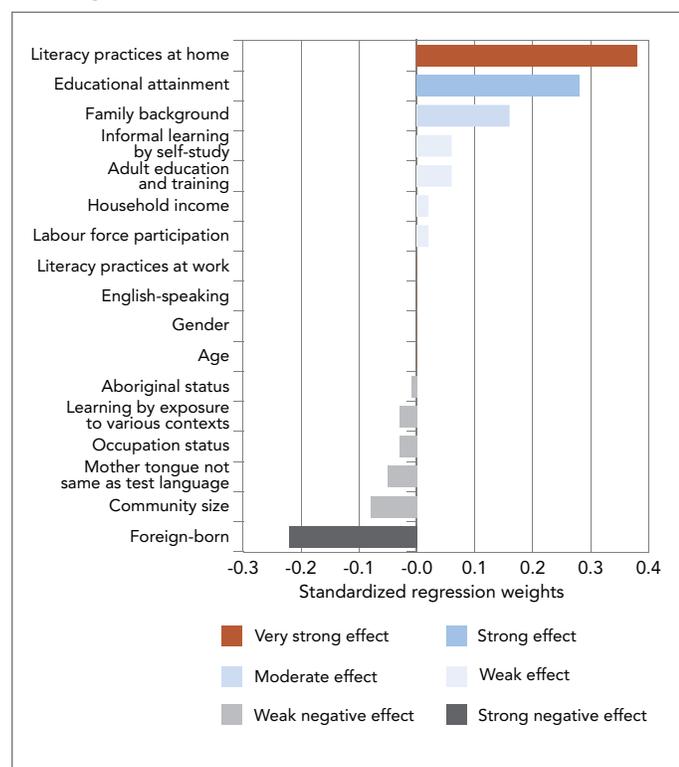
Level of educational attainment	2001			2003			2005		
	Excellent/ Very Good	Good	Fair/Poor	Excellent/ Very Good	Good	Fair/Poor	Excellent/ Very Good	Good	Fair/Poor
	%			%			%		
Less than high school	44.7	33.1	22.2	43.3	35.6	21	42.9	35.2	21.8
High school	63.4	26.9	9.6	57.7	32.2	10.1	59.4	30.1	10.5
Some post-secondary	62.2	27.7	10.9	59.9	29.9	10.1	59.4	30.2	10.3
Post-secondary graduation	70.5	23.1	6.9	65.7	27.2	7.1	66.9	25.8	7.3

Source: Cycle 2.1 and 3.1 data were taken from Statistics Canada, *Canadian Community Health Survey, Cycle 1.1 (2000–2001), 2.1 (2003) and 3.1 (2005)* (Ottawa: May 8, 2002, ongoing), Catalogue no. 82C0022.

Note: Percentages may not add up to 100% because they do not include the "Don't know" and "Refusal" responses.

CCL's 2008 report, *Health Literacy in Canada: A Healthy Understanding*, examines factors influencing health literacy and concludes that the most important factor predicting health literacy—after literacy practices at home—is educational attainment.

Figure 6.3
Factors predicting health literacy for adults aged 16–65 years, Canada



Source: Canadian Council on Learning, *Health Literacy in Canada: A Healthy Understanding 2008* (Ottawa: 2008).

Research on the relationship between mortality rates and educational levels has produced some notable results. Although data are not available for Canada, the results for 14 OECD countries suggest that mortality rates vary consistently according to levels of educational attainment. The overall average for all OECD countries shows that males with low levels of education had a mortality rate 1.5 times higher than males with high levels of education. The rate for females with low levels of education was 1.3 times higher than for females with high levels of education. The confounding influence of the relationship between low income and low education may significantly influence these data. However, as described earlier, higher levels of education are also associated with healthier behaviour patterns, which would also have an impact on the data.

Table 6.3
Ratio of mortality rates, low educational attainment to high educational attainment, by gender, selected OECD countries

	Year	Age (years)	Mortality ratio (low education to high education)	
			Males	Females
OECD			1.5	1.3
Austria	1991–1992	45+	1.4	1.3
Belgium	1991–1995	45+	1.3	1.3
Czech Republic	End 1990s	20–64	1.7	1.1
Denmark	1991–1995	60–69	1.3	1.3
England and Wales	1991–1996	45+	1.4	1.2
Finland	1991–1995	45+	1.3	1.2
France	1990–1994	60–69	1.3	1.1
Hungary	2002	45–64	2	1.6
Italy	1991–1996	45+	1.2	1.2
Netherlands	1991–1997	25–74	1.9	1.3
Norway	1990–1995	45+	1.4	1.3
Poland	1988–1989	50–64	2.2	1.8
Spain	1992–1996	45+	1.2	1.3
Switzerland	1991–1995	45+	1.3	1.3

Sources: Johan P. Mackenbach, *Health Inequalities: Europe in Profile* (United Kingdom: UK Presidency of the European Union, February 2006), a commissioned report for the Tackling Health Inequalities: Governing for Health project, supported by funding from the European Commission.

Life Satisfaction

The OECD's 1999–2004 World Values Surveys¹³ provide a compilation of data on life satisfaction by level of educational attainment (classified as low, middle and high attainment).¹⁴ In general, the scores for life satisfaction increased with higher levels of educational attainment. On average, a 10-percentage-point spread separated individuals with low educational attainment (64%) from those with high levels (74%). Canada ranked above the OECD average for all categories of education, but trailed Austria and Denmark. The World Values Survey results also indicate that a sense of well-being and satisfaction with life are closely related to other factors such as marital status, socio-economic conditions and where individuals live.

Summary: Opportunities and Future Directions

The effects of education extend well beyond what can be measured by labour-market earnings and economic growth. Current research indicates that PSE attainment can have a considerable impact on individual well-being and social engagement. Individuals with more education tend to report higher levels of life satisfaction, contribute more actively to the communities in which they live and are more likely to be in excellent or very good health.

Understanding the health benefits of education is essential. The demands on the health-care system are expected to rise because of the aging Baby Boom population. Improving our understanding of how education impacts health outcomes could advance our ability to anticipate and respond to these pressures. A better understanding of education's impact on health would help to target investments in learning, not only for school-aged children but also for adults.

Research on the social outcomes of learning is in its formative stages. Isolating the impacts of education from other confounding factors such as age, gender, income, race and ethnicity will be of prime importance if meaningful

Table 6.4

Life satisfaction by levels of educational attainment, selected OECD countries

	Education		
	Low	Middle	High
	(%)	(%)	(%)
OECD (26 member countries)	64	70	74
Austria	78	85	88
Canada	78	77	83
Denmark	82	88	84
France	63	67	70
Germany	70	76	75
Japan	45	50	62
United Kingdom ^a	74	72	77
United States	73	76	79

Source: OECD, *Society at a Glance: OECD Social Indicators, 2006 Edition* Chart CO7.1 (Paris: 2007).

^a Great Britain only.

Note: These figures represent the percentage of respondents who reported a high level of life satisfaction.

results are to be obtained. As work progresses, individuals and communities in Canada stand to benefit from the new knowledge that will be developed. An important contribution to understanding the impact of education on an active and healthy citizenry will come from the activities of the OECD's Social Outcomes of Learning project.

Future Directions: An International Perspective

The OECD's Social Outcomes of Learning (SOL) project complements many years of study on the economic benefits of a post-secondary education. It is aimed at creating a more comprehensive understanding of the relationship between education and social capital, so that appropriate policy can be elaborated. In order to benefit fully from developments at the international level, Canada will need to participate in the many symposia and research activities associated with this project. The OECD report, *Understanding the Social Outcomes of Learning*,¹⁵ also provides a framework for action that will allow OECD member countries to make progress in this area. The following is a selection of activities from the SOL report.

Review the public objectives of education.

To what extent are objectives, such as improving health or encouraging civic participation, stated as explicit goals of education? What criteria and measures are being used to monitor progress?

Strengthen the knowledge base.

Activities related to the SOL project need to be based on theory and evidence. Key areas for development are conceptual constructs for analyzing social outcomes, policy indicators and other measures, and the application of cost–benefit analyses.

Enrich data analysis.

Existing database information needs to be expanded. Further construction and application of longitudinal data, experimental designs, biographical analysis and in-depth studies of learning processes are high priorities.

Explore the implications for pedagogy, assessment and qualification systems.

Adult and informal learning contribute significantly to social outcomes, but often are unacknowledged. SOL's work calls for further understanding of how learning achievements of different kinds are recognized and valued.

Widen the range of literacy benchmarks.

This entails the extension of the range of educational achievement measures to include health and civic literacy.

Foster inter-sectoral dialogue.

Crossing sectoral boundaries is always desirable but rarely realized. Using SOL results to promote dialogue across sectoral boundaries makes analysis more comprehensive and policy development more pertinent.



- ¹ Canadian Council on Learning (CCL), *Health Literacy in Canada: A Healthy Understanding* (Ottawa: CCL, 2008). Available at www.ccl-cca.ca.
- ² Elections Canada, *Estimation of Voter Turnout by Age Group at the 39th Federal General Election, Jan. 23, 2006*, Working paper series (Ottawa: March 2008).
- ³ Organisation for Economic Co-operation and Development (OECD), *Understanding the Social Outcomes of Learning* (Paris: July 12, 2007).
- ⁴ W. McMahon, "Conceptual framework for the analysis of the social benefits of lifelong learning," *Education Economics* 6, no. 3 (December 1998), pp. 309–346.
- ⁵ OECD, *Society at a Glance: OECD Social Indicators, 2006 Edition* (Paris: 2007).
- ⁶ Robert Putnam, *Bowling Alone: The Collapse and Revival of American Community* (New York: Touchstone, 2000).
- ⁷ J. Lauglo and Tormod Øia, *Education and Civic Engagement—Review of Research and a Study on Norwegian Youths*, OECD Education Working Paper No. 12 (Paris: OECD Directorate for Education, 2007), p. 13.
- ⁸ Lauglo and Øia, *Education and Civic Engagement—Review of Research and a Study on Norwegian Youths*.
- ⁹ Public Health Agency of Canada (PHAC), *Toward a Healthy Future: Second Report on the Health of Canadians* (Ottawa: September 1999).
- ¹⁰ PHAC, *Toward a Healthy Future: Second Report on the Health of Canadians*.
- ¹¹ OECD, *Understanding the Social Outcomes of Learning*.
- ¹² Statistics Canada, *Highest Certificate, Diploma or Degree (14), Age Groups (10A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census – 20% Sample Data* (Ottawa: Released March 4, 2008), Catalogue no. 97-560-XCB2006007.
- ¹³ World Values Survey [online]. Available at www.worldvaluessurvey.org/ (accessed Oct. 4, 2008).
- ¹⁴ OECD, *Society at a Glance: OECD Social Indicators, 2006 Edition*, p. 114.
- ¹⁵ OECD, *Understanding the Social Outcomes of Learning*, Executive summary, p.14.

An Overview: Key Findings

Positive performances

In 1998, Canada passed the halfway mark in the proportion of the population aged 25 to 64 with post-secondary education (PSE)—including trades, college, *Collèges d'enseignement général et professionnel* (CEGEPs, which are post-secondary institutions found only in Quebec) or university certificates, diplomas or degrees. By the 2006 Census, six out of 10 adults aged 25 to 64 had completed some form of PSE. Canadian rates of educational attainment are now among the highest in the world.

As of 2005–2006, more than one million students were enrolled at Canadian universities for the third year in a row. Projections of labour-market requirements for people with these skills—1.42 million new university graduates by 2015—may well be met at the Canada level. However, regional or local labour markets with specific skilled-labour requirements are not necessarily reflected at this aggregate level. Over the next 10 years, shortages are expected in a number of university-level occupations, including natural and applied sciences and health.

Employment opportunities for PSE graduates in Canada have grown significantly, accompanied by declining unemployment rates and more job stability. Over the last 15 years, unemployment rates for individuals who had not graduated from high school were generally three times higher than unemployment rates for those with a university degree.

Troubling trends

Canada needs to address several trends in order to sustain economic well-being. Large numbers of Canadian-born and immigrant workers with PSE are functioning below Level 3 on the prose literacy scale—the minimum literacy skill level required to cope adequately with the demands of everyday life and work in an advanced society like Canada. In the context of an aging population, literacy levels are not expected to improve over time, despite the fact that a higher proportion of young adults are completing PSE. High levels of educational attainment are not enough. PSE attainment levels must be accompanied by literacy levels that maximize the value of the education.

The highest labour-market demand between now and 2015 will be for trades and college graduates. Student PSE choices have funnelled toward university since the early 1990s: the proportion of university graduates has increased by about five percentage points with each new 10-year age cohort. At the same time, the number of college graduates over the last two age cohorts has stabilized, and the proportion of those completing programs in the trades has declined. In addition, immigration policies have leaned toward university graduates in recent years. These factors combine to create uncertainty about whether there will be enough diversity in types of PSE attainment to meet the projected demand for college and trade graduates for 2015.

Similar funnelling trends appear within PSE subjects of study. Business management graduates account for one-quarter of the growth in university graduates across age cohorts. In the college sector, students in business management and computer related fields made up one-third of the growth. There is little research on the levels of educational attainment needed by subject area or on the process students use for selecting subjects of study. As a result, government and post-secondary responses to labour-market shortages in specific fields of study are typically reactive rather than proactive.

Canada has depended on immigration to supplement the supply of post-secondary graduates in the labour market. In 2006, one in 10 trades graduates residing in Canada was neither Canadian-born nor a graduate from a Canadian trades program. The rate was similar in the college sector and twice as high in universities (one in five).

Overall, almost one-quarter of recent immigrants in Canada with foreign university-level credentials were working in low-skilled jobs. Integration of skilled workers and professionals from abroad is complicated by issues of assessment of quality and relevance of foreign credentials to current labour-market conditions. Poor language and literacy skills in Canada's official languages (English and French) can also impede immigrants' capacity to integrate into Canadian society and the economy.



A SKILLED AND ADAPTABLE WORKFORCE

A SKILLED AND ADAPTABLE WORKFORCE

Introduction

The availability of a skilled and adaptable workforce is the cornerstone of a productive and prosperous country. As in other countries, the labour market in Canada is continually changing. Canada's current labour force is diverse, having adjusted to many factors over the past two decades: significant growth resulting from the increased participation of women and under-represented groups; an aging population; shifting industrial demands as some industries decline and others experience rapid growth; and the introduction of technology that has affected virtually all facets of communication and production. In addition, there is an increasing need for highly educated personnel to respond to advances in research and innovation, and to an information-age economy.

Shifts in the labour market

Between the 2001 and 2006 Censuses, Canada lost approximately 150,000 jobs in the manufacturing sector.¹ This stands in contrast with equivalent gains observed in the professional, scientific and technical sectors, and even greater gains in health care, social assistance, construction and retail trade.

Recent downturns in the economy have resulted in further job losses. These types of shifts in the labour market are often associated with retraining or retooling the labour force. The 2009 federal budget included extended coverage under the Employment Insurance program for workers pursuing training.²

Graduates of Canada's post-secondary education (PSE) programs have met many of the labour-market needs of this country. Canada has also increased its dependence on immigrants to supplement the labour-market pool of post-secondary graduates.

To remain responsive to labour-market needs, post-secondary institutions (PSIs) in Canada have actively fostered linkages to the labour market through a variety of initiatives, such as: co-op placements; classroom instruction by labour-market experts; the design of courses to match specific labour-market requirements; and off-campus or job-site course offerings. Canada's extensive and successful community college and polytechnic system deserves special note, in particular, as it has developed strong linkages with local and regional economies and with the business community. Research and development in the college sector is particularly targeted at resolving industry challenges. The applied research clusters of the seven Canadian public

polytechnic institutes include:

- business and information technology
- manufacturing and construction
- health sciences and biotechnology
- environmental technology and renewable energy
- community outreach and development of specialization³

These types of activities keep the pedagogical material in PSE programs pertinent to current labour-market conditions and facilitate students' transitions from the classroom to the job market.

This chapter discusses indicators that provide insight into Canada's performance in establishing the skilled and adaptable workforce required by the labour market now and into the future. It also examines the relative labour-market outcomes for individuals who have PSE and for those who do not.

The sections covered in this chapter include:

- labour-market demand, by PSE attainment
- labour-market supply, by levels of educational attainment
- convergence in levels of PSE attainment and fields of study
- immigrant levels of PSE educational attainment
- labour-market outcomes for PSE graduates
- summary: opportunities and future directions

Labour-market Demand

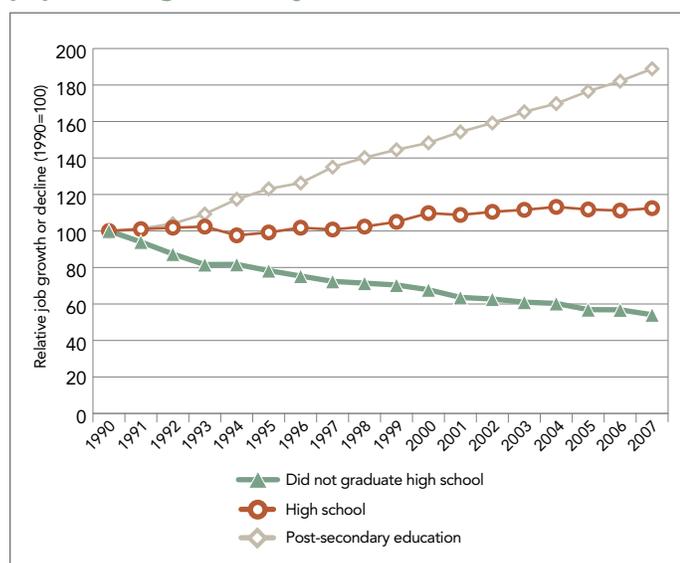
For years, economists have struggled to assess differences between the demand for labour and the availability of workers. In a country with a land mass as large as Canada's, where there are many regionally specific labour markets, this is a particularly difficult task. In 2006, Human Resources and Social Development Canada (HRSDC) released a 10-year outlook for the Canadian labour market for the period 2006–2015.⁴ The report presents a detailed assessment of past, current and future labour-market conditions for Canada. It concluded that the Canadian labour market had been performing well over the previous several years, with strong growth rates in both employment and participation, and with relatively low unemployment rates. These analyses were conducted prior to the recent economic downturn.

Looking Back

The 2006 Census reports that between 2001 and 2006, total employment in Canada increased at an annual average rate of 1.7%, the fastest rate increase among the Group of Seven nations.⁵

Between 1990 and 2007, the increase in jobs for workers with PSE was much greater than for those without PSE. The number of jobs almost doubled for PSE graduates—for every 100 PSE graduates working in 1990, 189 were working in 2007. In contrast, there were one-half as many jobs for those who had not completed high school for every 100 workers in this category in 1990, there were 54 in 2007.

Figure 7.1
Relative job change, by level of educational attainment, population aged 25–64 years, Canada, 1990–2007



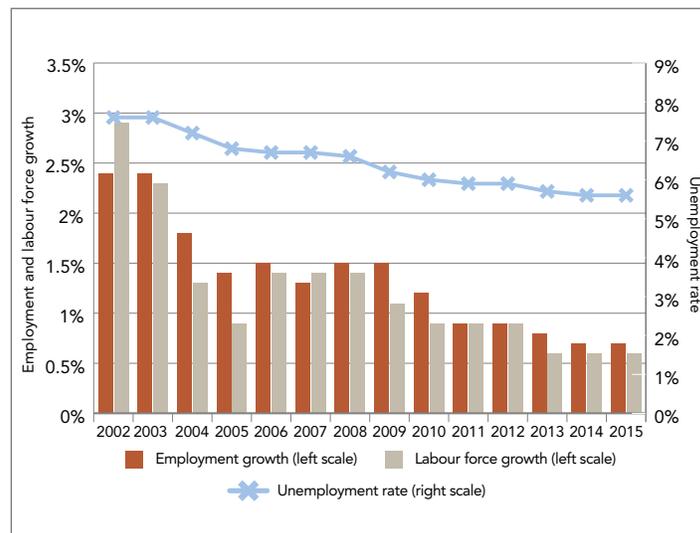
Sources: Statistics Canada, *Labour Force Historical Review 2007*, CD-ROM (Ottawa: Feb. 19, 2008), Catalogue no. 71F0004XCB.

HRSDC anticipates that the demand for post-secondary graduates will continue well into the future. Before 2015, about 5.5 million job openings will result from both the creation of new jobs and from positions vacated by retiring baby boomers. Two-thirds of these openings will be in management or occupations usually requiring PSE (3.4 million). The 2006 Census indicates that about 70% of people in management occupations held PSE certificates, diplomas or degrees⁶. Approximately 1.42 million university graduates will be required before 2015, (which includes 40.8% of the expected management job openings). The highest demand in the next 10 years will relate to colleges or apprenticeships, with 2.02 million graduates needed by 2015 (which includes 28.7% of the management jobs openings).⁷

Canada's aging labour force

Results from Census 2006 show that Canada's labour force is aging. In 2006, workers aged 55 and older accounted for 15.3% of the total labour force, up from 11.7% in 2001.⁸

Figure 7.2
Aggregate labour-market outlook, Canada, 2002–2015



Source: Mario Lapointe et al., *Looking-Ahead: A 10-Year Outlook for the Canadian Labour Market (2006–2015)* (Ottawa: Human Resources and Social Development Canada, October 2006).

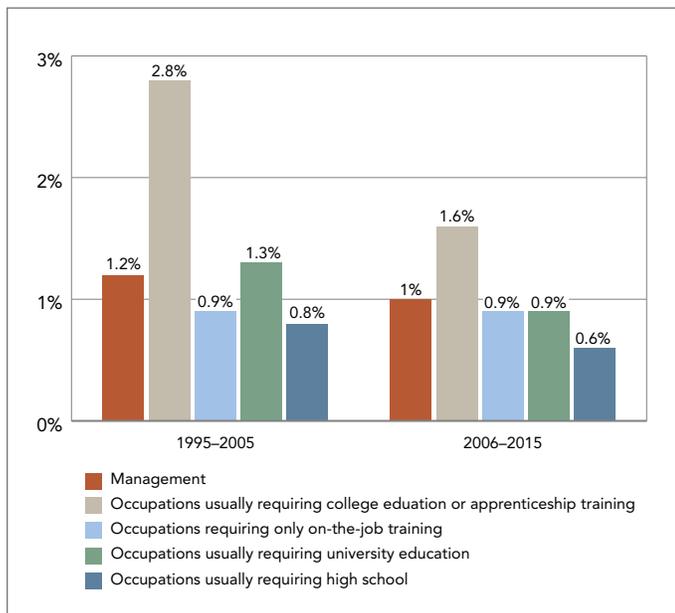
Table 7.1
Job openings by skill requirements, Canada, 2006–2015

	Expansion count (in thousands)	Retirement count (in thousands)	Total count (in thousands)	Distribution management and other occupations (%)
Total	1,697	3,801	5,498	100
Management (skill requirements unidentifiable)	170	433	603	11
All other occupations	1,527	3,369	4,896	
Skills required				
University education	445	726	1,171	21.3
College education or apprenticeship training	560	1,288	1,848	33.6
High school	425	1,035	1,460	26.6
On-the-job training only	97	320	417	7.6

Source: Mario Lapointe et al., *Looking-Ahead: A 10-Year Outlook for the Canadian Labour Market (2006–2015)* (Ottawa: Human Resources and Social Development Canada, October 2006), p. 56.

Despite forecasts of a balanced labour market at the national aggregate level, the nature of employment and the realities of the Canadian labour market suggest potential labour shortages. Regional or local labour markets with specific skilled-labour requirements are not necessarily reflected at the aggregate level. Over the next 10 years, shortages are expected in occupations such as business, finance and administration, natural and applied sciences, health, and primary and processing industries.⁹ At the same time, recent economic events have increased the number of workers without jobs. Thus the current reality is that there are people without jobs and jobs without people.

Figure 7.3
Labour-force growth by skill level, Canada, 1995–2015



Source: Mario Lapointe et al., *Looking-Ahead: A 10-Year Outlook for the Canadian Labour Market (2006–2015)* (Ottawa: Human Resources and Social Development Canada, October 2006), p. 56.

Note: Average annual compound growth rates.

Canada's skilled and adaptable workforce depends to a large degree on the adaptability of Canada's PSIs. As declining birth rates in Canada result in slower growth in labour-force entrants, Canada will need to maximize all available human resources. To replenish the labour force, PSIs will need to facilitate learning for the unemployed, adult learners, learners from low-income families, and other non-traditional PSI participants. The ability of PSIs to respond to changing labour-market realities and to the needs of non-traditional learners will be a key determinant of Canada's capacity to achieve economic growth and maintain its international competitiveness now and well into the future.

Labour-market Supply: Educational Attainment in the Canadian Labour Market

Demand for skilled workers in Canada is met through two fundamental sources: graduates from Canada's PSIs, who are the major contributors to the skilled-labour market, and immigrants with PSE credentials, who provide the second largest supply. More detailed data profiles on these two groups can advance the assessment of labour-market supply against labour-market demand.

What is post-secondary attainment?

Post-secondary attainment refers to the proportion of the population who have completed PSE. PSE attainment in any population is typically assessed and measured by calculating the distribution of graduates from academic, technical and vocational programs taken beyond the secondary-school level. In Canada these are provided by colleges, Collèges d'enseignement général et professionnel (CEGEPs), universities and university colleges. While most of these institutions are public, some are private. Graduates from these programs receive diplomas, certificates, or undergraduate or graduate degrees. PSE attainment measures in Canada also include graduates from registered apprenticeship trades programs. These programs typically require high-school completion for entry and include both in-class components (often taken in the college setting) and workplace apprenticeship training. Upon completion, trades graduates receive journeyman certificates or certificates of qualifications.

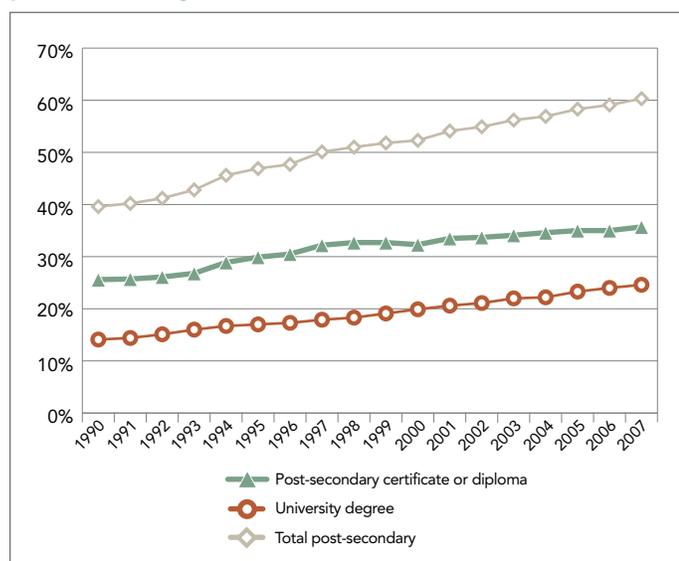
The Organisation for Economic Co-operation and Development (OECD) measures attainment by calculating distributions of graduates from tertiary education programs. Tertiary education includes programs taken beyond the secondary (high-school) level. Type B tertiary programs are equivalent to college or CEGEP programs in Canada. Type A tertiary and advanced research programs are equivalent to university-level programs in Canada. The OECD typology classifies Canadian registered apprenticeship and trades programs as "post-secondary non-tertiary education."

Post-secondary graduates: The new education norm

During the late 1990s, completion of some form of PSE became the new education standard in Canada. In 1998, Canada passed the halfway mark in the proportion of the population aged 25 to 64 with PSE (including trades, college, CEGEP or university certificates, diplomas or degrees). Previously, completion of high school was the education norm.

The percentage of the population aged 25 to 64 years with post-secondary credentials has risen consistently over the past two decades. The percentage with a college credential or trade certificate rose from 25.6% in 1990 to 35.7% in 2007. The percentage with a university degree increased from 14.1% in 1990 to 24.6% in 2007.

Figure 7.4
Proportion of the population aged 25–64 years with post-secondary education, Canada, 1990–2007



Sources: Statistics Canada, "Labour force survey," *The Daily* (Nov. 1, 2007), www.statcan.ca/english/dai-quo/; and Statistics Canada, *Labour Force Historical Review 2007*, CD-ROM (Ottawa: Feb. 19, 2008), Catalogue no. 71F0004XCB.

Note: Post-secondary certificate or diploma includes trades and registered apprenticeship, college, CEGEP and other non-university graduates.

Labour-market participants with PSE

The recently released 2006 Canadian Census figures, provide a rich source of data on many aspects of labour-market participation and demographic factors. The 2006 Census reports that six out of 10 adults aged 25 to 64 had completed some form of PSE by May 2006.¹⁰

Studies show that "each extra year of full-time education (corresponding to a rise in human capital of about 10% for OECD countries as a whole) is associated with an increase in output per capita of about 6%."¹¹ As other countries recognize the importance of building and strengthening their post-secondary systems to meet the skills requirements of the knowledge economy, growth patterns in educational attainment have shifted significantly. The number of enrolments in tertiary education around the globe increased from 68 million in 1991 to 132 million in 2004.¹² Average annual growth rates in tertiary education over this period were 5.1%. They were higher in East Asia and the Pacific, sub-Saharan Africa and South and West Asia—ranging from 6.8% to 8.1% compared with 1.9% in North America and Western Europe.¹³

Canadian rates of educational attainment are among the highest in the world. Of Canada's population aged 25 to 64 in 2006, 47% had attained a university or college education—compared with rates of 40% and 39% in Japan and the United States respectively. Canada's increase in PSE attainment has been steady at about 1% per year since 2001. The most recent OECD data indicate that, on average, growth in PSE attainment between 2005 and 2006 of about 1% was consistent across most member countries. In Canada, however, a 1% increase in the population aged 25 to 64 with PSE would be an increase of about 170,000 graduates. A comparable increase in more populated countries would be significantly higher. A 1% increase in the United States, for example, would represent 1.6 million additional graduates. While Canada continues to show steady increases, considerable challenges lie ahead—such as meeting upcoming labour-market demands within the country and maintaining Canada's position in an increasingly well-educated, competitive and innovative international forum.

Table 7.2
Proportion of the population aged 25–64 years that has completed post-secondary (tertiary) education, OECD countries, 1999–2006

	1999	2001	2002	2003	2004	2005	2006
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
OECD average	22	23	23	24	25	26	27
EU (19 member countries) average					23	24	24
Australia	27	29	31	31	31	32	33
Austria	11	14	14	15	18	18	18
Belgium	26	28	28	29	30	31	32
Canada	39	42	43	44	45	46	47
Czech Republic	11	11	12	12	12	13	14
Denmark	27	27	28	32	32	34	35
Finland	31	32	33	33	34	35	35
France	21	23	24	23	24	25	26
Germany	23	23	23	24	25	25	24
Greece	18	18	18	18	21	21	22
Hungary	14	14	14	15	17	17	17
Iceland	22	25	26	26	28	31	30
Ireland	21	36	25	26	28	29	30
Italy	9	10	10	10	11	12	13
Japan	32	34	36	37	37	40	40
Korea	23	24	26	29	30	32	33
Luxembourg	18	18	19	15	23	27	24
Mexico	13	15	6	15	16	15	15
Netherlands	23	23	24	24	29	30	30
New Zealand	27	29	30	31	25	27	38
Norway	27	30	31	31	32	33	33
Poland	11	12	12	14	16	17	18
Portugal	10	9	9	11	13	13	13
Slovakia	missing	11	11	12	12	14	14
Spain	21	24	24	25	26	28	28
Sweden	29	32	33	33	35	30	31
Switzerland	24	25	25	27	28	29	30
Turkey	7	9	9	10	9	10	10
United Kingdom	25	26	27	28	29	30	30
United States	36	37	38	38	39	39	39

Source: OECD, *Education at a Glance 2008: OECD Indicators*, Table A1.3a (Paris: 2008).

Note: Tertiary education in OECD countries includes college/vocational and university programs. It does not include trade and registered apprenticeship graduates.

Convergence in Post-secondary Attainment and in Fields of Study

While the overall distribution of Canada's population with PSE is positive, troubling trends are apparent at the more detailed level. Over the last 15 years, convergence has increased in the type of PSE that students select and in the fields of study completed.

Convergence in types of PSE completed

Younger generations increasingly choose university as their preferred type of PSE option; 28.9% of the younger population aged 25 to 34 (new entrants to the labour force) had university education in 2006, compared with 18.3% of the older population aged 55 to 64 (those about to retire from the labour force or labour-force leavers). In 2005–2006, more than one million students were enrolled at Canadian universities.¹⁴ This was the third year in a row that university enrolments passed the one million mark. In light of these enrolment figures, the projected labour-market requirements for people with these skills—1.42 million new university graduates by 2015—may be met. However, as noted earlier, regional or local labour markets with specific skilled-labour requirements are not necessarily reflected at this aggregate level. Over the next 10 years, shortages are expected in a number of university-level occupations, including natural and applied sciences, and health.

College and CEGEP completions are higher among the younger population, compared with the older group (22.7% versus 16.2%). However, they appear to have stabilized and have experienced little growth among the two youngest age groups (25 to 34 years and 35 to 44 years). In addition, as 2006 Census results indicate, younger generations are less likely than older generations to pursue PSE in the trades. While 13.1% of the population aged 55 to 64 had a trades certificate in 2006, 10.4% of those aged 25 to 34 had similar qualifications. Given that college, CEGEP and apprenticeship graduates in the trades are expected to be in high demand in the coming years—2.02 million new graduates are required by 2015—the loss in the trades and the apparent stabilization in the proportion of college and CEGEP graduates is of concern.

Statistics Canada reports that in 2005, there were about 514,000 full-time enrolments at colleges and CEGEPs across Canada in programs eligible for academic credit, including the in-class portion of registered apprenticeship programs. ACCC reports that in 2007, total enrolment in community colleges and CEGEPS, including full-time and part-time in both credit and not-for-credit programs,¹⁵ was approximately 1.5 million. Enrolment must remain steady and PSE graduation rates must be high in order to satisfy the labour-market demand for college, CEGEP and trade graduates by 2015. Furthermore, while

apprenticeship registrations have increased in recent years, including in the Red Seal trades,* completions (passing the final exam to become a journeyman or obtaining the certificate of qualification) are not increasing accordingly. (For more detailed information on current enrolments in trade, college and university, see Chapter 1, "From Access to Attainment.") Individuals with journeyman's certificates or certificates of qualifications in the trades are necessary to maintain the high level of quality in the work that is completed and to oversee the training of new apprentices.

Table 7.3
Proportion of the population by level of educational attainment, by age group, Canada, 2006

Level of educational attainment	25–34 years (%)	35–44 years (%)	45–54 years (%)	55–64 years (%)	Percentage point change, between youngest and oldest age groups
Total	100	100	100	100	
Did not graduate high school	10.9	12.6	16.4	22.9	-12
High-school diploma	22.5	22.8	26.1	23.9	-1.4
Post-secondary qualification	66.6	64.6	57.5	53.2	13.4
Trades certificate	10.4	12.7	13.2	13.1	-2.7
College diploma	22.7	22.2	19.6	16.2	6.6
University certificate or diploma below BA	4.5	4.9	5	5.6	-1
University degree	28.9	24.8	19.7	18.3	10.6

Source: Statistics Canada, 2006 Census of Population (Ottawa: released March 2008), Catalogue no. 97-560-XCB2006007.

Convergence in types of PSE fields of study

Similar funnelling trends occur within PSE fields of study. The declining number of individuals who have completed qualifications in the trades (the number of labour-force leavers versus labour-force arrivals) is almost entirely within the Red Seal trades. These losses include, for example, workers who are skilled as electricians, plumbers, mechanics, welders and millwrights. (Millwrights are trades specialists who maintain or construct industrial machinery.) This raises concerns about the current availability of these types of skills in the labour force and of the loss of economic contribution made by these types of workers. Furthermore, without a steady flow of qualified graduates and journeymen in these areas, it will be difficult to train and certify the next generation of workers with these skills.

Although comparisons between older and younger workers show gains in the number of people with college and university qualifications, the growth has been uneven across the fields of study. In the college sector in 2006, there were almost 300,000 more graduates in the younger population (aged 25 to 34) than in the older population (aged 55 to 64); however, the younger population pursued less diverse subject areas than the older population. Almost one-third of the increase (30.6%) was related to only two subject areas—business and computers.

This type of funnelling toward particular fields of study occurs with university programs as well. Two-thirds of the growth in university graduates (almost 500,000) occurred in five fields of study. Business graduates account for 25.6% of the growth. Computer-related subjects, health professions, engineering and social sciences each accounted for about 10% of the growth.

* The Red Seal Program was established to provide skilled workers with greater mobility across Canada. It enables apprentices who have completed their training and are certified journeymen to obtain a Red Seal endorsement on their Certificates of Qualification and Apprenticeship by successfully completing an Interprovincial Standards Examination. The Red Seal Program encourages standardization of provincial and territorial apprenticeship training and certification programs. It allows qualified tradespersons to practice their trade in any province or territory in Canada where the trade is designated, without being required to write further examinations. To date, there are 49 trades across are included in the Red Seal Program. See Appendix for a list of the trades. Source: *Interprovincial Standards Red Seal Program*, www.red-seal.ca.

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Table 7.4 highlights the funnelling of students to university and to specific fields of study by comparing 25- to 34-year-olds (labour force entrants) to 55- to 64-year-olds (those preparing to leave the work force). For example, in 2006 there were almost 26,000 fewer 25- to 34-year-olds than 55- to 64-year-olds who were trades graduates having studied mechanic and

repair technologies or were mechanic and repair technicians. At the same time, there were 123,000 more 25- to 34-year-old university graduates in business, management, marketing and related support services, compared to the number in the 55- to 64-year-old population.

Table 7.4
Change in count between labour-force leavers and labour-force arrivals in specific fields of study, by level of educational attainment, Canada, 2006

Field of study	Level of educational attainment		
	Trades	College	University
	loss/gain^a		
Engineering technologies/technicians	-4,520	21,130	
Precision production ^b	-8,765	1,645	
Construction trades	-18,550	-3,105	
Mechanic and repair technologies/technicians	-25,775	5,895	
Business, management, marketing and related support services	-22,575	38,155	123,445
Education		-18,210	-19,005
Personal and culinary services	12,495	12,730	
Public administration and social service professions		12,915	
Health professions and related clinical sciences	-5,350	11,025	44,390
Computer and information sciences and support services	-6,205	58,535	45,515
Security and protective services		25,340	
Family and consumer sciences/human sciences		26,250	
Legal professions and studies		16,285	
Humanities			18,030
Natural resources and conservation			10,340
Parks, recreation, leisure and fitness studies			15,385
Engineering			56,380
Biological and biomedical sciences			32,245
Communication, journalism and related programs			17,925
Psychology			20,290
Social sciences			52,260
Visual and performing arts			23,135

Source: Statistics Canada, Labour Force Activity (8), Highest Certificate, Diploma or Degree (14), Major Field of Study – Classification of Instructional Programs, 2000 (73), Age Groups (9) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas, and Census Agglomerations, 2006 Census – 20% Sample Data (Ottawa: released July 17, 2007), Catalogue no. 97-560-XCB2006011.

^a Loss/gain: Count of 25- to 34-year-olds minus count of 55- to 64-year-olds. The difference in counts is done separately for each field of study.

^b Precision production includes: machine tool technology/machinist, machine shop technology/assistant, sheet metal technology/sheetworking, tool and die technology/technician, welding technology/welder, ironworking/ironworker, precision metal working, boilermaker, other (see CIP 2000 code 48).

Notes:

- Labour-force leavers are the population aged 55–64 years who are nearing retirement. Labour-force arrivals are new entrants to the labour force, aged 25–34 years.
- To be included in the table, any field of study (except the trades) had to show a gain or loss of 10,000 people or more.

Again, the convergence toward particular types of post-secondary study and subject areas raises questions about balancing student choices and labour-market demands over the longer term. The entrepreneurial spirit of the post-recession 1990s and the technology boom clearly influenced recent student choices (business and computer-related subject areas). However, this type of funneling is detrimental to enrolment in other areas of study and may not be responsive to labour-market needs. The ability of post-secondary institutions to respond to labour-market demands may be mitigated by student preferences. Understanding how and why students make the PSE choices they do would enhance the ability of PSIs to be labour-market responsive.

Immigration and PSE Attainment Levels

Canada's immigration policies include the awarding of points based on the applicant's level of educational attainment. These points for education have been adapted over the years to respond to labour-market needs for particular types of skilled workers. According to the 2006 Census, 7.2% of the trades population and 8.2% of the college-educated population were not born in Canada and did not earn their certificates or diplomas in Canada. In 2006, more than one in five university graduates living in Canada (21.5%) were immigrants with foreign credentials.

Table 7.5
Proportion of the population aged 25–64 years, Canadian-born and foreign-born, by post-secondary education completed, Canada, 2006

Whether born in Canada and studied in Canada	Apprenticeship or trades (%)	College or CEGEP (%)	University certificate, diploma or degree (%)
Total	100	100	100
Canadian-born, studied in Canada	81.9	79.6	63
Canadian-born, studied outside Canada	0.5	0.6	2.9
Not Canadian-born, studied in Canada	10.5	11.6	12.6
Not Canadian-born, studied outside Canada	7.2	8.2	21.5

Source: Statistics Canada, Immigrant Status and Period of Immigration (9), Labour Force Activity (8), Highest Certificate, Diploma or Degree (7), Location of Study (16), Age Groups (9) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census – 20% Sample Data (Ottawa: 2008), Catalogue no. 97-560-x2006025.

Data from Citizenship and Immigration Canada (CIC) show that 43% of immigrants who arrived in Canada in 2006 had completed a university degree prior to immigration, down slightly from the previous year (46%). This decline is accounted for by a decline of two percentage points between 2005 and 2006 in the number of immigrants accepted into Canada with a bachelor's degree. About 12% of immigrants with a university education in 2006 were master's graduates and 2% had completed a doctorate. As Statistics Canada reported in 2006, "although 23% of Canadians aged 25 to 64 were born outside Canada, they [immigrants] accounted for nearly one-half (49%) of the doctorate holders in Canada and for 40% of adults with a master's degree."¹⁶

Since 1996, the proportion of post-secondary graduates in the trades who immigrated to Canada dropped by half, from 10% to 5%. This reflects CIC policy changes to the point-credit system. For the last three years of data available, the proportion of immigrants with college-level education has remained steady at 11%.

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Table 7.6

Landed immigrants aged 15 years and older, by year of immigration and level of post-secondary education completed, Canada, 1996–2006

	Year of immigration											
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	
	(%)											
Level of post-secondary educational attainment												
Total	47	51	54	57	58	60	60	59	61	61	59	
Trade certificate	10	10	9	8	6	5	4	5	5	5	5	
Non-university certificate or diploma	8	8	10	9	9	9	9	10	11	11	11	
Total university degree	29	33	35	41	44	46	46	45	46	46	43	
Bachelor's degree	22	25	27	30	32	34	34	34	32	31	29	
Master's degree	6	7	7	9	10	10	10	10	11	12	12	
Doctorate	2	2	2	2	2	2	2	2	2	2	2	

Source: Citizenship and Immigration Canada, *Facts and Figures 2006: Immigration Overview: Permanent and Temporary Residents* (Ottawa: 2007).

Factors that Impact Canada's Skilled and Adaptable Workforce

Central to a discussion of Canada's skilled and adaptable workforce are two important issues: literacy and credential recognition (between provinces and between countries).

Literacy

In a knowledge-based society, literacy is a critical skill. Yet data from the International Adult Literacy and Life Skills Survey (IALLS, 2003) indicate that 48%—almost half—of all Canadians aged 16 and older are below Level 3 on the prose literacy scale. Level 3 is considered to be the minimum literacy skill level required to cope adequately with the demands of everyday life and work in an advanced society. Given our aging population and demographic trends, Canada's literacy levels are not projected to improve over time, despite the fact that

more young adults are completing PSE. Poor literacy levels hinder the ability of post-secondary graduates to maximize their contribution to the Canadian labour market.

Literacy levels vary substantially by levels of educational attainment. Based on 2003 data, projections for 2006 indicated that 79% of all adults without a high-school diploma had low levels of literacy, whereas only 20% of all adult university graduates (including seniors) had low levels of literacy.

Poor literacy levels within the immigrant population contribute to these figures. In 2006, almost two-thirds of the immigrant population had low levels of literacy overall, with 35% of immigrants with a university degree scoring below Level 3. However, it is important to note that the IALLS testing is conducted only in English or French, and therefore is not able to distinguish between immigrants with low levels of literacy versus immigrants who may need more English- or French-language training.

Table 7.7

Proportion of the population below Level 3 in prose literacy, current and projected, total population and immigrant population, by levels of educational attainment, Canada

Year	Canada					Non-immigrant population		Immigrant population	
	Level of educational attainment					Total	With a university education	Total	With a university education
	Total	Did not graduate high school	High school	Some post-secondary ^a	University				
	(%)					(%)		(%)	
2006	48	79	54	38	20	43	13	65	35
2011	47	80	56	39	21	41	14	64	36
2016	46	80	58	41	22	41	14	63	37
2021	46	81	60	42	23	41	15	62	37
2026	46	81	62	44	24	41	15	61	38
2031	46	82	63	45	24	40	15	61	39

Source: Canadian Council on Learning, *Reading the Future: Planning to meet Canada's future literacy needs* (Ottawa: June 2008).

^a Some post-secondary includes attendance at any post-secondary institution without completion and completions from any post-secondary institutions except university.

Immigrants' successful integration into Canadian society takes several years—regardless of their level of educational attainment.¹⁷ Finding work is often complicated by the need to learn one of Canada's official languages. About one-third of

recent immigrants had neither English- nor French- language skills. Poor literacy or poor official-language skills can slow the successful integration of newcomers into Canadian society.

Table 7.8
Immigrants to Canada (permanent resident category), by year of immigration and language ability, Canada, 1997–2006

	Year of immigration									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
	(%)									
Total	100	100	100	100	100	100	100	100	100	100
Language ability										
English	52	48	49	47	46	43	44	49	51	53
French	4	5	5	5	5	5	5	5	5	5
Both French and English	3	4	4	4	5	6	7	10	9	9
Neither	42	43	42	44	44	46	44	37	36	33

Source: Citizenship and Immigration Canada, *Facts and Figures 2006: Immigration Overview: Permanent and Temporary Residents* (Ottawa: 2007).

Credential recognition

The skill match between labour-market demand and labour-market supply is assessed typically through the measurement of levels of educational attainment. However, in the past, students completed their high-school diploma and continued on in a fairly linear fashion to PSE in the trades, college or university. Options were clearly delineated, and students, PSE institutions and employers shared an understanding of the skills associated with each type of post-secondary qualification. Measuring skill levels within the population more or less reflected specific levels of educational attainment.

Today, Canada's PSE system is in a period of flux and the link between levels of educational attainment and the assessment of the availability of skills in the labour force is not as clear as it once was. Students now can participate in a growing variety of PSE options including traditional publicly funded programs at colleges, CEGEPs, universities and in the trades, as well as those offered by degree-granting colleges, and privately funded colleges and universities. In addition, many students choose to complete both a college and a university program. Although this increase in post-secondary options responds to student demands and enhances access, it has blurred the ability of many—including employers, policy-makers and post-secondary institutions themselves—to evaluate and recognize the skill level associated with some post-secondary credentials.

Program offerings vary across Canada's education jurisdictions and between public and private-sector education. This limits students' inter-institutional mobility if they choose to change provinces while studying and their entry into job markets in provinces other than where they studied. Without an elaborate evaluative process, post-secondary institutions and employers can find it difficult to recognize qualifications and assess the skills associated with credits or credentials from other jurisdictions.

In addition, about 3% of the Canadian-born population with university education obtained their credentials outside of Canada,¹⁸ while one in five university graduates and close to one in 10 trades or college graduates are immigrants with foreign credentials. Foreign credentials submitted for recognition in Canada come from all corners of the world and from all types of education systems. As a result, all provinces, professional organizations and PSIs have been struggling to address the issue of recognizing foreign credentials while, at the same time, maintaining the high standards of quality that have been associated with Canadian certificates, diplomas and degrees.* The 2009 federal budget allocated \$50 million over two years to establish a national foreign credential recognition framework in partnership with the provinces and territories.

* The Provincial Assessment Committee of Canada has published guidelines for credential recognition in its online publication *Alliance of Credential Evaluation Services of Canada: General Guiding Principles for Good Practice in the Assessment of Foreign Credentials*, available at www.canalliance.org. For other examples of credential recognition practices, see *The Committee of the Convention on the Recognition of Qualifications Concerning Higher Education in the European Region: Recommendation on Criteria and Procedures for the Assessment of Foreign Qualifications*, available at www.cepes.ro.

Labour-market Outcomes for PSE Graduates

Considerable information is available on the labour-market outcomes of various levels of educational attainment, including long-term employment and unemployment rates, and income for specific levels of education. These outcomes are monitored to assess the returns to investment for specific post-secondary certificates and degrees, and to understand factors that influence the variability of employment and income across groups.

It is not clearly understood how aware high-school students are of the impact that various types of education will have on their future life paths. Little is known about the extent to which they assimilate information on job opportunities, unemployment rates, income levels and quality-of-life differences that are associated with various levels of educational attainment. Nor is there sufficient analysis of how students use this information, if at all, to choose both the type of PSE to pursue (trade, college or university) and the field of study in which to specialize. This information is critical to any complete analysis of, and the ability to monitor, the match between labour-market supply and labour-market demand.

Unemployment rates and job stability

Unemployment rates have long served as an indicator of the balance between the supply of and demand for labour. Low unemployment rates of 3% to 5% usually signal some “tightness” or excess demand (shortages) in the labour market. Labour-force participants experience the impact of fluctuating unemployment rates differently, depending on their level of education.

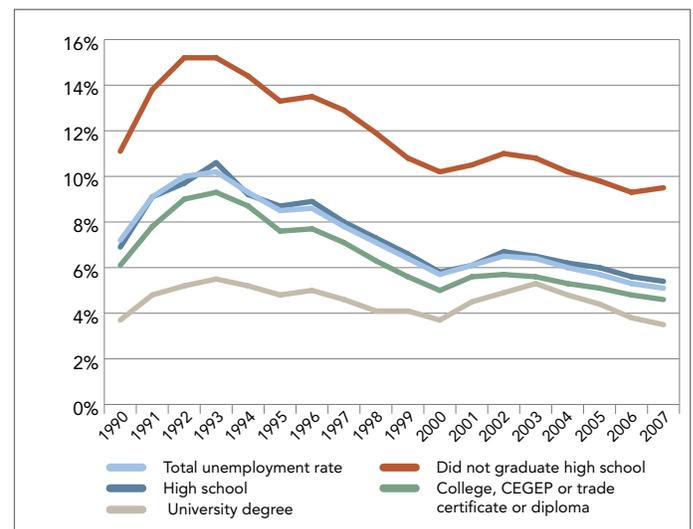
Even during periods of relatively high unemployment for all workers, such as in the early 1990s, individuals with higher levels of education had lower unemployment rates. As Figure 7.5 illustrates, since 1990, unemployment rates in Canada for individuals who had not graduated from high school were generally three times higher than unemployment rates for those with a university degree. Since 2000, the unemployment rates for people without high school have been about twice as high as the unemployment rates for high-school graduates.

Higher education contributes to less volatility in unemployment rates. Unemployment rates for individuals without a high-school diploma ranged from 15.2% in 1992 to 9.3% in 2006, a difference of almost six percentage points. Unemployment rates for university graduates ranged from 5.5% in 1993 to 3.5% in 2007, a difference of just two percentage points. This group is more likely to find a job during recessionary periods—and those who are already employed are more likely to keep their jobs—than those who do not have a university education.

Unemployment rates for all levels of education declined steadily after the 1991 recession. In 2007, they were the lowest in 18 years. This reflects Canada’s strong economy at the time, as well as the ability of labour-force participants to obtain jobs in regions experiencing significant economic growth—where highly skilled workers were in shorter supply. Recent data from Statistics Canada indicate that volatility in the labour market was greater in 2008 than in recent years. Job losses in manufacturing, business, building and other support services, and educational services¹⁹ are worrisome. And in the midst of the global economic downturn, the population with low levels of educational attainment may well be experiencing more employment challenges than they have had to deal with in almost two decades.

Questions have been raised as to whether employment growth in recent years has adequately generated sufficient jobs to accommodate the growing numbers of those with post-secondary qualifications—is our population over-qualified? The concern is that highly qualified graduates may be displacing less educated workers. According to the OECD, in countries like Canada, which have experienced rapid growth in post-secondary education, “the relative unemployment rate for those with secondary [high-school] qualifications has not increased substantially, contrary to what the crowding-out or displacement hypothesis would have suggested.”²⁰

Figure 7.5
Unemployment rates, population aged 25–64, Canada, 1990–2007



Sources: Statistics Canada, “Labour force survey,” *The Daily* (Nov. 1, 2007), www.statcan.ca/english/dai-quo/; and Statistics Canada, *Labour Force Historical Review 2007*, CD-ROM (Ottawa: Feb. 19, 2008), Catalogue no. 71F0004XCB.

Trends in Canada's unemployment rates by level of educational attainment are similar to those of other countries, as highlighted in the OECD's *Thematic Review of Tertiary Education*.²¹ Across all OECD member countries, unemployment rates for graduates with tertiary education are about 10 percentage points lower than for graduates with high-school or post-secondary, non-tertiary education.²² On average, the unemployment gap between those with a tertiary education and those with a high-school diploma has not changed in the last decade.²³

Poor unemployment rates for those without a high-school diploma are more pronounced for males than for females. In most OECD countries in 2006, the unemployment rate for

males who had not graduated from high school at age 20 to 24 was higher than for females in the same age group. While more females in this group may not be in the labour force (for reasons such as caring for children) and are, therefore, not saturating the market, the gender differences in unemployment rates are very wide in several countries. In Canada, the unemployment rate for males was 7.1 percentage points higher than for females in 2006. In comparison, the male unemployment rate in the United Kingdom was 12.6 percentage points higher than the female rate; in the United States, the female unemployment rate was three percentage points higher than the rate for males.

Table 7.9
Proportion of the population aged 20–24, below upper-secondary education, not in education and unemployed, OECD countries, 2002–2006

	2002		2003		2004		2005		2006	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
	(%)									
Australia	17.6	8.6	17	10.3	14.2	7.3	12.7	6.2	11.6	6.8
Austria	16.3	7.4	15.7	11	15.4	8.5	—	—	17.6	9.7
Belgium	15	22.3	22.6	19.5	21.1	18.3	19	23.7	18.4	11.8
Canada	17.5	9.9	17.8	10.1	16.5	8.9	18.2	7.4	15	7.9
Czech Republic	29.2	15.3	30.6	19.8	30.8	19	22.3	13.3	21	14.4
Denmark	10.7	6.3	4.8	5.4	5.4	6.8	10.6	—	—	—
Finland	9.1	5.1	23.2	22	13.3	6.3	10.1	—	9.6	—
France	20.1	17.2	19.7	15.7	23.9	23.3	23	22.1	25.9	18.9
Germany	22.7	13.5	26.1	15.6	15.6	9.3	16.3	11.1	16.6	10.6
Greece	13.4	19.7	11.9	21.3	15.4	18.7	—	—	—	—
Hungary	17.9	5.1	15.3	6.4	14.6	6	14.3	—	13.6	10.3
Iceland	—	—	—	—	—	—	—	—	missing	—
Ireland	12.3	6	11.9	5.2	13.5	10.2	15.6	—	14	9.1
Italy	16.9	15.5	missing	missing	15.4	17.4	18.1	14.4	14.6	15.2
Luxembourg	5.9	7.6	9	7.9	8	13.9	—	—	11.2	—
Netherlands	3.2	3	3.2	3	8.1	6.4	8.8	4.3	3.1	3.3
Norway	23.8	7.4	18.2	8.7	13.2	5.9	—	—	—	—
Poland	46.4	32.9	45.6	43.3	29.1	20	23.7	18.3	30.1	21.2
Portugal	6.7	9.8	8.7	11.5	missing	missing	9.5	14.2	8.6	10.7
Slovak Republic	13.9	16.6	58.2	28.3	—	—	58.1	29.7	47.4	27.2
Spain	13.9	16.6	14.8	19.2	6.7	8.3	12	16.7	11.7	13.3
Sweden	18.4	14.5	17.7	15.4	12.2	11.6	20.9	—	17.4	—
Switzerland	7.7	8.9	[12.9]	[15.9]	missing	missing	—	—	—	—
United Kingdom	16.8	5.3	20.5	7.6	12	9.7	20.5	—	20	7.4
United States	12.5	12	11.2	12.6	12	10.4	11.1	8.8	8.3	11.3

Source: Data derived from OECD, *Education at a Glance: OECD Indicators*, for the years 2004, 2005, 2006, 2007 and 2008, Table C4.3 (Paris).

Notes:

- Upper-secondary education in OECD countries is equivalent to high school in Canada.
- Numbers in square brackets are considered statistically insignificant due to small sample size.
- Data are listed as "—" if they are based on too few observations to make the estimates reliable.

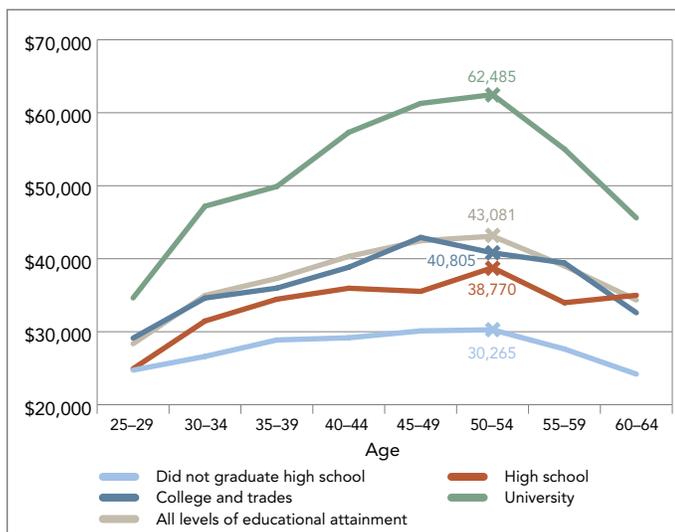
A SKILLED AND ADAPTABLE WORKFORCE

Income

Income levels are positively associated with educational attainment levels. In 2005, individuals aged 40 to 59 with a university degree earned, on average, twice the income of those who had not completed high school. University earnings were about 50% higher than those with non-university PSE certificates (college and trades). Earnings for all levels of education peak among those aged 50 to 54, after which retirements influence the annual average income for each level of educational attainment.

University graduation in Canada is typically associated with high income levels across the lifespan. As suggested in Figure 7.6, income levels in Canada are low for university graduates at the beginning of their careers but improve substantially as these workers gain labour-force experience. In 2005, income levels for workers aged 25 to 29 years with a university education were only about \$5,000 higher than college and trade graduates of the same age. On average, this difference increased to about \$18,000 by age 40 and to over \$20,000 by age 50.

Figure 7.6
Average employment income by age group and education level (all workers), Canada, 2005



Source: Jocelyn Wisner and Christopher Duddek, *Data Quality for the 2006 Survey of Labour and Income Dynamics* (Ottawa: Statistics Canada, Aug. 20, 2008), Catalogue no. 75F0002MIE2008005; and Statistics Canada, 2006 Survey of Labour and Income Dynamics (SLID), custom tabulation (Ottawa).

Earnings patterns by level of education appear to hold across the 25 reporting OECD countries. Individuals with higher levels of educational attainment earn more than those with lower levels of education. Hungary had the highest (at 146) earnings differential—i.e., the difference between those with a university degree and those who had not completed high school or post-secondary non-tertiary education—while Canada had one of the lowest differentials at 61.

In Canada, 60% of all university degrees are held by individuals under the age of 44,²⁴ compared with 54% in the United States and 55% in England.²⁵ The high concentration of young university graduates in Canada helps explain, in part, the fairly low differential, as it skews the average level of income downward. It is noteworthy that the Scandinavian countries are below Canada on this measure.

Table 7.10
Relative earnings of the population with income from employment, ages 25–64, by level of educational attainment, OECD countries, 2006 or latest available year (upper-secondary and post-secondary non-tertiary education = 100)

Countries	Below upper secondary education	Post-secondary non-tertiary education	All tertiary education	Income differential (all tertiary minus below upper-secondary)
Hungary	73	120	219	146
Portugal ^a	67	missing	177	110
United States	66	109	176	110
Czech Republic	74	missing	183	109
Austria	66	124	157	91
Poland	84	109	173	90
United Kingdom	70	missing	159	89
Italy ^b	79	missing	165	85
Ireland ^b	85	102	169	83
Switzerland	74	110	156	81
Turkey ^a	69	missing	149	80
Germany	90	112	164	75
Korea ^c	67	missing	141	74
Luxembourg ^d	78	117	145	67
Netherlands ^d	84	missing	148	65
France	85	87	149	64
Canada^a	77	106	138	61
Finland ^b	94	missing	149	54
Norway ^a	78	120	129	51
Australia ^a	81	96	131	51
Spain ^b	85	89	132	47
Belgium ^a	89	100	133	44
Denmark ^a	82	97	125	43
Sweden ^a	86	121	126	40
New Zealand	78	110	115	37

Source: OECD, *Education at a Glance 2008: OECD Indicators*, Table A9.1a (Paris: 2008).

a Reference year 2005.

b Reference year 2004.

c Reference year 2003.

d Reference year 2002.

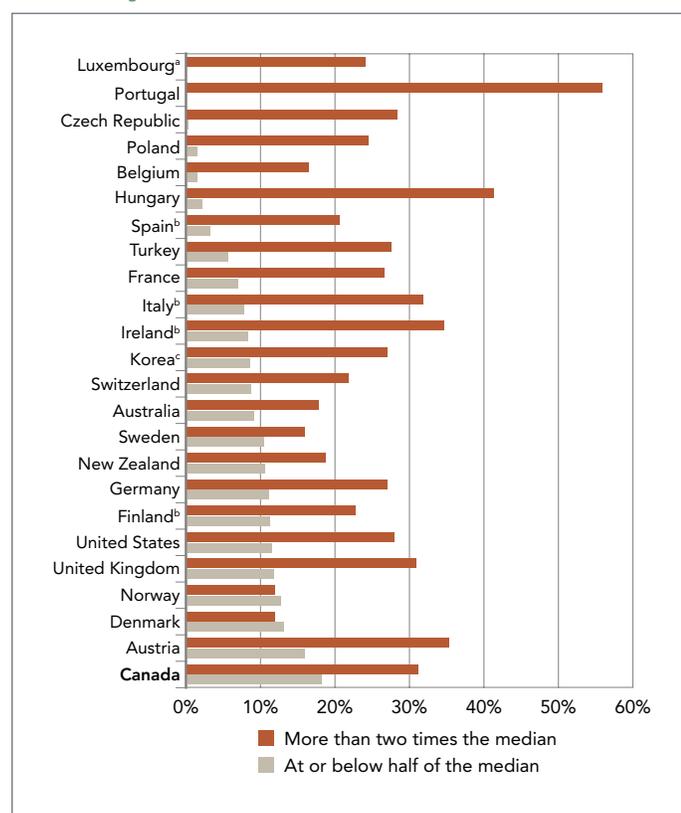
Notes:

• Tertiary education in OECD countries includes college/vocational and university programs. It does not include trade and registered apprenticeship graduates.

• Upper-secondary education in OECD countries is equivalent to high school in Canada.

While individuals with PSE tend to have higher incomes than individuals without high school, this “income premium” is not necessarily evenly distributed among those with PSE. As indicated in the study *Funding Postsecondary Education in Ontario: Beyond the Path of Least Resistance* (2004), some university graduates earn less than the average high-school graduate. “While BA-level university graduates can expect to earn, on average, between 30% and 40% more than high-school graduates, there is a substantial degree of variability around that average. For one-quarter of university graduates, the “premium” for PSE is actually negative, meaning they earn less than the average high-school graduate. For another 25% of university graduates, the premium is greater than 80%.”²⁶

Figure 7.7
Proportion, by level of earnings, of 25- to 64-year-olds who have completed type A tertiary or advanced research programs, OECD countries, 2006 or latest available year



Source: OECD, *Education at a Glance 2008: OECD Indicators*, Table A9.4a (Paris: 2008).

^a Reference year is 2002.

^b Reference year is 2004.

^c Reference year is 2003

Note: Tertiary-type A education in OECD countries is equivalent to university education in Canada..

OECD data on 24 member countries indicate that in 2005, Canada had the highest share of university graduates aged 25 to 64 (18%) who were earning less than one-half the country’s median income, and at the same time, the 6th highest share (31%) in the same age group who were earning more than twice the median income. Again, the high concentration of young university graduates in Canada, and the increasing differential in earnings across the lifespan in Canada, partly explains both spectrums of the Canadian data.

Earnings differentials are apparent across genders and immigrant status in Canada. According to the 2006 Census, females with a university degree earned, on average, \$18,000 less per annum than their male counterparts, down from a difference of over \$21,000 in 1980 (see Table 7.11). Several factors account for this situation. First, there are more males in the older university-educated population with many years of labour-force experience behind them and therefore increased annual salaries. Second, as Statistics Canada notes, “young women are over-represented in low-paying occupations ... [and while] gender differences in earnings within identical occupations were generally very small among new entrants, two exceptions were management occupations and sales and service occupations, where women consistently earned far less than men.”²⁷ The report added that “young women employed in management occupations earned 86 cents for every dollar earned by their male counterparts in 2005,” and that in sales and service occupations “the gap was even larger, at 72 cents for every dollar.”

In 2001, close to 65% of degree-qualified recent immigrants were employed, however, only 30% of them were in professional work. (In this study, degree-qualified included immigrants who had completed at least a university degree. Recent immigrants included immigrants who arrived between 1996 and 2001.) Overall, about 24% of degree-qualified recent immigrants were working in low-skilled jobs.²⁸ Integration of skilled workers and professionals from abroad is complicated by issues of assessment of quality and relevance of foreign credentials to current labour-market conditions. There may also be insufficient information provided before immigration to Canada about challenges of labour-market integration and credentialing that newcomers are likely to face. Poor language and literacy skills in Canada’s official languages (English and French), as explained earlier, can also impede immigrants’ capacity to integrate fully into Canadian society and the economy.

Census data on earnings reflect this situation. In 2005, there were large differences in annual earnings between immigrant workers with a university degree and Canadian-born workers with a university degree. In 2005, annual earnings for recent immigrant male workers with a university education were \$32,000 less than for Canadian-born male workers with a university degree. For females, this difference was more than \$25,000. Given that one in five university graduates is an immigrant with foreign credentials, these income differences further inform the data presented in Table 7.10 and Figure 7.7.

Table 7.11
Median earnings of male and female recent immigrant earners and Canadian-born earners aged 25–54 years, with a university degree, Canada, 1980–2005

Year	Recent immigrant earners with a university degree		Canadian-born earners with a university degree	
	Males	Females	Males	Females
	(2005 constant dollars)			
1980	\$48,541	\$24,317	\$63,040	\$41,241
1990	\$38,351	\$25,959	\$61,332	\$41,245
2000	\$35,816	\$22,511	\$61,505	\$43,637
2005	\$30,332	\$18,969	\$62,566	\$44,545
Differences	(2005 constant dollars)			
Male – female, 1980	\$24,224		\$21,799	
Male – female, 2005	\$11,363		\$18,021	
Male immigrant with university – Canadian-born male with university, 2005	-\$32,234			
Female immigrant with university – Canadian-born female with university, 2005		-\$25,576		

Source: Statistics Canada, *Income and Earnings, 2006 Census*, Table 8 (Ottawa: Sep. 30, 2008), Catalogue no. 97-563-XWE.

Notes:

- Recent immigrants are those who arrived during the five-year period 2000 to 2004.
- The numbers for earners refer to all earners, whether or not they worked on a full-time basis for a full year.
- Individuals with self-employment income are included while those living in institutions are excluded.

Skilled and unskilled occupations

An individual's successful entry into the labour force includes finding work that is appropriate to his or her level of educational attainment. A number of factors will influence these matches, including the demand for certain types of occupations, literacy requirements and literacy levels, and in Canada, the recognition of foreign credentials.

The OECD provides data on the match between educational attainment and the skill level of occupational categories of workers in its member countries. In 2006, Canadian college graduates worked in skilled and semi-skilled occupations at about the same rate (48% and 47% respectively). The rate of skilled employment for these graduates in Canada was well below the OECD average of 69%.

Although one would expect all university graduates to be in skilled occupations, only 79% of Canadian university graduates were in the skilled-occupation category. This was also below the OECD average of 85%. Another 19% of university graduates were in semi-skilled occupations. The reasons behind these distributions in Canada are not clear. Several factors that were discussed earlier in this chapter may account for Canada's relatively low standing in this international comparison. Among them are poor literacy levels, both within the Canadian-born and immigrant populations, challenges with quality assessment of foreign credentials, and the frequent requirement for new immigrants to learn one of Canada's official languages.

*The Dynamics of Overqualification: Canada's Underemployed University Graduates*²⁹—an analysis based on results from Statistics Canada's Survey of Labour and Income Dynamics, which follows respondents for six years—found that as of 2001, the likelihood of ever experiencing overqualification is slightly greater for: women; people under 30 years of age; recent immigrants (relative to established immigrants and the Canadian-born population); and part-time workers. The slightly higher likelihood of being over-qualified for women, for those under the age of 30 and for part-time workers may indicate a child-rearing factor and that some over-qualification may be a reflection of personal choice in the type of job that is pursued.

Table 7.12
Proportion of the population aged 25–64, by levels of attainment, and by skilled and unskilled occupations, OECD countries, 2006

	ISCED 5B (college in Canada)				ISCED 5A/6 (university in Canada)			
	% of the population with 5B attainment	ISCO category			% of the population with 5A/6 attainment	ISCO category		
		ISCO 1–3 Skilled occupations	ISCO 4–8 Semi-skilled occupations	ISCO 9 Unskilled occupations		ISCO 1–3 Skilled occupations	ISCO 4–8 Semi-skilled occupations	ISCO 9 Unskilled occupations
	(%)				(%)			
OECD average	8	69	29	2	27	85	14	1
Luxembourg	8	95	4	0	16	98	2	0
Czech Republic	x	86	13	1	14	95	5	0
Slovakia	1	79	19	2	13	92	7	1
Finland	16	70	28	2	19	92	8	1
Denmark	8	61	35	4	27	91	7	1
Hungary	0	63	35	2	17	90	10	0
Portugal	x	81	18	1	13	89	10	1
Switzerland	10	68	31	1	20	89	10	1
Germany	9	59	38	3	15	89	10	2
Sweden	9	76	22	2	22	89	10	1
Austria	7	62	35	2	10	88	11	1
Iceland	4	91	9	0	26	87	11	1
Netherlands	2	80	20	0	28	87	12	1
Italy	1	80	17	3	12	86	12	1
France	11	70	29	1	16	86	12	1
Poland	x	missing	missing	missing	18	85	14	0
Belgium	18	72	26	1	14	85	15	1
Norway	2	missing	missing	missing	31	84	15	1
Australia	9	65	33	2	24	84	15	1
United Kingdom	9	63	33	3	22	83	16	1
Ireland	11	50	46	4	20	80	18	2
Canada	23	48	47	5	24	79	19	2
Spain	9	37	57	5	20	78	20	3
Turkey	x	missing	missing	missing	10	75	24	1
United States ^a	5	38	62	0	35	68	32	0

Sources: OECD, *Education at a Glance 2008: OECD Indicators*, Table A1.7 (Paris: 2008); and OECD, Network B special data collection, Supply of Skills working group.

^a For the United States, ISCO groupings 3 and 9 in 2006 are not separated and are distributed among remaining ISCO classification.

Notes:

- ISCO refers to the International Standard Classification of Occupations.
- ISCO1: legislators; senior officials; managers
- ISCO2: professionals
- ISCO3: technicians; associate professionals
- ISCO4: clerks
- ISCO5: service workers
- ISCO6: skilled agricultural and fishery workers
- ISCO7: craft and related trades workers
- ISCO8: plant and machine operators; assemblers
- ISCO9: elementary occupations
- x indicates that 5B is included in 5A/6 as total tertiary education.

Summary: Opportunities and Future Directions

Canada's information on future labour-market demand for PSE graduates extends up to 2015. The proportion of the Canadian population with post-secondary credentials has risen consistently over the past two decades and now more than six out of 10 adults aged 25 to 34 have completed some form of PSE. It appears that the demand for university graduates may be met, as long as enrolments and graduation rates remain stable. However, the situation for trades and college graduates is less clear. A lack of information on college-level trends and low completion rates of journeyman certificates in the trades makes an assessment in these areas more difficult. The 2009 federal budget³⁰ includes a tax incentive for registered apprentices who complete their Red Seal credential, in an effort to encourage registered apprentices to complete this final step of their program. Projections at the subject-of-study level are not available.

Several factors appear to impede the maximum contribution that Canada's well-educated population can make to the economy. High proportions of both Canadian-born and immigrant populations with low levels of literacy are unacceptable. Recognition of credentials across jurisdictions and integration of immigrants with foreign credentials into the labour market remains a slow process. Thus, available skills are not being used to their fullest extent.

As a possible outcome of public discourse, students' choices for PSE over the last 15 years have funnelled toward university. The resulting pool of post-secondary graduates lacks the size and diversity needed to meet the projected demand for college and trade graduates. A strategy is needed to diversify post-secondary participants' choices in PSE, by type and by field of study. This would require additional research on how the decision to continue on to post-secondary studies is made and how the type of PSE—trade, college, polytechnic or university—and field of study are chosen. There are many opportunities for better alignment of labour-market needs with the supply of post-secondary graduates. Developing better information linkages between the labour market, post-secondary institutions and high-school students could help steer students toward programs that are in demand and match their interests.

However, in an ever-changing economy it is difficult to predict labour-market demands, to anticipate shortages and bottlenecks, and to identify necessary skills. If Canada is to maximize the skills of its well-educated population, then considerable progress is needed in the areas of credential recognition and prior learning assessment and recognition. The recognition of credentials across jurisdictions is fundamental to the mobility of skilled workers and Canada's labour-market adaptability. In January 2009, Canada's federal, provincial and territorial leaders made substantial progress on the issue of labour mobility with new amendments to the Agreement on Internal Trade, which allow full labour mobility within Canada as of April 1, 2009.³¹

Future Directions: An International Perspective

The OECD's 750-page report *Tertiary Education for the Knowledge Society* (2008)³² includes a compilation of strategies and recommendations related to workforce skill levels and worker adaptability. The following is a selection of pertinent strategies or recommendations from the report that are applicable to the Canadian situation.

Ensuring a skilled and adaptable workforce that is able to meet labour market requirements

Coordinate labour market and education policies.

Within many OECD countries, separate government departments or ministries govern educational and labour-market institutions and their activities, employment and worker training. The OECD recommends the development of a mechanism for human capital development that addresses the integration of education, training and employment.

Improve data and analysis about graduate labour-market outcomes.

For most countries reviewed, there were insufficient data on the labour-market outcomes of post-secondary graduates. This lack of data significantly impacts the capacity of post-secondary institutions and students to respond to labour-market signals. It also impacts on proper allocation of public resources to meet labour-market needs. More information on wages and employment among recent graduates is needed to enable students to make enrolment choices that respond to labour-market signals. Furthermore, information should be easily accessible and frequently updated, available

at the field-of-study level and able to identify differences in wages and employment across PSE choices. The report also recommended the improvement of data collection and the development of a data system that tracks a number of outcomes. These include short-term labour-market outcomes such as wages and unemployment after graduation and long-term outcomes such as career mobility, occupational change, job mismatch and over-education.

Strengthen career services at secondary- and tertiary-educational levels.

To make well-informed decisions about their post-secondary education and field of study, students require up-to-date information about the kinds of jobs available and the types of educational preparation necessary for those positions. High-school career guidance counsellors and post-secondary career placement counsellors should access available data on educational alternatives and labour-market outcomes. This information needs to be both produced and disseminated.

Ensure appropriate coordination between secondary and tertiary education systems.

A high degree of coordination between the high-school and PSE sectors is essential to ensure that high-school students receive the guidance needed to understand the benefits of PSE. Additionally, coordinated efforts should ensure dissemination of adequate information on labour-market outcomes, study options and the extent to which high-school curricula provide a sound foundation for successful post-secondary learning.

Build linkages between different types of tertiary education institutions.

Overall coherence within the PSE sector is needed. This involves building linkages between several sub-sectors. Students should have the opportunity to move freely within the PSE sector—to transfer across the sector, between institutions and between vocational and academic programs. The strategy would aim to stimulate flexible learning paths and validate students' prior learning experiences throughout the sector.



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- 3 Polytechnics Canada, *Sharpening Canada's Competitive Edge*, Competition Policy Review Panel online submission (Toronto: Polytechnics Canada, Jan. 10, 2008). Available at www.polytechnicscanada.ca/publications.
- 4 M. Lapointe et al., *Looking-Ahead: A 10-Year Outlook for the Canadian Labour Market (2006–2015)* (Ottawa: Human Resources and Social Development Canada, October 2006).
- 5 Danielle Zietsma et al., *Canada's Changing Labour Force, 2006 Census*.
- 6 Statistics Canada, *Occupation - National Occupational Classification for Statistics 2006 (11), Highest Certificate, Diploma or Degree (14), Major Field of Study - Classification of Instructional Programs, 2000 (73), Age Groups (9) and Sex (3) for the Employed Labour Force 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census - 20% Sample Data* (Ottawa: March 4, 2008), Catalogue no. 97-560-XCB2006013.
- 7 M. Lapointe et al., *Looking-Ahead: A 10-Year Outlook for the Canadian Labour Market (2006–2015)*, p. 58.
- 8 Danielle Zietsma et al., *Canada's Changing Labour Force, 2006 Census*.
- 9 M. Lapointe et al., *Looking-Ahead: A 10-Year Outlook for the Canadian Labour Market (2006–2015)*, p. 58.
- 10 Statistics Canada, *Educational Portrait of Canada, 2006 Census* (Ottawa: 2008), Catalogue no. 97-560-X (Ottawa: 2008).
- 11 Paulo Santiago et al., *Tertiary Education for the Knowledge Society: OECD Thematic Review of Tertiary Education: Synthesis Report* (Paris: April 2008), p. 12.
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- 18 Statistics Canada, *Immigrant Status and Period of Immigration (9), Labour Force Activity (8), Highest Certificate, Diploma or Degree (7), Location of Study (16), Age Groups (9) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census - 20% Sample Data* (Ottawa: 2008), Catalogue no. 97-560-X2006025.
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- 23 Santiago et al., *Tertiary Education for the Knowledge Society: OECD Thematic Review of Tertiary Education: Synthesis Report*, Vol. 3, p. 10.

- ²⁴ Statistics Canada, Highest Certificate, Diploma or Degree (14), Age Groups (10A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census - 20% Sample Data (Ottawa: March 4, 2008), Catalogue no. 97-560-XCB2006007.
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- ²⁷ Statistics Canada, *Earnings and Incomes of Canadians Over Past Quarter Century, 2006 Census*, Table 8 (Ottawa: 2008), Catalogue no. 97-563-X, p. 20.
- ²⁸ Leslyanne Hawthorne, "The impact of economic selection policy on labour market outcomes for degree-qualified migrants in Canada and Australia," *IRPP Choices* 14, no. 5 (May 2008).
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An Overview: Key Findings

Positive performances

To understand and benchmark elements of quality in Canada's post-secondary education (PSE) sector, various institutions, advocacy agencies and governments are exploring several approaches and measurement tools. Their objective is to maintain quality PSE and make improvements where needed. Although consensus is lacking on what constitutes quality in education, current efforts to measure PSE in Canada demonstrate that progress is indeed being made.

New surveys and research at universities, colleges and in the trades highlight a number of elements that are tied to quality in education. They also provide some accountability to investors in PSE, to students and governments alike. New areas of analysis include such topics as student satisfaction, student engagement, cognitive skill development and exemplary practices by staff.

Data presented elsewhere in this report show returns on PSE investments—such as employment experience, lifetime earnings differentials, and social benefits (see *chapters 6 and 7*)—that affirm the quality of PSE in Canada.

Troubling trends

International trends that are also affecting Canada—the proliferation and diversification of PSE providers, the changing profile of educators and the increased demand for PSE—suggest that continued quality in education is not a given in this country. To ensure quality PSE for future generations, procedures that evaluate, maintain and, where needed, improve the quality of education are becoming increasingly imperative.

The diversification of education providers and the proliferation of educational programs introduce complexity to the post-secondary landscape. Emerging institutional venues, in both the public and private sectors of PSE, and changes in credential labels (e.g., applied degrees) can lead to confusion about which institutions offer which credentials, and which credentials lead to which educational and career paths. There is no longer a common understanding about the meaning of terms such as degree, diploma and certificate.

Moreover, considerable work is needed to develop meaningful indicators for national and international comparisons of quality in PSE. The data strategy contained in the Canadian Council on Learning's (CCL) 2007 report on PSE in Canada provides a detailed discussion of these points.

Some data highlight areas for improvement to maintain quality in education in Canada. More than half of registered apprentices who were long-term continuers (still in training for more than one and a half times longer than the time normally required to complete the program) stated that they had difficulty understanding the in-class component of their programs. Data from the Association of Universities and Colleges of Canada (AUCC) linking trends in the hiring of faculty to student–staff interactions demonstrate how overlapping issues impact quality in education.



QUALITY ASSURANCE IN PSE

Introduction

Providing quality in education is universally cited as a key goal by post-secondary institutions (PSIs), and by government departments and agencies responsible for PSE. Students also expect they will have access to PSE of the highest quality. Previous chapters have discussed the importance of quality PSE education to Canada's economic growth and standard of living. Furthermore, Canada has a solid international reputation for producing PSE graduates who contribute valuable skills and knowledge to international labour markets, to global humanitarian agencies and to the international research and development community.

PSE is a \$30-billion sector of the Canadian economy.* Students, families and all levels of government invest in the PSE sector. Accountability to these investors is inherently tied to issues of quality.

Recent trends in PSE and the labour market require an evaluation of Canada's capacity to sustain quality in PSE throughout the coming years. These trends include:

- an increasing proportion of jobs that require PSE;
- rapid growth in PSE participation worldwide, leading to high demand from domestic and international students;
- several new types of post-secondary providers, including an increasing number in the private sector; and
- dramatic growth in the mobility of students and graduates between provinces, territories and countries, thereby requiring the portability of credits and credentials.

Given the extent of changes taking place, we can no longer presume that quality in our PSE sector will persist over time or that there is no room for improvement. In the context of change outlined above, it is imperative to establish mechanisms aimed at sustaining quality in Canada's PSE sector, mechanisms that will help identify where improvements may be needed.

PSE is a complex endeavour that serves many purposes and a diverse clientele. Although it is challenging to reach consensus on the meaning of quality in PSE, there has been support in Canada and across member countries of the Organisation for Economic Co-operation and Development (OECD) for the development of quality-assurance practices. It is vital to Canada's social and economic well-being and to its international position that PSE quality be maintained for future generations.

The sections covered in this chapter include:

- defining quality assurance in PSE
- current approaches to quality assurance
- measurement approaches
- current indicators
- international advances in quality assurance
- summary: opportunities and future directions

What is Quality Assurance in PSE?

Quality assurance is a process to assess the quality of a course, program, or PSE institution. The process generally involves two key elements: clearly delineated standards of quality, and established procedures to evaluate an institution or program against these standards. For instance, the process of accreditation involves a third-party evaluation of an institution or program, leading to public and formal recognition of the capacity of the program or institution to meet certain minimum criteria or standards.¹ Quality assurance seeks to ensure accountability, as well as foster improvement.

A comprehensive quality-assurance framework includes identifying indicators that measure various aspects of quality in education and provide information that responds to accountability requirements. These indicators can be used to establish benchmarks of current performance, to highlight progress and identify weaknesses, and to make comparative evaluations of quality within and across institutions. These measurements can help identify areas of high performance and achievement, and areas where improvements are needed.

As indicated elsewhere in this report, different measures apply to different aspects of PSE delivery. For example, measurements at the sector level, such as participation rates in PSE, can provide a general sense of the overall trends in, and efficiency of, public and private investments in PSE. However, sector-level trends also influence elements of quality at the institutional and program levels—such as infrastructure, research, teaching methods, staffing and student satisfaction. Measures such as trends in student-faculty ratios, library holdings and student completion rates are useful to assess quality at the institutional level but can also reveal elements of quality at the program or course level.

* See Chapter 4, "Affordable and Sustainable Post-Secondary Education."

Current Approaches to Quality Assurance

There are a number of approaches to quality assurance in Canada, each of which addresses a particular aspect of PSE. Some approaches are pan-Canadian in scope, while others are limited to specific jurisdictions, such as a particular province or a particular type of PSE. Following an in-depth review of processes at the degree level, Oldford concluded in 2006 that “Canada lacks a consistent and comprehensive approach to quality assurance”² that:

- includes all types of institutions offering degree-level programs;
- enjoys the trust and support of PSE stakeholders and the public; and
- leads to an easily understandable and recognizable statement of quality that students, parents and institutions can use to compare quality.

The following sections outline current quality evaluation practices across the three types of publicly funded PSE in Canada. They highlight variations in approaches and the challenges associated with developing quality-assurance frameworks in Canada.

Universities and other degree-granting institutions

Although membership in the AUCC is not itself an accreditation process, it has long served as a proxy for the accreditation of degree-granting institutions (universities and degree-granting colleges) in Canada. Membership in the AUCC requires that institutions demonstrate adherence to academic and operational standards outlined in the AUCC membership criteria,³ many of which relate to quality. AUCC members must demonstrate quality standards⁴ that include the following:

- highly qualified academic staff holding the PhD or other appropriate terminal degree, and relevant professional experience where appropriate;
- undergraduate programs taught by senior academic staff;
- a quality assurance policy that requires a cyclical or continuous assessment of all academic programs and support services, and which includes the participation of those directly involved in delivering the program or service, institutional colleagues, and external experts and stakeholders;
- the periodic evaluation of the performance of academic staff, including a student assessment component;
- access to library and other learning resources appropriate to the institution’s mission, goals and programs;
- the periodic monitoring of graduate outcomes, and established and transparent processes for disseminating this information inside and outside the institution;

- academic counselling and other student services appropriate to its programs; and
- financial resources to meet its mission statement and goals.

Institutions are responsible for assuring quality at the course and program levels—generally through a process of external program review. Although the AUCC does not conduct or monitor its members’ evaluations of programs or courses, it does provide guiding principles for quality reviews at the program level.⁵ A quality assessment process that adheres to these principles, among other things:

- is based on self-evaluation and peer review;
- involves, as a fundamental dimension, external disciplinary experts;
- involves internal and external stakeholders—including students, faculty and administration—and may also involve alumni and community representatives; and
- involves the institution’s participation in accreditation or certification processes for certain professional and other programs; these standards are integrated into the institution’s quality review processes.

Ontario, Alberta and British Columbia also recently established external quality assurance boards and agencies to review applications from certain institutions wishing to offer new degrees. In part, the impetus behind these new quality assurance programs was the proliferation of for-profit private institutions seeking to grant degrees. Many of these institutions are not eligible for AUCC membership. The Maritime Provinces’ Higher Education Commission has also collaboratively developed a policy on quality assurance that impacts the activities of degree-granting institutions in all Maritime provinces.

In April 2007, provincial and territorial ministers responsible for advanced education endorsed a statement on quality assurance⁶ that contained three elements:

- a Canadian degree qualifications framework
- procedures and standards for quality assessment of new degree programs
- procedures and standards for assessing new degree-granting institutions

In addition, Ontario has established the Higher Education Quality Council of Ontario whose primary mandate is to “provide leadership in creating a quality framework for the postsecondary education sector.”⁷ The council conducts research and publishes papers that “guide our ongoing research into the quality, accountability, accessibility and design of Ontario’s higher education system.”⁸

Colleges and CEGEPs

Members of the Association of Canadian Community Colleges (ACCC) strive to provide quality education while also meeting their objective of addressing “the economic and social needs of the communities they serve.”⁹ According to the ACCC website, these goals are achieved through:

- training technical and vocational teachers and trainers;
- industry-based curriculum development;
- co-operative education programs;
- institutional management development; and
- integrated human resource development planning for industry, both regionally and locally.

The *Inventory of Exemplary Practices in College Student Learning*, available on the ACCC website, identifies more than 70 exemplary practices related to student success. The site allows prospective and current students and faculty to “extract information about institution-specific policies, programs or strategies designed to promote specific student first-year experiences such as increased contact with faculty and peers, improved student perceptions of their academic program or increased career clarity.”¹⁰ The information is provided at the institution level and includes contact information for each type of activity (e.g., peer student counselling) where available.¹¹ The information is organized under several headings:

- first-year initiatives and barriers checklist
- institutional orientation and policy context
- institutional research on the first year
- exemplary practices for students
- exemplary practices for staff

In October 2008, the ACCC organized the symposium *Quality in our Institutions*,¹² which covered such topics as:

- strategic planning and quality
- the scholarship of teaching and learning
- the patterns of persistence in PSE in Canada
- institutional commitment to student engagement
- issues and strategies for quality assurance in the growing practice of prior learning assessment and recognition.

Trades and registered apprenticeship certificates

The Interprovincial Standards Red Seal Program—a partnership of the provincial, territorial and federal governments, industry representatives and the Canadian Council of Directors of Apprenticeship—provides for quality assurance in the trades and apprenticeship sectors of PSE. The program’s goal is to “provide skilled workers mobility across Canada by encouraging the standardization of training and certification programs.”¹³ Tradespeople with Red Seal designation have passed a standardized interprovincial exam that can be administered in any province or territory, enabling them to work anywhere in Canada where their trade is designated. Exams are developed by industry and based on nationally validated occupational analyses,¹⁴ thus ensuring standards and industry relevance. The Red Seal confers a standard of quality that may not be presumed for trades without a Red Seal designation. Of the approximately 300 trades in Canada, only 49 have Red Seal designation, although several other trades are in the process of developing Red Seal practices within their sectors.

Measuring Quality in PSE: An Overview of Measurement Approaches

The elements of a quality education are not yet completely defined. Nevertheless, for PSE to be fully accountable it is important to measure Canada’s PSE performance and progress.

One strategy is to adapt measures and indicators already available. One frequently used measure is the graduation rate. However, Ross Finnie and Alex Usher noted in 2005 that “different jurisdictions use very different measures depending on local policy contexts. Employment indicators are widely used, as are measures of graduates’ satisfaction with their education. Financial performance appears just about everywhere, and is usually measured by having low administrative overhead Less frequent are items such as faculty diversity, student default rates, fundraising performance, and quality data reporting.”¹⁵

Generally, performance measures fall into three categories: inputs, outputs and outcomes. A CCL review done in 2006 looked at available research—nearly 1,900 studies—and identified indicators most frequently used to interpret the quality of education. Measures identified as inputs included faculty qualifications, salaries, teaching loads and tuition. Outputs included degree and certificate completions, student satisfaction and faculty publications. Outcome measures included employment rates, income levels and post-graduate admission rates.¹⁶

Several other measures—both established and in development—can also address issues of quality in education. Many PSIs conduct student satisfaction surveys as part of their ongoing evaluation and planning processes. These surveys explore student-oriented issues such as satisfaction with the educational experience, acquisition of skills and knowledge during studies, and the relationship between academic preparation and subsequent employment. Several provinces also use student outcome surveys as part of their accountability reporting. CCL's 2006 report on PSE in Canada includes examples of student outcome surveys conducted in Ontario, Alberta and British Columbia to illustrate progress in benchmarking and in evaluating the quality components of PSE. Updated examples, and work done in other provinces, can be found on various provincial government websites.

Many Canadian and international jurisdictions are experimenting with new research tools and surveys in an attempt to collect information about student perceptions of and engagement with the academic experience. For example, the National Survey of Student Engagement (NSSE), a quality-assessment instrument developed for use in the United States, asks students about their learning experiences and covers topics such as average frequency and duration of homework, frequency of contact with faculty or other advisors, and number of books read for courses and for pleasure. The NSSE has been in use for the past decade in several hundred American institutions, and in a growing number of Canadian universities.

All publicly funded universities in Ontario have been administering NSSE since 2005. Some key NSSE responses, such as students' overall evaluation of their educational experience, are published as key indicators by Common University Data Ontario. Several institutions in other provinces also use this instrument to examine the quality of their students' PSE.

The knowledge and skill components of a post-secondary education are typically measured through the well-established process of end-of-term or end-of-course exams. However, in the United States, the Collegiate Learning Assessment (CLA) tool was developed by the Council for Aid to Education to assess general cognitive skills—specifically, those of critical thinking, analytic reasoning, problem-solving and written communication—as opposed to subject-level knowledge (such as mechanical engineering) which is tested through end-of-term exams. The CLA also assesses the more traditional knowledge and skills of the student (such as grammar).¹⁷ Although students themselves complete the test, the information is aggregated to the institution level, enabling comparisons between the cognitive skills of in-coming versus out-going student groups. Comparisons are also possible across institutions. For the individual institution, the aggregated measure becomes an indicator of the value added to cognitive skills by the post-secondary experience.

Several hundred American institutions are now using the CLA on a trial basis. Canada has the opportunity to pilot this assessment tool and advance our understanding of the general cognitive benefits that can be obtained from PSE in Canada.

Also used in the United States is the Community College Survey on Student Engagement (CCSSE), which is designed to assess the success of two-year community college programs. As with the NSSE, which measures three- and four-year programs, the CCSSE surveys students about behaviours and institutional practices that have a positive impact on learning. The survey provides community colleges with benchmarks, a diagnostic tool and monitoring device. In Canada, the ACCC has also administered surveys at both the student and institutional levels, which provide measures of quality education at Canadian community colleges.

Quality of training was one specific component of the National Apprenticeship Survey (2007), a collaborative effort of Statistics Canada, Human Resources and Skills Development Canada, and the Canadian Council of Directors of Apprenticeship. The survey had three major objectives:

1. to understand why a large percentage of registered apprentices do not complete the program
2. to understand the extent to which program completion affects the labour-market outcome of journeymen
3. to identify why some apprentices take much longer than expected to complete the program.¹⁸

Survey respondents answered questions about the quality of the education and training they received throughout their apprenticeship program. These included questions on the level of supervision they received in the workplace, the clarity and thoroughness of supervisors' explanations and in-class instruction, the difficulty of tasks in the workplace and classroom, the currency of the equipment and technology in the training, and the clarity of written material.

This section has reviewed some of the approaches and sources of information on quality assessment currently in place in Canada and internationally. Diverse sources of information and aspects of quality are included. Data—covering aspects of quality PSE that pertain to learners, institutions and governments—are collected from the administrative files of institutions, provincial ministries of education and federal government departments, and from surveys of learners and institutions. These data therefore highlight the variety of elements related to quality in PSE, and add to our understanding of what specific factors contribute to quality in education.

Current Indicators

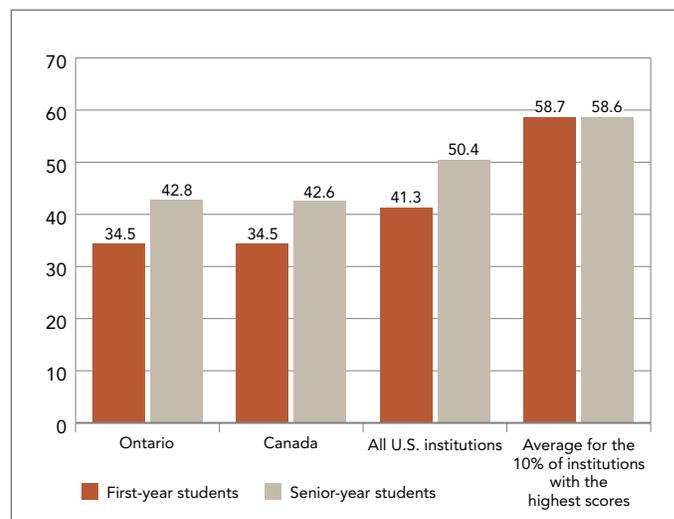
Indicators providing additional insight into the benchmarking elements that address quality education in Canada are discussed in other chapters of this report. These indicators, which can be monitored and evaluated over time, include:

- public and private expenditures on PSE (Chapter 4, “Affordable and Sustainable Post-Secondary Education”)
- age profile of university educators (Chapter 4, “Affordable and Sustainable Post-Secondary Education”)
- research and development in higher education (Chapter 5, “Innovation, Knowledge Creation and Knowledge Transfer”)
- non-completion of post-secondary education (Chapter 1, “From Access to Attainment”)
- levels of educational attainment in Canada (Chapter 7, “A Skilled and Adaptable Workforce”)
- labour-market outcomes of post-secondary graduates (Chapter 7, “A Skilled and Adaptable Workforce”)

The three-volume AUCC publication, *Trends in Higher Education*, provides comprehensive overviews of financing and faculty in Canada’s degree-granting institutions.¹⁹ *Volume 2: Faculty* presents the following U.S. and Canadian NSSE results:

The first category—active and collaborative learning—measures participation in class, making presentations, working with other students on projects, tutoring other students and participating in community-based projects. In this category, the average U.S. scores for first-year students (41.3) and senior-year students (50.4) were both significantly higher than the Canadian averages (34.5 and 42.6, respectively).²⁰

Figure 8.1
Canadian universities score lower than U.S. peers in active and collaborative learning activities, Ontario, Canada and the United States, scores from the 2005 National Survey of Student Engagement



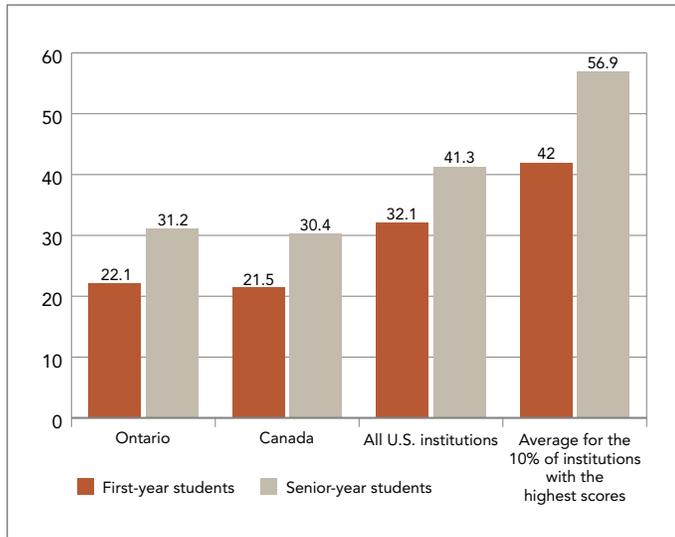
Sources: Association of Universities and Colleges of Canada, *Trends in Higher Education: Volume 2. Faculty* (Ottawa: 2008), p. 27.

Note: The scores in these charts are averages of the benchmark scores for all the institutions in a grouping. An institution’s benchmark score is the average of all the student-by-student benchmark scores. The only way an institutional benchmark score of 100 would be possible would be if every student responded to the highest category on every one of the component items in that benchmark.

In the category of student–faculty interaction, the relative advantage in the U.S. was even higher for both first-year and senior-year students. This benchmark is significantly influenced by investments in university faculty. It includes measures like discussing grades with instructors, receiving prompt feedback, talking about career plans with faculty members, discussing ideas with faculty outside class, and working with faculty on activities other than coursework, which can range from social committees to research projects.²¹

QUALITY ASSURANCE IN PSE

Figure 8.2
Canadian universities trail U.S. peers in student–faculty interaction, Ontario, Canada and the United States, scores from the 2005 National Survey of Student Engagement

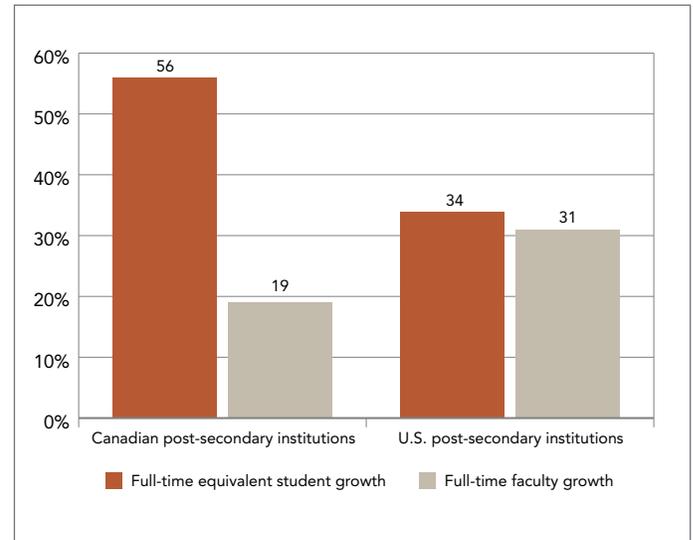


Sources: Association of Universities and Colleges of Canada, *Trends in Higher Education: Volume 2. Faculty* (Ottawa: 2008), p. 27.

Note: The scores in these charts are averages of the benchmark scores for all the institutions in a grouping. An institution's benchmark score is the average of all the student-by-student benchmark scores. The only way an institutional benchmark score of 100 would be possible would be if every student responded to the highest category on every one of the component items in that benchmark.

The AUCC also notes that in the United States, full-time enrolment grew by an estimated 34% between 1987 and 2006, while full-time faculty increased by 31%. In Canada, however, enrolment increased nearly three times the rate of faculty over this period—56% versus 19%. “These very different trends,” concludes the AUCC, “are one of the factors that drive differences in the levels of student engagement reported in Canada compared to peer institutions in the U.S.”²²

Figure 8.3
Full-time faculty growth and enrolment growth, post-secondary institutions, Canada and the United States, 1987–2006



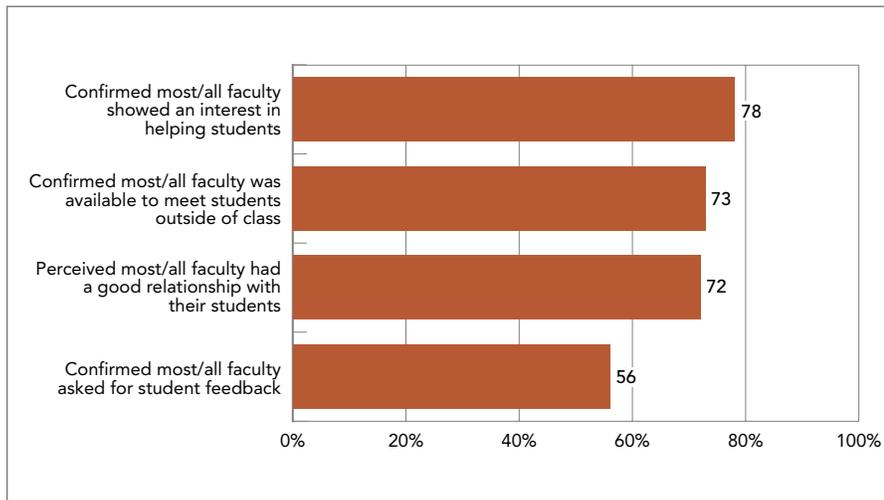
Sources: Association of Universities and Colleges of Canada, *Trends in Higher Education: Volume 2. Faculty* (Ottawa 2008), p.26, using data from Statistics Canada and the National Center for Education Statistics.

In 2005, the ACCC, with funding from Human Resources and Skills Development Canada, undertook the *Pan-Canadian Study of First Year College Students*. The study surveyed students at more than 90 participating colleges, at both the beginning and the end of their first year. The objective was to collect student perceptions of the quality of their first-year experience and profile the college student population in general. Some key findings from this study are presented in Chart 8.4.

As with the university survey, an important focus of the college survey was the nature of student–faculty interaction. In 2005, 78% of college student respondents believed that all faculty demonstrated an interest in helping students, while 73% reported that faculty were available to meet outside of class.[†] Just over seven in 10 students reported that faculty–student relationships were positive.

[†] Although this survey polled a large sample of first-year college students, more than two-thirds of the respondents were from Ontario. A substantial number of institutions and respondents were from the Atlantic provinces, Manitoba and Saskatchewan; those in Quebec, Alberta and British Columbia were under-represented. For this reason, overall project findings should not be viewed as representative of first-year college students nationwide. Source: Association of Canadian Community Colleges and Human Resources and Social Development Canada, *Pan-Canadian Study of First Year College Students – Report 1 Student Characteristics and College Experience – August 2007, Executive Summary* (Gatineau: August 2007).

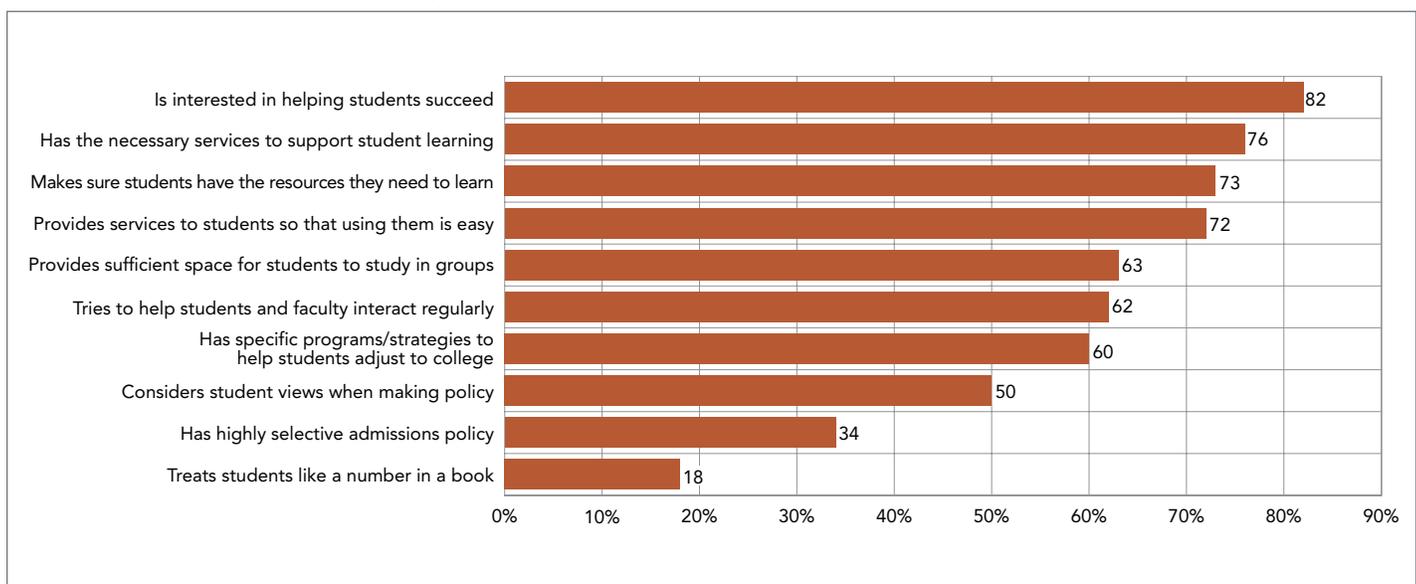
Figure 8.4
Student perceptions of faculty interactions with students, Canada, 2005



Source: Association of Canadian Community Colleges and Human Resources and Social Development Canada, *Pan-Canadian Study of First Year College Students – Report 1 Student Characteristics and College Experience – August 2007* (Gatineau: August 2007), Figure 7, p. 53.

More than eight in 10 students believed their college or institute was interested in helping them succeed, which was reflected in the types of services made available to students. Just over three-quarters of students (76%) indicated that their college or institute provided the necessary services and resources to support learning, and 60% stated that their school had specific programs to help students adjust to the college environment. On the other hand, only one-half of students believed that their college took students into account when making policies.

Figure 8.5
Student perceptions of their college or institute, 2005



Source: Association of Canadian Community Colleges and Human Resources and Social Development Canada, *Pan-Canadian Study of First Year College Students – Report 1 Student Characteristics and College Experience – August 2007* (Gatineau: August 2007), Figure 10, p. 56.

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In addition to these survey results, the ACCC's 2008 report, *The Economic Contribution of Canada's Colleges and Institutes*, found that "compared to their counterpart with only a high-school diploma, the typical student of Canada's Colleges and Institutes who graduates with a diploma will see an increase in annual earnings of \$9,300, or approximately \$345,000 over the course of a working lifetime."²³ The report also concluded that roughly \$132.2 billion of Canada's current total income (about 8% of GDP) can be attributed to the past and present efforts of this country's colleges and institutes. These types of measurements are potentially very useful for demonstrating quality and accountability within a particular educational sector.

In September 2008, the National Apprenticeship Survey (NAS) released initial data that covered three categories of respondents:

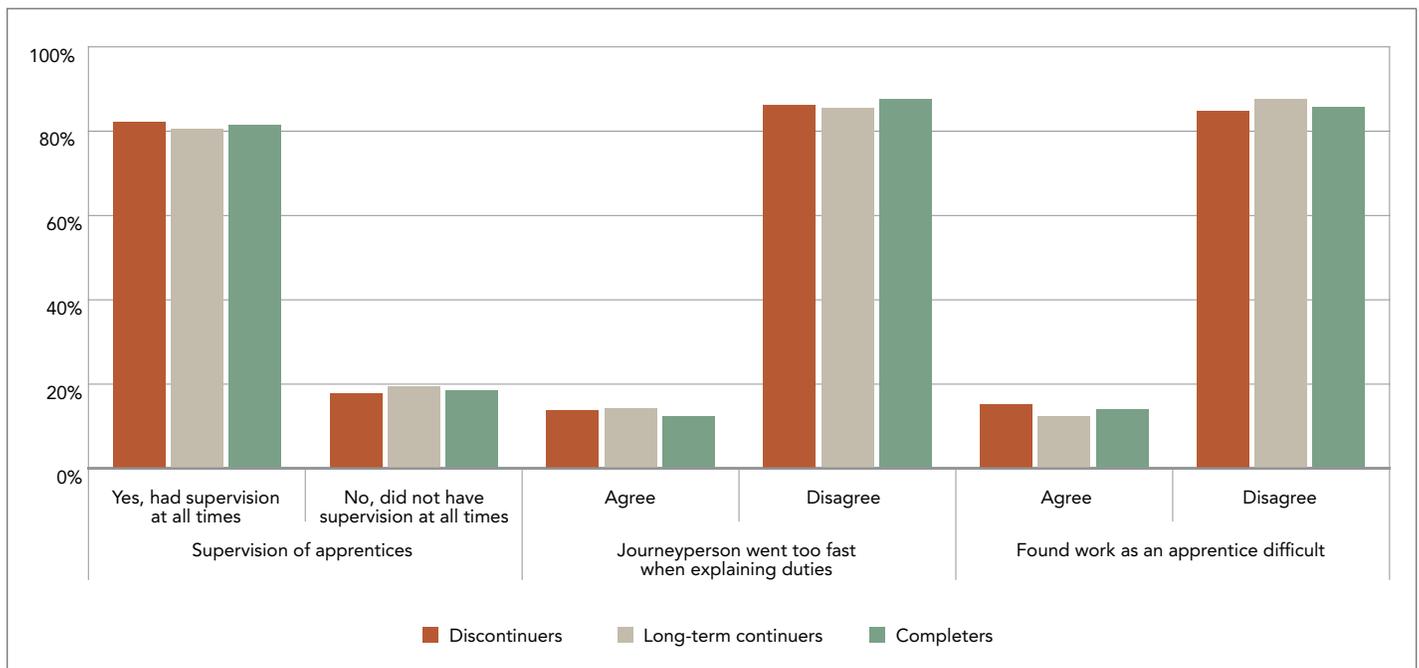
- *long-term continuers*: individuals who are still in training and had been registered apprentices more than one and a half times longer than the time normally required to

complete the program

- *completers*: individuals who have completed in-class training and hours of supervised work experience, with or without completion of the journeyman or certificate of qualification exams
- *discontinuers*: individuals who were registered apprentices at the beginning of the survey period (2002) but were no longer apprentices at the end of the period (2007) and had not completed the apprenticeship requirements²⁴

Some results pertain to the quality of training received in Canada's apprenticeship programs. More than 80% of all apprentices were supervised by a journeyman at all times throughout their workplace training and reported that their supervisor took the time required to explain their training and tasks clearly. As a result, more than 80% of apprentices in each category reported that their workplace training was

Figure 8.6
Quality of on-the-job training received, by apprentice status, Canada, 2007



Source: Marinka Ménard, et al., *National Apprenticeship Survey: Canada Overview Report 2007*, Culture, Tourism and the Centre for Education Statistics research paper (Ottawa: Statistics Canada, September 2008), Catalogue no. 81-598-X—No. 001.

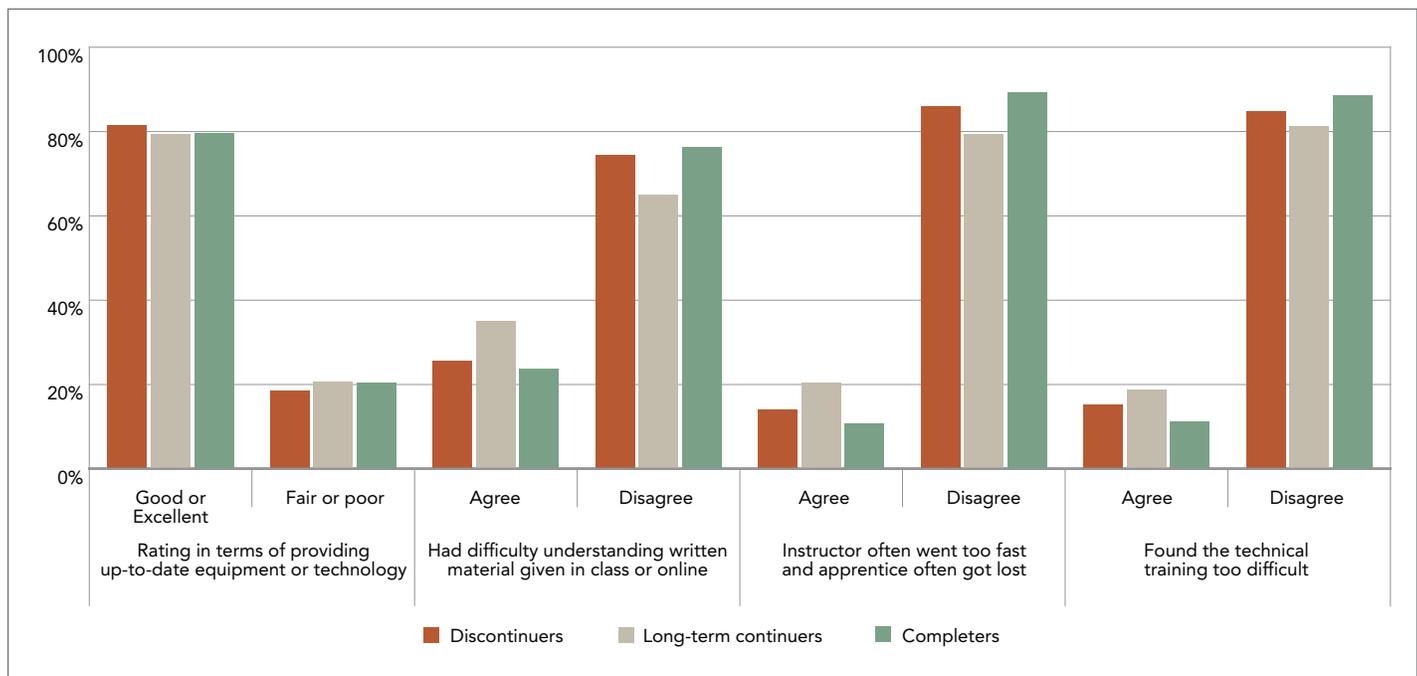
Note: The National Apprenticeship Survey was conducted in 2007. Apprenticeship status for respondents will have changed during the period between 2002, the beginning of the survey, and 2006, the last reference period for the survey. An apprentice's status as it appears for this table would be their status at the time of the survey.

not too difficult.

While all three types of apprentices felt that the technology and equipment was up-to-date, there were large differences between the three groups in their experiences with the in-class training component. More long-term continuers (35%) reported having difficulty with the material provided in class or online, compared with completers and discontinuers (23.7%

and 25.5%). They also more frequently reported that the in-class instructor explained the material too quickly—20.5% compared with 10.8% of completers and 14% of discontinuers. Nearly one in five (18.7%) of long-term continuers found that the in-class component was too difficult, compared with 11.3% of completers and 15.1% of discontinuers. Notably, the responses of discontinuers were more similar to completers than to long-term continuers.

Figure 8.7
Quality of technical training received by apprentice status, Canada, 2007

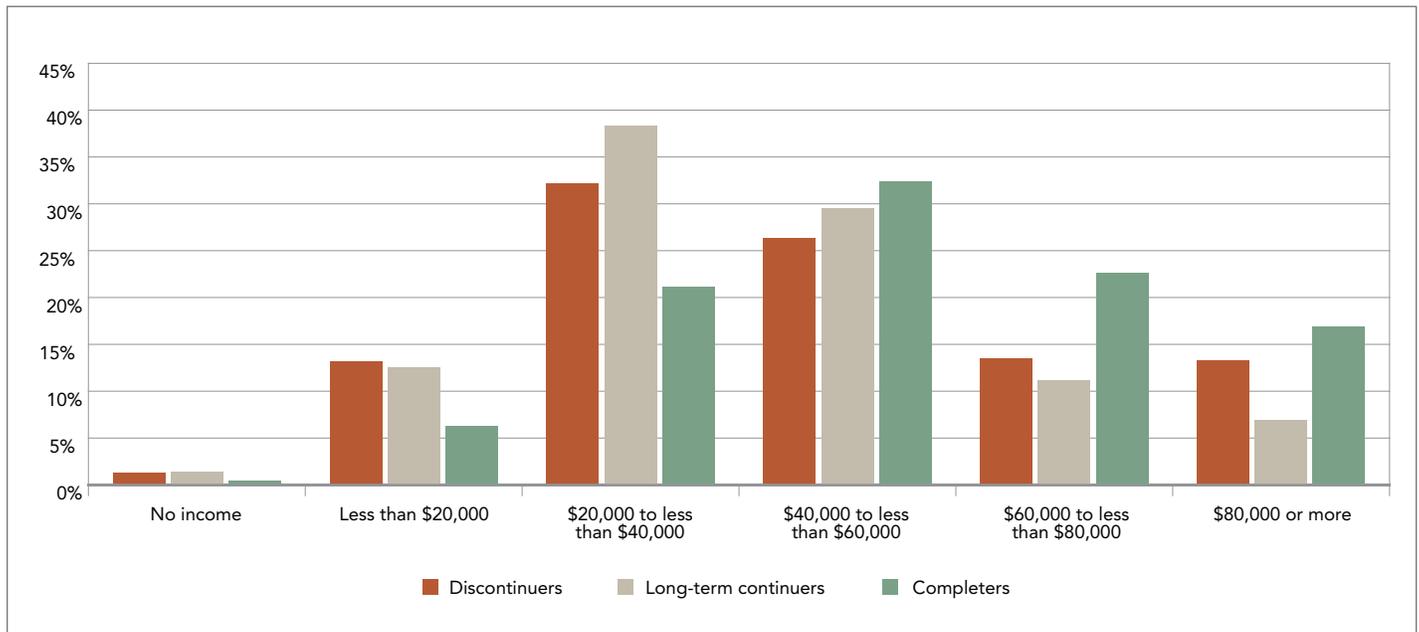


Source: Marinka Ménard, et al., *National Apprenticeship Survey: Canada Overview Report 2007*, Culture, Tourism and the Centre for Education Statistics research paper (Ottawa: Statistics Canada, September 2008), Catalogue no. 81-598-X—No. 001.

Note: The National Apprenticeship Survey was conducted in 2007. Apprenticeship status for respondents will have changed during the period between 2002, the beginning of the survey, and 2006, the last reference period for the survey. An apprentice's status as it appears for this table would be their status at the time of the survey.

As explained earlier, the average income of graduates can be considered as a measure of quality. It represents learners' returns on the time and financial investment made in their PSE. The results from the NAS survey show the value of completing an apprenticeship program. Although data on completers' income was not disaggregated according to completion or non-completion of journeyman exams, 39.5% of completers were earning more than \$60,000 per annum within a maximum of four years after graduation. For discontinuers, this figure was 26.8%. Alternatively, 46.7% of discontinuers were making less than \$40,000 per annum, while 28% of completers were making that amount.

Figure 8.8
Distribution of total employment income in the last 12 months by apprentice status, Canada, 2007



Source: Marinka Ménard, et al., *National Apprenticeship Survey: Canada Overview Report 2007*, Culture, Tourism and the Centre for Education Statistics research paper (Ottawa: Statistics Canada, September 2008), Catalogue no. 81-598-X—No. 001.

Note: The National Apprenticeship Survey was conducted in 2007. Apprenticeship status for respondents will have changed during the period between 2002, the beginning of the survey, and 2006, the last reference period for the survey. An apprentice's status as it appears for this table would be their status at the time of the survey.

Although the above indicators are limited, they do illustrate Canada's progress toward benchmarking quality in PSE, while highlighting the challenges associated with completing a comprehensive framework for measurement.

International Advances in Quality Assurance

As cited in the OECD's 2008 *Thematic Review of Tertiary Education*, PSE systems in other countries are also impacted by several trends that raise issues of accountability and sustainable quality. As in Canada, these trends include the expansion of tertiary education systems, diversification of institutional providers and program offerings, and an increasingly heterogeneous student body.

At the same time, education systems and institutions worldwide face the sometimes competing challenges of responding to multiple demands, such as "quality of teaching and learning defined in new ways including greater relevance to learner and labour market needs; research and development feeding into business and community development; contributing to internationalization and international competitiveness."²⁵

International efforts are intensifying to ensure that national education systems demonstrate quality, continuous improvement, accountability and responsiveness. CCL's 2007 report on PSE in Canada reviewed various international approaches to quality assurance in use in Australia, New Zealand, the United Kingdom, the United States and the European Union.

The OECD maintains that a key first step to quality assurance is the formation of a "coherent strategic vision" to "guide future policy development over the medium and long term in harmony with national social and economic objectives."²⁶ This strategic vision can provide a framework for assessing the quality of the system—with the dual objectives of improvement and accountability. The OECD notes that "one possible model for this may be to focus on improvement through external audits and internal quality assurance mechanisms while accountability would be addressed on the basis of performance indicators."²⁷

While the core purposes of quality assurance are improvement and accountability, quality assurance can also help enhance student and graduate mobility. This is particularly true for jurisdictions that share similar quality assurance practices and credentials.

The Bologna Process

The connection between quality and mobility is particularly evident in initiatives such as the Bologna Process, a collaborative effort by 46 countries to establish a European Higher Education Area (EHEA) by 2010. The Bologna Process is a voluntary association that includes all 27 European Union members and other countries, such as Norway, Switzerland, the Russian Federation and Ukraine.

The Bologna Process consists of initiatives and utilities that participating states have all agreed to implement within their respective jurisdictions. The initiatives include:

European Credit Transfer System: To foster student mobility among EHEA nations, a common system was established to recognize periods of study abroad. This involved acceptance of a common and “systematic way of describing an educational program by attaching credits to its components.”²⁸

Diploma Supplement: The countries working toward the EHEA have acknowledged that “original credentials alone do not provide sufficient information, [and that] it is very difficult to gauge the level and function of a qualification without detailed appropriate explanation.”²⁹ To make qualifications more meaningful to education institutions and employers, the EHEA has developed a standardized template to provide explanatory information that can supplement transcripts and credentials.

European Qualifications Framework (EQF): While the diploma supplement increases the transparency of credentials, the EQF allows for increased credential recognition by delineating the learning outcomes and competencies expected of learners at particular levels. The EQF defines eight consecutive credential levels—including general and adult education, vocational education and training, and higher education—that serve as a common standard for mapping the credentials of various European jurisdictions.³⁰

European Association for Quality Assurance in Higher Education (ENQA): The ENQA was established in 1999 to encourage further quality assurance methods and to promote European co-operation. In 2005, the ENQA published the *Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG)*. This document contains standards and guidelines for: (1) internal quality assurance within higher education institutions; (2) external quality assurance of higher education; and (3) external quality assurance agencies.³¹

European Quality Assurance Register (EQAR): This common frame of reference has resulted in the establishment of a collaborative agency within the EHEA, which in August 2008 began accepting applications from “quality assurance agencies that demonstrate that they operate in substantial compliance with the ESG.”³² According to its website, the EQAR is expected to:

- promote student mobility by providing a basis for increased trust among higher education institutions;
- reduce opportunities for “accreditation mills” to gain credibility;
- provide a basis for governments to authorize higher education institutions to choose any agency from the EQAR, if compatible with national arrangements;
- provide a means for higher education institutions to choose between different agencies, if compatible with national arrangements; and
- serve as an instrument to improve the quality of agencies and to promote mutual trust among them.³³

The EQAR will publish a list of quality-assurance agencies that meet its criteria for inclusion.

Summary: Opportunities and Future Directions

Although it is difficult to reach consensus on the definition of quality in education, current efforts to measure the PSE sector in Canada demonstrate that progress is indeed being made.

Canada is experiencing the effects of worldwide trends in PSE—a diversification of PSE providers and certificates, increased demand by learners and a changing profile of educators—trends that suggest sustained quality in education is not a given, in Canada or elsewhere. Procedures that evaluate, maintain and, as needed, improve the quality of education are becoming increasingly imperative.

Considerably more work is needed to develop meaningful indicators for national and international comparisons of quality in PSE. Opportunities exist to expand the use of available instruments to assess and monitor quality. While these instruments have limitations—most are targeted to particular aspects of a quality learning experience—in combination they can broaden understanding of the multiple and interrelated factors that ensure quality in PSE. If Canada can devise valid ways to assess the quality of learning for the variety of PSE contexts, Canada will advance PSE, in the broad sense that applies to modern societies.

Future Directions: An International Perspective

Canada has much to offer and much to gain by participating in international forums—such as the September 2008 OECD conference entitled *Outcomes of Higher Education: Quality, relevance and impact*.³⁴ Also, it is valuable to consider how quality assurance is addressed in the OECD's sweeping 750-page publication *Tertiary Education for the Knowledge Society*.³⁵ The 2008 report includes a compilation of strategies and recommendations to address issues of sustaining and improving quality assurance. The following is a selection of strategies and recommendations from the report that are pertinent to the Canadian situation.

Build consensus on clear goals and expectations.

Consensus requires agreement on a comprehensive framework of concepts and indicators of quality. This framework could also specify elements—such as certain data requirements and institutional quality assurance mechanisms—that would strengthen the system's coherence while accommodating the specific requirements and missions of individual tertiary education institutions (TEIs, which are equivalent to Canada's PSIs).

Design a quality-assurance framework consistent with the goals of tertiary education.

A well co-ordinated quality-assurance system ensures that:

- each student is provided with quality education;
- the overall system contributes to the country's social and economic development;
- the activities of TEIs foster equity of access and outcomes; and
- quality assurance contributes to the improvement of TEIs' internal co-ordination and to the integration of the overall tertiary system.

Ensure that quality assurance serves improvement and accountability purposes.

Although it is important that quality-assurance systems provide information to various stakeholders, they also must serve as a mechanism for enhancing quality, rather than forcing compliance with bureaucratic requirements. To be effective and to sustain the support of academics, a quality-assurance system must strike a balance between improvement and accountability.

Combine internal and external quality-assurance mechanisms.

A combination of internal and external quality-assurance mechanisms could address the multiple purposes of quality assurance.



Increase focus on student outcomes.

The focus of quality assurance needs to shift to student outcomes, (i.e., learning and labour-market performance relative to input factors such as faculty and physical resources). This shift in orientation can be achieved by clarifying outcome objectives in national qualifications frameworks, and by incorporating them into the design and evaluation of tertiary curricula.

Make stakeholders, such as students, graduates and employers, visible in the evaluation procedures.

To be legitimate, the quality-assurance system must consider the views of a range of stakeholders, including students, graduates and employers.

Develop mechanisms to support the work of academics.

Academics highly value their relationships with students and colleagues, the sense of being valued and supported by the leaders of their institution, good working conditions, and opportunities to develop their skills. As new expectations and demands are placed on academics, institutional mechanisms need to be established to support and recognize their work.

Enhance the international comparability of the quality-assurance framework.

As education and research become global, quality-assurance systems could enhance international understanding of the various PSE systems.



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ELLIS CHART

The Ellis Chart presented here is a listing of all the occupations in the trades as recognized by Human Resources and Skills Development Canada and the Canadian Council of Directors of Apprenticeship. The online version of the Ellis Chart (www.ellischart.ca) links each occupation to information about training, certification, education and entrance requirements, as well as prior learning assessment and accreditation processes. Also indicated in the chart below are the 49 trades recognized by the Interprovincial Standards Red Seal Program.

A	
Aboriginal Early Childhood Educator	Automotive Service Technician (Steering, Suspension and Brakes)
Aggregate Plant Operator	Automotive Service Technician (Transmission)
Agricultural Equipment Technician*	Automotive Service Technician Level 1
Agriculture - Dairy Herdsperson	Automotive Service Technician Level 2
Agriculture - Fruit Grower	Automotive Service Technician Level 3
Agriculture - Swine Herdsperson	Automotive Upholsterer
Aircraft Maintenance Engineer	B
Aircraft Structural Technician	Baker
Alarm and Security Technician	Baker*
Appliance Service Technician*	Barber
Aquatic Products Processing Plant Quality Controller	Bearings Mechanic
Arboriculturist	Binding and Finishing Machine Operator
Arborist	Blacksmith
Architectural Sheet Metal Worker	Blaster
Asphalt Plant Operator	Boat Builder
Asphalt/Paving Laydown Technician	Boilermaker*
Assistant Cook	Boom Truck Operator - Folding Boom 22 tonnes and under
Auto Body Prepper	Boom Truck Operator - Folding Boom Unlimited tonnage
Auto Body Repairer	Boom Truck Operator - Stiff Boom 40 tonnes and under
Auto Body Repairer and Painter	Boom Truck Operator - Stiff Boom Unlimited tonnage
Automotive Electronic Accessory Technician	Bricklayer*
Automotive Glass Technician	Building Envelope Technician
Automotive Machinist	C
Automotive Painter*	Cabinetmaker*
Automotive Radiator Manufacturer and Repairer	Cable Splicer
Automotive Refinishing Prep Technician	Cable Telecommunications Technician
Automotive Repairer	Carpenter*
Automotive Service Technician	Cement (Concrete) Finisher
Automotive Service Technician*	Cement Mason
Automotive Service Technician (Fuel and Electronics Systems)	Chef
Automotive Service Technician (Service Station Mechanic)	Child and Youth Worker

* Interprovincial Standard Red Seal

CNC Programmer
Communication Technician
Community Antenna Television Technician
Composite Material Laminator
Composite Structures Technician
Concrete Finisher*
Concrete Plant Operator
Construction Craft Worker*
Construction Electrician*
Construction Formwork Technician
Construction Millwright
Cook*
D
Dairy Production Technician
Die Designer
Die Maker
Diesel Engine Mechanic
Diesel Fuel Injection Mechanic
Distribution Construction Lineman
Domestic/Residential Certified Heating Technician
Domestic/Residential Geothermal Heating Technician
Door and Window Fabricator
Draftsperson - Mechanical
Draftsperson - Plastic Mould Design
Draftsperson - Tool and Die Design
Drinking Water Operator
Drywall Installer and Finisher
E
Early Childhood Educator
Early Childhood Educator - Inclusion Practices
Educational Assistant
Electric Motor System Technician*
Electrical Control (Machine) Builder
Electrical Equipment Operator - Crane
Electrical Equipment Operator - Derrick

Electrical Equipment Operator - Gantry Crane
Electrical Equipment Operator - Shovel
Electrical Mechanic (Electrical Utility)
Electrical Motor and Equipment Repairer - Winding
Electrician (Domestic and Rural)
Electrologist
Electronics Assembler
Electronics Communication Technician
Electronics Technician
Electronics Technician (Consumer Products)*
Electroplater
Elevator Constructor and Mechanic
Elevator Mechanic (Non-Construction)
Embalmer and Funeral Director
Engineering Assistant
Entertainment Industry Power Technician
Esthetician
Exterior Insulated Finishing Systems Mechanic Bottom of Form
F
Facilities Mechanic
Facilities Technician
Film Projectionist
Firefighter
Fishmonger
Fitter - Assembler (Motor Assembly)
Fitter Welder
Flexographic Press Operator
Floorcovering Installer*
Florist
Food and Beverage Server
Forest Worker (Arboriculturist - No Urban)
Forest Worker (Faller - Mixed or Deciduous Forests)
Forklift Mechanic
Four-Colour Sheet-Fed Offset Press Operator
Framer
Funeral Director

* Interprovincial Standard Red Seal

APPENDIX

G
Gas Utility Operator
Gasfitter
Gasfitter - First Class
Gasfitter - Second Class
Gasfitter - Third Class
Glazier*
Graphic Arts - Bindery
Graphic Arts - Litho Pressperson (Web, Sheet Fed, Rotary or Gravure)
Graphic Arts - Pre-Press
Graphic Arts - Press
Guest Services Representative
H
Hairstylist*
Hardware, Lumber and Building Materials Retailer
Hardwood Floorlayer
Heat and Frost Insulator
Heat Treatment Technician
Heavy Duty Equipment Technician*
Heavy Equipment Operator
Heavy Equipment Operator - Dozer
Heavy Equipment Operator - Excavator
Heavy Equipment Operator - Tractor Loader Backhoe
Heavy Equipment Technician - Transport Trailer Mechanic
Hoist Operator
Hoist Operator (Boom Truck 'A')
Hoist Operator (Boom Truck 'B')
Hoist Operator (Conventional Crane)
Hoist Operator (Hydraulic Crane)
Hoist Operator (Mobile Crane 8-15 Tons)
Hoist Operator (Tower Crane)
Hoist Operator (Wellhead)
Horse Groom
Horse Harness Maker

Horticultural Technician
Horticulturist (Landscape-Greenskeeper)
Horticulturist (Nursery, Greenhouse)
Housing Maintainer
Hydraulic Service Mechanic
Hydraulic/Pneumatic Mechanic
I
Inboard/Outboard Mechanic
Industrial Butcher - Slaughter and Meat Cutting
Industrial Cleaning Operator
Industrial Electrician*
Industrial Mechanic (Millwright)*
Industrial Sewing Machine Mechanic
Industrial Warehouseperson
Information Technology Contact Centre - Customer Care Agent
Information Technology Contact Centre - Inside Sales Agent
Information Technology Contact Centre - Technical Support Agent
Information Technology Hardware Technician
Information Technology Network Technician
Instrumentation and Control Technician*
Insulator (Heat and Frost)*
Ironworker (Generalist)*
Ironworker (Metal Building Systems Erector)
Ironworker (Reinforcing)*
Ironworker (Structural/Ornamental)*
J
Jeweler and Goldsmith
L
Landscape Worker
Lather (Interior Systems Mechanic)*
Locksmith
LogBuilder
Logistics and Distribution Level 3

* Interprovincial Standard Red Seal

Logistics and Distribution Person Level 2
Lumber Grader
M
Machine-Tool Builder and Integrator
Machinist*
Machinist (C.N.C.)
Marine Electrician
Marine Engine Mechanic
Marine Fitter
Marine Mechanical Technician
Marine Repair Technician
Meat Cutter
Meat Cutter (Processor Endorsement)
Meat Cutter (Slaughterer Endorsement)
Metal Fabricator (Fitter)*
Meter Technician
Milk Production Laborer
Miner
Mobile Crane Operator*
Mobile Crane Operator - Hydraulic 80 tonnes and Under
Mobile Crane Operator - Hydraulic Unlimited tonnage
Mobile Crane Operator - Lattice Boom Hydraulic Crane
Motion Picture and Theatre - Grip
Motion Picture and Theatre - Set Dresser
Motor Vehicle Body Repairer (Metal and Paint)*
Motorcycle Mechanic*
Mould Designer
Mould Maker
Mould Maker and Coremaker
Mould or Die Finisher
N
Nail Technician
Native Clothing and Crafts Artisan

Native Residential Construction Worker
Network Cabling Specialist
O
Oil and Gas Transportation Services - Bed Truck Operator
Oil and Gas Transportation Services - Bulk Haul Truck Operator
Oil and Gas Transportation Services - Multi-wheel Truck Operator
Oil and Gas Transportation Services - Supervisor
Oil and Gas Transportation Services - Swamper
Oil and Gas Transportation Services - Winch Tractor Operator
Oil Burner Mechanic*
Operating Engineer
Optics Technician (Lens and Prism Maker)
Outdoor Power Equipment Technician
Outdoor Power Equipment Technician - Marine Equipment
Outdoor Power Equipment Technician - Power Equipment
Outdoor Power Equipment Technician - Recreational Equipment
Outdoor Power Equipment Technician - Turf Equipment
P
Packaging Machine Mechanic
Painter and Decorator*
Painter and Decorator - Industrial
Parts and Warehousing Person Level 1
Partsperson*
Partsperson
Partsperson Level 2
Pattern Maker
Petroleum Installer Technician
Piledriver and Bridgeworker
Pipeline Equipment Operator
Pipeline Equipment Operator - Dozer Operator Endorsement

* Interprovincial Standard Red Seal

APPENDIX

Pipeline Equipment Operator - Excavator Operator Endorsement
Pipeline Equipment Operator - Grader Operator Endorsement
Pipeline Equipment Operator - Side Boom Operator Endorsement
Planermill Maintenance Technician 1
Planermill Maintenance Technician 2
Plasterer
Plastic Moulding Machine Set-Up Operator
Plumber*
Plumber - Maintenance and Repair (No-Construction)
Pool and Hot Tub/Spa Installer
Pool and Hot Tub/Spa Service Technician
Pork Production Technician
Pork Production Technician - Breeder Endorsement
Pork Production Technician - Facilities Management Endorsement
Pork Production Technician - Farrowing Endorsement
Pork Production Technician - Grower-Finisher Endorsement
Pork Production Technician - Nursery Management Endorsement
Power System Electrician
Power System Operator
Powered Lift Truck Technician
Powerline Technician*
Powerline Technician (Construction)
Precast Concrete Erector
Precast Concrete Finisher
Precision Metal Fabricator
Precision Sheet Metal Set-Up Operator
Printing and Graphic Art
Printing-Related-Process Machine Operator
Process Operator: Food Manufacturing
Process Operator: Power
Process Operator: Refinery, Chemical and Liquid Processes
Pump Systems Installer

* Interprovincial Standard Red Seal

R
Railway Car Technician
Recreation Vehicle Service Technician*
Refrigeration and Air Conditioning Mechanic*
Refrigeration and Air Conditioning Mechanic (Non-Construction)
Refrigeration and Air Conditioning Mechanic (Residential)
Reinforcing Rodworker
Reinforcing Steel Installer
Residential Building Maintenance Worker
Residential Construction Framing Technician
Residential Steep Roofer
Restoration Mason
Restoration Stone Mason
Retail Butcher
Rig Technician*
Rig Technician 1
Rig Technician 2
River Control Operator
Roll Grinder/Turner
Roofer*
Rotary Offset Press Operator
Rubber Moulding Machine Operator
S
Saddlery
Sawfiler/Fitter
Sawfiler/Fitter (Benchperson)
Sawfitter
Sawmill Machine Operator
Scaffolder
Screen Printing Operator
Security Alarm Installer
Semiautomatic Welding Production Operator
Sheet Metal Worker*
Ski Lift Mechanic

Skin Care Technician
Small Engine and Equipment Mechanic
Snubbing Services - Assistant Operator
Snubbing Services - Operator 1
Snubbing Services - Operator 2
Snubbing Services - Operator 3
Snubbing Services - Supervisor 1
Snubbing Services - Supervisor 2
Special Events Coordinator
Spinning Machine Operator
Sprinkler System Installer*
Sprinkler System Installer (No-Construction)
Staker/Detailer
Stationary Engineer 'A' - Refrigeration Plant Operator
Stationary Engineer 'B' - Refrigeration Plant Operator
Stationary Engineer (1st Class)
Stationary Engineer (2nd Class)
Stationary Engineer (3rd Class)
Stationary Engineer (4th Class)
Steamfitter/Pipefitter*
Steamfitter/Pipefitter (Non-Construction)
Steel Detailer
Stone Mason
Structural Metal Fabricator (Non-Construction)
Structural Steel Erector
Switchboard Operator (Power Generating Station)
T
Telecontrol Technologist
Tilesetter*
Tire Repairer
Tire Wheel and Rim Mechanic
Tool and Cutter Grinder
Tool and Die Maker*
Tool and Gauge Inspector

Tool/Tooling Maker
Tractor-Trailer Commercial Driver
Transport Refrigeration Mechanic
Transport Trailer Technician*
Truck and Transport Mechanic*
Truck and Transport Mechanic
Turf Equipment Technician
U
Upholsterer
Utility Arborist
W
Warehousing - Basic
Warehousing - Intermediate
Warehousing - Technician
Water Well Driller
Weaving Machine Operator
Welder*
Welder - Fitter
Welder - Wire Process Operator
Welder Level 'B'
Welder Level 'C'
Well Testing Services Supervisor - Level Five
Well Testing Services Supervisor - Level Four
Well Testing Services Supervisor - Level Three
Wood Painter-Finisher
Wooden Boat Rebuilder/Repairer

* Interprovincial Standard Red Seal

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