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PISA 2000 and
the Canadian Context

Abstract

This chapter provides the context in which to interpret the analyses presented in the chapters that follow. It describes the objectives and designs of the Programme for International Student Assessment (PISA) and the Youth in Transition Survey (YITS) and discusses a rationale for linking cross-sectional and longitudinal surveys. It uses Canada as an example to identify the benefits of synergies between cross-sectional and longitudinal studies in education. The chapter concludes with an overview of the systems of education in Canada in order to facilitate and enhance the interpretation of the evidence discussed in subsequent chapters.

IMPORTANCE OF LINKING ASSESSMENTS AND LONGITUDINAL PROJECTS FOR POLICY

PISA allows countries to benchmark the performance of students near the end of compulsory schooling to a global standard. The survey also provides information on the quality and equity in educational outcomes (Brink, 2009; OECD, 2001). However, while the results potentially predict the future quality of human capital within countries and also signal future competitive advantages and challenges, these are projections to the future and so cannot be made with certainty on the basis of the PISA results alone.

The addition of a longitudinal component, such as YITS, to a cross-sectional survey, such as PISA, is of potentially great value to educational, economic and social policy design, implementation and evaluation. YITS provides an opportunity to assess the extent to which predictions of future quality of human capital on the basis of PISA actually come to fruition in the form of subsequent educational and labour market outcomes such as access to post-secondary education, employment and hourly earnings. Furthermore, it is possible to examine how and why different subsequent educational trajectories play out for further education and work after completion of compulsory education.

This chapter begins with a brief overview of PISA 2000 and describes how and why Canada implemented a longitudinal component beginning in 2000. Then it offers a short presentation of YITS, the longitudinal component of PISA. An overview of the Canadian education system is also given to provide a context in which to interpret the results of analyses featuring in subsequent chapters.

PISA OVERVIEW

The OECD Programme for International Student Assessment (PISA) is a collaborative endeavour among OECD member countries and economies to assess the extent to which students at age 15, approaching the end of compulsory schooling, are prepared to meet the challenges presented to them by the knowledge societies of the twenty-first century. The assessment is therefore focused on young people's capacity to use their knowledge and skills to solve real-life challenges rather than on mastery of a school-based curriculum. This approach represents a shift in the objectives of curricula, which are increasingly focusing on what students can do with the knowledge and skills learned at school, over and above whether they have learned it.

PISA represents the most comprehensive and rigorous international assessment programme to date. It collects not only information on student achievement in the three key domains of reading, mathematics and science, but also important contextual information on individual, family and institutional factors in order to understand how and why achievement varies. The scope and design of these instruments was guided by leading experts in the participating countries and steered by governments on the basis of shared, policy-driven interests. The assessments incorporate both cultural and linguistic breadth and the study is
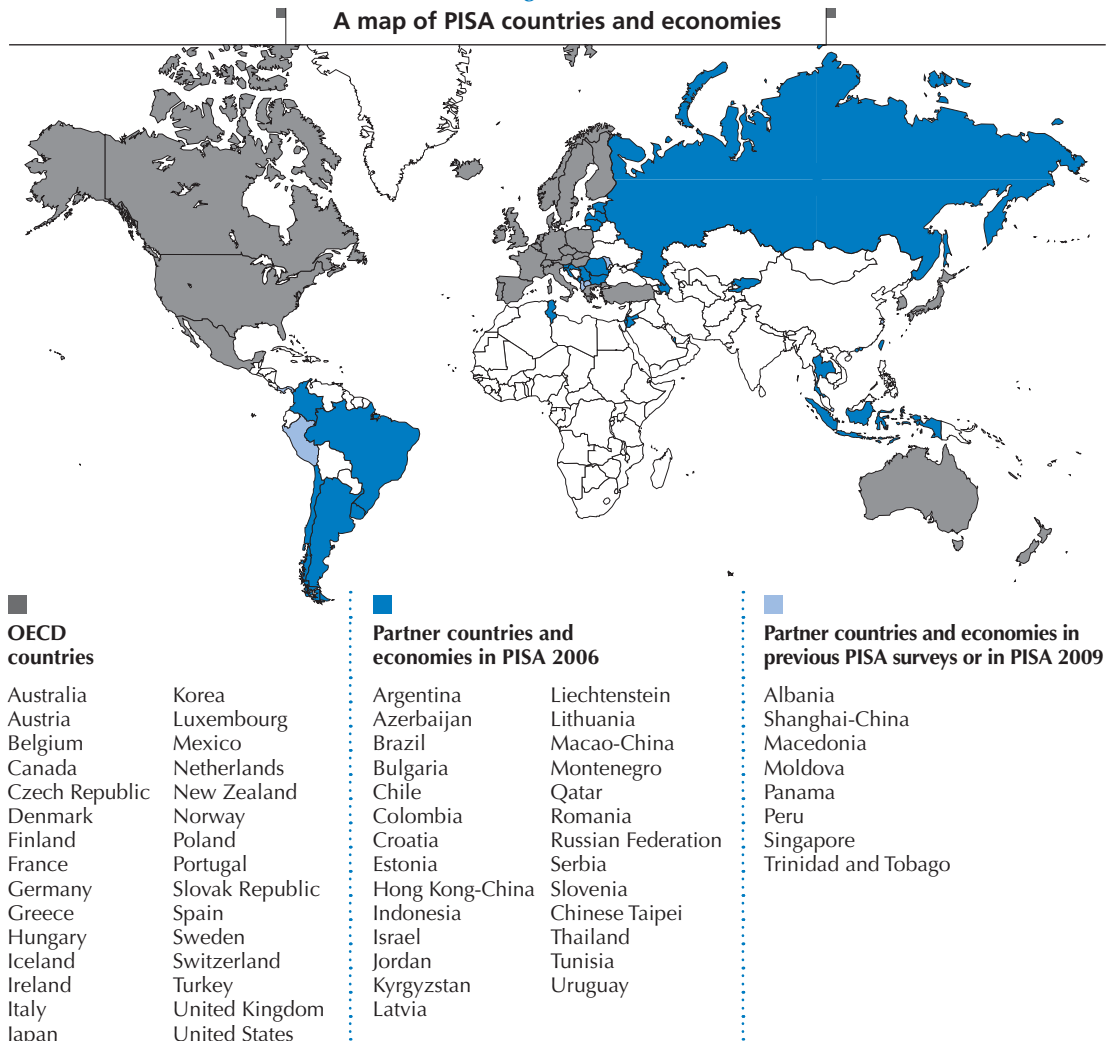
underpinned by a stringent quality assurance programme that covers all aspects of implementation, including sampling, translation and response rates. As a result, the PISA data have high validity and reliability and provide high-quality, internationally comparable measures of cognitive ability.

PISA is based on a dynamic model of lifelong learning, in which knowledge and skills are continuously acquired throughout a person's lifetime in order to adapt successfully to a changing environment. PISA therefore focuses on knowledge and skills that 15-year-olds will need in the future and aims to assess how they apply what they have learned. The assessment is informed, but not constrained, by national curricula.

The assessment takes place every three years, with the first one in 2000 in 28 OECD member countries and four partner countries (Figure 2.1). In total, over one-quarter of a million students, representative of close to 17 million 15-year-olds enrolled in schools across these 32 countries, participated. In 2002 an additional 11 partner countries and economies administered the PISA 2000 assessment, for a total of 43 educational systems.

Figure 2.1
A map of PISA countries and economies

OECD countries

Australia	Korea
Austria	Luxembourg
Belgium	Mexico
Canada	Netherlands
Czech Republic	New Zealand
Denmark	Norway
Finland	Poland
France	Portugal
Germany	Slovak Republic
Greece	Spain
Hungary	Sweden
Iceland	Switzerland
Ireland	Turkey
Italy	United Kingdom
Japan	United States

Partner countries and economies in PISA 2006

Argentina	Liechtenstein
Azerbaijan	Lithuania
Brazil	Macao-China
Bulgaria	Montenegro
Chile	Qatar
Colombia	Romania
Croatia	Russian Federation
Estonia	Serbia
Hong Kong-China	Slovenia
Indonesia	Chinese Taipei
Israel	Thailand
Jordan	Tunisia
Kyrgyzstan	Uruguay
Latvia	

Partner countries and economies in previous PISA surveys or in PISA 2009

Albania
Shanghai-China
Macedonia
Moldova
Panama
Peru
Singapore
Trinidad and Tobago

Source: OECD (2007).

In PISA 2000, students in participating countries completed a two-hour written assessment and a 30-minutes questionnaire, while school principals completed a school questionnaire. In 25 of the countries, students also completed an optional section of the questionnaire that examined their attitudes to learning. The assessments comprised a mixture of multiple-choice questions (about two-thirds of tasks) and open-ended questions requiring a written response (about one-third of tasks). The types of written responses ranged from a word or short phrase to more extended responses of several sentences in length. About seven hours of assessment material was used, with each student attempting a subset of this material. In 2000, reading was the main focus of the assessment, with smaller amounts of the total assessment time allocated to mathematics and science. In 2003 the focus domain was mathematics and in 2006, it was science. In 2009, the focus was again on reading.

Since 2000, the number of countries participating has increased, so that by 2009, 67 countries and economies participated in PISA.

The results of PISA yield a number of important outcomes including a detailed profile of knowledge and skills of 15-year-olds and contextual factors that relate these results to student and school characteristics. The PISA assessments form a rich knowledge base for policy analysis and research; with each successive three-year cycle, trend data monitor changes over time. In particular, comparing reading results from 2000 and 2009 can provide information about improvements (or worsening conditions) in educational programmes.

What PISA measures

Proficiency in the three domains (reading, mathematics and science) is conceived as a continuum rather than a binary measure. PISA suggests a minimum threshold level of proficiency, below which competency levels would be considered to be inadequate for effective functioning in the modern world. The concept of proficiency levels is explained a little later in this section.

The assessment framework for PISA 2000 (OECD, 1999, 2000) describes each domain in detail, distinguishes between the content or structure of the assessment, the processes required and the contexts in which knowledge and skills are applied. A comprehensive compendium of assessment tasks drawn from PISA 2000, 2003 and 2006 was also published (OECD, 2009).

In PISA 2000, reading literacy is defined as the ability to understand, use and reflect on written texts in order to achieve one's goals, to develop one's knowledge and skills and to participate effectively in society. This definition goes well beyond the notion of reading as simply decoding or literal comprehension and extends it to its value in the real world.

In total, 141 questions were used in the 2000 assessment of reading. Performance on three subscales (retrieving information, interpreting texts and reflecting and evaluating texts) was also reported (OECD, 2001). Scales were developed based on a hierarchy of tasks, from simple retrieval of information to higher-order analytical thinking.

In PISA 2000, competency in mathematics is defined as the ability to identify, to understand and engage in mathematics and to make well-founded judgements about the role that mathematics plays for an individual's current and future private life, occupational life, social life with peers and relatives and life as a constructive, concerned and reflective citizen. In total, 32 mathematics questions were included in the PISA 2000 assessment.

Finally, in PISA 2000, competency in science is defined as the ability to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity. A total of 35 questions were included in the assessment of science in PISA 2000.

Figure 2.2
PISA 2000 reading literacy proficiency levels

Retrieving information	Interpreting texts	Reflection and evaluation

What is being assessed on each of the reading literacy scales:

Retrieving information is defined as locating one or more pieces of information in a text.

Interpreting texts is defined as constructing meaning and drawing inferences from one or more parts of a text.

Reflecting and evaluation is defined as relating a text to one's experience, knowledge and ideas.

Characteristics of the tasks associated with increasing difficulty on each of the reading literacy scales:

Task difficulty depends on the number of pieces of information that need to be located. Difficulty also depends on the number of conditions that must be met to locate the requested information, and on whether what is retrieved needs to be sequenced in a particular way. Difficulty also depends on the prominence of information and the familiarity of the context. Other relevant characteristics are the complexity of the text and the presence and strength of competing information.

Task difficulty depends on the type of interpretation required, with the easiest tasks requiring identification of the main idea in a text, more difficult tasks requiring an understanding of relationships that are part of the text and the most difficult requiring an understanding either of the meaning of language in context or analogical reasoning. Difficulty also depends on how explicitly the text provides the ideas or information the reader needs in order to complete the task, how prominent the required information is and how much competing information is present. Finally, the length and complexity of the text and the familiarity of its content affect difficulty.

Task difficulty depends on the type of reflection required, with the easiest tasks requiring simple connections or explanations relating the text to external experience and the more difficult requiring a hypothesis or evaluation. Difficulty also depends on the familiarity of the knowledge that must be drawn on from outside the text, the complexity of the text, the level of textual understanding demanded on how explicitly the reader is directed to relevant factors in both the task and the text.

LEVEL

	Retrieving information	Interpreting texts	Reflection and evaluation
5	Locate and possibly sequence or combine multiple pieces of deeply embedded information, some of which may be outside the main body of the text. Infer which information in the text is relevant to the task. Deal with highly plausible and/or extensive competing information.	Either construe the meaning of nuanced language or demonstrate a full and detailed understanding of a text.	Critically evaluate or hypothesise, drawing on specialised knowledge. Deal with concepts that are contrary to expectations and draw on a deep understanding of long or complex texts.
4	Locate and possibly sequence or combine multiple pieces of embedded information, each of which may need to meet multiple criteria, in a text with unfamiliar context or form. Infer which information in the text is relevant to the task.	Use a high level of text-based inference to understand and apply categories in an unfamiliar context, and to construe the meaning of a section of text by taking into account the text as a whole. Deal with ambiguities, ideas that are contrary to expectation and ideas that are negatively worded.	Use formal or public knowledge to hypothesise about or critically evaluate a text. Show accurate understanding of long or complex texts.
3	Locate, and in some cases recognise, the relationship between pieces of information, each of which may need to meet multiple criteria. Deal with prominent competing information.	Integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. Compare, contrast or categorise taking many criteria into account. Deal with competing information.	Make connections or comparisons, give explanations, or evaluate a feature of text. Demonstrate a detailed understanding of the text in relation to familiar, everyday knowledge, or draw on less common knowledge.
2	Locate one or more pieces of information, each of which may be required to meet multiple criteria. Deal with competing information.	Identify the main idea in a text, understand relationships, form or apply simple categories, or construe meaning within a limited part of the text when the information is not prominent and low-level inferences are required.	Make a comparison or connections between the text and outside knowledge, or explain a feature of the text by drawing on personal experience and attitudes.
1	Take account of a single criterion to locate one or more independent pieces of explicitly stated information.	Recognise the main theme or author's purpose in a text about a familiar topic, when the required information in the text is prominent.	Make a simple connection between information in the text and common, everyday knowledge.

Source: *Knowledge and skills for life: First results from PISA 2000* (OECD, 2001).

For all three domains, achievement scores for PISA 2000 were scaled to have an OECD average of 500 and a standard deviation of 100. That is, across the OECD, approximately two-thirds of students score between 400 and 600. The averages and standard deviations for the three reading subscales differ slightly to those of the combined reading scale.

Since the mathematics and science assessments contained fewer questions in PISA 2000, it was not possible to develop proficiency levels. However, in the case of reading, proficiency levels were developed. The *PISA 2000 Technical Report* (OECD, 2002) provides detailed information on the methods used to produce the achievement scales and also the proficiency levels.

To develop and describe the reading proficiency levels, cut-points on the continuous scales were first identified based on the hierarchy of tasks and the knowledge and skills associated with each task within a level was described. In this manner, the knowledge and skills of students scoring at a particular level can be described in concrete terms and with reference to specific assessment tasks. This is important since the levels can then be used to benchmark performance within and across countries and describe in concrete terms what these benchmarks mean in relation to real-world demands.

Proficiency Level 5 corresponds to a score of more than 625, Level 4 ranges from 553 to 625, Level 3 ranges from 481 to 552, Level 2 corresponds to a score between 408 and 480 and Level 1 ranges between 335 and 407. Students scoring below 335, *i.e.* below Level 1, were routinely unable to demonstrate the most basic levels of knowledge and skill assessed in PISA. While PISA does not establish a threshold for illiteracy, performance below Level 1 does signal serious deficiencies in reading and at most, an ability to respond successfully only to the most basic and straightforward of reading tasks. Furthermore, it is likely that students scoring at Level 1 and below are some distance from possessing adequate knowledge and skills to function effectively in the future. As such, students scoring at or below Level 1 may be the focus of targeted interventions. In contrast, students scoring at Level 5 may be regarded as demonstrating advanced reading skills and able to reason in complex, analytic ways.

Figure 2.2 provides a description of the knowledge and skills associated with each reading proficiency level for the three reading subscales of retrieving information, interpreting texts and reflecting on and evaluating texts.

Canada's sample for PISA 2000 was over 30 000 respondents (where a "typical" sample size was around 4 500). This large sample tremendously boosts analytical power, allowing, for example, detailed comparisons across Canada's provinces along different dimensions of quality and equity in educational outcomes. Canada also included a parents' questionnaire to collect more accurate information on parents' education, occupation and income, as well as their aspirations for their children.
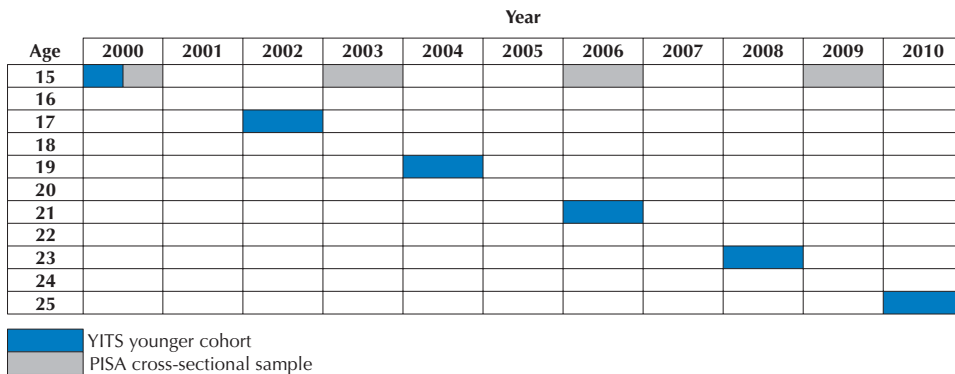
YITS OVERVIEW

The idea to implement the Youth in Transition Survey (YITS) began in the mid-1990s, in order to develop evidence for policies to improve the educational outcomes of Canadian youth to ensure Canada's continuing prosperity. A better understanding was required of the costs and benefits of educational investments, reasons why some youth pursue education while others do not and the pathways youth take as they transition into the labour market (Motte *et al.*, 2008).

In total, 29 687 students in 1 242 schools in Canada participated in PISA 2000. These students were then followed up every two years.[1] To date, data are available for 2000, 2002, 2004 and 2006. Two more cycles, ending in 2010, will provide extremely detailed data by which to analyse and contextualise the education and labour market pathways for Canadian youth, who will be age 25 in 2010.

Figure 2.3
Overview of data collection waves for YITS and PISA

Age		Year									
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
15	■ ▨			▨			▨			▨	
16											
17			■								
18											
19					■						
20											
21							■				
22											
23									■		
24											
25											■

■ YITS younger cohort
▨ PISA cross-sectional sample

Source: HRSDC.

Figure 2.3 shows the data collection cycles for YITS for students that participated in PISA 2000.[2]

The information gathered in each cycle of YITS is slightly different. In 2000, the information gathered was composed of four components:

- Data derived from participation in PISA 2000.

- A specially designed student survey that collected information on learning behaviours.

- A questionnaire for parents that collected information on learning environments at home.

- A specially designed school survey in addition to what was already included in the PISA school questionnaire that collected detailed information on the learning environments of the school.

In 2002, 2004 and 2006, only the student survey was re-administered, with some further questions adjusted to account for the youths' current situation and their previous responses. No data was collected from parents or from schools, but the survey focused on pathways and contextual information to measure progress and change in context.

The YITS, administered by telephone, gathered information on four major themes – demographic and family characteristics, high school experience, post-secondary education and labour market activities financial factors as related to post-secondary education (Motte *et al.*, 2008; Statistics Canada, 2007).

This information was merged with the rich content of the PISA 2000 dataset for Canada. In this way, PISA and YITS represent a complementary and synergistic programme of research. As a result, the Canadian national report released in 2001 (Bussière *et al.*, 2001) contained more detailed national analyses compared to the international report. It provided additional information on the performance of individual provinces and more detailed analysis of background variables not included in PISA. It also contained documentation of the beginning of pathways near the end of compulsory education, where diversity was limited and equity was likely to be higher.

As an illustration, Box 2.1 describes the content of the information collected in the YITS student survey in 2006 in a little more detail.

Box 2.1 **What type of information is gathered in YITS?**

The YITS student survey was designed to complement the information gathered in PISA 2000 and to allow researchers to address important questions that relate to student pathways and transitions through education and work.

In some cases, the information was used to check information in previous cycles; in others, it provided an update of the respondent's current situation and related decisions. The information collected over the cycles tracked the shifts to adult roles in higher education, work and society.

In 2006, students were asked questions on the following topics:
- Upper and lower secondary school and primary school education status
- Post-secondary education and engagement
- Financing of post-secondary education
- Educational and work aspirations
- Move to the USA/Return to Canada
- Health issues
- Support from others
- Employment status and details
- Courses attended relevant to employment
- Gaps (periods not in education and not in work)
- Volunteering
- Self-rated skills profile
- Personal characteristics and family background
- Income

The YITS database allows for a very rich analysis. For example, although participants are only surveyed every two years, they are asked on a month-by-month basis their education or employment status. Then, when databases from successive cycles are merged, extremely detailed analyses of transition patterns and other outcomes are possible. Furthermore, being able to merge this information with prior assessment data held in the PISA 2000 database further strengthens the analytic and policy-relevant potential of this research programme.

Source: Motte *et al.*, 2008; Statistics Canada, 2007.

Advantages of YITS

The Canadian government invested in PISA and YITS in order to develop more solid evidence on the pathways of youth beyond high school into higher education and work. This extra effort makes it possible to develop policies and programmes on the basis of characteristics of those students who did not complete secondary education; who left, then returned to complete secondary school; or who went directly to work or higher education.

The combination of the initial measure of competencies (*i.e.* achievement in PISA 2000), detailed background characteristics at each cycle and subsequent education and labour market outcomes makes it possible to identify and target those on less desirable pathways in order to provide them with training and support to ensure a secure future and also to design intervention programmes for future generations of Canadian youth.

Canada is not alone in its endeavour to apply a longitudinal component to the PISA study. Six other countries have implemented longitudinal studies that are linked to PISA (Australia, the Czech Republic, Denmark, Germany, Switzerland and Uruguay). More detailed information on these studies features in Annex A.

Box 2.2 **How can a longitudinal survey add to PISA?**

Limitations of cross-sectional surveys

As with all cross-sectional surveys, PISA 2000 provides a "snapshot" – picture at a specific point in time – of the group being surveyed. Therefore, even though PISA provides detailed information on students, this is at a single point in time, so although one can examine the relationships between student achievement and background characteristics, causal inferences cannot be made and one cannot predict with any accuracy what the future lives of these students will be like.

Added value of longitudinal surveys

A longitudinal survey, on the other hand, involves following the same group of people over a period of time. Collecting information on the same respondents over time makes it possible to study relationships between characteristics measured in one period with outcomes measured in subsequent time periods. A key advantage of integrating PISA and a longitudinal component is that the relationship between proficiency, that has been measured using a high quality, reliable and valid instrument, and education and labour market outcomes of youth measured longitudinally, can be examined. The added value of a longitudinal study thus provides a natural analytic and policy-relevant synergy with a cross-sectional survey.

Analytical advantages

A wide array of antecedent characteristics (achievement, demographics, socio-economic factors, attitudinal and behavioural variables and educational experiences) can be examined with respect to subsequent educational and occupational outcomes. In this way, it is possible to exploit the PISA data further to determine the combinations of antecedent conditions that lead to more and less positive educational and occupational outcomes. Adjustments for changes in context over time can also be taken into consideration.

Policy advantages

Examining educational and labour market outcomes with respect to competence and a detailed set of antecedents and identifying characteristics of sub-groups of Canada's population of 15-year-old youth with more and less favourable educational and occupational outcomes enables the development of targeted policies designed to improve the outcomes of youth with less positive outcomes. Furthermore, the efficacy and appropriateness of existing policies can be evaluated in a rigorous, evidence-based manner. The success of youth who have overcome disadvantages provide insights for policy.

Source: Bussière *et al.*, 2001; Statistics Canada, 2007.

OVERVIEW OF CANADA AND ITS EDUCATION SYSTEM

Canada is a federation composed of ten provinces and three territories.[3] Western Canada consists of British Columbia and the three Prairie provinces (Alberta, Saskatchewan and Manitoba); Central Canada includes Québec and Ontario; while Atlantic Canada is composed of the three Maritime provinces (New Brunswick, Prince Edward Island and Nova Scotia), along with Newfoundland and Labrador. Sometimes Central and Atlantic Canada are referred to jointly as Eastern Canada. Northern Canada is comprised of three territories[4] (Northwest Territories, Nunavut and Yukon). Provinces have more autonomy than territories.

The provinces are autonomous in the administration of social programmes, such as health care and education. Indeed, provinces together collect more revenue than the federal government, which is unusual for a federated structure. While the federal government may initiate national policies, provinces can opt in or out of these (though opting out is rare in practice). The federal government operates a system of equalisation payments in order to achieve uniform standards of services and taxation revenue between the provinces.

The total population of Canada in 2009 was 33.6 million. This population is unevenly distributed across provinces. The largest ones, in terms of population, are Ontario (with 13 million inhabitants), Québec (7.8 million), British Colombia (4.4 million) and Alberta (3.7 million). The smallest two provinces are Newfoundland and Labrador (510 000 inhabitants) and Prince Edward Island (141 000 inhabitants) (Statistics Canada, 2009).

Across Canada, 58% of the population speaks English as a first language, 22% speak French and 20% speak another language (*www.statcan.gc.ca*, 2006 Census). Of this third group, there is considerable diversity in languages spoken. The most common language groups are Chinese, Italian, German, Punjabi, Spanish and Arabic. Individuals speaking languages other then French or English are clustered mainly in Ontario (26.4%) and British Colombia (27.1%). French speakers are concentrated in Québec (where 80% are Francophone) and to a lesser extent, New Brunswick (where 33% are Francophone) (Table 2.1). Francophone minorities are found in Ontario, Nova Scotia, Manitoba and an Anglophone minority in Québec. In Québec, there are separate school boards serving the minority language populations.

Table 2.1
Population counts, GDP, unemployment rates, and languages spoken, by province and Canada overall

	Share of total population (%)	GDP per capita (2007)	Unemployment rate (2008)	Language spoken		
				English	French	Other
Alberta	10.9	54 939	3.6	80.0	1.9	18.1
British Columbia	13.2	37 221	4.6	71.5	1.4	27.1
Manitoba	3.6	34 715	4.2	74.9	3.9	21.1
New Brunswick	2.2	30 389	7.7	64.8	32.6	2.6
Newfoundland and Labrador	1.5	36 867	13.2	97.7	0.4	1.9
Nova Scotia	2.8	30 875	7.7	92.5	3.6	3.8
Ontario	38.7	41 406	6.5	69.4	4.1	26.4
Prince Edward Island	0.4	29 951	10.8	93.8	4.0	2.2
Québec	23.2	34 297	7.2	7.8	80.1	12.1
Saskatchewan	3.1	39 535	4.1	85.8	1.7	12.5
Canada	**100.0**	**39 736**	**6.1**	**57.9**	**22.2**	**19.9**

Sources:
http://www40.statcan.ca/l01/cst01/econ50-eng.htm
http://www40.statcan.gc.ca/l01/cst01/labor07a-eng.htm?sdi=unemployment
http://www4.hrsdc.gc.ca/.3ndic.1t.4r@-eng.jsp?preview=1&iid=26
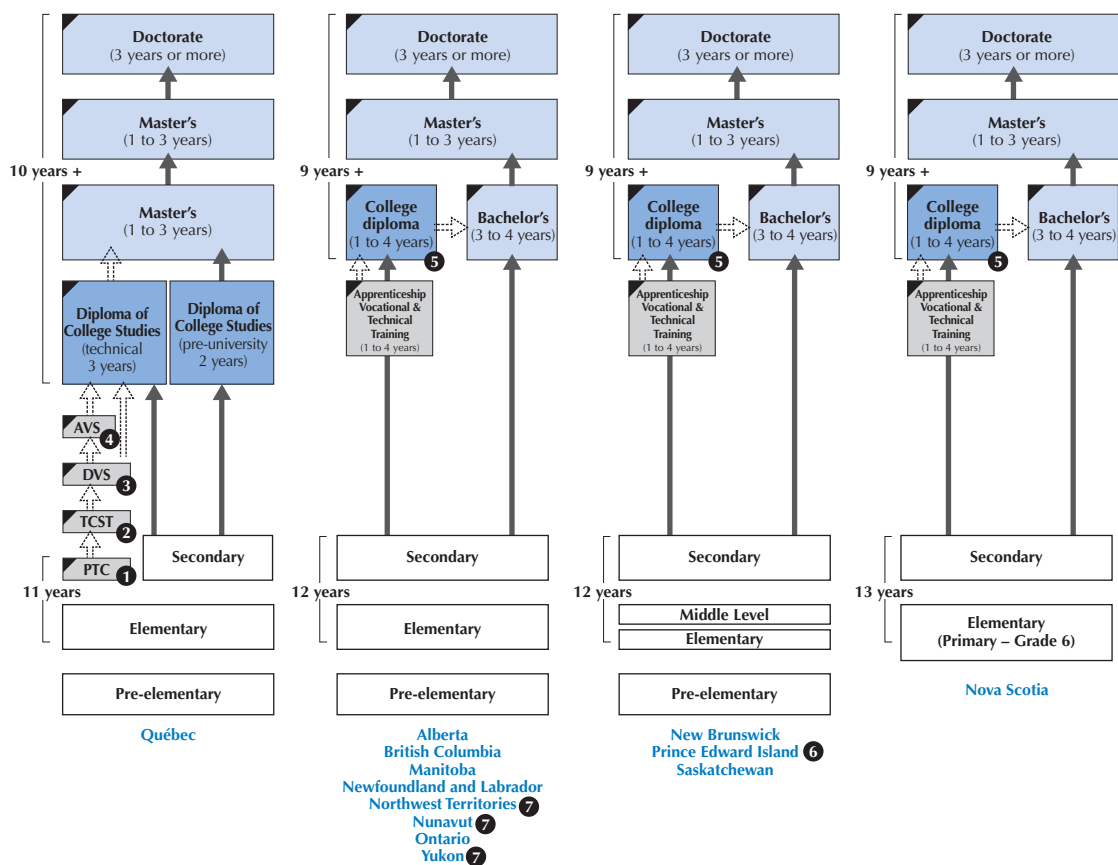*http://www40.statcan.gc.ca/l01/cst01/demo11c-eng.htm*

There is some variation in GDP per capita and unemployment rates across provinces (Table 2.1). For Canada as a whole, GDP per capita in 2007 was 39 736 Canadian Dollars (CDN). This ranged from a low of CDN 30 000 in Prince Edward Island, New Brunswick and Nova Scotia, to a high of almost CDN 55 000 in Alberta. Similarly, unemployment rates vary, from a low of about 3 to 4% in Alberta, Manitoba and Saskatchewan to a high of 11 to 13% in Prince Edward Island and Newfoundland and Labrador.

Canada spends approximately 6.2% of its GDP on all levels of education. This is higher than the OECD average of 5.8% and is eighth highest across the OECD. Of this, 3.6% is spent on primary, secondary and post-secondary (non-university education) and 2.6% is spent on tertiary education. The OECD averages, respectively, are 3.8% and 1.5%. Canada ranks eleventh of 29 OECD countries in its spending per GDP at primary level and is second only to the United States in its spending on tertiary education (2005 figures in OECD, 2008).

Figure 2.4
Canada's education systems

University Education
College Education
Apprenticeship - Vocational & Technical Training
To the job market
Typical pathway
Alternate pathway

❶ **PTC – Pre-work Training Certificate** *(3 years after Secondary II)*

❷ **TCST – Training Certificate for a Semi-skilled Trade** *(1 year after Secondary II)*

❸ **DVS – Diploma of Vocational Studies** *(600 to 1800 hrs), depending on the programme*

❹ **AVS – Attestation of Vocational Specialization** *(300 to 1185 hrs), depending on the programme*

❺ Selected institutions in Alberta, British Columbia, Ontario and Prince Edward Island offer applied degrees.

❻ In Prince Edward Island, secondary education is divided into junior high (3 years) and senior high (3 years).

❼ The territories have no degree-granting institutions. Some degrees are available through partnerships. Students may also access degrees directly from institutions outside the territories.

Notes: All colleges and universities offer certificate programmes of variable length. Continuing and adult education programmes, while not shown on this Chart, may be offered at all levels of instruction.
Source: 2008 Canadian Information Centre for International Credentials, Council of Ministers of Education, Canada.

As already mentioned, education is the responsibility of individual provinces and each of them has its own educational system. Therefore, provinces differ with respect to curriculum, assessment, accountability practices, teacher salaries, etc. Compulsory schooling ages also differ. Schooling is compulsory up to age 16 in every province except for Ontario and New Brunswick, where it is 18. Public education is free to all Canadians at primary and secondary level, provided they meet various age and residence requirements. Private schools exist, but are rare, as about 93% of Canadian students attend publicly-funded institutions at primary and secondary levels (OECD, 2008).

Figure 2.4 provides a schematic overview of the structure of the education system of Canada, by province. The system of Québec is distinct from other provinces particularly with respect to pathways to post-secondary education.

All provinces with the exception of Nova Scotia provide pre-school education (*i.e.* ages 5 to 6). Ontario is the only province to provide Junior Kindergarten (*i.e.* ages 4 to 5). Three provinces (New Brunswick, Prince Edward Island and Saskatchewan) offer schooling that is intermediate between elementary and secondary, while the other seven provinces do not. Combining primary and secondary schooling totals 12 years in all provinces except Nova Scotia (where it is 13 years in length) and Québec (where it is 11 years).

The primary school curriculum focuses on language, mathematics, social studies, science, health and physical education and arts; some provinces also offer second-language learning. In lower secondary school, students take mostly compulsory courses. The proportion of options increases in upper secondary so that students may take specific courses to prepare for the labour market or to meet the entrance requirements of post-secondary courses.

Secondary school diplomas are awarded to students who complete the requisite number of compulsory and optional courses. The secondary school diploma or its equivalent is a requirement for entry into post-secondary and tertiary education courses.

At post-secondary level, a distinction is made between colleges, universities and graduate schools. In colleges, the most common academic qualification granted is a diploma, following two to three years' study. In universities, a Bachelor's Degree is awarded after three to four years. In graduate schools, students may study a one- to two-year course to be awarded a postgraduate certificate or diploma, such as a Master's degree. Doctoral degrees can take three years or more.

Québec is distinct from the other provinces in many respects, notably, in the manner in which students proceed from secondary school to colleges/universities. The CÉGEP system (*Collège d'enseignement général et professionnel*) aims to make post-secondary education more accessible. Completion of a CÉGEP programme is compulsory before entering university courses. To compensate for this, there are 11 rather than 12 years of schooling at primary and secondary levels. Students can choose whether they want to follow a college stream (three years of CÉGEP) or a university stream (where they enter university after two years of CÉGEP).

Table 2.2 shows that graduation rates vary across Canada's provinces. In 2005, for Canada as a whole, 90% of students completed secondary schooling, while 33% earned a Bachelor's Degree or equivalent and 8% earned a postgraduate degree. Across provinces, secondary completion rates are lowest in Manitoba (87%) and highest in British Colombia (92.5%) and Newfoundland and Labrador (92%).

The frequency of Bachelor's degrees awarded in 2005 (per population at the typical age of graduation) exceeded 50% in Nova Scotia, between 35% and 40% in Ontario and New Brunswick, to around 24% in British Colombia. The rate of postgraduate graduations (again per population at the typical age of graduation) does not follow the same trend as that for undergraduate qualifications. For example, Québec ranks third lowest in its undergraduate completion rates but second on postgraduate completion rates.

Table 2.2
Secondary and third-level graduation rates, by province and Canada overall (2005)

	Secondary completion rate	Bachelor's and first professional degrees	Master's degrees	Earned doctorates
Alberta	88.0	28.0	4.6	1.0
British Columbia	92.5	24.0	4.5	1.0
Manitoba	87.0	31.0	3.0	0.0
New Brunswick	90.8	35.0	5.0	0.0
Newfoundland and Labrador	92.0	32.0	6.0	1.0
Nova Scotia	90.7	51.0	12.0	1.0
Ontario	90.9	39.0	7.0	1.0
Prince Edward Island	90.3	30.0	0.9	0.0
Québec	88.1	28.0	9.0	1.0
Saskatchewan	89.3	31.0	5.0	1.0
Canada	**89.9**	**33.0**	**7.0**	**1.0**

Sources:
http://www.statcan.gc.ca/cgi-bin/af-fdr.cgi?l=eng&loc=/pub/81-582-x/2006001/excel/updates200606/chapD5.xls
http://www.statcan.gc.ca/pub/81-004-x/2005004/8984-eng.htm#table2

The OECD (2008) has noted that 47% of Canadians between the ages of 25 and 64 have a tertiary qualification, which is high relative to the OECD average. The figure is even higher for the 25-34 age group, at 55%, indicating a steady increase in graduation rates over time (but also due to a large but selective immigration system). These high rates are achieved despite the fact that the average tuition fees in Canada, for tertiary-type A (university) institutions are high relative to the OECD and particularly countries in the EU. Student financial assistance is provided mainly in the form of subsidised loans and tax credits to compensate.

The earnings advantage associated with a tertiary qualification compared to those with an upper secondary qualification is 38%. This ranks Canada eighth out of 25 OECD countries with available data (OECD, 2008). In contrast, having an upper secondary education relative to not having one is expected to accrue an earnings advantage of 14% or so, which ranks Canada 18th out of 25 OECD countries with these data available (OECD, 2008). These figures point to the importance of attaining a tertiary qualification in the Canadian context and the diminishing number of low-skill jobs.

Employment rates for Canadians associated with five levels of educational attainment are compared to the OECD averages for males and females in Table 2.3 (OECD, 2008). The table shows firstly that employment rates are higher for females in Canada (71%) compared with the OECD average (64%). Secondly, employment rates by level of education are similar in Canada compared with the OECD average for both males and females, with the exception of primary level only, in which both males (56%) and females (33%) are at a relative disadvantage compared to the OECD averages for males (64%) and females (39%). Again, this points to the importance of high educational attainment in the Canadian context.

Table 2.3
Employment rates by level of education and gender: Canada and OECD averages (2006, 25- to 64-year-olds)

	Canada		OECD	
	Males	Females	Males	Females
Primary only	56	33	64	39
Lower secondary	71	53	73	50
Upper secondary	81	69	83	67
Post-secondary non-tertiary	83	73	87	72
Tertiary	87	79	89	80
Average	**82**	**71**	**82**	**64**

Source: OECD, 2008, Table A8.1a.

To provide a snapshot of the Canadian education system in an international perspective, Box 2.3 summarises some key points drawn from this section.

Box 2.3 **Highlights of the Canadian education systems
in international perspective**

Provinces have high levels of autonomy for education with respect to curriculum, assessment, accountability and teacher salaries.

Québec's education system is distinct from the other nine provinces in its entry paths to colleges and universities.

There is significant diversity across provinces in terms of languages spoken, percentage of immigrant population, graduation rates, GDP per capita and unemployment rates.

In comparison with other OECD countries, Canada has:

- Medium spending per GDP on primary, secondary and non-tertiary education

- High spending per GDP on tertiary education

- High tertiary tuition fees, offset by well-developed student financial assistance programmes

- Comparatively high tertiary graduation rates, at 55% of 25-34 year-olds

- A moderate 38% advantage in earnings of having a tertiary qualification over upper secondary

- A modest 14% advantage in earnings of having an upper secondary qualification over lower secondary

- A high proportion of tertiary-educated working-age population

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CONCLUSION

The richness and complexity of both the PISA and YITS datasets make it possible to link compulsory education to labour market and educational outcomes in order to develop more effective policies not only within each achievement domain, but also across them. It is also possible to examine the pathways to these outcomes over time.

Canada's commitment to education is evident in its high spending on education. However, the Canadian education system is itself complex, owing to Canada's federated system and the high levels of autonomy granted to the provinces in providing education to their children, youth and adults. Nevertheless, some of the indicators reviewed in this chapter confirm that the education system in Canada is remarkably equitable in outcomes across the country. Canada performs well in terms of, for example, tertiary graduation rates.
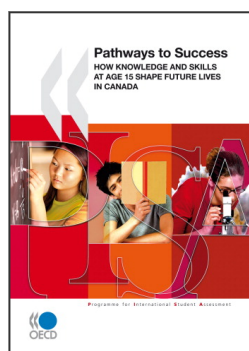
However, the evolving demographic and social conditions challenge educational policies in Canada. Policies should take this into account in order to maintain Canada's strong international position, as other countries are improving their performance faster and may surpass it. Canada's high immigration and increasing language diversity pose challenges to schools and risk slowing any efforts to improve performance. Furthermore, Canada's knowledge-based economy demands a well-educated labour force, which requires schools to graduate students capable of lifelong learning based on a solid foundation of knowledge and skills acquired during compulsory education that can be built on effectively in further education in college or university.

The results presented in the following chapters may be useful to other countries participating in PISA for their own policy debates. In addition, if the value of linking PISA with longitudinal surveys is demonstrated, countries may consider implementing a longitudinal component in their future decisions regarding PISA. The benefits for federated countries are also highlighted, where national objectives of equity must work in parallel with local objectives of excellence.

Notes

1. Needless to say, despite best practice and considerable efforts to follow up on all students in each cycle of YITS, some students were inevitably not possible to follow up. To account for the loss of students, or attrition in the sample size, special weights were computed and applied to all analyses. For technical information on these weights and patterns of attrition, see Statistics Canada (2007) and Tabuchi (2008).

2. It should be noted that YITS also included a survey of older Canadian youth, who were aged between 18 and 20 years in 2000. These individuals were also surveyed every two years, up to 2008, in order to have earlier information on post-secondary education participation and also to compare the younger and older cohorts. However, the lack of a measure of competencies was a shortcoming in potential analyses.

3. Due to its federated structure, some education statistical indicators published in the OECD's annual *Education at a Glance* (*e.g.* OECD, 2008) are not available for Canada. Therefore, this section is unable to draw extensively on that data source.

4. Due to their tiny population (0.32% of the total population) and geographical remoteness, the territories did not participate in PISA or in YITS.