

Student Testing: An International Context

by Matthew Lau

Summary

■ Developed economies around the world use both large-scale learning assessments (which are written by a sample of students) and standardized tests (which are written by all students of the same grade level) to evaluate the performance of their educational systems.

■ One of the best-known large-scale assessments is the Programme for International Student Assessment (PISA) conducted by the Organisation for Economic Co-operation and Development (OECD). Canadian policymakers use PISA results to compare student achievement over time and help them determine how educational systems can be improved.

■ According to a survey of principals, about three-quarters of 15-year old students in OECD countries attend schools where mandatory standardized tests are used at least once annually. In Canada the proportion is higher

than the average, but lower than in the United States.

■ The significance to students of standardized tests varies. For example, in Ontario, standardized tests administered by the Education Quality and Accountability Office do not affect students' report card grades in Grades 3 and 6, but may in Grade 9, and students must pass the Grade 10 Literacy Test to graduate from high school.

■ The main uses of standardized tests, according to school principals, are to monitor the school's progress from year to year, to compare the school's performance to district or national performance, and to compare the school to other schools.

■ Different assessments serve different purposes. The OECD reports that it is important to use multiple types of student assessments, including teacher-developed tests, teachers' judgements, long-term projects, and standardized tests.

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Introduction and definition of terms

The purpose of this bulletin is to provide a brief overview of standardized testing in countries and jurisdictions around the world to enable readers to compare what is done in Canadian provinces to what is done elsewhere.

To begin, some definition of terms will be helpful. In this bulletin, “large-scale learning assessments” refers to standardized international or national assessments that are written by only a sample of students and for which results are reported only at an aggregate level. The best-known of the international large-scale learning assessments are the Programme for International Student Assessment (PISA) conducted by the Organisation for Economic Co-operation and Development (OECD), the Trend in International Mathematics and Science Study (TIMSS), and Progress in International Reading Literacy Study (PIRLS).

The large-scale learning assessments are differentiated in this essay from “standardized tests,” which here refer to national or sub-national tests that are taken by all students at the same grade level and that test the same material. Examples of standardized tests include: in Ontario, the tests administered by the Education Quality and Accountability Office for students in Grades 3 (reading, writing, and math), 6 (reading, writing, and math), 9 (math), and 10 (literacy); and in British Columbia, the Foundation Skills Assessments for Grades 4 and 8, the Numeracy and Literacy Student Assessments for Grade 10, and the Literacy Student Assessment for Grade 12. This essay discusses both large-scale learning assessments and standardized tests, but focuses on the latter.

International large-scale learning assessments

When discussing the measurement of student achievement, the international large-scale learning assessment programs—of which the major ones are PISA, TIMSS, and PIRLS—are a good starting point. The OECD (Undated a) reports that its 2022 PISA study includes students in more than 80 countries or economies. The PISA study, conducted every three years by the OECD (except for the four-year interval between the 2018 and 2022 assessments), measures student achievement in reading, mathematics, and science literacy among 15-year-old students in OECD member countries and other participating jurisdictions. In the latest round of PISA testing for which data are available, done in 2018, Canada as a whole compared favourably relative to most other developed countries, but the trend over time has been gradually downward. Scores in all three subjects declined since the assessments were first done (in 2000 for reading, 2003 for mathematics, and 2006 for science) and the decline in mathematics and science scores was larger than for any other G7 country (OECD, Undated b).

The TIMSS and PIRLS results are not directly comparable to PISA, but tell a less favourable story about the education systems in Canada than PISA. The most recent TIMSS assessment was done in 2019. Students in five provinces—Alberta, Manitoba, Ontario, Quebec, and Newfoundland & Labrador—participated at the Grade 4 level; only students in Ontario and Quebec participated at the Grade 8 level. Although not representative of all provincial education systems, Canada’s results were mediocre: the proportion of Grade 4 students reaching the intermediate international benchmark was 69 percent for mathematics and 75 percent for science, compared to an inter-

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national median of 71 percent for mathematics and 71 percent for science (O’Grady et al., 2021a). The latest PIRLS assessment was done in 2016 with students in all provinces except Nova Scotia and Prince Edward Island participating; 83 percent of Canadian students in Grade 4 reached the intermediate international benchmark compared to an international median of 82 percent (Brochu et al., 2018).

Large-scale assessments are not administered to all students, but to a representative sample of students in each jurisdiction. Therefore, they cannot be used to evaluate the performance of specific students, teachers, or schools. Nevertheless, they are still useful and in Canada, according to the Council of Ministers of Education, the international large-scale assessments are widely used to inform policymakers. The council reports, for instance, that these assessments are useful in informing the public, providing data to policymakers to make decisions based on evidence, evaluating changes made by provincial governments to their education systems, helping governments channel spending to the areas where it is most needed and where it will have the strongest impacts, and improving the ability of policymakers and administrators to compare student achievement over time (Brochu et al., 2018; O’Grady et al., 2019; O’Grady et al., 2021a).

Overview of standardized testing in developed countries and economies

Education systems in developed countries around the world use not only international large-scale assessments to measure student performance, but also national and sub-national standardized tests to varying degrees. Across the OECD, according to a survey of school principals, on average approximately three-quarters of 15-year old students attend schools in

which mandatory standardized tests are used at least once annually, although there is significant variation across countries: “In 11 countries, including Costa Rica, the Dominican Republic, Germany, Montenegro and Uruguay, at least one in two students attend schools where mandatory standardised tests are never used, while in Sweden and the United Kingdom, all school principals reported that such tests are used at least once a year” (OECD, 2016: 132). Mandatory standardized tests are also widely used in the United States, where “almost all students” are assessed with a mandatory standardized test at least once annually (OECD, 2016: 132). In Canada, standardized tests are used less frequently than in the United States, but more frequently than the OECD average (OECD, 2016: 133).

Standardized tests serve various purposes. They can be used for informational purposes—for example, to compare the academic performance of students in one school to another, or to measure the improvement or decline in academic performance in a specific jurisdiction. Unlike the large-scale assessments, which are written by only a sample of students and which do not affect students’ academic careers, standardized tests can have varying levels of significance for students. Some standardized tests may have no consequences on students’ academic careers, but in other cases standardized tests might be used to determine whether students pass or fail a grade level, affect students’ ability to be admitted to certain schools, or be used to group students for instructional purposes.

An OECD survey of school principals asked principals about 11 possible uses for standardized tests and found that, most commonly, standardized tests are used to compare the school to district or national performance or to monitor the school’s progress over time.

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Percentage of students in schools whose principal reported that standardized tests are used to:

	Canada	OECD Average
Guide students' learning	57.0%	62.5%
Inform parents about their child's progress	65.5%	61.9%
Make decisions about students' retention or promotion	49.3%	31.3%
Group students for instructional purposes	29.2%	30.4%
Compare the school to district or national performance	80.8%	68.2%
Monitor the school's progress from year to year	82.7%	69.4%
Make judgement about teachers' effectiveness	15.9%	37.0%
Identify aspects of instruction or the curriculum that could be improved	67.7%	58.9%
Adapt teaching to students' needs	50.9%	51.6%
Compare the school with other schools	73.4%	59.5%
Award certificates to students	29.2%	40.0%

Source: (OECD, 2016, Table II.4.24)

There is significant variance between countries as to the uses of standardized tests and whether the tests have consequences for students' academic careers. For example, while in Canada 49.3 percent of students attend schools where standardized tests are used to make decisions about whether students will be retained or promoted, across the OECD the average is only 31.3 percent. In some countries, the proportion is in the single digits, as in the Czech Republic (3.4 percent), Iceland (8.6 percent), and Norway (5.0 percent); while in other countries the proportion is more than half, as in France (50.7 percent), Greece (60.6 percent), Ireland (53.7 percent), Israel (51.7 percent), Latvia (59.4 percent), New Zealand (57.6 percent), Portugal (56.1 percent), and the United Kingdom (58.7 percent). In some countries outside of the OECD, it is even higher, as in Singapore (88.6 percent).

A review by Morris (2011) revealed that standardized tests that have no immediate consequences for students are used in OECD countries to identify learning needs, inform classroom instruction, develop curriculum, improve teaching, inform school policy, hold schools accountable for meeting performance standards, evaluate teacher performance, and to compare or rank schools. In Australia, for example, Morris reports that the National Assessment Program—Literacy and Numeracy tests students in Grades 3, 5, 7, and 9 in reading, grammar, and numeracy, with the stated aim of monitoring the education system, increasing school accountability, and providing public information. Similarly, in the United States, the National Assessment of Educational Progress is done for monitoring and accountability purposes. In Denmark, the National Test is administered to students in Grades 2 to 8, test-

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ing students in four subjects, and is used to improve teaching strategies. In Sweden, Norway, and Korea, national standardized tests are used for monitoring and formative purposes.

A key advantage of standardized tests over large-scale assessments—in addition to their use to evaluate the performance of specific students, teachers, and schools—is that students are likely to take standardized tests more seriously since the test results may be factored into their report card grades or have other consequences. With the large-scale assessments, which cannot have consequences on individual students, there can be significant variation as to how seriously students take the test, producing misleading results. On the whole, if students do not take the test seriously, since they have no incentive to do so, the test scores are likely to be downward biased. Indeed, there is evidence that this is the case for the PISA results (Akyol et al., 2018). The results of assessments that have no stakes for students can also be misleading if politicians and administrators, who benefit from high PISA scores (as this suggests the education systems they oversee perform relatively well) try to “game the system” by having schools and teachers train students for the exam and so improve their jurisdiction’s ranking. In Prince Edward Island, for example, the government has distributed handbooks to teachers and runs workshops for principals in order to prepare students for PISA testing (Prince Edward Island 2002a, 2002b, 2006). Thus, PISA may produce misleading results if students are trained to take the test seriously in some jurisdictions but not elsewhere, as this would inflate the relative test scores in jurisdictions where students are trained.

While educational systems around the world use standardized tests widely and for varying purposes—including to assess individual

students—they also use other types of assessments. Generally, different types of assessments serve different purposes. Because the same tests are issued to all students, standardized tests are most useful in comparing student performance between schools or jurisdictions. Meanwhile, the assessment of individual student performance relies more heavily on teacher-developed tests and teachers’ judgemental ratings. The OECD reports that on the whole, “across OECD countries, high-stakes decisions and decisions on how to better teach students are based more frequently on teacher-developed tests; standardised tests are more frequently used to compare school achievement against local, regional, national or international standards” (2016: 238). As varying assessments are better suited for varying purposes, “it is important to combine multiple types of assessments strategically, including traditional written exams designed by teachers, oral tests, teachers’ judgements, collaborative problem solving, long-term projects or standardised tests, so that a wide variety of education goals can be fulfilled and students can develop the skills they need for the future” (OECD, 2016: 229).

Country overviews: Canada, the United States, the United Kingdom, and Singapore

Canada

In Canada, the national large-scale learning assessment program is the Pan-Canadian Assessment Program (PCAP), an initiative of the Council of Ministers of Education, Canada. It is issued to a sample of students every three years (except for a four-year gap between the 2019 and planned 2023 assessments) beginning in 2007; prior to the PCAP there was the School Achievement Indicators Program (SAIP), which had been in place since 1993. The PCAP tests

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Grade 8 (Secondary II in Quebec) students in mathematics, reading, and science. In each assessment one of these three subjects is the focus, which means that a larger sample is tested in that subject than in the other two (Council of Ministers of Education, Canada, Undated). In all, some 30,000 students participate in the assessment. The goals of the PCAP, as established by Canada's ministers of education in 2003, are: "to inform educational policies that seek to improve approaches to learning; to focus on reading, mathematics, and science, with the possibility of including other domains as the need arises; to reduce the testing burden on schools through a streamlined administrative process; to provide useful background information through the use of complementary context questionnaires for students, teachers, and school administrators; and to enable provinces and territories to use both national and international results to validate the results of their own assessment programs, and to improve these programs" (O'Grady et al., 2021b). As it is a large-scale assessment in which only a sample of students participate, the results are not reported at a school or student level.

The PCAP "is not intended to replace provincial and territorial assessments, but rather to complement them," (Council of Ministers of Education, Canada, Undated), and indeed the provinces have their own assessment programs. Many of the standardized tests that provincial governments issue, although not all, do have some consequences for the students' academic careers. For example, in British Columbia, students are required to write the Grade 10 Numeracy and Literacy Student Assessments and the Grade 12 Literacy Student Assessment in order to graduate. British Columbia students in Grades 4 and 7 are also required to participate in the Foundation Skills Assessments, which do not contribute to their final grades. In Alberta,

all students are required to write the Grade 6 and 9 Provincial Assessment Test, which does not contribute to final course grades, and the Grade 12 Diploma Exams, which account for 30 percent of the student's course grade. In Ontario, the Education Quality and Accountability Office, which is arms-length of the government, oversees the provincial tests. The Grades 3 and 6 tests in reading, writing, and mathematics do not contribute to students' final grades, but students' results in the Grade 9 Assessment of Mathematics may, if teachers and schools choose, be counted towards students' course grades. There is also a Grade 10 Ontario Secondary School Literacy Test, which students must pass to graduate from high school. Other provinces also have their own testing regimes, with varying levels of significance for students.

The United States

The national large-scale assessment program in the United States is the National Assessment of Educational Progress (NAEP), done by the US Department of Education. The NAEP tests students on a wide range of subjects. The tests are administered to a representative sample of students in public and private schools in the United States in Grades 4, 8, and 12. In each subject, test results are reported at the national level, although for core subjects results are also available at the state or district level and by type of school. Results are not available at an individual school or student level, and so do not affect students' academic careers. Instead, the government uses the NAEP tests compare students' academic performance over time, or between jurisdictions, in order to evaluate the performance of the school system within the jurisdiction and to inform educational improvements. The prime goal of this extensive and complex assessment program is to provide an easily accessible and comprehensive "Nation's

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Report Card” of what US students know and can do in the selected grades and subjects.

Similar to Canadian provinces, in addition to the national large-scale national assessment, states will also make use of standardized tests, which often have consequences for students’ academic careers. In New York, for example, there is the New York State Testing Program Assessments. These assessments include elementary and intermediate-level tests, which test students in Grades 3 to 8 in Language Arts and mathematics, and students in Grades 4 and 8 in science (New York State Education Department, Undated). These may be considered significant for students as “student scores may be used in admissions decisions for middle and high school” (Domanico, 2020). In New York City, approximately one-third of public middle and high schools use an admissions screening process which considers the state test scores, among other things (Lallinger, 2020). In addition to the elementary and intermediate-level tests, the New York State Assessments also include the Regents Examination for high school students, which students must pass to obtain a high school diploma.

United Kingdom

Students in the United Kingdom write standardized tests that have varying levels of significance to their academic careers. The education systems differ slightly between England, Wales, Northern Ireland, and Scotland, but in each case the education system in the UK has four Key Stages. The UK’s 1988 Education Reform Act established national Standard Assessment Tasks (SATs) for students at the end of Key Stage 1 (7 year olds), Key Stage 2 (11 year olds), and Key Stage 3 (14 year olds), although the Key Stage 3 SATs have since been dropped (Andreasen et al., 2015). The SATs at the end of

Key Stage 1 are in reading and mathematics, and at the end of Key Stage 2 they are in reading, mathematics, grammar, punctuation, and spelling. These SATs have “few consequences for students in terms of grade promotion,” but have significant consequences for schools, Gregory and Clarke (2003) report. “Publishing raw school-level results places schools in a marketplace environment, with each trying to attract more able students. As one incentive to encourage higher school achievement on these tests, parents are relatively free to move their children from one school to another, providing the schools are willing to accept their children.”

Thus, one of the main effects of these tests is to inform parental choice and give schools the incentive to improve their education by creating a more competitive environment. The test results also inform teachers and schools about the standards expected of students and where instruction needs to be improved to meet those standards. Around the age of 16, in Key Stage 4, students write the General Certificates of Secondary Education (GCSE) tests. “At the age of 16,” University of London professor emeritus Dylan Wiliam has noted, “almost every child in England will take probably about 15 or 20 substantial examinations” (Turney, 2014). However, unlike the lower-level SATs, the GCSE tests are not standardized tests.

Singapore

Singapore’s education system, which makes significant use of standardized tests, is widely regarded as high performing. In PISA 2018, Singapore’s test scores in reading, mathematics, and science were better than any OECD country, and Singapore has also ranked at or near the top of jurisdictions participating in recent TIMSS and PIRLS (Suto and Oates, 2021). Students in Singapore write high-stakes exams at

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the end of both primary and secondary school. Students at the end of their final year of primary school (approximately age 12) write the Primary School Leaving Examination (PLSE), which factors into which secondary school they can attend (Singapore, Ministry of Education, 2021a). Students are assigned to secondary schools based on their test scores and their choice ordering of schools, with the student's PLSE score being the primary criterion. As well, based on their scores, students are assigned into Express, Normal (Academic) or Normal (Technical) courses (Singapore, Ministry of Education, 2021b; 2021c).

Critics have suggested that these exams, particularly for students at such a young age, are counterproductive and put too much pressure on students. Nevertheless, a survey found that by a margin of 57.5 to 42.5 percent, parents in Singapore disagreed with delaying the high-stakes exams until students were older. "This may suggest," the survey authors noted, "that while there is still no clear consensus on the issue, at this stage a slight majority still see a major national examination as a necessary checkpoint for their child's learning progress, and a means to gauge their academic aptitude relative to peers" (Mathews et al., 2017). Notably, similar to the views of parents in other countries that administer standardized tests, the PSLE scores were also seen as a way to evaluate school performance (OECD, 2016: 136). The survey found that 72.8 percent of parents said a primary school's record of PLSE scores was either essential, very important, or important (as opposed to only moderately important, of little importance, or unimportant) in determining whether it was a good school.

Concluding comments

In countries all around the world, students write both large-scale learning assessments (international or national tests written by a sample of students, for which results are reported on the aggregate level) and national or sub-national standardized tests (which are written by all students and which may, unlike large-scale assessments, affect students' academic careers). Specifically, more than 80 countries or jurisdictions are participating in the OECD's 2022 PISA study and the OECD reports that about three-quarters of 15-year-old students attend schools in which mandatory standardized tests are used at least once annually. Both large-scale assessments and standardized tests enable student performance to be compared between jurisdictions or over time. However, because all students write the standardized tests, those tests provide parents, educators, researchers, and policymakers with more information than do the large-scale assessments as they allow for the evaluation of individual schools or students.

In Canada, according to the OECD's survey of school principals, the most frequent uses of standardized tests are to inform parents about their child's progress, compare the school to district or national performance, monitor the school's progress from year to year, identify aspects of instruction or the curriculum that could be improved, and compare the school with other schools. Individual provinces have their own testing regimes. On the whole in Canada standardized tests are used less frequently than in the United States, but more frequently than the average in OECD countries. The standardized tests are one tool of many used to assess the performance of students, schools, and educational systems.

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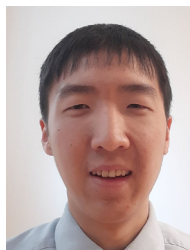
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