Outside the Box: Canadian Results of the OECD PISA 2022 Study

The Performance of Canadian 15-Year-Olds in Creative Thinking

Highlights

cmec

Canada

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Canadian results in creative thinking in international context

Canada performed well in the PISA 2022 creative thinking assessment. The proportion of 15-year-old Canadian students who performed at Level 3 (the baseline level of proficiency in creative thinking) or above was 89 percent, compared to the OECD average of 78 percent. Inversely, 11 percent of Canadian students did not reach Level 3, which is considerably less than the OECD average of 22 percent. Of the 64 participating countries,[1] only two — Singapore and Latvia — had a significantly higher proportion of students performing at Level 3 or above than Canada. At the higher end of the PISA creative thinking proficiency scale, 45 percent of Canadian students performed at Levels 5 and 6, compared to 27 percent performing at these levels on average across OECD countries.

Canadian students achieved an average score of 38 points in the creative thinking assessment, which is 5 points above the OECD average of 33 points. Canada was outperformed only by Singapore. Students in Canada performed as well as students in Korea and Australia.

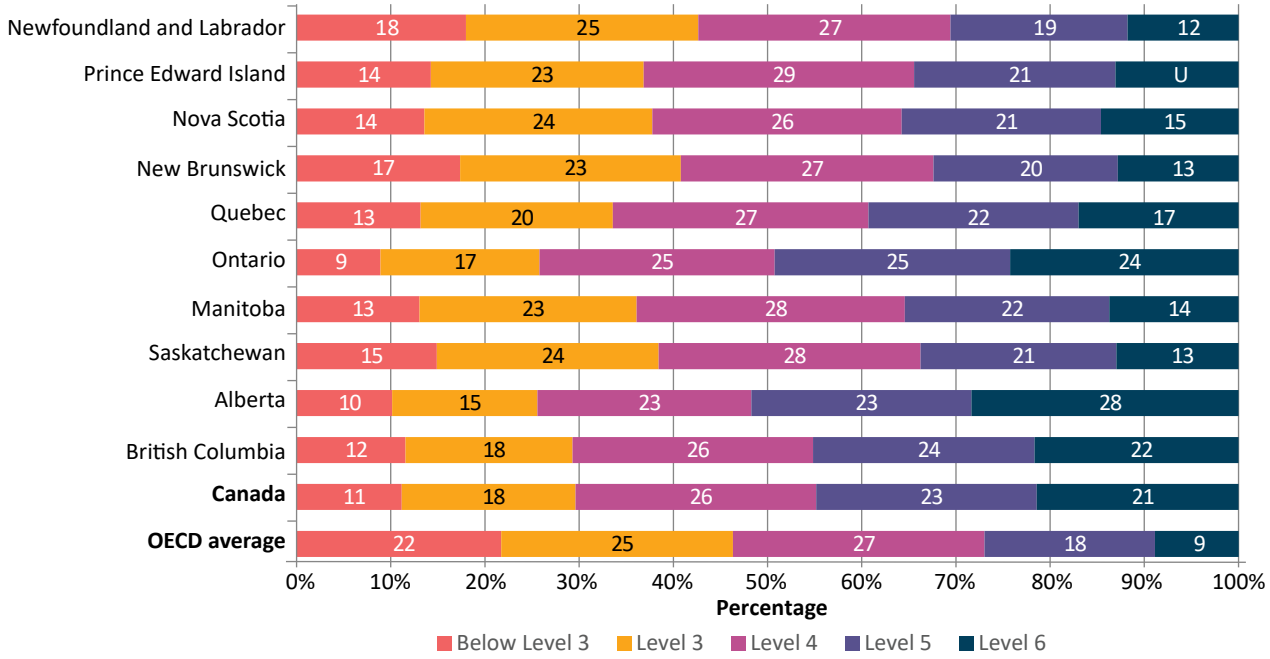
Provincial results in creative thinking

Within Canada, the percentage of students at or above the baseline level of performance ranged from 82 percent in Newfoundland and Labrador to 91 percent in Ontario. Inversely, the percentage of low achievers (those achieving below Level 3) ranged from 9 percent in Ontario to 18 percent in Newfoundland and Labrador. At the higher end of the proficiency scale, the proportion of high-performing students (Levels 5 and 6) varied across provinces, ranging from 31 percent in Newfoundland and Labrador to 52 percent in Alberta (see Figure 1).

[1] In PISA 2022 reports, the word "countries" is used to denote countries and economies.

Figure 1.1

Percentage of students at each proficiency level in creative thinking

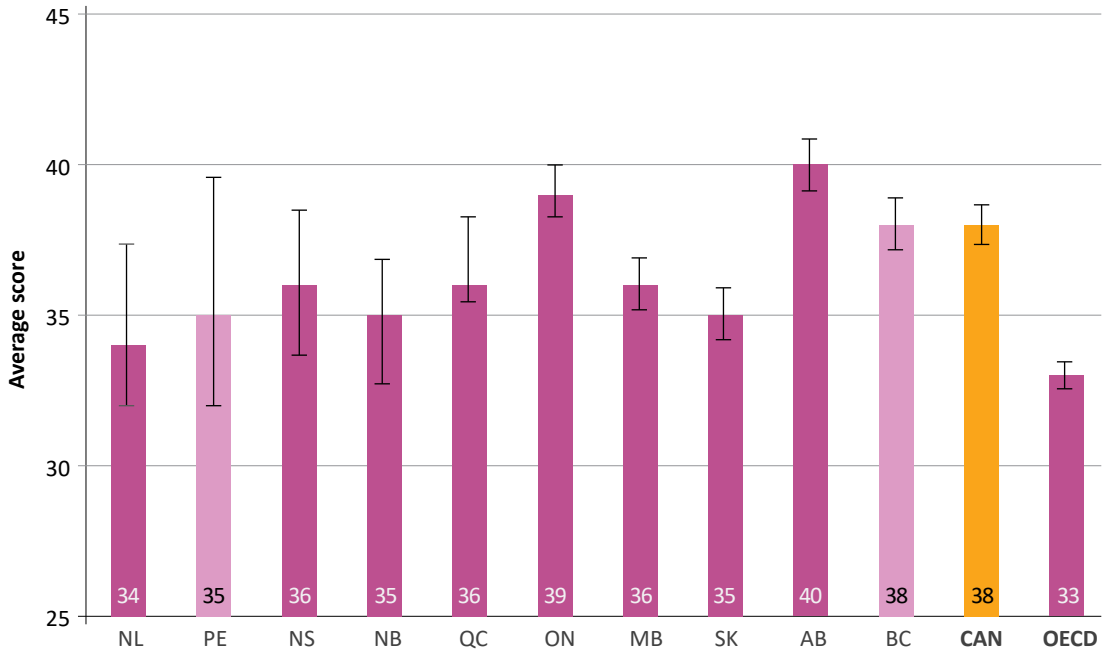


U Too unreliable to be published.
Note: Percentages may not add up at 100 due to rounding. See the PISA 2022 Canadian report for caveats about the PISA results for Canada and most Canadian provinces.

With respect to achievement scores at the provincial level, students in seven provinces (Nova Scotia, Quebec, Ontario, Saskatchewan, Manitoba, Alberta, and British Columbia) achieved average scores above the OECD average. Students in the remaining three provinces achieved average scores that were at the OECD average. Figure 2 illustrates the average achievement scores across provinces, along with the OECD and Canadian averages. Students in Alberta and Ontario achieved scores that were above the Canadian average, while students in Prince Edward Island and British Columbia achieved scores that were at the Canadian average. Students in the remaining six provinces achieved scores below the Canadian average.

Figure 1.2

Achievement scores in creative thinking



Note: Darker shades denote significant difference compared to Canada. See the PISA 2022 Canadian report for caveats about the PISA results for Canada and most Canadian provinces. Error bars represent 95 percent confidence intervals.

What is PISA?

The Programme for International Student Assessment (PISA) was initiated by the member countries of the Organisation for Economic Co-operation and Development (OECD) to measure the skills and knowledge of 15-year-old students. Data gathered through PISA allow for a thorough comparative analysis of the performance of students near the end of their compulsory education. In addition to student performance data, the contextual data collected as part of the assessment provide insight into the ways in which achievement varies across different social and economic groups, within and among countries. As a result, PISA provides policy-oriented international indicators to shed light on a range of factors that contribute to successful students, schools, education systems, and learning environments. In Canada, PISA is carried out through a partnership between Employment and Social Development Canada (ESDC) and the Council of Ministers of Education, Canada (CMEC).

The assessment has been conducted every three years since 2000 (due to the global pandemic, the cycle scheduled for 2021 was delayed by a year). PISA assesses mathematical, reading, and scientific literacy and provides a more detailed look at one of those domains in the years when it is the major focus. The major focus of PISA 2022 was mathematics, while reading and science were tested as minor domains, with creative thinking as an innovative domain and financial literacy as an optional minor domain. As part of the assessment, students and their school principals completed questionnaires that were designed to provide contextual information to aid in the interpretation of the performance results.

In 2022, 81 countries participated in the assessment of PISA's core domains of mathematics, reading, and science. Out of these 81 countries, 64 took part in the creative thinking assessment. In Canada, all 10 provinces participated in the creative thinking assessment.

In the context of PISA, "creative thinking" is defined as "the competence to engage productively in the generation, evaluation and improvement of ideas that can result in original and effective solutions, advances in knowledge and impactful expressions of imagination."[2]

The PISA 2022 creative thinking assessment focused on four domains and three facets or ideation processes for assessing and measuring creative thinking.

Creative thinking domains

- ***Written expression:*** Students express imaginative ideas using written language through tasks such as creating captions for an illustration, coming up with a slogan for a product, or constructively improving someone else's written work.
- ***Visual expression:*** Students use digital design tools to complete visual design tasks such as creating a poster or flyer for an event or improving someone else's visual work.
- ***Social problem solving:*** Students come up with solutions for interpersonal and social issues or propose original ways to improve an existing solution, such as proposing ideas on how to save water, then strategizing diverse communication methods to share these water-saving activity ideas with different groups of people.
- ***Scientific problem solving:*** Students solve problems by generating new ideas, designing experiments or hypotheses, or coming up with new methods or inventions in a scientific context (e.g., inventing a product to address an issue, formulating a theory to explain a phenomenon, or making inferences about a dataset).

Creative thinking facets/ideation processes

- ***Generating diverse ideas:*** The capacity to think flexibly by developing ideas that are distinctively different from one another. The focus is on the uniqueness of each idea among multiple ideas rather than the quality of ideas.
- ***Generating creative ideas:*** The capacity to develop ideas that are uncommon, or infrequent, relative to the responses of other students completing the same task. The ideas need to be both unique and appropriate, meaning that they are useful with respect to the situational context.
- ***Evaluating and improving ideas:*** The capacity to modify someone else's work in a way that maintains the content but offers an original improvement or advancement.

Correlation between creative thinking and PISA core domains

The correlation between performance in creative thinking and in the PISA core domains of mathematics, reading, and science was lower in Canada overall compared to the OECD average. In other words, while performance in creative thinking was positively correlated with performance in the three core domains, this correlation was not as strong in Canada as it was on average across OECD countries.

With respect to relative performance, Canadian students scored higher than expected in creative thinking based on their scores in the three core domains. For example, students scored 5 points higher in creative thinking than expected based on their mathematics scores, and 4 points higher than expected based on their scores in both reading and science. These score-point differences were higher in Canada overall compared to the OECD average of 2 points across all three domains.

[2] Organisation for Economic Co-operation and Development (OECD), *PISA 2022 results (Volume III): Creative minds, creative schools* (OECD Publishing, 2024), p. 47 (https://www.oecd-ilibrary.org/education/pisa-2022-results-volume-iii_765ee8c2-en).

Achievement in creative thinking by language of the school system

On average across Canada, anglophone school systems had a greater proportion of high achievers and a smaller proportion of low achievers (47 and 10 percent, respectively) compared to francophone school systems (38 and 14 percent, respectively).

Students in anglophone school systems also achieved a higher average score in creative thinking than students in francophone systems (38 points and 36 points, respectively).

Achievement in creative thinking by gender

Girls outperformed boys in creative thinking in all but 3 of the 64 participating countries, including Canada, and in all provinces except Prince Edward Island, where there was no difference in the average scores of boys and girls.

A higher proportion of girls than boys achieved Level 3 and above in Canada overall and in all provinces except Alberta and Prince Edward Island, where the difference was not significant.

In Canada overall and all provinces expect Prince Edward Island, a greater proportion of girls than boys were also high achievers, with differences ranging from 7 percentage points in Quebec to 15 percentage points in Newfoundland and Labrador.

Students' beliefs and attitudes toward creative thinking

The PISA 2022 creative thinking report also explored Canadian 15-year-old students' self-reported beliefs and attitudes regarding creativity and how these opinions relate to their achievement scores in the PISA 2022 creative thinking assessment.

In each of the five indices derived from the student questionnaire (indices of creative self-efficacy, openness to intellect, participation in creative activities at school, pedagogies encouraging creative thinking, and peer and family environments encouraging creative thinking) that were analyzed in the creative thinking report, Canadian students consistently had higher index scores than the OECD average.

A positive relationship was observed between high scores on four of the five indices (creative self-efficacy, openness to intellect, pedagogies encouraging creative thinking, and peer and family environments encouraging creative thinking) and students' performance in creative thinking in Canada overall.

Looking forward

The results of the PISA 2022 creative thinking assessment demonstrate the success of education systems across Canada, but they also offer important insights about areas for growth. Looking ahead to a future that is becoming increasingly difficult to predict, it is absolutely essential to think about the skills that young people will need to be successful. While the core domains of mathematics, reading, and science continue to be foundational to a quality education, there is growing recognition that global competencies such as creativity "can equip learners with the ability to meet the shifting and ongoing demands of life, work and learning; to be active and responsive in their communities; to understand diverse perspectives; and to act on issues of global significance."[3]

[3] Council of Ministers of Education, Canada (CMEC), *Pan-Canadian global competencies: Backgrounder* (Author, 2018), p. 3 (https://rb.gy/2j6vut).

Further Canadian results are available in the report *Outside the Box: Canadian Results of the OECD PISA 2022 Study — The Performance of Canadian 15-Year-Olds in Creative Thinking.*

This publication is available electronically without charge, at www.cmec.ca.