

To the attention of:

Master's and Ph.D. students, Researchers, and Data analysts



## WHAT ABOUT USING THE PCAP 2010 DATASET?

### What is PCAP?

The Pan-Canadian Assessment Program (PCAP) is the continuation of the commitment of the Council of Ministers of Education, Canada (CMEC) to inform Canadians about how well their education systems are meeting the needs of students and society. It assesses the knowledge of **Grade 8/Secondary Two** students in three domains: **mathematics, science, and reading**. The PCAP assessment frameworks are based on the commonalities of the Grade 8 curricula across Canada. PCAP is meant to assess the kinds of learning that we value in Canada as a whole and is intended to give students in Grade 8 an opportunity to demonstrate what they know and are able to do in mathematics, science, and reading. It is designed to have a range of difficulty to try to capture the variety of students' knowledge and skills at that grade level in each jurisdiction.

PCAP provides both pan-Canadian results — the mean scores for Canada overall — as well as results for individual jurisdictions, including breakdowns by language and gender. It also collects extensive contextual information from questionnaires completed by students, teachers, and principals.

The PCAP assessment is repeated every three years with each cycle providing a detailed assessment in one of the three domains and summary assessments in the other two (containing fewer questions). In PCAP 2010, mathematics was the major assessment domain, while science and reading were minor domains. For the purpose of this assessment, mathematics was broadly defined as a conceptual tool that students can use to increase their capacity to calculate, describe, and solve problems. The domain was divided into four subdomains — *numbers and operations, geometry and measurement, patterns and relationships, and data management and probability* — and five mathematical processes — *problem solving, communication, representation, reasoning and proof, and connections*.

The PCAP 2010 dataset includes data for ten Canadian provinces and one territory (Yukon). It provides interesting research opportunities by connecting student performance to their individual characteristics as well as characteristics of their teachers and schools



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## Participants

- ◆ About 32,000 Grade 8 students in over 1,600 schools, with approximately 24,000 responding in English and 8,000 in French
- ◆ About 1,900 teachers of mathematics (linked to students)
- ◆ About 1,600 school principals (linked to teachers and students)

## Student achievement data in mathematics, science, and reading

There were four assessment booklets in PCAP 2010, each containing approximately 45 questions. About half of these questions belonged to mathematics domain, and the other half to science and reading. Approximately 30 per cent of the questions were selected-response items and approximately 70 per cent constructed-response items. Each student was asked to complete one of the four booklets. Each of the four booklets was equally and randomly distributed in intact grade 8 classes.

### ◆ *Standard scale scores:*

In order to allow for direct comparisons across populations and across tests, raw student scores were converted to “standard scale scores,” using a scale on which the average for the pan-Canadian population was set at 500, with a standard deviation of 100.

In the PCAP 2010 dataset, the standard scale scores are available for mathematics overall, as well as four sub-domains. Standard scale scores are also available for the minor domains (science and reading).

**Note:** As compared to other large-scale assessments, PCAP does not use plausible values. All analyses can be performed on mean scores.

### ◆ *Proficiency levels:*

In addition to the reporting of standard scale scores, the results for each student are referenced to the levels of achievement using a performance scale. This scale is based on descriptions of what students know and are able to do at each level, by taking into account two factors: *cognitive demand* (determined by the level of reasoning required by the student to correctly answer an item, from low demand to high demand) and *degree of difficulty of the item* (determined by a statistical determination based on the collective performance of the students on the assessment).

For the mathematics test, four proficiency levels were defined, with Level 2 considered the acceptable level of performance for Grade 8 students. These levels are available for mathematics only.

## Contextual data

In PCAP 2010, students, teachers, and school principals were asked to complete a background questionnaire, asking about home, classroom, and school contexts.

### ◆ *Data from the student questionnaire:*

The PCAP 2010 dataset includes about 250 variables related to:

- a. *student characteristics* (i.e., gender, language, socio-economic status, immigration status, self-declared aboriginal identity, student aspirations),

- b. *student attitudes* (i.e., attitudes towards school, attitudes towards mathematics, attributions of success and failure, confidence in mathematics),
- c. *student mathematics behaviours and strategies* (i.e., strategies on encountering difficult mathematics problems, time spent on out-of-school activities, early mathematics learning, mathematics learning strategies),
- d. *student report of disciplinary climate* (i.e., lost time and disruption in mathematics classes),
- e. *student report of time allocation and use* (i.e., student absence, time spent on homework, type of mathematics homework assignments),
- f. *student report of teaching strategies* (i.e., mathematics assignments),
- g. *student report of assessment* (i.e., methods for classroom assessment, use of rubrics).

◆ **Data from the teacher questionnaire:**

The PCAP 2010 dataset includes about 250 variables related to:

- a. *teacher characteristics* (i.e., gender, teaching experience, teacher qualifications and specialization in mathematics),
- b. *teacher report of instructional climate* (i.e., class size, challenges in teaching mathematics),
- c. *teacher report of time allocation and use* (i.e., time spent on homework, type of mathematics homework assignments),
- d. *teacher strategies* (i.e., mathematics teaching strategies, mathematics learning strategies, learning resources),
- e. *teacher report of assessment* (i.e., type of assessment items used, criteria for grading, assessment components contributing to student final marks, grading methods).

◆ **Data from the school questionnaire:**

The PCAP 2010 dataset includes about 120 variables related to:

- a. *school characteristics* (i.e., school size, public and private schools, diversity of student populations, school locations by community size),
- b. *school report of instructional climate* (i.e., areas of emphasis on mathematics, sources of influence on school programs, presence and accommodation of special-needs students),
- c. *school report of time allocation and use* (i.e., school time spent on mathematics, student absence),
- d. *school report of assessment* (i.e., availability and use of external assessments, purpose for which assessment results are used).

**Note:** In the PCAP 2010 dataset, students' responses are already linked to the responses of their teachers and school principals.

## Weights

Weighting is an essential aspect in large-scale data analyses. In the PCAP 2010 dataset, student and school weights are already available for use, with a short guide explaining how to apply them for different types of analyses.

## Future research

An important feature of PCAP is to determine if the performance of students changes over time. In 2013, there was a new cycle of PCAP assessment, with science tested as a major domain, and reading and mathematics as minor domains. The 2013 test was constructed from a subset of PCAP 2007 and 2010 items so that comparisons can be made between the years. The PCAP 2013 dataset will be available in summer 2014.

## Format

The 2010-dataset is available in SPSS and Excel formats, with labels defined in English or French. Codebooks and a technical report are also available in both national languages upon request.

### INTERESTED IN THE DATA?

Please contact the Council of Ministers of Education, Canada, at

[pcapinfo@cmecc.ca](mailto:pcapinfo@cmecc.ca)

Further information is available in the ***PCAP-2010 Report on the Pan-Canadian Assessment of Mathematics, Science, and Reading*** at:

<http://www.cmecc.ca/Publications/Lists/Publications/Attachments/274/pcap2010.pdf>