To the attention of:
Master's and doctoral students, researchers, and data analysts

LOOKING FOR DATA ON STUDENT ACHIEVEMENT? WHAT ABOUT USING THE PCAP 2013 DATASET?

What is PCAP?

The Pan-Canadian Assessment Program (PCAP) is part 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. The information gained from this pan-Canadian assessment provides ministers of education with a basis for examining the curriculum and other aspects of their school systems.

School programs and curricula vary from jurisdiction to jurisdiction across the Canada, so comparing results from these programs is a complex task. Yet, despite curricular differences, students in different jurisdictions receive a similar education and attain the same skills and knowledge in reading, mathematics, and science. PCAP has been designed to determine whether students across Canada truly attain similar levels of performance in these core disciplines (at about the same age). PCAP results also complement existing jurisdictional assessments by offering comparative Canada-wide data on the achievement levels attained by Grade 8/Secondary II students.

PCAP provides both pan-Canadian results (e.g., mean scores for all of Canada) 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.

PCAP is repeated every three years, with each cycle providing a detailed assessment of the primary domain, as well as summary assessments of the other two domains. In PCAP 2013, science was the primary assessment domain, while mathematics and reading were minor domains. For the purposes of the 2013 assessment, science literacy was defined through three competencies (scientific inquiry, problem solving, and scientific reasoning); four subdomains (nature of science, life sciences, physical sciences, and Earth sciences); as well as attitudes about science and its role in society. Science performance levels were developed in consultation with independent experts in education and assessment.

The PCAP 2013 dataset includes data for all ten Canadian provinces. It provides interesting research opportunities by linking student performance to contextual characteristics such as their personal life, or information about their teachers and schools.

Participants

- About 32,000 Grade 8/Secondary II students in close to 1,500 schools, with approximately 24,000 responding in English and 8,000 in French
- About 1,600 teachers of science (linked to students)
- About 1,500 school principals (linked to teachers and students)

Student achievement data in science, mathematics, and reading

There were four 90-minute booklets in PCAP 2013. These four booklets included both field-tested science items and anchor items for reading and mathematics to ensure comparability over time for the minor domains. No anchor items were included for science because this was the first time that science was the primary domain and substantive changes to the framework were necessary to reflect the current programs of study across Canada. Each booklet was composed of eight to 10 assessment units that taken together span each of the competencies and subdomains. Each unit included a scenario and between one and six items. The science units were organized into eight groups or clusters. The eight clusters were distributed within four booklets so that each booklet contained two clusters of science items, one reading cluster, and one mathematics cluster. The four booklets were randomly and equally distributed to students within a single class. While every student completed two of the eight clusters of science assessment items, all eight clusters were completed by students within a given class.

- ***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 2013 dataset, the standard scale scores are available for science overall as well as for each competency and subdomain. Standard scale scores are also available for the minor domains (mathematics and reading).

  Note: 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) 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 science test, four proficiency levels were defined, with Level 2 considered the acceptable level of performance for Grade 8/Secondary II students. These levels are available for science only.

Contextual data

In PCAP 2013, 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 2013 dataset includes 213 variables related to:
  a. *student characteristics* (e.g., gender, language, socio-economic status, immigration status, self-declared aboriginal identity, student aspirations)
  b. *student attitudes* (e.g., attitudes towards school, attitudes towards science, attributions of success and failure, confidence in science)
  c. *student science behaviours and strategies* (e.g., strategies on encountering difficult science questions, time spent on out-of-school activities, early science learning, science learning strategies)
  d. *student report of disciplinary climate* (e.g., lost time and disruption in science classes)
  e. *student report of time allocation and use (*e.g., student absence, time spent on homework, type of science homework assignments)
  f. *student report of teaching strategies* (e.g., science assignments)
  g. *student report of assessment (*e.g., methods for classroom assessment, use of rubrics)

- ***Data from the teacher questionnaire***

  The PCAP 2013 dataset includes 165 variables related to:
  a. *teacher characteristics* (e.g., gender, teaching experience, teacher qualifications and specialization in science, teaching assignment, professional development, science teaching efficacy and beliefs)
  b. *teacher report of instructional climate* (e.g., class size, challenges in teaching science)
  c. *teacher report of time allocation and use* (e.g., time spent on homework, type of science homework assignments)
  d. *teacher strategies* (e.g., science teaching strategies, science learning strategies, learning resources)
  e. *teacher report of assessment* (e.g., type of assessment items used, criteria for grading, assessment components contributing to student final marks, grading methods, modifications used to meet the needs of all students)

- ***Data from the school questionnaire***

  The PCAP 2013 dataset includes 66 variables related to:

  a. *school characteristics* (e.g., school size, public and private schools, diversity of student populations, school locations by community size)
  b. *school report of instructional climate* (e.g., areas of emphasis on science, sources of influence on school programs, strategies to meet the needs of all students, challenges in teaching science)
  c. *school report of time allocation and use* (e.g., school time spent on science, student absence)
  d. *school report of assessment* (e.g., availability and use of external assessments, purpose for which assessment results are used)

Note: In the PCAP-2013 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 2013 dataset, student and school weights are already available for use. Definitive teacher population figures are not available because the teacher sample was based on the school and student samples.

Future research

An important feature of PCAP is ability to measure changes in the performance of students over time. In the spring of 2016, the next assessment will be administered, with reading as a major domain, and mathematics and sciences as minor domains. The PCAP 2016 dataset will be available in 2017.

Available Format

The 2013 dataset is available in SPSS and Excel formats, with labels defined in English or French. Codebooks are also available upon request in both national languages.

Technical Information

The *PCAP 2013 Technical Report* is available at:
http://cmec.ca/Publications/Lists/Publications/Attachments/351/PCAP2013-Technical-Report-EN-Final-Web.pdf

INTERESTED IN ACCESSING THE DATA?

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