

Albania, United Arab Emirates,
Argentina, Australia, Austria, Belgium,
Bulgaria, Brazil, Canada, Swi -
Programme for International Student
Assessment, Computer-Based
Assessment 2012

Organisation for Economic Co-operation and Development

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Overview

Identification

ID NUMBER

WLD_2012_PISA-CBA_v01_M

Version

VERSION DESCRIPTION

PRODUCTION DATE

NOTES

Overview

ABSTRACT

PISA 2012 supplemented the paper-based assessment with an optional computer-based assessment in mathematics and reading in which 32 of the 65 countries and economies participated. In addition, PISA 2012 included an optional computer-based assessment of problem solving in which 44 of the countries and economies participated. Forty-one specially designed computer-based items were developed for the assessment. Future PISA surveys will feature more sophisticated computer-based items as developers and item writers become more fully immersed in the computer-based assessment and as delivery of the computer-based assessment becomes more sophisticated.

There were two reasons for including a computer-based mathematics assessment in PISA 2012. First, computer-based items can be more interactive, authentic and engaging than paper-based items. They can be presented in new formats (e.g. drag-and-drop), include real-world data (such as a large, sortable dataset), and use colour, graphics and movement to aid comprehension. Students may be presented with a moving stimulus or representations of three-dimensional objects that can be rotated, or have more flexible access to relevant information. New item formats can expand response types beyond verbal and written, giving a more rounded picture of mathematical literacy. Second, computers have become essential tools for representing, visualising, exploring, and experimenting with all kinds of mathematical objects, phenomena and processes, not to mention for realising all types of computations – at home, at school, and at work. In the workplace, mathematical literacy and the use of computer technology are inextricably linked.

KIND OF DATA

Sample survey data [ssd]

UNITS OF ANALYSIS

To better compare student performance internationally, PISA targets a specific age of students. PISA students are aged between 15 years 3 months and 16 years 2 months at the time of the assessment, and have completed at least 6 years of formal schooling. They can be enrolled in any type of institution, participate in full-time or part-time education, in academic or vocational programmes, and attend public or private schools or foreign schools within the country. Using this age across countries and over time allows PISA to compare consistently the knowledge and skills of individuals born in the same year who are still in school at age 15, despite the diversity of their education histories in and outside of school.

Scope

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- The mathematical competencies being tested: These comprise aspects of mathematical literacy applicable in any environment, not just computer environments, and are being tested in every computer-based assessment item.

- Competencies that cover aspects of mathematics and ICT: These require knowledge of doing mathematics with the assistance of a computer or handheld device. These are being tested in some – but not all – computer-based assessment items. The computer-based test may include assessments of the following competencies:

- making a chart from data, including from a table of values (e.g. pie chart, bar chart, line graph) using simple ‘wizards’;

- producing graphs of functions and using the graphs to answer questions about the functions;
- sorting information and planning efficient sorting strategies;
- using hand-held or on-screen calculators;
- using virtual instruments such as an on-screen ruler or protractor; and
- transforming images using a dialog box or mouse to rotate, reflect or translate the image.

- ICT skills: Just as pencil and paper assessments rely on a set of fundamental skills for working with printed materials, computer-based assessments rely on a set of fundamental skills for using computers. These include knowledge of basic hardware (e.g. keyboard and mouse) and basic conventions (e.g. arrows to move forward and specific buttons to press to execute commands). The intention is to keep such skills to a minimal core level in every computer-based assessment item.

Coverage

GEOGRAPHIC COVERAGE

44 countries and economies participated in a computer-based assessment of problem solving, and among them, 32 participated in a computer-based assessment of reading and mathematics.

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Organisation for Economic Co-operation and Development	

OTHER PRODUCER(S)

Name	Affiliation	Role
Australian Council for Educational Research		
Netherlands National Institute for Educational Measurement		
Service de Pédagogie Expérimentale at Université de Liège		
Westat (USA)		
Educational Testing Service (USA)		
National Institute for Educational Research (Japan)		

FUNDING

Name	Abbreviation	Role
Organisation for Economic Co-operation and Development	OECD	

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Development Economics Data Group	DECDG	The World Bank	Documentation of the DDI

DATE OF METADATA PRODUCTION

2014-07-20

DDI DOCUMENT VERSION

Version 01 (June 2014)

DDI DOCUMENT ID

DDI_WLD_2012_PISA-CBA_v01_M_WB

Sampling

Sampling Procedure

Out of the 65 countries and economies that participated in PISA 2012, 44 also implemented the computer-based assessment (CBA) of problem solving. Of these, 12 countries and economies only assessed problem solving, while 32 also assessed mathematics and (digital) reading on computers.

In all 44 countries/economies, only a random sub-sample of students who participated in the paper-based assessment (PBA) of mathematics were sampled to be administered the assessment of problem solving. However, as long as at least one student in a participating school was sampled for the computer-based assessment, all students in the PISA sample from that school received multiple imputations (plausible values) of performance in problem solving. This is similar to the procedure used to impute plausible values for minor domains in PISA (for instance, not all test booklets in 2012 included reading questions; but all students received imputed values for reading performance).

In all but four of the 44 countries/economies that assessed problem solving, the school samples for CBA and PBA coincide. As a consequence, in 40 countries/economies the main student dataset, containing the results of paper-based assessments, and the CBA dataset have the same number of observations.

For more on sampling, refer to the report titled "PISA 2012 Results: Volume V," provided as an external resource.

Deviations from Sample Design

Response Rate

Weighting

Questionnaires

Overview

The duration of the PISA 2012 computer-delivered assessment was 40 minutes. A total of 80 minutes of problem-solving material was organised into four 20-minute clusters. Students from countries not participating in the optional computer-based assessment of mathematics and digital reading did two of the clusters according to a balanced rotation design. Students from countries also participating in the optional computer-based assessment of mathematics and digital reading did two, one or none of the four problem-solving clusters according to a separate balanced rotation design. The optional computer-based component contained a total of 80 minutes of mathematics material and 80 minutes of reading material. The material for each domain was arranged in four clusters of items, with each cluster representing 20 minutes of testing time. All material for computer delivery was arranged in a number of rotated test forms, with each form containing two clusters. Each student did one form, representing a total testing time of 40 minutes.

The computer-based assessment included a variety of types of questions. Some required students to select or produce simple responses that can be directly compared with a single correct answer, such as multiple-choice or closed-constructed response items. These questions had either a correct or incorrect answer and often assess lower-order skills. Others were more constructive, requiring students to develop their own responses designed to measure broader constructs than those captured by more traditional surveys, allowing for a wider range of acceptable responses and more complex marking that can include partially correct responses.

Data Collection

Data Collection Dates

Start	End	Cycle
2012	2012	N/A

Data Collection Mode

Face-to-face [f2f]

Data Collection Notes

This study is the product of a concerted effort between the countries participating in PISA, the experts and institutions working within the framework of the PISA Consortium, and the OECD.

Questionnaires

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Supervision

Data Processing

Data Editing

Other Processing

Data Appraisal

Estimates of Sampling Error **Other forms of Data Appraisal**

Documentation

Questionnaires

Educational Career Questionnaire for PISA 2012

Title Educational Career Questionnaire for PISA 2012
subtitle International Option
Author(s) Australian Council for Educational Research (ACER, Australia) cApStAn Linguistic Quality Control (Belgium)
Deutsches Institut für Internationale Pädagogische Forschung (DIPF, Germany) Educational Testing Service (ETS, USA) Institut for Lærerutdanning o
Date 2011-12-01
Language English
Filename MS12_EC_ENG.pdf

Information and Communication Technology Familiarity Questionnaire for PISA 2012

Title Information and Communication Technology Familiarity Questionnaire for PISA 2012
Australian Council for Educational Research (ACER, Australia) cApStAn Linguistic Quality Control (Belgium)
Author(s) Deutsches Institut für Internationale Pädagogische Forschung (DIPF, Germany) Educational Testing Service (ETS, USA) Institut for Lærerutdanning o
Date 2011-12-01
Language English
Filename MS12_ICT_ENG.pdf

Parent Questionnaire for PISA 2012

Title Parent Questionnaire for PISA 2012
subtitle International Option
Author(s) Australian Council for Educational Research (ACER, Australia) cApStAn Linguistic Quality Control (Belgium)
Deutsches Institut für Internationale Pädagogische Forschung (DIPF, Germany) Educational Testing Service (ETS, USA) Institut for Lærerutdanning o
Date 2011-12-01
Language English
Filename MS12_PaQ_ENG.pdf

School Questionnaire for PISA 2012

Title School Questionnaire for PISA 2012
Author(s) Australian Council for Educational Research (ACER, Australia) cApStAn Linguistic Quality Control (Belgium)
Deutsches Institut für Internationale Pädagogische Forschung (DIPF, Germany) Educational Testing Service (ETS, USA) Institut for Lærerutdanning o
Date 2011-12-01
Language English
Filename MS12_ScQ_ENG.pdf

Student Questionnaire Form A

Title Student Questionnaire Form A
Australian Council for Educational Research (ACER, Australia) cApStAn Linguistic Quality Control (Belgium)
Author(s) Deutsches Institut für Internationale Pädagogische Forschung (DIPF, Germany) Educational Testing Service (ETS, USA) Institutt for Lærerutdanning o
Language English
Filename MS12_StQ_FORM_A_ENG.pdf

Student Questionnaire Form B

Title Student Questionnaire Form B
Australian Council for Educational Research (ACER, Australia) cApStAn Linguistic Quality Control (Belgium)
Author(s) Deutsches Institut für Internationale Pädagogische Forschung (DIPF, Germany) Educational Testing Service (ETS, USA) Institutt for Lærerutdanning o
Language English
Filename MS12_StQ_FORM_B_ENG.pdf

Student Questionnaire Form C

Title Student Questionnaire Form C
Australian Council for Educational Research (ACER, Australia) cApStAn Linguistic Quality Control (Belgium)
Author(s) Deutsches Institut für Internationale Pädagogische Forschung (DIPF, Germany) Educational Testing Service (ETS, USA) Institutt for Lærerutdanning o
Language English
Filename MS12_StQ_FORM_C_ENG.pdf

Student Questionnaire Form UH

Title Student Questionnaire Form UH
Australian Council for Educational Research (ACER, Australia) cApStAn Linguistic Quality Control (Belgium)
Author(s) Deutsches Institut für Internationale Pädagogische Forschung (DIPF, Germany) Educational Testing Service (ETS, USA) Institutt for Lærerutdanning o
Language English
Filename MS12_StQ_FORM_UH_ENG.pdf

Reports

PISA 2012 Assessment and Analytical Framework

Title PISA 2012 Assessment and Analytical Framework
Author(s) OECD
Date 2013-01-01
Language English
Filename PISA 2012 framework e-book_final.pdf

PISA 2012 Results: What Students Know and Can Do (Volume I)

Title PISA 2012 Results: What Students Know and Can Do (Volume I)
Author(s) This report is the product of a collaborative effort between the countries participating in PISA, the experts and institutions working within the framework of the PISA Consortium, and the OECD Secretariat.
Date 2014-01-01

Language English

Filename pisa-2012-results-volume-I.pdf

PISA 2012 Results: Creative Problem Solving (Volume V)

Title PISA 2012 Results: Creative Problem Solving (Volume V)

Author(s) This report is the product of a collaborative effort between the countries participating in PISA, the experts and institutions working within the framework of the PISA Consortium, and the OECD Secretariat.

Language English

Filename PISA-2012-results-volume-V.pdf

Technical documents

Codebook for PISA 2012 Main Study Cognitive Items- CBA Database

Title Codebook for PISA 2012 Main Study Cognitive Items- CBA Database

Date 2014-03-12

Language English

Filename C_cogn_codebook.pdf

Codebook for PISA 2012 Main Study Scored Cognitive Items - CBA Database

Title Codebook for PISA 2012 Main Study Scored Cognitive Items - CBA Database

Date 2014-03-12

Language English

Filename C_cogs_codebook.pdf

Codebook for PISA 2012 Main Study Parent Questionnaire- CBA Database

Title Codebook for PISA 2012 Main Study Parent Questionnaire- CBA Database

Date 2014-03-12

Language English

Filename C_par_codebook.pdf

Codebook for PISA 2012 Main Study School Questionnaire- CBA Database

Title Codebook for PISA 2012 Main Study School Questionnaire- CBA Database

Date 2014-03-12

Language English

Filename C_sch_codebook.pdf

Codebook for PISA 2012 Main Study Student Questionnaire- CBA Database

Title Codebook for PISA 2012 Main Study Student Questionnaire- CBA Database

Date 2014-03-12

Language English

Filename C_stu_codebook.pdf

Compendium for the student questionnaire

Title Compendium for the student questionnaire
Language English
Filename C_comp_STU_MAR31.zip

Compendium for the cognitive item responses

Title Compendium for the cognitive item responses
Language English
Filename C_comp_COG_MAR31.zip

Compendium for the EC questionnaire

Title Compendium for the EC questionnaire
Language English
Filename C_comp_EC_MAR31.zip

Compendium for the ICT questionnaire

Title Compendium for the ICT questionnaire
Language English
Filename C_comp_ICT_MAR31.zip

Compendium for the parent questionnaire

Title Compendium for the parent questionnaire
Language English
Filename C_comp_PAQ_MAR31.zip

Compendium for the school questionnaire

Title Compendium for the school questionnaire
Language English
Filename C_comp_SCQ_MAR31.zip
