Project: Data Exploration of the performance of globally selected 15/16-year-old students in Mathematics, Reading and Science Literacy, based on the results of the PISA 2012 test

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Introduction of the topic and dataset

Introduction to PISA (ref.: NCES 2014-024, U.S. Department of Education)

What Is PISA?

The Program for International Student Assessment (PISA) is a system of international assessments that allows countries to compare outcomes of learning as students near the end of compulsory schooling. PISA core assessments measure the performance of 15-year-old students in mathematics, science, and reading literacy every 3 years. Coordinated by the Organization for Economic Cooperation and Development (OECD), PISA was first implemented in 2000 in 32 countries. It has since grown to 65 education systems in 2012.

What PISA Measures?

PISA's goal is to assess students' preparation for the challenges of life as young adults. PISA assesses the application of knowledge in mathematics, science, and reading literacy to problems within a reallife context (OECD 1999). PISA does not focus explicitly on curricular outcomes and uses the term "literacy" in each subject area to indicate its broad focus on the application of knowledge and skills. For example, when assessing mathematics, PISA examines how well 15-year-old students can understand, use, and reflect on mathematics for a variety of real-life problems and settings that they may not encounter in the classroom. Scores on the PISA scales represent skill levels along a continuum of literacy skills.

Each PISA data collection cycle assesses one of the three core subject areas in depth (considered the major subject area), although all three core subjects are assessed in each cycle (the other two subjects are considered minor subject areas for that assessment year). Assessing all three subjects every 3 years allows countries to have a consistent source of achievement data in each of the three subjects, while rotating one area as the primary focus over the years. Mathematics was the major subject area in 2012, as it was in 2003, since each subject is a major subject area once every three cycles. In 2012, mathematics, science, and reading literacy were

assessed primarily through a paper-and-pencil assessment, and problem solving was administered via a computer-based assessment. In addition to these core assessments, education systems could participate in optional paper-based financial literacy and computer-based mathematics and reading assessments. The United States participated in these optional assessments. Visit www.nces.ed.gov/surveys/pisa for more information on the PISA assessments, including information on how the assessments were designed and examples of PISA questions.

Introduction to the PISA 2012 dataset

PISA is a survey of students' skills and knowledge as they approach the end of compulsory education. It is not a conventional school test. Rather than examining how well students have learned the school curriculum, it looks at how well prepared they are for life beyond school.

Around 510,000 students in 65 economies took part in the PISA 2012 assessment of reading, mathematics and science representing about 28 million 15-year-olds globally. Of those economies, 44 took part in an assessment of creative problem solving and 18 in an assessment of financial literacy.

Questions

After looking throughout the Dataset, we will try to find answers to following questions:

-   How do students from different gender perform in Math, Reading and Science literacy?

-   Which countries have students with exceptionally high literacy scores?

-   We would like to find out whether students whose parents have different cultural backgrounds will report any changes in average scores, compared with students raised in a homogenous family background.

Conclusions from the Data Analysis

-   **How do students from different gender perform in Math, Reading and Science literacy?**
    We have performed the analysis of particular question. The results can be explored in Visualisation 5 of Bivariant analysis.

-   **Which countries have students with exceptionally high literacy scores?**
    Generally, we have seen Asian countries as being the world leaders at educating students who perform exceptionally. Singapore and China are examples of this.

- **We would like to find out whether students whose parents have different cultural backgrounds will report any changes in average scores, compared with students raised in a homogenous family background.**
  We found that students whose parent come from different culture background tend perform better than students whose parents are from same culture background.