To the full report

Israeli Students' Performance on the PISA Assessment in Mathematics

An abstract based on analysis by Zbigniew Marciniak and Agnieszka and Antonina Sotveska

The researchers accessed the international PISA assessment database and analyzed the performance of Israeli students for the years 2006-2018. The goal was to identify strengths and weaknesses, both with respect to mastery of mathematical concepts and technique, and aspects of thinking and reasoning skills. The importance of the study is to provide Israeli decision makers with an in-depth picture of the extent to which Israeli students are prepared for the current era in which people are required to solve surprising and complex problems that require creative mathematical thinking.

Main findings

1. Israeli students have a good command over mathematical technique, but have much difficulty in translating a problem from a real-world context to a mathematical model or language, and also have difficulty in evaluating the significance of the mathematical results and their implications for resolving the real problem. The researchers hypothesize that this is because most of the practice in school is devoted to formal procedures.

2. Israeli students have special difficulty in the field of "space and form" (geometry). PISA examines the transition between the physical world and geometric models vice versa. It appears that this particular transition presents a unique and even unusual difficulty for many Israeli students.

3. Israeli students tend to "skip" many questions that present them with the need to cope with problems they have not previously encountered. When ae problem requires independent thinking and courage, they are fearful and give up quicky.

4. The researchers believe that Israeli policy makers may want to consider the following steps:

- **a.** The Israeli curriculum should give substantial place to literacy skills, mainly in the field of geometry, and allow teachers and students a creative space for transitions between context, concept and model.
- **b.** The high rate of skipping questions signals a possible lack of readiness for independent mathematical thinking and absence of courage to contend with unfamiliar situations. Therefore, teachers should stimulate open and flexible discussions in class and not focus only on standard solutions to problems.
- **c.** Classroom pedagogy in mathematics lessons in Israel should change. Students should be given more time to think, cope, experiment, make mistakes and to reach the solution on their own. The teachers should arouse the belief among students that they have the capacity to solve any complex problem.