

Gender Gaps on the 2022 PISA Assessment

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After several years of improvement, the 2022 cycle of the PISA assessment indicated widening gaps between the achievements of female and male students in mathematics. In only three developed countries did female students outperform male students (Finland, Norway, and Slovenia). Regarding the level of excellence in mathematics, in all countries worldwide, male students outperformed female students. Israel reached the fourth (and not esteemed) place in terms of gender gaps in the level of excellence in mathematics (after Macau, Hong Kong, and Japan).

In Israel, 11.8% of male students reached the top level of excellence in mathematics on the 2022 PISA (compared to an OECD average of 8.7%, and 10.5% among male students only). In comparison, only 4.9% of female students in Israel reached this level (compared to 6.8% of female students in the OECD). The largest gender gaps in Israel were recorded in state-religious schools, where 18.5% of boys reached the level of excellence in mathematics, as opposed to only 4.3% of girls.

To dive deeper into the data and identify difficulties and potential causes for the gap earlier in the process, we consulted Prof. Rami Benbenishty of The Hebrew University and Eli Kleinberger, also from The Hebrew University, who specializes in statistical data analysis. We asked them to perform advanced analyses and cross-referencing between questionnaires and test items. We attempted to identify specific mathematical topics where female students face greater challenges or lower success rates, aiming to uncover unique thinking processes characteristic of female students. We also examined whether there is a correlation between responses on social and emotional topics in the questionnaires and mathematical performance among female students.

Main findings

1. In Israel, male students excel on the PISA mathematics test at a rate over 2.5 times that of excelling female students. In general, this large gap exists across all tested mathematical topics and required mathematical thinking processes. No specific topic or process could be identified in which female students particularly excel or struggle relative to the general gap.
2. The smallest gender gap is in the fields of algebra, statistics, and probability, while the largest gender gaps were recorded in quantitative thinking and geometry. In terms of mathematical thinking processes, the smallest gap was observed in transitioning from the mathematical world to the real world (interpretation and evaluation), whereas the largest gap appeared in transitioning from the real world to the mathematical world (modeling).
3. The research showed that in Israel, many male and female students chose to skip test questions, especially at higher levels. They opted to skip these questions either because the specific question was particularly challenging or because they became fatigued with this type of test item and decided to give up. The most significant rate of abandonment among both genders was in algebra, while the lowest was in quantitative thinking questions.

4. From a gender perspective, it was found that in the Jewish sector, female students skipped questions at a higher rate than male students, while in the Arab sector, the situation was reversed (consistent with data indicating a very low gender gap in excellence in the Arab sector). Arab male students skipped relatively more questions that required interpretive and evaluative thinking skills (transitioning from a mathematical solution to real-world meaning).
5. No correlation was found between female students' responses on questionnaires regarding their emotional and social conditions or their learning experience in the classroom and school, and their rates of excelling in the mathematics assessment. Jewish male students who excelled, reported a high level of attentiveness to what the teacher said in class and of persevering, trying to understand the material even when they did not initially grasp it

