# Running head: Gender-Based Math Instruction for PISA Success

# Title: Enhancing PISA 2022 Mathematics Performance in Slovenia: A Gender Analysis Approach to Additional Instruction Methods

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## Ethical considerations

Not applicable

## Consent to participate

Not applicable

## Consent for publication

Not applicable

## Declaration of Competing Interest

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## Data availability statement

The authors declare that the data supporting the findings of this study are publicly available. Dataset used is publicly available at OECD <https://www.oecd.org/pisa/data/>.

## Abstract

The PISA 2022 datasets offer valuable insights into factors influencing student performance in mathematics. In Slovenia, interest is growing in how supplementary instructional methods affect outcomes. This exploratory study examines the impact of additional math instruction—such as one-on-one tutoring, video resources, and group study—on Slovenian students’ PISA 2022 performance. Chi-square tests assessed gender differences and compared Slovenian and international data, while regression analysis evaluated the instructional methods’ effects on math literacy, using Rubin’s rules to pool estimates. Findings show most students did not receive extra instruction. Among those who did, Slovenian students preferred video-based learning, whereas one-on-one tutoring was more common internationally. In Slovenia, girls favored tutoring, and boys preferred videos; globally, gender differences appeared in all methods except large group instruction. Regression results indicated that one-on-one and large group instruction were negatively associated with math scores, while video and small group formats had positive effects. Notably, students with no additional instruction outperformed those in tutoring or large group settings. These findings highlight varied instructional preferences and their influence on achievement. The study suggests a need for balanced integration of digital and traditional methods to improve mathematics instruction and guide education policy.

## Keywords

Assessment, Gender Differences, Instruction Methods, Mathematics education