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Connecting School Experiences and Mathematics Achievement in the Fourth Grade: An Analysis Based on TIMSS 2023 Data

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Abstract

Enhancing mathematical skills depends not only on individual abilities but also on the conditions in which learning takes place. A fundamental prerequisite for academic success is that students feel safe, supported, and accepted within their learning environment. In this study, the relationships among students' attitudes toward learning mathematics, student bullying, sense of school belonging, and mathematics achievement were examined at the student level, using a quantitative correlational study design. The sample consisted of around 4,609 fourth-grade students who participated in Trends in International Mathematics and Science Study (TIMSS) in 2023. The present study utilized Pearson's correlation method to investigate whether these factors related to students' mathematics performance in Kosovo. The findings show that all examined relationships reached statistical significance ($p < .001$). They indicate that there is a positive relationship between students' attitudes toward learning mathematics and their levels of mathematics outcomes. Additionally, students exposed to bullying were more likely to experience a decline in mathematics scores, whereas students with a greater sense of school belonging were likely to demonstrate increased levels of mathematics proficiency. Hence, positive math attitudes and a strong sense of school belonging encourage students to engage actively in the learning process while demonstrating greater commitment and responsibility. Conversely, bullying implies stress, insecurity, and persistent feelings of anxiety, which negatively affect students' well-being and focus, limiting their potential for academic progress. This work provides evidence to strengthen school-based strategies, foster safe and supportive learning environments, and enhance awareness among the education community. The implications of the findings are discussed.

Keywords: Student; Math Attitudes; School Belonging; Student Bullying; Mathematics Achievement