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ABSTRACT

FOURTH- AND EIGHTH-GRADE STUDENTS' ACHIEVEMENT IN STATISTICS: AN EXPLORATORY STUDY OF TIMSS 2019 DATA FROM THE UNITED STATES

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Using data from the 2019 Trends in International Mathematics and Science Study (TIMSS 2019), this dissertation research explores factors associated with US fourth- and eighth-grade students' performance in statistics. Multilevel linear models (MLMs) were used to analyze the effects of student-, teacher-, and school-related factors on students' overall performance in statistics. Binomial multilevel linear models (Binomial MLMs) were used to analyze the effects of the same factors on students' performance in the subdomains of statistical literacy, reasoning, and thinking. Binomial MLMs were also used to analyze the effects of student-centered and teacher-centered instructional practices on students' knowledge and skills related to isolated statistical curricular concepts (e.g., medians, bar graphs).

Student demographic variables, such as gender and socioeconomic status, were included as controls. Instructional practices were categorized as teacher-centered (e.g., lectures and memorization) or student-centered (e.g., collaborative group work and explorations). While student-centered instruction was positively associated with performance in several models, students' self-confidence in mathematics emerged as the most consistent and statistically significant predictor. The findings indicate that instructional approaches that enhance students' mathematical self-efficacy may play a key role in improving statistical learning outcomes.

In Progress