The Relationship between Students’ Performance on Conventional Standardized Mathematics Assessments and Complex Mathematical Modeling Problems

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Abstract

Critical to many science, technology, engineering, and mathematics (STEM) career paths is mathematical modeling—specifically, the creation and adaptation of mathematical models to solve problems in complex settings. Conventional standardized measures of mathematics achievement are not structured to directly assess this type of mathematical modeling. Therefore, a major question is whether a conventional standardized test can serve as a reliable predictor of students’ potential to mathematical modeling performance. To investigate this question, a study was designed to find the relation between students’ conventional standardized measures of mathematics achievement and their performance on mathematical modeling problems. Students’ (N=1656) SAT (Scholastic Aptitude Test) mathematics scores were used as a conventional standardized measure of achievement and students’ scores on two model-creation problems based on complex settings were used to capture mathematical modeling performance to answer the question whether standardized achievement tests function well in predicting their mathematical modeling performance.

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