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A mixed-methods explanatory study of the failure rate for freshman STEM calculus students.

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Summary: In this study we aimed to understand who was struggling in freshman calculus courses, and why. Concentrating on the Fall sections of the class, the best predictors for success ($R^2 = 0.4$) were placement test results, the student's own appraisal of the quality of mathematics teaching they received in high school, and the Motivated Strategies for Learning Questionnaire constructs that measure test anxiety, self-efficacy, and organization. However, the ability to accurately predict whether a student would fail was very low. Three groups of students of interest were identified: those yet to declare their major, non-traditional students, and, curiously, students who choose to enroll in the 10 a.m. section.

Classification: D65 D75 C35 I15

Keywords: calculus; mixed methods; post secondary; STEM

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