

Identifying Barriers to Success in First Year College Mathematics Courses

Dana Olanoff
Widener University

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For first year students, their first semester GPA is a strong predictor of college persistence, that is, whether they return to university in the fall of their sophomore year (Steward, Lim, & Kim, 2015). This study was conducted at private, nonprofit university in the northeastern United States. Approximately 75-80% of the roughly 900 first year students enrolled in the Fall 2025 registered for a mathematics course. While many of these students are successful in their mathematics courses, too large a number of them struggle. This poster presents on a study designed to identify these barriers and suggests ideas of future work in designing interventions to help overcome some of the barriers.

For this study, the researcher went to 35 sections of what are traditional first year mathematics courses (e.g., elementary and college algebra, precalculus, calculus 1, intro statistics, math for elementary teachers, intro discrete mathematics) to ask students to fill out a preliminary survey discussing their high school mathematics experiences. 464 of the approximately 700 students enrolled in these courses filled out the survey in its entirety. The questions on the preliminary survey asked mainly about students' experiences in their prior math courses as well as their expectations for their current mathematics course. Some preliminary results include approximately 44% of respondents identifying as first-generation college students and nearly 22% of students not having taken a mathematics course in the previous year. 36% of the students reported taking online tests in their previous mathematics course, with 20% of those students reporting that they had no exams on paper. (3% of the students reported not having exams at all.) Nearly 92% of the students at least somewhat agreed that they had the knowledge and skills necessary to succeed in their current mathematics course with a similar number anticipating that they would earn a grade in the A or B range in their current course. When asked what they anticipated would be their biggest barriers to succeeding in their mathematics courses, the answers reported by the most students were "I don't do well on tests/have test anxiety" (46%); not being fully prepared for their current course (40%); and "I am not a math person" (37%).

At the end of the semester, students will be asked to complete a post-survey with similar questions regarding their current mathematics course. Then the researcher will use students' final course grades to try identify a profile of students who were least successful in their mathematics courses, as well as those who were most successful. Using final course grades, attendance records, and pre and post surveys, we hope to be able to determine factors that contribute both to students struggling and succeeding in their first year mathematics courses. We will also look to see if strong differences exist in reported experiences in high school versus college courses, as differences between the way that high school and college mathematics courses were structured and taught can lead to students struggling in their STEM courses (Meaders et al., 2019).

After gathering and analyzing all of the data, future work will entail designing interventions to help students overcome the identified barriers, such as review modules for missing content areas and test preparation advice for studying and taking college math exams.

References

- Meaders, C.L., Toth, E.S., Lane, A.K., Shuman, J.K., Couch, B.A., Stains, M., Stetzer, M. Vinson, E., & Smith, M.K. (2019). "What will I experience in my college STEM courses?" An investigation of student predictions about instructional practices in introductory courses. *Life Sciences Education*, 18:ar 60, 1-14.
- Steward, S., Lim, D.H., & Kim, J. (2015). Factors influencing college persistence for first-time students. *Journal of Developmental Education*, 38(3), 12-20.