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Bret Benesh


College of Saint Benedict/Saint John's University, bbenesh@csbsju.edu

Tim Boester

Aaron Weinberg

Eimilie Wiesner

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UNDERGRADUATES' USE OF MATHEMATICS TEXTBOOKS

Bret Benesh, Tim Boester, Aaron Weinberg, Emilie Wiesner
University of Georgia
wiesner@math.uga.edu

While most mathematics textbooks are written to help the reader develop an understanding of the mathematical content, our hypothesis is that many undergraduate students do not use textbooks in ways that help them gain this understanding. Many college mathematics teachers have anecdotal accounts of the ways students use textbooks but this has not been studied in detail. Our goal is to describe the ways undergraduate math students use their textbooks.

In our pilot study, we administered a survey to students in 1st and 2nd year mathematics courses at three large universities and a liberal arts college. Participating students were enrolled in a math class, including college algebra, calculus, statistics, and math content courses for elementary teachers.

The survey questions asked students to identify the parts of the textbook they use, the times they use them, and their goals in using them. For example, we found that 90% of students look at the examples in the book, and students in math courses for pre-service elementary teachers were more likely to rephrase or summarize these examples while doing homework than students in other classes. We found that students thought the most important qualities of a textbook were including many examples and highlighting important equations. The survey also asked how the textbook is integrated into the course. For example, we found that within a class students' perceptions of how they are asked to use their textbook vary considerably. However, when students believe they are asked to read their textbook daily or weekly, they are more likely to use the book to prepare for class than if they are asked less frequently.

Researchers have previously investigated mathematics curricula at the K-12 level. There has been considerable research on the teacher-curriculum relationship (e.g. Remillard, 2005). Studies have also investigated the impact of curricula, in particular standards-based or reform curricula, on student learning (e.g. Riordan and Noyce 2001). Some studies have attempted to characterize various aspects of textbook content, such as types of definitions or control structures (e.g. Mesa, 2004).

We believe our study adds to previous research by addressing several characteristics of undergraduate education that differ from K-12. Because of the lack of extensive curricular materials and college instructors' considerable freedom in structuring courses, the textbook is effectively the unifying curricular element in undergraduate mathematics classes. Also, the student's relationship with the textbook exists primarily outside of class, and the instructor is involved only indirectly in this relationship. In addition, our study informs textbook analyses by describing how students actually use different aspects of the textbook.

References

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