

Research Outline of Preparation of Potential STEM Majors for College Calculus

Karen C. Enderle
Clemson University

S. Megan Che, Ph.D.
Clemson University

The initial college mathematics placement of Science Technology Engineering and Mathematics (STEM) majors may influence the direction and duration of their college studies. This study aims to explore how secondary mathematics preparation of potential STEM majors may influence their initial mathematics placement. For this study, we consider mathematics preparation to consist of secondary mathematics courses and college preparation advice.

Literature Review

Secondary mathematics course sequences may be accelerated or hyper accelerated. These practices can be advantageous for some students yet push others too quickly through the mathematics curriculum (NCTM, 2012). Oftentimes, accelerating mathematics ensures the student has access to a high school calculus course. However, sometimes in a Rush to Calculus, students may complete the highest secondary mathematics course available to them before their senior year of high school; this can create a gap in rigorous mathematics coursework prior to beginning college mathematics.

First year college students who understand the expectations of college mathematics typically have a smoother transition from high school to college mathematics (Clark & Lovric, 2008). In high school, potential STEM majors may obtain advice from their secondary community about college preparation; however, the community may prioritize secondary calculus for its perceived role in college admissions.

Research Question and Theoretical Framework

Guiding this study is the following research question: How are undergraduate STEM majors' high school mathematics experiences and college preparation connected to their initial college mathematics placement?

The theoretical framework is The Theoretical Model of the Secondary to Tertiary Transition in Mathematics by Clark & Lovric (2008) where the researchers mapped the Rites of Passage from the field of anthropology onto the transition from high school to college mathematics. The theoretical model considers not only the time required to learn mathematics but also the community's role in preparing students for college mathematics.

Methodology

This observational study is a sequential mixed methods design. In the first phase, factors that may influence initial mathematics placement are analyzed quantitatively. The factors being the timing of participants' secondary mathematics courses including any gaps in rigorous mathematics learning prior to beginning college mathematics. After completion of the quantitative data analysis, a survey will be distributed to collect qualitative data in the second phase. The survey questions participants about their experiences transitioning from secondary to tertiary mathematics and the advice they received. Once the qualitative data is analyzed, the results will be compared with the quantitative findings to uncover any meta inferences.

References

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