

Designing a Motivation Intervention in College Calculus

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Calculus students often ask, “why are we learning this?” They have a hard time seeing the value or the connections between course material and their lives (Wulf, 2007; Brophy, 1999). Hence, making mathematics and science courses personally relevant and meaningful may engage students in the learning process (Hulleman & Harackiewicz, 2009). This study investigates motivational aspects such as utility value and interest in calculus courses. The study follows a quasi-experimental research design. The purpose of this study is to test the impact of an intervention, which is the implementation of the Science and Engineering Integrated Calculus Tasks (SEICT) in calculus courses in order to improve students’ interest and performance by increasing their utility value for calculus. To accomplish the purpose of this study, following research questions will be investigated: - How do the Science and Engineering Integrated Calculus Tasks (SEICT) impact students’ interest, utility-value and performance in calculus courses? -How does the impact of the Science and Engineering Integrated Calculus Tasks (SEICT) differ among students’ intended majors?

Participants of this research are students taking Calculus -1 courses at a Southwestern University in the United States. Approximately 214 students are currently taking those courses during the Fall 2017 semester. These calculus courses were designed for STEM field majors in general and being taught in the Mathematics Department. Since there are three Calculus-1 courses and each course has two lab sections, there will be 6 lab sections included in this study. Each lab section includes approximately 35 students. Each of the 6 lab sections that come from 3 calculus courses form the treatment and comparison groups.

The intervention is the implementation of the Science and Engineering Integrated Calculus Tasks. There will be 3 different tasks to implement in the treatment groups. These tasks were developed by a team of professors from the Mathematics, Physics, Computer Science, and Engineering departments at Texas State University.

A survey called “Calculus Motivation Survey” is currently being used in order to investigate student motivation. The survey includes the measurements about the constructs; performance expectations, utility value and interest. Both the control groups and the treatment groups take the survey four times throughout the semester. Since this is an ongoing study, the analysis and results will be ready by December 2017, which is the end of the Fall 2017 semester.

References

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