

## THE EFFECTS OF A WEB-BASED CALCULUS APPLICATION ON TEACHING AND LEARNING

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The purpose of this study is to determine the effect of a web based application on student learning, performance, and satisfaction in Math 160- Calculus I. This is a core course for students in the College of Natural and Applied Sciences. In Math 160, students should demonstrate the ability to solve problems in differential and introductory integral calculus of one variable. Traditionally, the teaching of mathematics at Coastal Carolina University has been teacher-centered as opposed to student-centered. The instructor introduces concepts and gives examples to the class as a whole, since time constraints prevent individualized student-centered learning. This study provides an opportunity to develop new teaching methods in calculus with regard to course delivery.

The study contributes to the scholarship of teaching and learning in mathematics by looking at how technology may affect student learning, including their perception of learning, and their course satisfaction; the type of learners that prefer using technology to learn Mathematics; and the impact of technology on mathematics teaching in a calculus course. The National Council of Teachers of Mathematics (2000) proposes that teaching and learning of mathematics can be affected by the use of technology. Technology can provide resources for student learning beyond the boundaries of the classroom, thus redefining the education process in the traditional setting, where the teacher is the center of instruction.

With Calculus on the Web (COW), students will be able to work through calculus problems individually guided by the web tutorial. Unlike working with a textbook, they will be led through the problem-solving process. They will also receive immediate and personalized feedback. It can also help students visualize calculus concepts through graphical representations. Some general research questions for this study are:

1. What are the effects of different learning environments on student learning?
2. How does the use of the Math software affect student performance?
3. What are the effects of different learning environments on teaching?

The participants will be approximately 140 students from four sections of Math 160, during Fall 2004. The treatment group (two of the four sections) will work extensively with COW both during and outside of class time. The instructor will use COW to go through calculus examples, and have students work on problems individually. As the students work through the exercises, the instructor will monitor their progress, and help them with problems and questions. After class, the students will work with COW in the computer labs or at home. The control group (70 students from Math 160) will not use COW, but will learn calculus through traditional teaching methods. Assessments will be based on student performance by comparing scores on a common final exam and also by means of a survey to discover any changes in student attitudes toward learning.