THE IMPACTS OF A FLIPPED CLASSROOM IN AP CALCULUS AB

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ABSTRACT

Many students are passively engaged in mathematics content across the United States because they are in classrooms that use traditional instruction methods (i.e. lecture and guided practice). Calculus is a struggle for students because of the critical thinking, conceptual understanding, and problem solving required. Active learning has been shown to improve student engagement in mathematics while improving achievement. One pedagogical method for active learning, the flipped classroom, has shown positive effects on student engagement and achievement in calculus. This action research study sought to examine the impact of flipping the classroom in an AP Calculus AB course. The research questions guiding the study are: what impact does a flipped classroom have on students’ achievement in conceptual understanding of calculus, and what are students’ attitude towards the flipped model of instruction in learning calculus? The methodology is based on a convergent mixed-methods action research design that collected data from a pre- and post-concept assessment, a student perception survey, and reflective journal to address the problem of practice: students in calculus lack conceptual understanding and the ability to solve non-routine problems. The results indicated a significant increase in student-participant scores from pre- to post-concept assessment, medium to high normalized gains on an item analysis of concepts, and favorability towards the flipped model of instruction in AP Calculus AB. An action plan was developed to communicate results, expand the implementation of the method, and be used as a basis for professional development and teacher growth.

Keywords: action research, calculus, flipped classroom, traditional instruction, high school mathematics, conceptual understanding