

How Will Teaching Mathematics Through Experiential and Discovery Learning Impact Student and Teacher Attitudes Toward Mathematics?

Problem

Although research states learners retain only 5 percent of the information they hear, 10 percent of what they read and 20 percent of what is presented to them in audio-visual format, traditional mathematics courses are taught using these three formats as the predominant mode of instruction.

This may explain why many students are not excelling in the area of mathematics. According to district results on the 2005 Florida Comprehension Test (FCAT), 41 percent of the students in the district did not demonstrate proficiency in mathematics. Consequently, it is necessary to research effective instructional methods that will increase student knowledge in mathematics.

Plan of Action

As a Curriculum Support Specialist with the district's Beginning Teacher Program, I have the opportunity to help new teachers develop the art of teaching by working with beginning teachers in a variety of school settings. To determine the effectiveness of Experiential and Discovery Learning on student and teacher attitudes, I chose to work with a struggling new teacher in a high need school. The site selected was a Title I school where a significant percentage of the students did not perform well on the mathematics portion of the 2005 FCAT.

As a Curriculum Support Specialist, I plan to conduct modeled, hands-on, discovery lessons with selected teachers from the targeted site once every other week (these classes meet in 110 minute block periods five times within a two week period). Through these lessons, students will be engaged in high interest experiences, such as creating pencil cars, developing personal budgets based on career interests/goals, and participating in the "data Olympics". By engaging in these carefully designed tasks, participating students will demonstrate understanding of mathematical concepts such as number sense, geometry, statistics, probability, and problem solving. The task will also help students collaborate, engage in mathematical discourse and use creative and critical thinking. This personal and engaging approach to imparting the subject matter is expected to increase student interest and participation, which is expected to positively impact student achievement and attitude toward mathematics. In addition, these positive student outcomes are expected to positively impact teacher attitude toward teaching mathematics.

Methodology

Participating students and teachers will engage in pre and post attitude surveys and be asked to reflect on each session. Students will also be given pre and post activity sheets based on the mathematics inherent in the modeled lessons. Students will engage in a variety of experiences that emphasize specific mathematics concepts and skills in a "fun" format. Experiential and discovery learning shrouds practice of necessary key concepts, while developing solid foundational skills that are required prerequisites for higher level mathematics courses.

Results

Comparative analysis of pre and post attitude surveys and pre and post activity sheets are expected to reveal hands-on, discovery learning has the potential to increase student interest, attitude and achievement in mathematics. These positive outcomes are expected to positively impact the teacher's attitude toward teaching mathematics and incorporating hands-on, discovery opportunities for their students.

Policy Implications

As a result of this action research, the writer expects to impact the quality and type of support provided to beginning teachers by the district via the Beginning Teacher Program and related professional development. Colleges of Education may be challenged to expand their programs to allow more time for studying, developing, planning and implementing hands-on, discovery math lessons for their education majors. Middle and high school curriculums may expand to include more opportunities for students to learn-by-doing. The summer enrichment and remediation programs may take on this fresh approach to impart skills students could not learn in the traditional format during the regular school year.

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