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The Impact of Applying The First Two Steps of Polya's Four Problem-Solving Steps In An Advanced Mathematics Classroom

ABSTRACT

The teacher-researcher spent eight weeks as a participant observer in an advanced high school mathematics class in a small town in the southeast. The process of problem-solving was introduced to all twenty students from a combined IB Math SL and AP Calculus AB class. After the pretest, three students were selected, from under-represented groups, for in-depth observation, interviews, and collection of artifacts in order to determine the impact of problem-solving techniques. The work of these students, from underrepresented groups, was examined to gain insight into their experiences and thought processes surrounding problem-solving. The students answered questions about their attitude towards problem solving. The students' attempts were marked for how far they were able to go in solving the problem and the strategies that were utilized. The students were also interviewed to find out if their attitude was changing over the eight-week time period.

Observations and interviews were coded and analyzed for themes and patterns. Three themes emerged related to the first two steps of Polya's problem-solving strategies; the lack of problem-solving strategies introduced in previous math classes, the independence of the student, and the expectations of the student and/or their parents. The study attempted to examine the perspective of the student in using problem-solving techniques. The study represents an effort to gain new awareness about student learning that may have significant influence on teaching and learning problem-solving in an advanced mathematics classroom.