Preservice Elementary Teachers’ Conceptions of Mathematics

Dana Olanoff
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Advisor: Prof. Joanna O. Masingila

Research Apprenticeship Report Abstract

Teachers’ beliefs about or conceptions of mathematics play a major role in how they teach, how they attempt to solve problems, and how they go about learning mathematics. Research (e.g., Ball, 1988, 1990; Schoenfeld, 1988; 1989) has shown that prospective teachers often view mathematics as procedural and algorithmic, and an arbitrary collection of facts and rules with little meaning. In this study, I examined prospective elementary teachers’ conceptions of mathematics at the beginning and end of their first mathematics content course taught via problem solving. I attempted to determine what the prospective teachers’ conceptions of mathematics were, how these conceptions changed as a result of taking their first mathematics content course, and the effect that the students’ conceptions had on how they behaved and performed in their mathematics course. The majority of the data came from case studies of four prospective teachers. The results indicated that, like students in previous studies, these prospective teachers talked about mathematics mainly in procedural terms, and equated understanding with knowing the proper rules and getting the right answer. While the students knew the “rhetoric” of mathematics, stating that the subject was useful, they all had difficulty describing any meaningful ways in which they used mathematics outside of school. Three of the four prospective teachers seemed to have difficulty separating their beliefs about mathematics from their beliefs about school in general. The data indicated subtle changes in the students’ conceptions of mathematics as a result of taking the mathematics course taught via problem solving, with all of them indicating the importance of being able to explain what they were doing in mathematics, rather than just following procedures without understanding.