

PRESERVICE ELEMENTARY TEACHERS' INITIAL AND POST-COURSE VIEWS
OF MATHEMATICAL ARGUMENTS:
AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS

Michael Perkowski

Dr. John Lannin, Dissertation Supervisor

ABSTRACT

Recent curriculum recommendation call for mathematical argumentation to play a significantly greater role in U. S. mathematics instruction at all grade levels, including the elementary grades. To better understand how preservice elementary teachers (PTs) enrolled in a one-semester course emphasizing mathematical argumentation might become better prepared to implement this change, I interviewed five such PTs at two points in time, near the beginning of the course and shortly after they completed it. Both interviews focused on a problem set in which fictional elementary school students present arguments for their solutions to mathematical problems. Interviewees compared the arguments, decided which were convincing, and gave reasons for their choices. I found that they initially preferred arguments in which they perceived the arguer as knowing what to do, getting the correct answer, using a quick way to get it, and showing how with numbers. In contrast, after completing the course, they focused on understanding the problem, finding answers that made sense, and explaining why with diagrams. These and other findings suggest that current research on PTs' approaches to mathematical justification may: (a) overemphasize the formal aspects of mathematical arguments and undervalue their substance, (b) overemphasize the role of verification and undervalue explanation, (c) be too far removed from PTs' perspectives, and (d) therefore fail to accurately reflect significant progress in PTs' understandings.