

# ELEMENTARY SCHOOL PRESERVICE TEACHERS' UNDERSTANDING OF ZERO

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Students often find the concept of zero difficult to understand. The linguistic of zero is confusing even for university students, including many elementary school preservice teachers (Ball, 1990; Blake & Verhelle, 1985). The purpose of this poster is to highlight some of the difficulties that the elementary school preservice teachers face in understanding zero and its concepts. This poster will depict some dilemmas of teaching these concepts.

The current study primarily focused on two questions. First, what do prospective teachers understand about zero in general? For example, do they consider zero a number? What do they know about the development of zero in various civilizations? Second, what is preservice teachers' understanding of division by zero? For example what is  $5/0$ ?  $0/0$ ? These questions lead to a discussion on their ability to convey the meaning of zero to their future students.

The data for this study were collected from a course entitled "Mathematics for Elementary School Teachers" for the last five years. Approximately, 200 students have participated in this study. This poster will draw data related to zero from their quizzes, exams, and personal interviews conducted by this researcher at the end of each course.

In all the courses, prospective teachers had difficulty understanding zero and its concepts. Before introducing zero in the class, more than 90% of the preservice teachers thought that a number divided by zero is zero. Even after the concepts of zero were taught for an entire session of one hour, only about 60% of the preservice teachers stated that  $5/0$  cannot be determined. The other 40% stated that  $5/0$  was zero. The percentage of correct response did not increase substantially in the final examination when basically the same question was asked. In the personal interviews, many students were confused and even indicated that they would avoid teaching the concept of zero to their future students. The author of this proposal finds it alarming and hopes that it will generate some discussion in the PME poster session.

## References

- Ball, D. L. (1990). The mathematical understandings that prospective teachers bring to teacher education. *Elementary School Journal*, 90, 449-466.
- Blake, R. & Verhille, C. (1985). The story of zero. *For the Learning of Mathematics*, 5 (3), 35-47.