

PROSPECTIVE TEACHERS' UNDERSTANDING AND REPRESENTATIONS OF MULTIPLICATION OF FRACTIONS

Ji-Won Son

Michigan State University

There is a growing consensus that teachers' knowledge is an important element in student learning. Since Shulman (1987) classifies pedagogical content knowledge as typical knowledge teachers should have, there is a lot of research which is interested in what a teacher should know and be able to do.

However, many studies show that teachers possess a limited knowledge of mathematics, including the mathematics they teach (Ma, 1999; Ball, 1990; Behr, and Lesh, 1991; Simon, 1993). A majority of teachers are good at performing computation, but few are able to explain the conceptual basis of the procedures in performing computation.

The purpose of this paper is to explore how prospective teachers understand multiplication of fractions with word problems and how they explain and justify the meaning behind their computation steps with multiple ways of representations.

Sixty prospective teachers were participated. All participants were majoring in elementary mathematics but have different grade level. The task was written task. It consisted of three problems and took about 10-20 minutes.

This study showed that prospective teachers have limited knowledge of multiplication of fractions. First, sixty eight percent of prospective teachers have recognized the word problem as one where multiplication of fractions could be applied. Second, seventy seven percent of total prospective teachers represented the word problem using representations. Overall, eighty nine percent of prospective teachers recognizing the word problem as multiplication of fractions represented the word problem using graphical representations. Most prospective teachers who recognized the word problem as a multiplication of fractions could explain their thinking using the graphical representations. As representations, fraction bars, area model, number line, part-whole model, and set model were used. Fraction bar was used most frequently.

The major finding from this study was that misconceptions prospective teachers might have when solving multiplication of fractions using word problem. This study categorized prospective teachers' misconceptions into three and found possible three reasons. This study has implications for both teacher educators and assessment developers.

References

Bezuk, N. S & Armstrong, B. E. (1995). Understanding of fraction multiplication and division of Fractions. *Mathematics Teacher*, 86(1), 120-131.

Ma. L. (1999). *Knowing and Teaching Elementary Mathematics: Teachers' understanding of fundamental mathematics in China and the United States*. Mahwah, NJ: Lawrence Erlbaum.