Preservice Elementary Teachers’ Beliefs toward Mathematics and Mathematics Teaching

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Introduction

Teachers’ beliefs about mathematics and instruction of mathematics are important and influence teachers’ enacted instructional practices (Brown & Conner, 1978; Pajares, 1992; Richardson, 1996). Even before starting their first courses in education, preservice teachers hold a wide range of beliefs about mathematics, as well as beliefs about teaching mathematics (Ball, 1988). Beliefs concerning the nature of mathematics can be roughly divided into two epistemological positions, absolutist and fallibilist (Figure 1). Beliefs concerning the teaching and learning of mathematics can be roughly divided into two approaches, traditional and constructivist (Figure 2). It has been shown that teachers with absolutist views of mathematics tend to follow a traditional instructional model while teachers with fallibilist views often use a constructivist approach (Chan, 2011; Chan & Elliott, 2004; Chissai, Lerman & Winslou, 2005; Yoder & Koehler, 2007). On the other hand, some teachers holding absolutist views do employ concrete manipulatives and information communication technology (ICT) in their instruction (Judson, 2006, Liljedahl, Rösken & Rolka, 2006), two actions promoted by the mathematics reform movement and rooted in a constructivist view of the subject (Romberg, 1992).

Results & Discussion

Questionnaire

Participants’ beliefs concerning the nature of mathematics were approximately normally distributed around 2.5 indicating preservice teachers hold a mixture of absolutist and fallibilist beliefs. Participants who hold fallibilist beliefs about the nature of mathematics and intend to teach using a constructivist approach hold aligning beliefs. Preservice teachers who hold absolutist beliefs about the nature of mathematics and intend to teach using a constructivist approach hold apparently misaligning beliefs.

Interviews

When the nature of mathematics was discussed, preservice teachers were found to hold a mixture of both absolutist and fallibilist beliefs about the nature of mathematics, however many held more absolute beliefs. All participants spoke of using manipulates to support a constructivist approach. This included using manipulatives during group work and using manipulatives to assist students explore problems and discuss their ideas. Manipulatives were used during group work to make math fun and to check to make sure students had the right process and product. When asked how she would help a struggling student, Julie responded, “I would probably spend a little bit of time with her and explain the process still using the block, borrowing like the way I did it in my lesson. ... and how you would place it. And then I would visually show her so that she was still using the blocks, it was still fun”.

Future Directions & Acknowledgements

This research adds to the body of knowledge concerning preservice teachers’ beliefs about the nature of mathematics and intended instructional practices. The findings of this study may impact teacher education programs. It would be valuable to conduct future research of this nature over the course of an entire B. Ed. year with the aim of examining potential change in participant beliefs.

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