

Features of Tasks and Instructor Actions That Promote Preservice Secondary Mathematics Teachers' Understanding of Functions

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The Enhancing Explorations in Functions for Preservice Secondary Mathematics Teachers Project is developing research-based tasks and explorations as well as instructor materials to be used in mathematics courses for preservice secondary mathematics teachers. The project, now in year two, continues to develop and refine these items based on data collected in year one and the advice of an expert panel and advisory board. The goal of this poster presentation is to provide information on lesson development and methods used in determining key characteristics of instructor moves for building student understanding of functions as well as gather feedback and suggestions on further design and development.

Keywords: Mathematical Knowledge for Teaching, Preservice Secondary Mathematics Preparation, Functions

High-quality mathematics teaching requires common, horizon, and specialized content knowledge (Ball et al., 2008; Hill, Ball, & Schilling, 2008). Developing this understanding of the content preservice teachers will teach can be done by engaging in tasks that illuminate mathematical concepts (Loucks-Horsley et al., 2003; Zaslavsky, 2008). This project aims to refine and supplement widely-used secondary teacher preparation materials used in a course on functions as well as develop an instructor's guide to scaffold the lessons and explorations.

Research Questions

Currently, limited research exists on how to facilitate development of profound understanding of functions and key characteristics of mathematical tasks that can promote this specifically for preservice secondary mathematics teachers. Discussion with RUME attendees will assist us in identifying additional design issues that need to be accounted for in addressing the following research questions: (1) What are key characteristics of mathematical tasks that promote development of profound understanding of functions for secondary mathematics teachers in the first two years of undergraduate study? (2) What are key instructor moves and pedagogical strategies for facilitating development of profound understanding of functions for secondary mathematics teachers engaging in high-yield mathematical tasks?

Discussion

Over two iterations of this course at a large urban university in the Southwest, this project has collected student artifacts including pre- and post-surveys on functions, classroom videos, pre-class instructor logs, post-class instructor interviews, observation notes, and 18 student interviews. This poster will provide details on lesson development as well as the methods used in determining key characteristics of instructor moves for building understanding of functions.

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