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Pre-service teachers' developing conceptions about the nature and pedagogy of mathematical modeling in the context of a mathematical modeling course.

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Summary: Adopting a multitiered design-based research perspective, this study examines pre-service secondary mathematics teachers' developing conceptions about (a) the nature of mathematical modeling in simulations of "real life" problem solving, and (b) pedagogical principles and strategies needed to teach mathematics through modeling. Unlike other studies that have focused on single-topic and lesson-sized research sites, a course-sized research site was used in this study. Having been through several iterations over three teaching semesters, the 15-week long course was implemented with 25 pre-service secondary mathematics teachers. Findings revealed that pre-service teachers developed ideas about the nature of mathematical modeling involving what mathematical modeling is, the relationship between mathematical modeling and meaningful understanding, and the nature of mathematical modeling tasks. They also realized the changing roles of teachers during modeling implementations and diversity in students' ways of thinking. The researchers' conceptual development, on the other hand, involved realizing the critical aspect of the "teacher role" played by the instructor during modeling implementations, and the need for more experience of modeling implementations for pre-service teachers.

Classification: M19 C39 C29

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