Using a Scripting Task to Probe Preservice Secondary Mathematics Teachers' Understanding of Function and Equation

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In order to determine preservice secondary mathematics teachers' (PSMTs) conceptual understanding following an inquiry-based lesson on the constructed meanings of the equals sign and the distinctions between the concepts of function and equation, we utilized a scripting task in which the PSMTs individually continued a dialogue between two hypothetical students with opposing viewpoints with respect to an equation arising from a function context. This study is part of the Enhancing Explorations in Functions for Preservice Secondary Mathematics Teachers Project which is developing research-based tasks and explorations together with instructor materials to be used in mathematics courses for PSMTs. The goal of this poster presentation is to discuss our implementation of the scripting task to gauge PSMTs' understanding of the nuances between function and equation. We also wish to gather feedback and suggestions on the study design and potential implications of our research.

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

Functions are a foundational component of the mathematics that preservice secondary mathematics teachers (PSMTs) will be expected to teach. However, the research literature identifies ways in which conceptions of functions can be limited for both PSMTs and inservice mathematics teachers (ISMTs). For example, some PSMTs and ISMTs believe that a function can always be represented by an algebraic formula, and others believe that the terms function and equation are interchangeable (Even, 1993; Hitt, 1998). Script writing in the context of a mathematics course for preservice teachers can be a useful tool to investigate and detail nuances in mathematical knowledge and understanding for prospective teachers (Zazkis & Zazkis, 2014). This study aims to detail what script writing revealed about PSMTs understanding of the distinctions between function and equation, particularly following their in-class experience in an inquiry-based lesson.

Data gathered from the scripting task were coded using open and axial coding, then inductive thematic analysis was applied (Braun & Clarke, 2006; Corbin & Strauss, 2008). Discussion with RUME attendees will assist us in identifying design issues that need to be accounted for in addressing the following research question using scripting tasks: How do PSMTs reconcile their understanding of function and equation with their in-class experiences with equations that arise from functions?

Based upon our initial analysis, though we were utilizing the scripting task to identify obstacles related to PSMTs' capacity to explain distinctions between functions and equations, it seems that the scripting task itself served to improve their understanding by helping PSMTs reflect on the constructed meanings of the equal sign in function and equation contexts.

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