

Public Abstract

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Teacher Knowledge is a critical factor that influences instructional decisions. Elbaz (1983) stated, “the single factor which seems to have the greatest power to carry forward our understanding of the teachers’ role is the phenomenon of teachers’ knowledge” (p. 45). Hence, if we want to help teachers make wise choices in the classroom we must know and understand the types of knowledge used during the process of instruction. Unfortunately, the mathematics education community still knows too little about the knowledge required for teaching (Ball, Lubienski, & Mewborn, 2001; RAND Mathematics Study Panel, 2003) and “there is no consensus on what critical knowledge is necessary to ensure that students learn mathematics” (Fennema & Franke, 1992, p. 147). This study sought to understand the extent to which, and how, two teachers drew upon their knowledge of mathematics, knowledge of learners, and knowledge of curriculum and instructional strategies in the act of providing instruction in algebraic generalization.

Stimulated recall interviews were conducted for three lessons on algebraic generalization for two teachers, Amanda and Emily. The interviews were transcribed and coded in terms of the type of knowledge used: knowledge of mathematics, knowledge of learners, and knowledge of curriculum and instruction. The transcripts were further segmented into episodes—portions of the transcripts were a single thought was being discussed—and divided into nodes in terms of the knowledge forms used. Each node was analyzed using elements of grounded theory to uncover the types of interactions that occurred among the various forms of knowledge.

The findings provide a description of how often, and in what ways, the teachers drew upon their knowledge of mathematics, learners, and curriculum and instructional strategies. Both teachers utilized their knowledge of learners prominently in their discussion about teaching. A framework was developed from the data to describe the ways in which the knowledge forms interacted with one another in the process of making instructional decisions. Typically, each teacher drew upon a primary form of knowledge with a second knowledge used in support. This secondary knowledge was either used to explain or justify the primary form of knowledge, or it was used to describe an implication of the primary form of knowledge.

This study developed a framework that describes how different knowledge bases interact in the mind of the teacher during the process of instruction. Further research needs to be conducted to uncover which types of interactions are beneficial to teachers in the act of providing instruction.