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Characterizing the development of specialized mathematical content knowledge for teaching in algebraic reasoning and number theory.

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Summary: This article characterizes the development of a deep and connected body of mathematical knowledge categorized by Ball and Bass' (2003b) model of Mathematical Knowledge for Teaching (MKT), as Specialized Content Knowledge for Teaching (SCK) in algebraic reasoning and number sense. The research employed multiple cases across three years from two content courses designed for elementary and middle-level mathematics specialists. Qualitative data were collected and a grounded theory approach to data analysis was employed. The resulting framework characterizes developmental levels of deep and connected mathematical content knowledge for teaching algebraic reasoning and number theory content. The framework consists of four intertwined components related to a teacher's ability to (1) solve problems and justify his/her reasoning, (2) use multiple representations, (3) recognize, use, and generalize conceptually similar tasks, and (4) pose problems. Implications for mathematics teacher education programs are discussed as well as directions for further research.

Classification: B50

Keywords: grounded theory; teacher education programs; number concepts; elementary algebra; educational research; pedagogical content knowledge

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