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The relationship between teachers' mathematical content and pedagogical knowledge, teachers' perceptions, and student achievement.

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Summary: This study of early-career teachers identified a significant relationship between upper-elementary teachers' mathematical content knowledge and their students' mathematics achievement, after controlling for student- and teacher-level characteristics. Further, the mathematical content and pedagogical knowledge of middlegrades teachers were each directly and positively related to their students' mathematics achievement, with and without teacher-level controls. Significant interactions emerged between teachers' perceptions and knowledge influencing student achievement. Teachers' claimed awareness of their students' dispositions toward mathematics interacted with upper-elementary teachers' content knowledge; middlegrades teachers' beliefs regarding modeling mathematical solutions and organizing instruction to support incremental mastery of skills interacted with both content and pedagogical knowledge. Findings provide evidence of the relevance of teacher knowledge and perceptions for teacher preparation and professional development programs.

Classification: D39 C29 C30

Keywords: pedagogical content knowledge; teacher attitudes; mathematics achievement; teacher characteristics; beliefs; teaching experience; item response theory; beginning teachers; knowledge level
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