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Mathematical content knowledge for teaching elementary mathematics: a focus on fractions.

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Summary: This article presents a research summary of prospective elementary teachers' (PTs') mathematical content knowledge in the area of fractions. The authors conducted an extensive review of the research literature and present the findings across three time frames: a historical look (pre-1998), a current perspective (1998–2011), and a look at the horizon (2011–2013). We discuss 43 articles written across these time frames that focus on PTs' fraction knowledge. Consistent across these papers is that PTs' fraction knowledge is relatively strong when it comes to performing procedures, but that they generally lack flexibility in moving away from procedures and using "fraction number sense" and have trouble understanding the meanings behind the procedures or why procedures work. Across the timeframes, the trend in the research has moved from looking almost entirely at PTs' understanding of fraction operations, particularly multiplication and division, to a more balanced study of both their knowledge of operations and fraction concepts. What is lacking in the majority of these studies are ways to help improve upon PTs' fraction content knowledge. Findings from this summary suggest the need for a broader study of fractions in both content and methods courses for PTs, as well as research into how PTs' fraction content knowledge develops.

Classification: F49 B50

Keywords: subject content knowledge; preservice teacher education; primary education; research; state of the art; bibliographies; fractions; rational numbers; concepts; fraction operations; teacher characteristics
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