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Previous K-12 mathematics standards have regarded facility with various representations of rational numbers as sufficient for understanding. The Common Core State Standards for Mathematics (CCSSM), however, emphasize a more general understanding of rational numbers while also targeting repeating decimal representations. Existing literature suggests that teachers' content knowledge is inadequate to meet this goal.

The purpose of this study was to describe understandings held by a sample of middle grades teachers and how these understandings manifested during instruction. An open-ended interview protocol was used to collect information, and observations of classroom instruction provided additional data. Data were analyzed both between and within cases using responses from the interview as a basis for comparison.

Results found teachers' understanding of rational numbers varied considerably with context. Each observed teacher also displayed at least one understanding that manifested during the interview. Despite none of the teachers demonstrating the "unified understanding of number" called for in the CCSSM, several strategies for addressing these idiosyncratic understandings were developed, and have significant implications for undergraduate K-6 pre-service programs. (Received September 17, 2014)