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*The Non-Uniqueness of Decimal Representations and the Modified Long Division*

This study investigates how students conceptualize the non-uniqueness of decimal representations of rational numbers. Prior mathematics education research has focused on repeating decimals, but this study examines students' conceptualization of a more general concept of the non-uniqueness of decimal representations of decimal fractions. This study analyzes students' conceptualization of the non-uniqueness of decimal representations of rational numbers and relates it to their understanding of repeating decimals and long division. As part of an instructional intervention, the participants saw how to do long division in fractional notation with the intentional underestimation of the quotient. The data consisted of responses to questions, including responses to examples of using the modified long division to rewrite decimal fractions as repeating decimals. Before the instructional intervention, most participants regarded repeating decimals as infinite processes that only approximated rational numbers. After the instructional intervention, the participants began to view repeating decimals as objects rather than processes. The study proposes that the modified long division was crucial in enabling the participants to move toward this conceptual shift.