

Public Abstract

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Title:Acquisition, Utilization, and Retention of Foundational Fraction Concepts by Middle Grade Students

This study investigated the acquisition, utilization, and retention of five fraction domains by middle grade students. Based on research findings, the five fraction domains that formed the conceptual analysis framework used in this study were: (1) unit fractions, (2) the whole, (3) modeling fractions, (4) comparing and ordering, and (5) benchmarks and estimation. Students who participated in the study had exhibited difficulties in mathematics and consequently were enrolled in a sixth-grade Tier II Response to Intervention (RtI) mathematics course. RtI provides additional instruction for students who have shown gaps in their learning. This RtI course was conducted utilizing a specially designed fraction curriculum. Data for the study were obtained from written records including independent student work from student booklets, pre-assessment and post-assessment responses, and one-on-one interviews a year later.

Results from the data analysis revealed that students who were struggling with fraction concepts retained knowledge of the whole, but became confused with the multiple meanings of the whole. When modeling fractions, they understood that the partitions of the model had to be equal, but were unable to precisely draw equal partitions. The notion that fractions can be compared by the size of the partitions created by the denominator was retained over the year period. But, the students also retained the idea that the numerator was not important when comparing and ordering fractions. Finally, benchmarks and estimation were not strongly developed and, consequently, were not often used when operating on fractions.