

Abstract

Results from the National Assessment of Educational Progress indicate that less than half of fourth-grade students perform at or above the proficient level in mathematics. Fractions are one particularly problematic area. This is a concern for educators because of the prominent role fractions play in the Common Core State Standards. Therefore, our study focused on developing four rising fifth graders' understanding of addition and subtraction of fractions with unlike denominators. During a nine-week study we conducted pre- and post- assessment interviews and taught seven one-hour lessons. The pre-assessment interviews helped us characterize students' pre-instructional understanding of fraction addition. Using this information, we designed lessons to build students' understanding. Weekly teaching sessions were video-recorded and transcribed to allow us to analyze students' progress and make conjectures about how to advance their thinking each week. The post-assessment interview questions were identical to the pre-assessment questions. This allowed us to identify what the students learned from the experience. In comparing the results from the pre- and post-assessment interviews we found that each student made progress toward understanding fraction addition. However, throughout the study, some students struggled to grasp how and why to find a common denominators when adding fractions. To address this difficulty we prompted students to represent fractions visually and compare the sizes of the pieces in whole units partitioned differently. Given the understandings students began to develop during this study, we recommend that similar representations be used with other students who are first learning about addition and subtraction of fractions.