

Abstract

The purpose of this study was to examine students' development of conceptual understanding of place value. Participants were four students, three male and one female, who had recently completed third grade. The study took place over nine weeks. During the first week, each student completed a 30-minute pre-assessment interview. The following seven weeks, students participated in a one-hour group instruction session each week. During the final week, each student completed a 30-minute post-assessment interview. Each interview and group session was video recorded, transcribed, and analyzed qualitatively to characterize strengths and weaknesses in students' mathematical proficiency. In the initial interviews, students displayed varying degrees of strength in procedural fluency. At the same time, they exhibited limited conceptual understanding of the base ten system. Therefore, during group instruction, students were encouraged to use visual models that would help reveal the structures of numbers represented in base ten notation. Students were also prompted to use concrete models and drawings to combine various quantities from problems set in everyday contexts. During the final stages of group instruction, students encountered situations requiring multiplicative comparisons. At the conclusion of the study, most students demonstrated growth in their understanding of place value as well as the ability to solve problems involving base ten concepts. This research suggests that students can benefit from using concrete representations to combine numbers from real world contexts. Such activities provide opportunities for students to make sense of base ten by naturally forming groups of ten before memorizing facts and algorithms.