

Probability is a challenging subject to learn; students exhibit numerous misconceptions about it. The purpose of the study was to investigate students' thinking about variation and expectation and design a game-based instructional sequence to help develop their probabilistic understanding. The goals for the instructional sequence were based on the Common Core State Standards for Grade 7 probability. Instructional design was guided by an iterative cycle in which we qualitatively analyzed students' reasoning after each lesson in a seven-lesson sequence and refined our teaching approach based on the analysis. The study participants were two boys and two girls who were finishing sixth grade and entering seventh. Individual pre-interviews were administered at the outset of the study to assess students' learning needs, and individual post-interviews following the same script occurred at the end of the study. The initial lessons in the instructional sequence were designed to build upon the understandings the students exhibited in the pre-interviews. The first three lessons further revealed where the students were in their understanding of simple and compound events. The next two lessons aimed to look at simulations that involved discrete models to a greater extent than continuous or infinite ones. The final two lessons aimed to combine and extend all of the ideas from the previous lessons. By the conclusion of the study, most students showed improvement in their understanding of probability concepts. Hence, the games and concrete activities used during the study show potential to help students develop stronger probabilistic thinking.