

Phyllis, H. (2001). The effects of using computer manipulatives in teaching probability concepts to elementary school students. EdD Columbia University Teachers College. Supervisor: Brice R. Vogelli.

The purpose of this study was to investigate the effectiveness of computer manipulatives compared to concrete manipulatives in teaching selected elementary probability topics. With the growing availability of computers in the classroom and the advancements in technological capabilities, computer manipulatives have the potential to have the same benefits of concrete manipulatives. It has been well documented that when used properly, concrete manipulatives benefit student's mathematical learning. Despite this fact, few teachers use concrete manipulatives because of classroom management issues. Several studies have shown that computer manipulatives are more manageable compared to their concrete counterparts and that computer manipulatives can facilitate students' mental operations better with the movements on screen. Thirteen fourth-grade students and two teachers were participants in the study. The students were separated into two groups of comparable ability. All students were to complete two activities which addressed nine probability-related target objectives. The first activity involved number cubes while the second involved spinners. When performing the number cube activity, half the students completed the activity using concrete cubes, the other half using computer cubes. To complete the second activity involving spinners, students who had used the computer number cubes for the first activity now used concrete spinners, and students who had used concrete number cubes for the first activity now used computer spinners. Students and teachers filled out a questionnaire and were interviewed at the completion of the study. Several comparisons showed that students using concrete manipulatives did just as well as those using computer manipulatives. Two out of four comparisons showed that students using concrete manipulatives scored better than those using computer manipulatives. Students and teachers reported that they enjoyed using computer manipulatives, and found them easy to use. Eight out of thirteen students saw no difference between the manipulatives with respect to their contribution to their learning, while about four out of thirteen students believed that concrete manipulatives were better for learning. Teachers did not change their belief that computer manipulatives are one of many tools that could be used to teach concepts however they reported that computer manipulatives will not replace concrete manipulatives.