

TWO ELEMENTARY MATHEMATICS TEACHERS' JOURNEYS THROUGH INTEGRATING MANIPULATIVES AND TECHNOLOGY INTO HER CLASSROOM

Drew Polly
University of Georgia Literature
dpolly@uga.edu

Research studies on the enactment of mathematical tasks (Doyle, 1988; Henningsen & Stein, 1997; Stein, Grover, & Henningsen, 1996), reform-based mathematics curricula (Kim & Stein, 2006; Remillard, 2005;) and technology-rich problem solving units (Cognition and Technology Group at Vanderbilt [CTGV], 1997) indicate that teachers face a myriad of barriers as they attempt to implement reform-based mathematical activities. Further, when teachers encounter these issues they teach in a didactic, teacher-centered manner. While the use of mathematical tasks, hands-on activities and technology has the potential to impact student learning, teachers must be given more support integrating these resources into the classroom.

Research Design

This paper shares the findings of two case studies of two elementary school teachers who participated in a professional development program. The program was designed to support their enactment of mathematical tasks, technology and manipulatives. This paper shares data about the research question, How are teachers' use of manipulatives and technology influenced by participation in a professional development program? During the study, teachers were videotaped when they intended to use the instructional practices that were emphasized during the professional development. Semi-structured interviews were also conducted after each interview to examine teachers' intended practices (what they planned to do) and espoused practices (what they thought they did). The videos were analyzed for evidence that supported teachers' use of specific instructional practices or instances in which specific instructional practices.

Findings

Keisha. Keisha, a fourth grade teacher, views herself as a teacher who is “different” and “non-traditional.” Keisha allows her students to use both manipulatives and technology, but in both cases the emphasis is on using the tool for the sake of using it, not to help students learn the relevant mathematical content. In one instance her students used tangrams to examine geometric transformations. However, Keisha did not bring any mathematics into the activity, so the lesson was merely a time for students to play with tangram pieces.

Selena. Initially, Selena intended and espoused that she was posing meaningful tasks to her students, since she was giving them problems and allowing them to use manipulatives. However, Selena gave students explicit procedures to follow with the manipulatives, which denigrated opportunities for students to develop their problem solving skills. As the study continued, Selena started to get away from the procedures and began posing more open-ended tasks along with the use of manipulatives, such as base-10 blocks and centimeter tiles. While Selena enacted the emphasized instructional practices more frequently towards the end of the study, when she attempted to use technology, Selena returned to a didactic approach, in which she had students follow a strict procedure to find their answers.

Conclusion

This poster will present more data and further findings about each participant's integration of technology and manipulatives into their mathematics classroom.

References

- Cognition and Technology Group at Vanderbilt. (1997) *The Jasper Project: Lessons in Curriculum, Instruction, Assessment, and Professional Development*. Lawrence Erlbaum Associates, Inc., Mahwah, NJ.
- Doyle, W. (1988). Work in mathematics classes: The context of students' thinking during instruction. *Educational Psychologist*, 23, 167-180.
- Henningsen, M., & Stein, M.K. (1997). Mathematical tasks and student cognition: Classroom-based factors that support and inhibit high-level mathematical thinking and reasoning. *Journal for research in mathematics education*, 28(5), 524-549.
- Kim, G. & Stein, M.K. (2006). *Analysis of the teacher learning demands of Everyday Mathematics and Investigations*. Paper to be presented at the 2006 Annual Meeting of the American Educational Research Association. San Francisco, CA.
- Remillard, J.T. (2005). Examining key concepts in research on teachers' use of mathematics curricula. *Review of Educational Research*, 75(2), 211-246.
- Stein, M.K., Grover, B.W., and Henningsen, M. (1996). Building Student Capacity for Mathematical Thinking and Reasoning: An Analysis of Mathematical Tasks Used