

EIGHTH GRADE STUDENTS' UNDERSTANDINGS OF GEOMETRIC TRANSFORMATIONS IN THE CONTEXT OF A DYNAMIC SOFTWARE ENVIRONMENT

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This study investigates the understandings of geometric transformations middle school students' construct when learning takes place in the presence of a dynamic software program for geometry. The researcher taught a 3-week technology-enabled instructional unit on geometric transformations to middle school students and conducted task-based interviews to gain insights into their understandings and uses of technology.

OVERVIEW

Function is an important concept in mathematics that students often have difficulty understanding (Breidenbach, Dubinsky, Hawks, & Nichols, 1992). Because geometric transformations are functions, their study provides students early opportunities to investigate important ideas related to function. While many elementary students experience geometric transformations as actions applied to objects (slides, turns, flips), thinking about transformations as operating on points rather than on objects, may assist students in understanding transformations as functions. The investigator reported such a transition was evident when honors high school students studied a technology-intensive instructional unit on transformations while using The Geometer's Sketchpad (Hollebrands, in press). Relatively little research has been conducted to determine the nature of middle school students' understandings of transformations as operating on objects or points. The current study examined the understandings of geometric transformations (translation, rotation, and reflection) middle school students' developed to determine if evidence of understanding transformations as functions were present.

The researcher taught a 3-week technology-intensive instructional unit to a class of twenty-one average-ability eighth grade mathematics students in an urban magnet middle school. Six students, three females (one Caucasian and two African American) and three African American males, were selected to serve as participants in the study. An interview was conducted with each student prior to instruction and with each student after the completion of the instructional unit. In addition, students' collaborative work in pairs during class was videotaped and their work with the computer was captured directly with a VCR. Analysis of the data is currently being conducted and initial findings will be shared during the presentation.

References

- Hollebrands, K. (in press). High school students' understandings of geometric transformations in the context of a technological environment. *Journal of Mathematical Behavior*
- Breidenbach, D., Dubinsky, E., Hawks, J., & Nichols, D. (1992). Development of the process conception of function. *Educational Studies in Mathematics*, 23, 247-285.