

What Works Clearinghouse



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WWC Quick Review of the Article “The Advantage of Abstract Examples in Learning Math”†

What is this study about?

This study examined whether college students are better able to apply knowledge of simple mathematical concepts when they are taught the concepts using abstract symbols or concrete examples.

Eighty Ohio State University undergraduates participated in the study.

Students were randomly assigned to one of four groups. One group was taught a set of mathematical concepts using abstract symbols; the three other groups were taught using either one, two, or three concrete examples.

Each group took a multiple choice test that examined their ability to apply what they had learned to a new example.

To examine the effectiveness of the different teaching strategies, the authors compared the test scores of each group.

What Teaching Strategies Were Contrasted?

One group of students was taught using abstract symbols to illustrate the concepts.

The other groups were taught the same concepts using concrete examples, such as slices of pizza or measuring cups filled with liquid.

WWC Rating

The research described in this article is consistent with WWC evidence standards

Strengths: The study is a well implemented randomized controlled trial.

Cautions: Ten percent of students in the original sample were dropped from the analysis. The authors do not report why students were omitted or how many were dropped from each group. In addition, the authors do not provide information about how well the test questions measured students’ knowledge of the concepts taught.

What did the study authors report?

College students taught the mathematical concepts using abstract symbols were better able to apply this knowledge to a new example than college students taught using concrete examples.

Furthermore, those taught with concrete examples scored roughly the same as they would have if they had answered questions randomly.

†“The Advantage of Abstract Examples in Learning Math.” *Science*, 320, 454-455. Jennifer A. Kaminski, Vladimir M. Sloutsky, and Andrew F. Heckler.