

WWC Quick Review of the Report “Access to Algebra I: The Effects of Online Mathematics for Grade 8 Students”^{1,2}

What is this study about?

The study examined the effect of offering an online Algebra I curriculum on math achievement and future advanced course-taking patterns of eighth-grade students attending schools that did not otherwise offer an in-class Algebra I curriculum.

The study analyzed data from more than 400 students attending 68 middle schools in predominately rural areas of Maine and Vermont that did not offer stand-alone eighth-grade algebra. About half of the schools were randomly assigned to offer an online Algebra I curriculum, and half were assigned to provide their usual eighth-grade mathematics curriculum, which typically included some algebra content in addition to other mathematics subjects.

Math achievement was measured using the Algebra and General Mathematics subtests of the Promise Assessment. Advanced course taking was defined as completing a ninth-grade course above Algebra I with a grade of “C” or above and enrolling in the next course in the sequence in tenth grade.

The study focused on students whom school staff identified before random assignment as ready for eighth-grade algebra. The study compared the test scores and future advanced course-taking patterns of students in schools that offered the online Algebra I curriculum and those in control schools.³

Features of the Online Algebra I Program

The study used an existing Algebra I online course developed by Class.com. The program includes three instructional components:

- *Online course software* provides an interactive electronic textbook focused on direct instruction and guided practice, practice problem sets with automated feedback, and quizzes and exams that offer immediate scores.
- *Trained online teachers* (provided by Class.com) monitor student progress and provide instructional support by communicating with the students.
- *Onsite proctors* (provided by the school) ensure that students have access to the needed technology, proctor exams, supervise student behavior, and serve as personal contacts for students and as liaisons with the online teacher and parents. In this study, 80% of the proctors were eighth-grade mathematics teachers who reported spending approximately 50 minutes per week answering algebra-related questions.

(continued)

¹ Heppen, J. B., Walters, K., Clements, M., Faria, A., Tobey, C., Sorensen, N., & Culp, K. (2012). *Access to Algebra I: The effects of online mathematics for grade 8 students* (NCEE 2012–4021). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

² Absence of conflict of interest: This study involved staff from Mathematica Policy Research. Because Mathematica operates the WWC, this study was reviewed by staff from subcontractor organizations.

³ The study also measured impacts on achievement for students in the school whom school staff identified as not ready for algebra. These analyses are excluded from this quick review because the study authors describe them as secondary, exploratory analyses.

Quick reviews examine evidence published in a study (supplemented, if necessary, by information from author queries) to assess whether that study’s design meets WWC evidence standards. Quick reviews rely on the effect sizes and significance levels reported by study authors.

The WWC rating applies only to the summarized results, and not necessarily to all results presented in the study.

What did the study find?

Among the students identified by school staff as eligible for the program, those attending schools that offered the online Algebra I course scored higher on the assessment of algebra skills than those attending schools without the program. The estimated effect size of 0.41 is roughly equivalent to moving a student from the 50th to the 66th percentile in algebra achievement.⁴ No statistically significant difference existed between the two groups in nonalgebra, general mathematics achievement.

The study also found positive effects on future advanced mathematics course taking: in schools that offered the online Algebra I course, 51% of the eligible students went on to participate in an advanced mathematics course sequence by tenth grade, compared with 26% of eligible students in control schools.

WWC Rating

The research described in this report meets WWC evidence standards

Strengths: This study is a well-implemented randomized controlled trial.

⁴ The study reported an effect size of 0.40 for the main impact analysis. This analysis included about 10 students who had imputed data on either a covariate or an outcome. In an appendix, the study reported an effect size of 0.41 when those students were excluded altogether from the analysis, which is the type of analysis preferred by the WWC.