

Get the Math:

Impact on Students' Use of Algebra



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EXECUTIVE SUMMARY

An embedded assessment approach was used to evaluate the educational impact of *Get the Math*, a multimedia project that employs online videos and interactive, game-like challenges to engage middle and high school students in meaningful algebraic problem solving as they attempt to solve real-world problems involving mathematical content such as proportional reasoning, linear relationships, or quadratic functions. As students worked on the algebraic challenges in three *Get the Math* modules (Math in Music, Math in Fashion, and Math in Basketball), they used accompanying worksheets to record their work. For each module, students completed three challenge tasks: an introductory pretest task (to obtain a baseline of students' reasoning before using *Get the Math*), Take the Challenge (the algebraic problem-solving task presented in a *Get the Math* video and online activity), and Try Other Challenges (related online problem-solving tasks).

Detailed coding schemes were used to analyze the worksheet responses and gain insight into the mathematical completeness and sophistication of 112 students' algebraic reasoning. The scores took into account, not only the correctness of each student's final answer, but also the validity of his or her approach (e.g., applying appropriate formulas, recognizing when a multiplicative approach was needed rather than addition or subtraction), accuracy in executing the approach (e.g., inserting the appropriate terms into a formula), and completeness in performing all of the necessary steps toward a solution. By comparing students' performance while using the *Get the Math* modules to their performance in the pretest tasks, the worksheet data yielded a naturalistic measure of *Get the Math*'s potential to elicit rich algebraic reasoning.

Some key findings are:

- While working on each of the three *Get the Math* modules, students produced significantly more complete and sophisticated solutions than they had in the pretest. Their solutions to both the Take the Challenge and Try Other Challenges tasks were significantly more sophisticated than their scores on the introductory pretest task. Thus, *Get the Math* succeeded in prompting more sophisticated algebraic reasoning performance than students exhibited previously.
- Students' interest in learning more about the algebra topics and their interest in learning algebra via the multimedia format of *Get the Math* varied across the three modules. Interest in both was much higher following the Music module than either the Fashion or Basketball modules, perhaps because the Music module was either the first module students used or because the topic is less gender-specific than either Fashion or Basketball. Reasons for interest often stemmed from either: an interest in the subject matter, appreciating that *Get the Math* demonstrated real-world applications of algebra, or feeling that the format of *Get the Math* made it easier to learn.
- The greatest attitudinal impact of *Get the Math* was in helping students recognize ways in which algebra can be used outside of school. After using *Get the Math*, 64% of the students said they could name ways in which algebra is used in the real world.

- To help us interpret the data, a supplementary teacher survey was conducted with 20 teachers whose students participated in the study. Most teachers rated *Get the Math* positively in terms of its educational value, appeal/engagement for students, and value/usefulness for teachers, and 65% reported that their students had learned or benefited from using *Get the Math*. Those teachers who were less positive about *Get the Math* generally felt that it took too much time away from class, or that the material was too difficult for some students.