SCIENTIFIC RESEARCH

QUASI-EXPERIMENTAL

Extended Use of MathFacts in a Flash Increases Student Performance

Students who used MathFacts in a Flash for a full year
had greater gains than those who used it for only six months

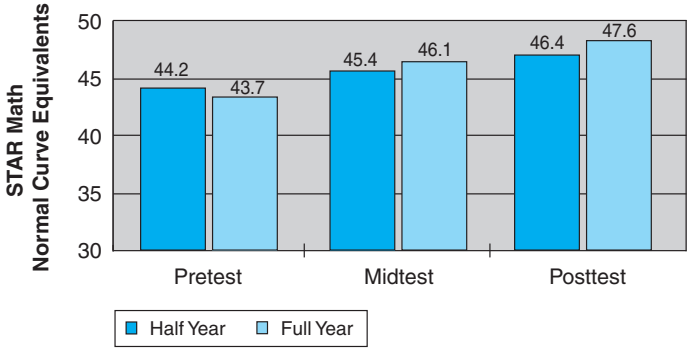
Summarized from: Ysseldyke, J., Thill, T., Pohl, J., & Bolt, D. (2005). Using MathFacts in a Flash to enhance computational fluency. *Journal of Evidence Based Practices for Schools, 6*(1), 59–89.

Introduction

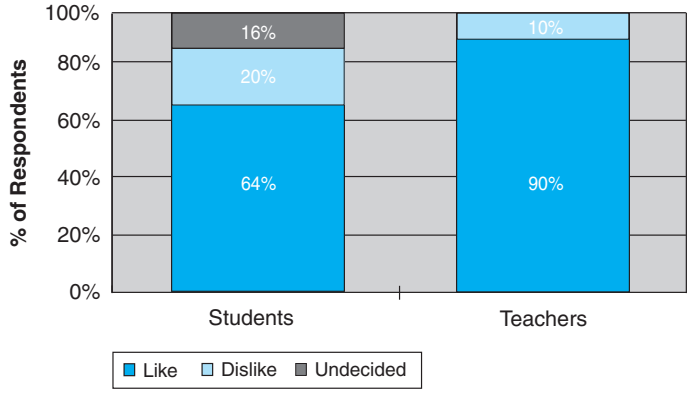
MathFacts in a Flash™ software is designed to improve computational fluency by providing practice on addition, subtraction, multiplication, and division facts, as well as squares and fraction/decimal conversion. Timed tests measure students' practice and mastery, while identifying the problems students are struggling with the most.

This study concluded that student achievement was greatest when MathFacts in a Flash was well implemented and used for the entire year. Furthermore, survey results revealed both teachers and students liked MathFacts in a Flash, and teachers felt it helped students become better at math.

Graph 1: Longer use of MathFacts in a Flash results in greater mathematics achievement



Graph 2: Students and Teachers like MathFacts in a Flash



Main Findings

- MathFacts in a Flash was an effective intervention for improving mathematics achievement.
- Students who used MathFacts in a Flash for a full year experienced greater gains in math achievement than did students who used it for half a year.
- Students demonstrated greater gains in mathematics achievement when MathFacts in a Flash was well implemented.
- A majority of students and teachers liked MathFacts in a Flash. Many students liked math more after using it, and teachers thought it was an effective intervention.

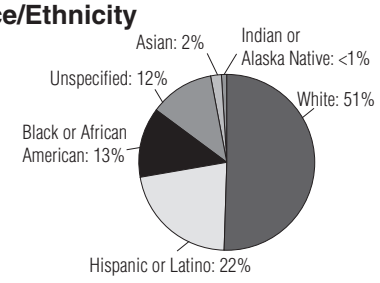
Participant Profile

4,224 students
148 teachers
163 classrooms
13 schools
10 states

Demographics

Free or reduced lunch: 35%
Title I eligible: 47%
Gifted/Talented: 2%
Learning disabled: 2%
Physical disability: <1%

Race/Ethnicity



Researcher Background

Jim Ysseldyke, Ph.D., is Birkmaier Professor of Educational Psychology and co-director of the Center for Reading Research at the University of Minnesota, Minneapolis.

PEER - REVIEWED

Study Description

Thirteen elementary and middle schools from 10 states were randomly assigned to two conditions. In Condition A schools (*n*=2,169), teachers used MathFacts in a Flash from October to May, and in Condition B schools *(n*=2,055), teachers used the software from January to May. Study participants included 4,224 students with 148 teachers in 163 classrooms.

Teachers were instructed to spend 5 to 15 minutes each day using MathFacts in a Flash, monitor student practice using the software, and provide appropriate instruction when needed. Additionally, teachers were asked to use MathFacts in a Flash in all classes taught, and each student started at the beginner level.

MathFacts in a Flash stores the time students spend using the software, the number of practice items and sessions, the number of test items and sessions, the number of levels mastered, and the level range for each student. In addition to these variables, the researchers measured implementation efficiency and the use of MathFacts in a Flash as a practice tool. In order to assess achievement, the researchers tested the students using STAR Math™, a valid and reliable computer-adaptive assessment of mathematics achievement, before implementation (pretest), during implementation (midtest), and after implementation (posttest) of MathFacts in a Flash.

Results

A hierarchical linear model, including student-, classroom-, and school-level variables, was used to assess intervention effects. The results of the analysis found that the use of MathFacts in a Flash as a practice tool after adequate instruction and with student monitoring resulted in greater student achievement than without such instruction or monitoring. Additionally, as intervention fidelity increased, so did overall student mathematics achievement.

The researchers also assessed the impact of duration of the intervention. The two groups, Condition A (October to May) and Condition B (January to May), were significantly different in an analysis of covariance, signifying that the students who used MathFacts in a Flash for a year improved their mathematics achievement more than those who used it for half a year.[1] Thus, MathFacts in a Flash is more effective with longer use.

In addition, students and teachers were surveyed at the end of the study, and the survey found that most students (64%) and teachers (90%) liked MathFacts in a Flash (see Graph 2). A majority of students (59%) liked math more after using MathFacts in a Flash, and a majority of the teachers (93%) thought that the software helped students in math.

Conclusion

MathFacts in a Flash was an effective intervention for the students in this study, and students that practiced at the appropriate level with adequate instruction experienced improved mathematics achievement. The fidelity of the intervention, which included efficient use, adequate instruction, and proper monitoring, was an important aspect of student achievement. The duration of the intervention was also important, with longer intervention being more beneficial for students. Additionally, students and teachers alike responded positively to the use of MathFacts in a Flash.

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[1] $F(2, 2961) = 4239.9$, $p < .001$

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