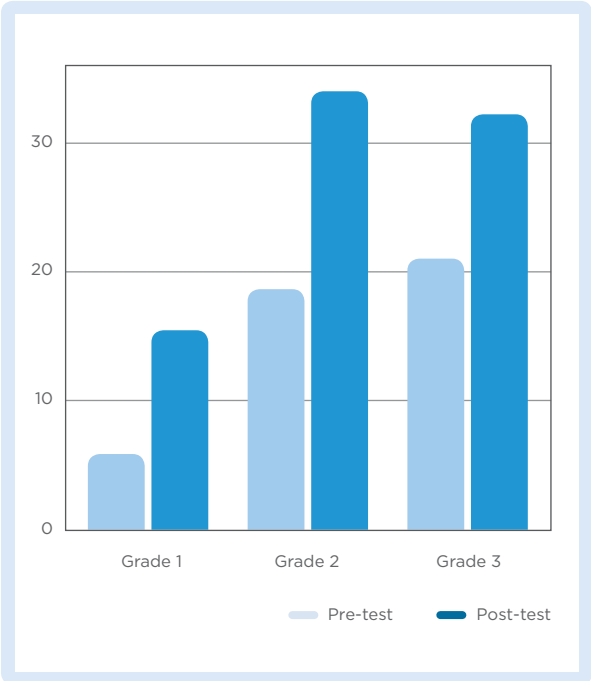
Imagine Math Facts: Significantly Improved Math Fact Fluency and Automaticity

Background

The development of math fact fluency and automaticity is a core requirement for later success in advanced mathematics (Nelson, Parker, & Zaslofsky, 2016; Steel & Funnell, 2001). To be considered fluent and automatic, a student must be able to rapidly recall the correct solutions to basic math operations including addition, subtraction, multiplication, and division (Geary, 2011). Despite the importance of developing these skills, several national groups—including the 2008 National Mathematics Advisory Panel—have found that "few curricula in the United States provide sufficient practice to ensure fast and efficient solving of basic fact combinations and execution of the standard algorithms." (NMAP, 2008)

Given this context, the Imagine Math Facts program is designed to improve math fact fluency for students. The program builds math fact fluency and automaticity by differentiating instruction for each user, providing repeated and focused practice on previously unlearned math facts, providing constant and immediate feedback, and maintaining engagement through exciting and rewarding gameplay.

Figure 1. Average Pre- and Post-Test Performance by Grade of Users of the Imagine Math Facts Program.



Method

During the first semester of the 2018–2019 school year, first- through third-grade teachers in a southern Texas school implemented Imagine Math Facts as a tool for improving addition, subtraction, and multiplication fact fluency and automaticity. To determine the impact of using the Imagine Math Facts program in the school, a 3-minute, 100-question math fact test was administered at the beginning and end of the semester.

Results

Students who used Imagine Math Facts logged an average of approximately two hours in the program. Figure 1 presents the average pre- and post-test scores by grade for students who used Imagine Math Facts during the first semester of the 2018–2019 school year. Students in all grades experienced significant improvements in math fact fluency and automaticity after using the Imagine Math Facts program.

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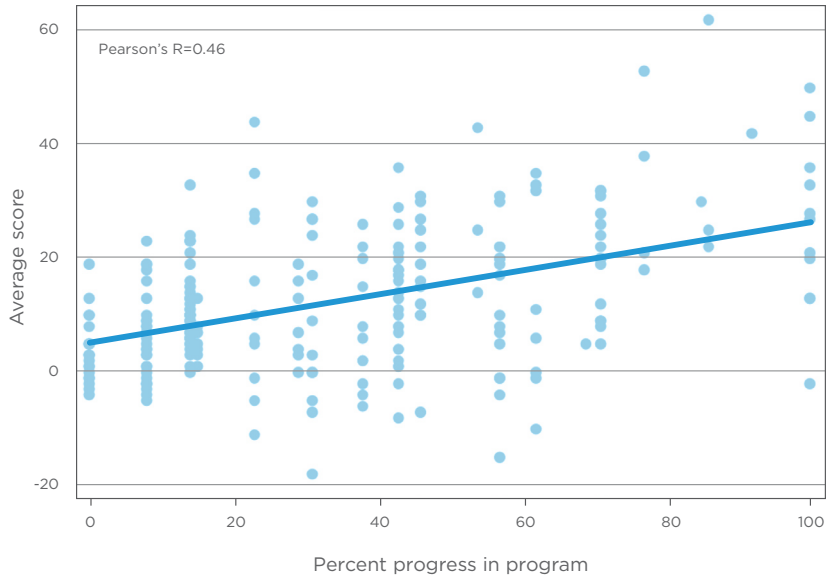
A direct correlation between progress within the Imagine Math Facts program and performance on the end-of-semester test of math fact fluency is demonstrated in Figure 2. The observed Pearson's R correlation coefficient was 0.46.

Figure 2. Correlation between Percent Progress in the Imagine Math Facts Program and Average Post-Test Performance.



Conclusions

The results of this study support the role of Imagine Math Facts as a tool for improving math fact fluency and automaticity. Students who used the program in this Texas school during the first semester of the 2018–2019 school year experienced significant improvements in math fact fluency and automaticity as demonstrated by performance on math facts assessments. Given these findings, we would expect similar results for other students who use the Imagine Math Facts program with fidelity.

References

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