

Imagine Math Facts: Timez Attack

Utah Case Report

Background

Success in mathematics education is dependent on the acquisition of foundational mathematics skills. Specifically, fluency and automaticity of basic math facts (i.e., addition, subtraction, etc.) is essential to comprehend more complex mathematic concepts and skills. Individuals who have not achieved math fact fluency must expend more cognitive resources to solve basic math operations before addressing other aspects of a complex math problem. Computer-assisted instruction may be a particularly effective tool in assisting students of all ability levels achieve math fact fluency.

Imagine Math Facts is an adaptive, digital education program designed to help elementary-age students become fluent in basic math. The program uses various instructional principles including focused and frequent practice, visual and auditory feedback, adaptive placement testing, and high motivation and engagement to help students of all skill levels achieve math fact fluency and automaticity.

Methods and Procedures

In the fall of the 2017–2018 school year, third-grade teachers at a charter school in Utah implemented Imagine Math Facts as a part of their multiplication fact curriculum. Over a period of three months, teachers administered 30 semi-weekly assessments consisting of 30 randomly selected multiplication facts of comparable difficulty.

A multiple baseline across groups research design was used to establish a causal link between the use of the Imagine Math Facts program and improvement in multiplication fact fluency. Students were randomly assigned into three equally-sized study groups that began using the Imagine Math Facts program in a staggered fashion. Following the baseline phase (weeks 1 and 2), groups 1, 2, and 3 began using the Imagine Math Facts program on weeks 3, 4, and 5, respectively. Students continued to use the program for up to 11 weeks. On week 14, all students discontinued use of the Imagine Math Facts program for two weeks (during the normally planned winter break). After this interval, students completed two weeks of assessments without using the IMF program to assess the permanence of learned math facts.

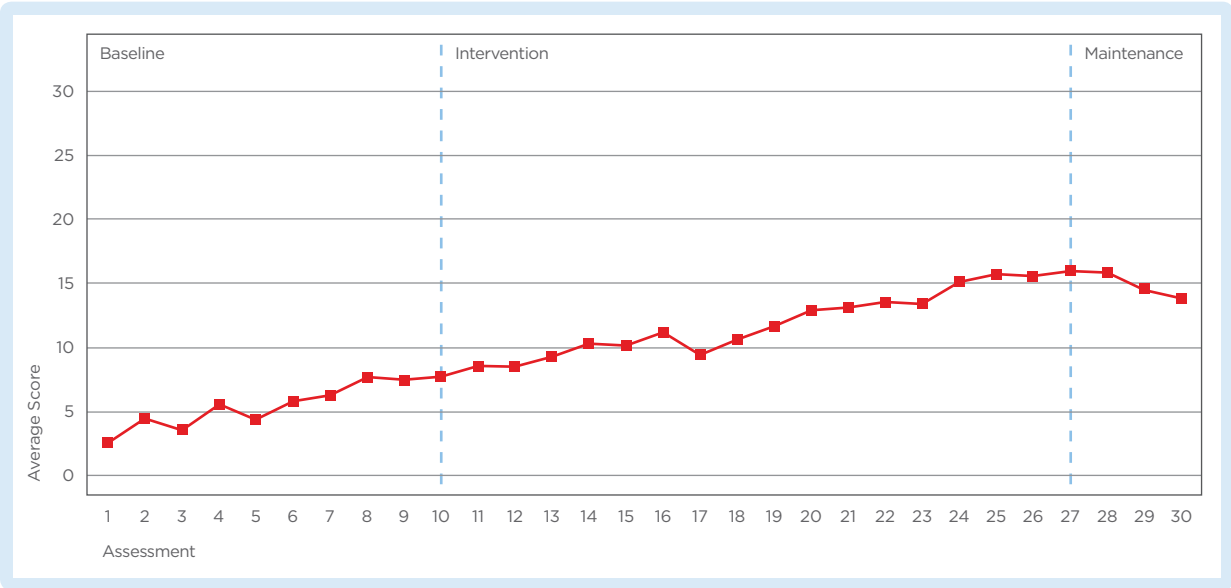
Results

The graphic below presents the average score on each assessment for each study group. For multiple baseline research designs, we would expect to observe relatively stable baseline performance followed by immediate and consistent improvement at the start of the intervention phase. In this study, baseline performance was stable for all three study groups until the completion of assessment 6 in week 3. From that point, we observed an upward trend in assessment performance for the remainder of the study. While the observed growth throughout the study was encouraging, initial improvement following assessment 6 may have been due, at least in part, to the start of in-class multiplication instruction by all three teachers. Despite this potential confound, the combination of in-class teaching and use of Imagine Math Facts appeared to promote improvements in math fact fluency for the full duration of the study. Additionally, while Group 1 did experience some minor decline in performance during the maintenance phase, acquired fluency generally persisted for all three groups despite discontinued use of Imagine Math Facts.

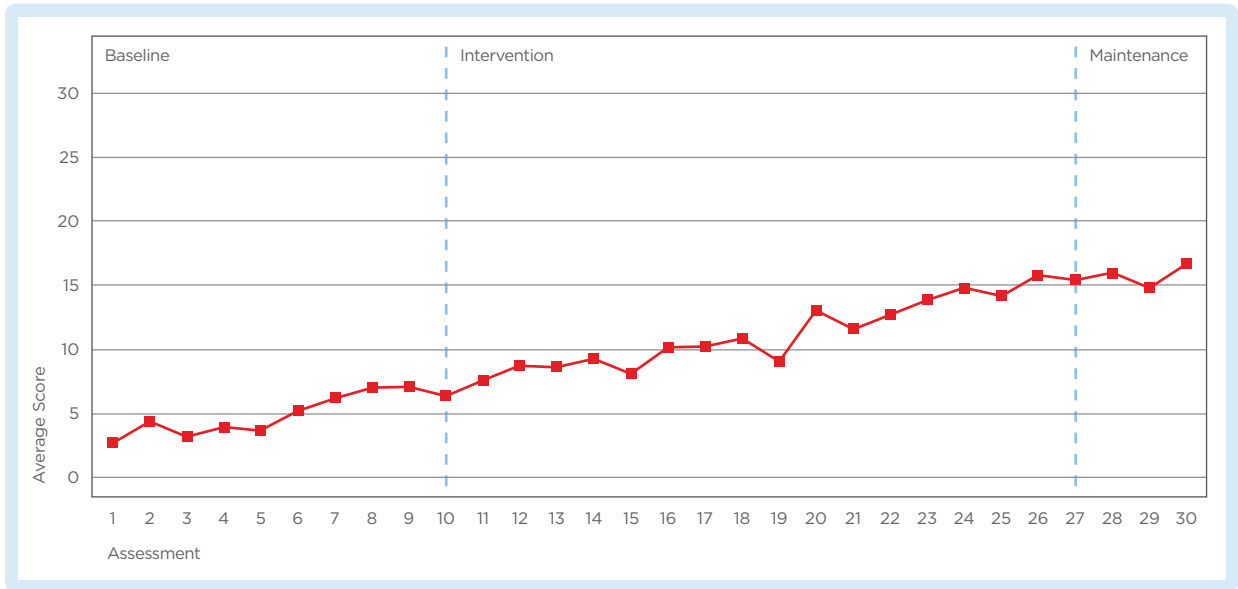
Conclusions

The results of this study support the role of Imagine Math Facts as a supplementary tool for the development of multiplication fact fluency. Students who used the Imagine Math Facts program for 9–11 weeks experienced consistent improvements in math fact fluency as demonstrated by performance on semi-weekly multiplication fact probes. Given these findings, we would expect similar results for other third-grade students who use the Imagine Math Facts program with fidelity.

Group 1



Group 2



Group 3

