RESEARCH BRIEF

Reflex increases the number of 2nd-grade students meeting yearly math growth goals

Study Sample:

- 518 2nd grade students
- Moline-Coal Valley School District, Illinois
- 2022-2023 school year
- NWEA MAP Growth math assessments in fall 2022 and spring 2023

Product Usage:

- Low Fidelity Reflex Usage (<50% Green Light days) n = 291 students
- High Fidelity Reflex Usage (>50% Green Light days) n = 227 students

Analyses Conducted:

- Independent samples t-tests and repeated samples t-tests to analyze fall-spring fluency growth, math assessment scores, and product usage (high/low fidelity)
- Partial correlations between usage and assessment growth, controlling for fall achievement
- Growth analyses conducted by Fall Math Achievement Quintiles (Low, LowAvg, Avg, HighAvg, High)
- Chi-square analyses comparing rates of meeting expected growth benchmarks (yes/no) and Reflex usage (high fidelity/low fidelity)

Getting the Green Light is a big goal for students using Reflex. The Green Light—located in the upper right corner of the screen—illuminates once a student answers a certain number of facts correctly on a given day. This marks the completion of a good day's math fact fluency practice. The current research brief highlights the importance of high fidelity usage, or achieving the Green Light, in the majority of days a student accesses Reflex by analyzing the impact of usage on fluency growth and grade-level math assessments in a sample of new users of Reflex.

Introduction

The current research report provides evidence of the impact of high fidelity Reflex usage on students' academic growth. In this sample of students in 2nd grade within the Moline-Coal Valley School District in Illinois, students completed a baseline assessment (fall 2022) and a follow-up assessment (spring 2023) using NWEA MAP Growth Math Assessments. During the course of the school year, all teachers in the district had access to Reflex. The current analysis focuses specifically on students with low fidelity usage compared to students with high fidelity usage:

- Low Fidelity Usage: 291 2nd-grade students who used Reflex on the addition/subtraction level for 20 or more days with less than 50% of their days achieving the Green Light

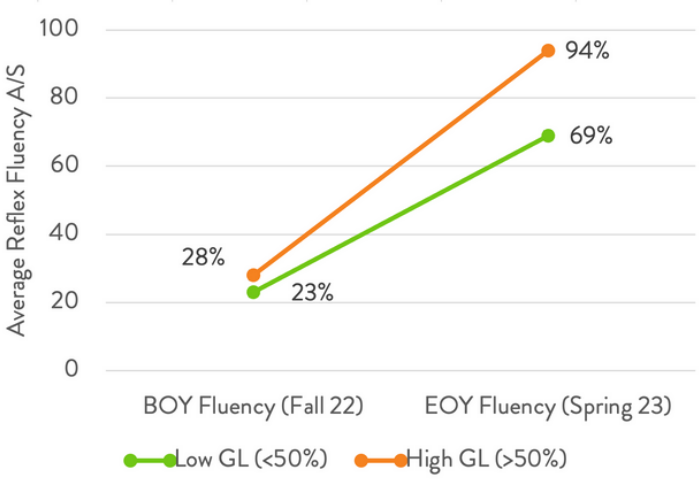
- High Fidelity Usage: 227 2nd-grade students who used Reflex on the addition/subtraction level for 20 or more days with 50% or more of their days achieving the Green Light

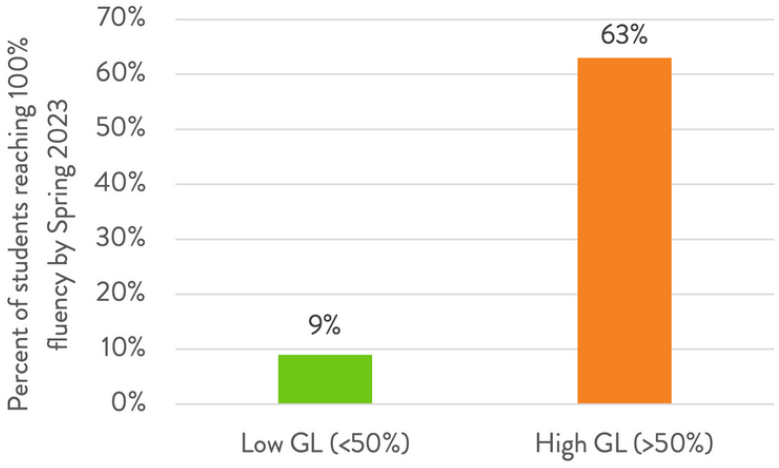
Researchers looked at fluency growth and NWEA MAP RIT score growth from fall 2022 to spring 2023 for this group of students. In all the analyses here, overall math scale scores were used to provide the most stringent test of the impact of Reflex on students' overall ability to perform grade-level mathematics.

Results

Outcome 1: Students who used Reflex with fidelity were 7.4x more likely to reach 100% fluency than students in the low fidelity Reflex usage group.

At the beginning of the school year, both groups of students had similar levels of addition/subtraction fluency in Reflex (23% and 28%). However, by the end of the school year, students who used Reflex with fidelity improved to an average of 94% fluency, whereas students in the low fidelity group reached an average of only 69% fluency[1]. Furthermore, 63% of students in the high fidelity group reached 100% fluency, compared to only 9% of students in the low fidelity group[2].





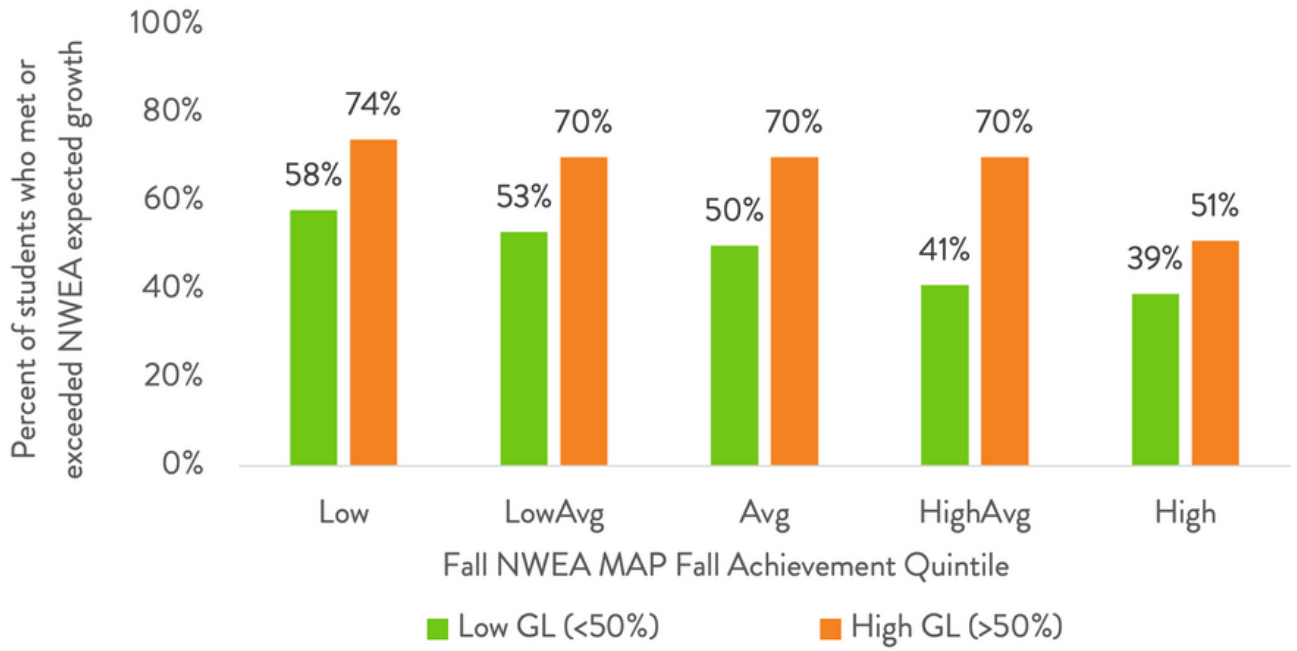
Outcome 2: Greater growth in Reflex was predictive of higher spring math RIT scores, regardless of a student's fall fluency or fall math RIT scores.

There was a significant correlation found between fluency percentage growth in Reflex between fall and spring and growth in RIT scores on the NWEA MAP from fall 22 to spring 23, even when controlling for fall fluency and fall RIT scores[3]. This means that independent of a student's baseline achievement, fluency growth predicted RIT score growth.

Results (continued)

Outcome 3: Students who used Reflex with fidelity were 25% -70% more likely to meet or exceed NWEA growth goals compared to similar students with low fidelity Reflex usage

NWEA calculates a projected growth measure that represents the number of RIT points the student is typically expected to grow from fall - spring based on their fall RIT score and a comparison to similar students in NWEA's norms study. Overall, students in the high fidelity group were significantly more likely to meet or exceed growth goals (65%) compared to students in the low fidelity group (51%)[4]. The graph below shows group differences in achievement rates based on fall achievement quintiles.



Conclusions

Despite starting off the school year with similar fluency levels in addition/subtraction, students who used Reflex with high fidelity, achieving the "Green Light" in the majority of usage sessions, were significantly more likely to reach 100% fluency levels by the end of the school year compared to students who were not using Reflex as intended. Importantly, these students also showed significantly higher growth on external math assessment scores and a greater likelihood or meeting or exceeding peer growth benchmarks. These results highlight the importance of "Going for the Green Light" for meeting growth goals.

Technical Notes

1. An independent samples t-test was conducted looking at the difference in fluency growth for the high fidelity group compared to the low fidelity group. Students in the high fidelity group experienced significantly larger fall-spring fluency growth (M = 66.16, SD = 25.76) than the low fidelity group (M = 45.38, SD = 25.04), $t(516) = 9.30$, $p < .001$.
2. 2x2 chi-square was conducted to analyze the rates of students reaching 100% (yes/no) within each usage group (high fidelity/low fidelity). Students in the high fidelity group were significantly more likely to reach 100% fluency (63%) compared to students in the low fidelity group (9%), χ^2 (1, N = 518) = 174.51, $p < .001$.
3. A partial correlation was conducted looking at relationships between growth in Reflex addition/subtraction math fact fluency and growth in RIT scores on the NWEA MAP from fall 22 to spring 23, controlling for fall fluency and fall RIT scores. The correlation was significant, $r(514) = .396$, $p < .001$.
4. A 2x2 chi-square was conducted to analyze the rates of students meeting or exceeding NWEA projected growth (yes/no) within each usage group (high fidelity/low fidelity). Students in the high fidelity group were significantly more likely to meet or exceed growth goals (65%) compared to students in the low fidelity group (51%), χ^2 (1, N = 518) = 10.21, $p = .0014$.