

# RENAISSANCE

SPECIAL REPORT | JUNE 2020

## Trends in Student Outcome Measures

The Role of Individualized Freckle™ Math Practice



# Overview

Freckle™ Math by Renaissance® helps teachers reach every student at their own level by offering individualized online practice. Freckle draws from over 50,000 items covering K–9 standards to present students with math problems that meet their skill level. For this study, we focused on students who used Freckle Math and tested with Renaissance Star Math® during the 2019–2020 school year to examine how patterns of growth vary depending on Freckle usage and performance. Specifically, we compared Star Math Student Growth Percentiles (SGPs)<sup>1</sup> across differing degrees of Freckle Math usage and performance with the typical growth of students who did not use the program.

## Main findings

Math practice with Freckle Math was associated with higher levels of fall-to-winter growth in general math ability.<sup>2</sup> This positive outcome increased as students engaged in practice that met or exceeded Freckle Math guidelines and as students used the program for more weeks in the school year.

## Data

The study data came from Renaissance databases, which comprised over 10,000 students in grades 1–12 who used Star Math and engaged in Freckle math practice during the 2019–2020 school year. The sample students participated in the Freckle math program for more than one day and completed a Star Math pretest in the Fall SGP testing window (first assessment taken August–November) and an additional test during the Winter SGP testing window (assessment closest to January 15<sup>th</sup> taken December–March). Students who began using Freckle after their Star Math winter test were not included in the sample.

To examine the relationship between performance on Freckle Math practice and growth in general math ability, we divided students into two groups based on the accuracy of their Freckle practice: (1) students who scored an average of 75% correct or better, compared to (2) students who scored less than 75% correct.

To examine the implications of the amount and duration of Freckle Math practice for growth in general math ability, we divided students into three groups based on the average amount of time spent on Freckle Math each day and the number of weeks Freckle was used during the school year:

- o Students who used Freckle Math during the school year, but **below the recommended [minutes-per-day guidelines](#)** (15 minutes per day for grades 2 and under, 20 minutes per day for grades 3 through 5, and 30 minutes per day for grades 6 and up)
- o Students who followed **recommended minutes-per-day use** for Freckle Math practice and practiced for a relatively **short weekly duration**, defined as Freckle Math practice falling below the median number of weeks of Freckle practice for students in the sample (below 9 weeks for elementary grades and below 8 weeks for middle/upper grades)
- o Students who followed **recommended minutes-per-day use** for Freckle Math practice and practiced for a **longer weekly duration**, defined as Freckle Math practice at or above the median number of weeks of Freckle practice for students in the sample (at least 9 weeks for elementary grades and 8 weeks for middle/upper grades)

---

1 Renaissance Learning (2019). *Student Growth Percentile in Star Assessments*. <http://doc.renlearn.com/KMNet/R00571375CF86BBF.pdf>

2 Fall-to-winter growth was considered in this study as it largely preceded the many school closings and atypical Freckle Math and Star Math usage in spring 2020. In the future we plan to expand this study to consider growth across the entire academic year.

Students were additionally categorized as struggling or non-struggling math students based on their Star Math pretest percentile rank (PR). Students with a pretest PR of 25 or below were classified as a struggling math student and students above the 25<sup>th</sup> PR were classified as a non-struggling math student.

We report results as median SGPs that convey how each student grew relative to their academic peers (kids in the same grade with a similar score history) over the duration of Freckle usage considered in this study (fall to winter). For comparison purposes, the SGPs of students using the Freckle program were compared to students in the same school districts who did not complete Freckle practice during that school year. This comparison group consisted of over 450,000 students with SGPs based on Star Math assessments.

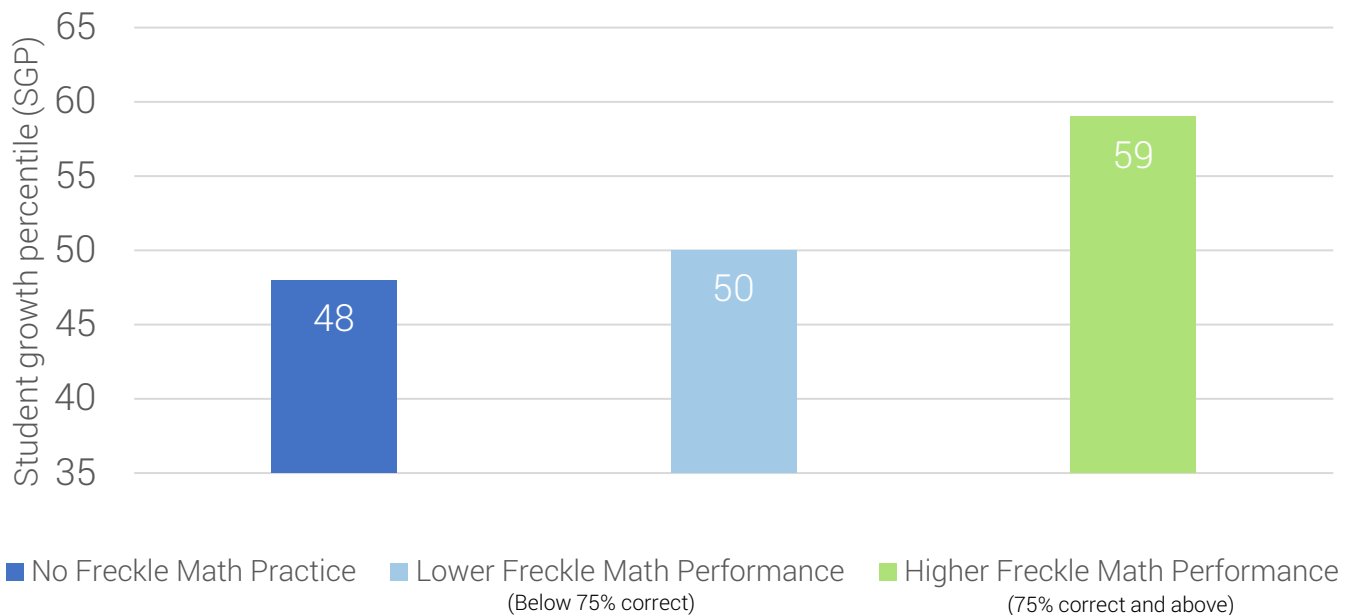
## Results

### Students engaging in more successful Freckle Math practice experienced more growth

As figure 1 shows, students whose Freckle Math performance was, on average, at least 75% experienced more growth in general math ability than students with average Freckle Math scores below 75%. The higher performing Freckle Math students also experienced more growth than students who did not engage in Freckle practice. Measuring growth with Student Growth Percentiles, which consider growth in relation to students with a similar score history, helps to control for student achievement prior to using Freckle Math.

Students engaging in more successful Freckle Math practice experienced more growth.

Figure 1. Overall, students scoring higher on Freckle Math practice grew more in general math ability



**Students practicing with Freckle Math at recommended levels and over a longer period realized higher math gains**

**Figure 2. Students who practiced with Freckle Math for recommended minutes per day had higher math growth**

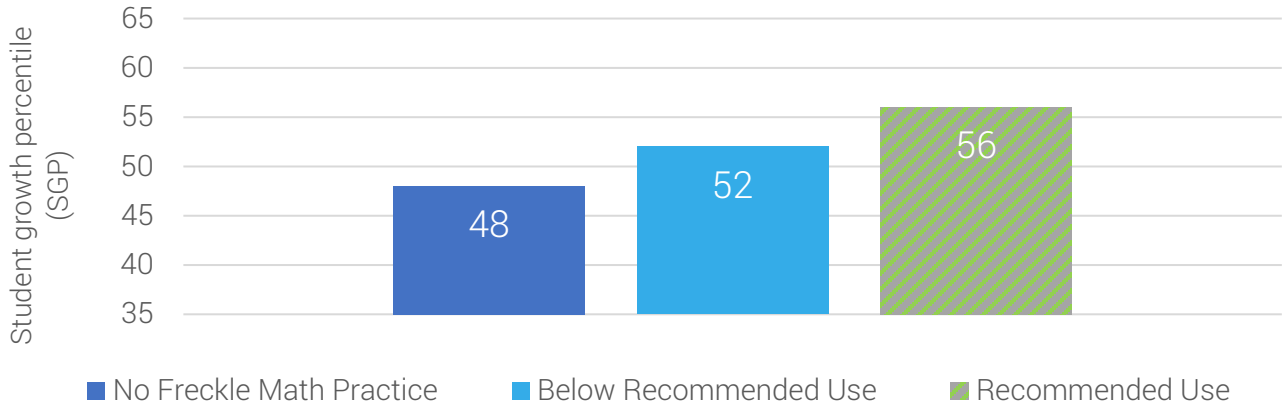
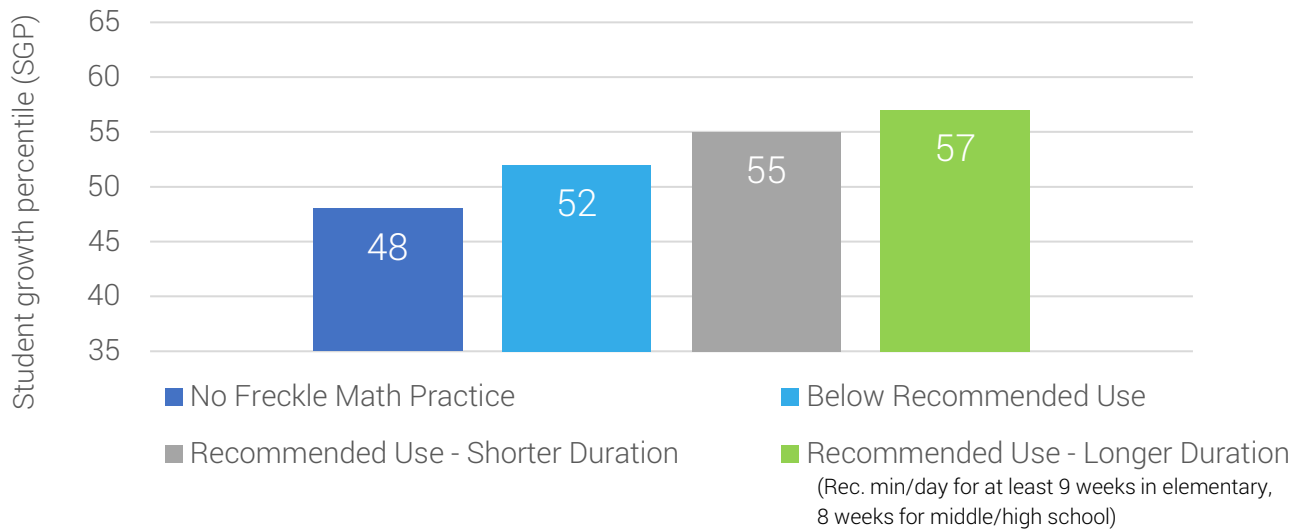


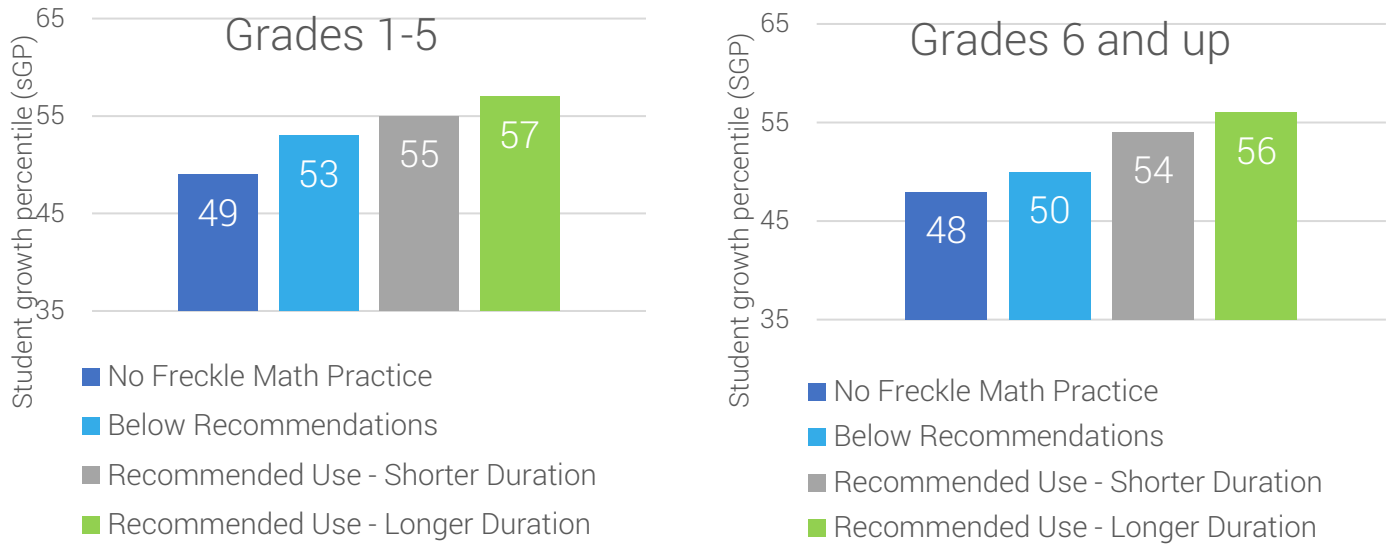
Figure 2 shows students grew more when they used Freckle Math for skills practice for the recommended time per day by grade (green/gray striped bar), but the most growth was observed in figure 3 when students were separated by whether they had maintained these minutes per day over at least 9 weeks in the elementary grades and 8 weeks in middle/high school (green bar).

**Figure 3. Overall, students who spent more weeks on Freckle Math practice for the recommended minutes per day experienced the most math growth**

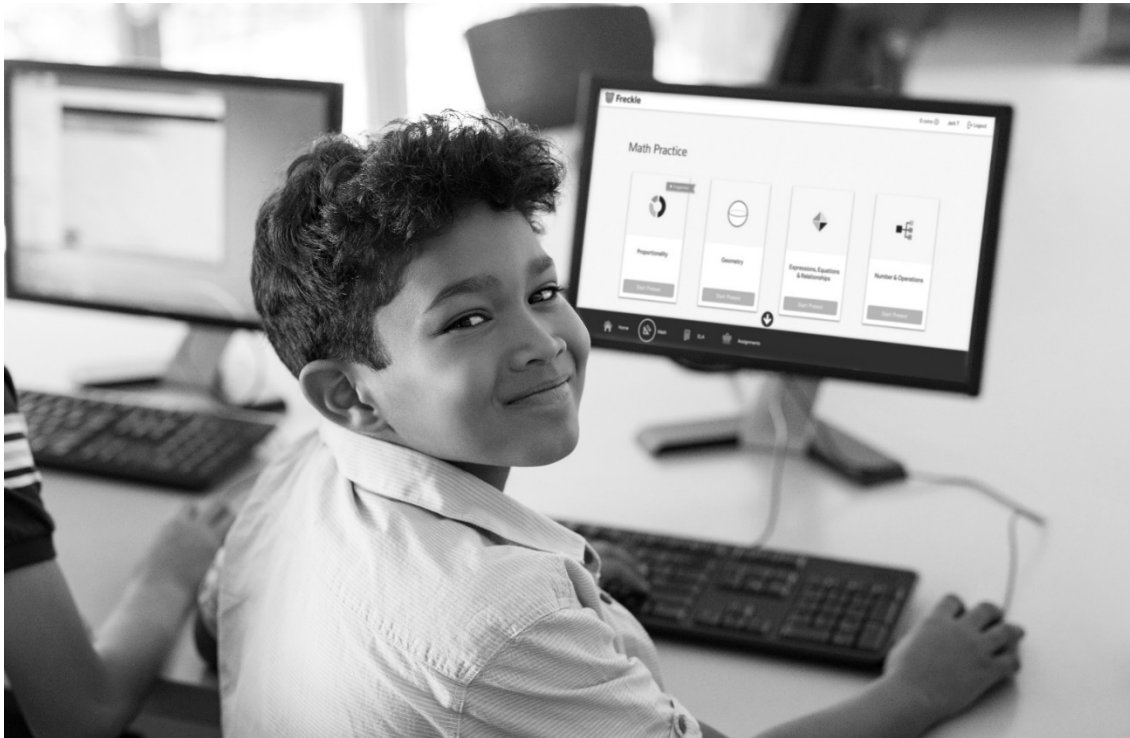


**Both elementary and secondary students saw higher math growth with sustained Freckle Math practice at recommended daily levels**

**Figure 4. Students in grades 1–5 and 6 and up who used Freckle Math over a longer duration with recommended daily practice grew more**



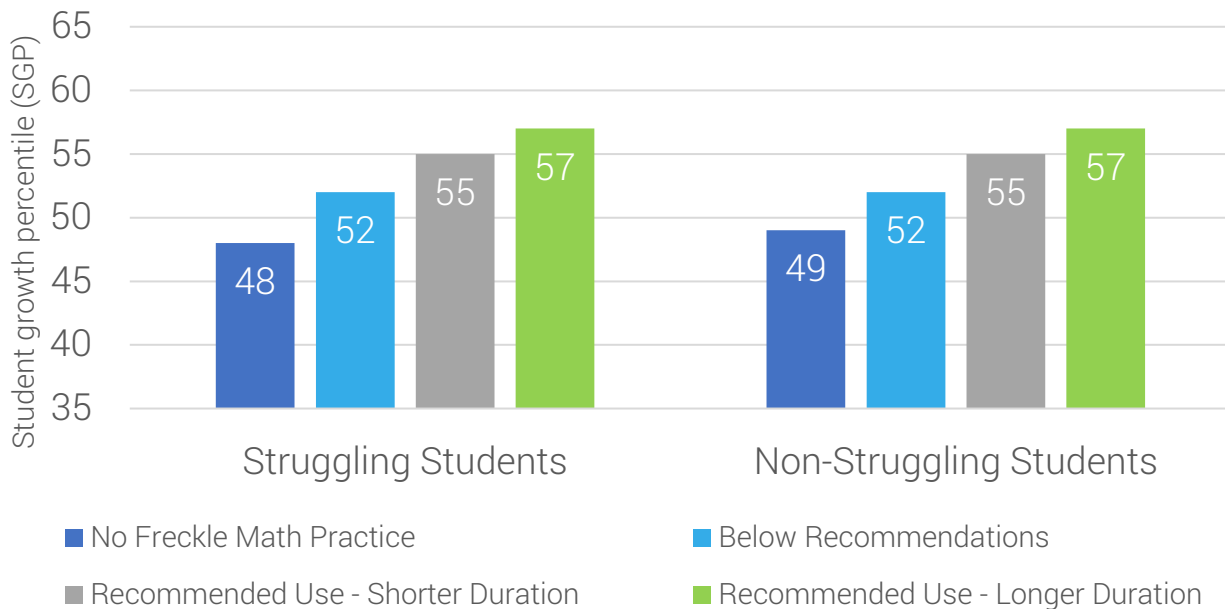
As displayed in figure 4, students in elementary, middle, and high school using Freckle Math at the recommended time per day experienced more growth than students not using Freckle Math or using it below recommended levels. The most growth was observed among students sustaining Freckle Math use at recommended levels over a longer duration, measured in weeks.



## Both struggling and non-struggling math students practicing at recommended levels experienced more growth

As figure 5 shows, both students who were struggling in math (Star Math percentile rank 25 or less) and those who were not struggling (Star Math percentile rank above 25), experienced more growth in general math ability if they were practicing on Freckle Math at the recommended time per day, particularly if their practice was over a longer duration of weeks. Struggling students using Freckle Math achieved as much growth as non-struggling students using Freckle Math.

**Figure 5. Overall, both struggling and non-struggling math students experienced more growth than non-Freckle users**



## Conclusion

Freckle Math is an online practice tool that can be used at school or at home to deliver effective math practice at students' individual levels. This study found that math practice with Freckle Math is time well spent. With sustained use of Freckle Math at 15 to 30 minutes per day, depending on grade level, students experience tangible growth in general math ability.

All logos, designs, and brand names for Renaissance's products and services are trademarks of Renaissance Learning, Inc., and its subsidiaries, registered, common law, or pending registration in the United States.

(800) 338-4204 | [www.renaissance.com](http://www.renaissance.com)

R63038.200624