

RENAISSANCE®

SPECIAL REPORT

Trends in Student Outcome Measures

The Role of Individualized Math Practice



 RENAISSANCE
Accelerated Math®

Overview

Renaissance Accelerated Math® helps teachers personalize standards-based math practice, monitor student progress, and make data-driven decisions that guide instruction. In this study, we examined how patterns of growth and expected college and career readiness vary according to the extent of individualized math practice students accomplish. Specifically, we compared independent math practice as tracked by Accelerated Math with the typical performance of students who did not use the program.

Main findings

Whether examined by grade or by populations of interest (students struggling with math, English learners, and students in free- or reduced-lunch programs), math practice with Accelerated Math was associated with better student performance and higher levels of annual growth. These positive outcomes increased the better Accelerated Math was used.

Data

The study data came from Renaissance's massive math database from the 2013–2014 school year, which comprised over 2.7 million students in grades 1–12. The sample students participated in the Accelerated Math program and completed a Renaissance Star Math® pretest (first assessment taken August–November) and posttest (last assessment taken April–July). We divided students into three groups depending on program use (which was voluntary, meaning students were neither recruited nor randomly assigned to a particular comparison group):

- **Typical students**, who did not use Accelerated Math
- Students with **moderate Accelerated Math use**, who mastered, on average, 1–3 subskills per week
- Students with **best practice Accelerated Math use**, who followed the program's research-based recommendations and mastered, on average, 4 or more subskills per week

We report results in two ways: (1) **student growth percentiles** (SGPs) that convey how each student grew relative to a unique group of academic peers (kids in the same grade with a similar score history),¹ and (2) **percentile ranks** (PRs) aligned to college- and career-readiness achievement levels, per the Smarter Balanced Assessment Consortium, that reveal end-of-year performance.²

Results

Overall

As figure 1 shows, students who used Accelerated Math realized more annual growth, as evidenced by a higher median SGP, than students who did not use the program. The better Accelerated Math was used, the more students grew. Also, students using Accelerated Math were more likely to meet college- and career-readiness (CCR) benchmarks. Nationwide, 30–40% of students in each grade are expected to meet these benchmarks—students not using Accelerated Math came in on the low end of this expectation at 33% of students meeting benchmarks; whereas, for the groups who used the program, the better it was used (moderate versus best practice use), the more students were likely to be proficient.

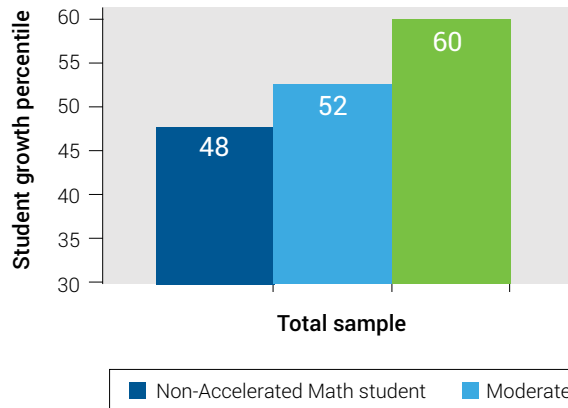
Students using Accelerated Math grew significantly more than kids not using the program and were nearly twice as likely to be college and career ready.

1 SGP is a widely accepted indicator of student progress used by states for instructional decisions and accountability reports. Its sophisticated calculation accounts for initial performance levels and provides context to evaluate if kids are growing at a typical rate. SGPs range from 1 to 99, with higher SGPs meaning more progress (50 is typical growth; over 50 indicates accelerated growth, which is important for kids working below grade level who need to grow quickly to catch up).

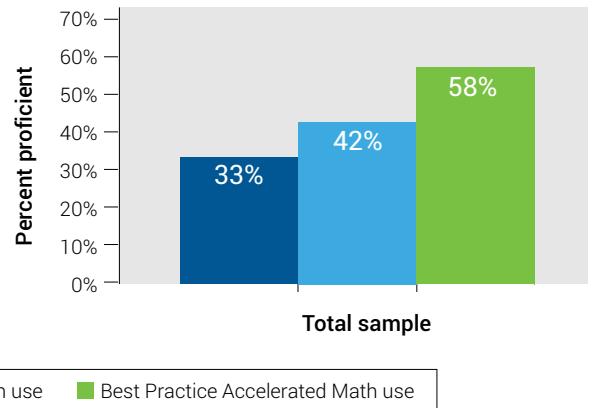
2 Based on posttest PRs, kids in grades 3–8 were classified as likely to be either *Proficient* (levels 3 and 4) or *Not Proficient* (levels 1 or 2) on the SBAC; Gewertz, C. (2014, November 17). Cutoff scores set for common-core tests. *Education Weekly*. Retrieved from <http://www.edweek.org/ew/articles/2014/11/17/13sbac.h34.html?cmp=ENL-EU-NEWS1>

Figure 1. Overall, students who used Accelerated Math® experienced better than expected growth

Student growth relative to academic peers



College and career readiness



Students using Accelerated Math grew significantly more than students not using the program. The better Accelerated Math was used, the more kids grew.

Students who reached subskill mastery targets with Accelerated Math were nearly twice as likely to be college and career ready as students not using the program, meaning they had a much higher likelihood of success on year-end summative tests.

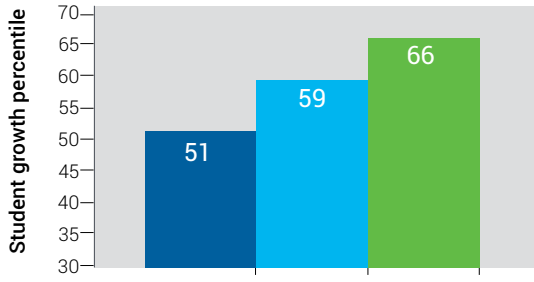


High-interest populations

We observed similar trends for students struggling with math (defined as students with a pretest PR of 25 or less), English learners, and students in free- or reduced-lunch programs (see figure 2 and box below). In all cases, quality of Accelerated Math use was associated with more growth.

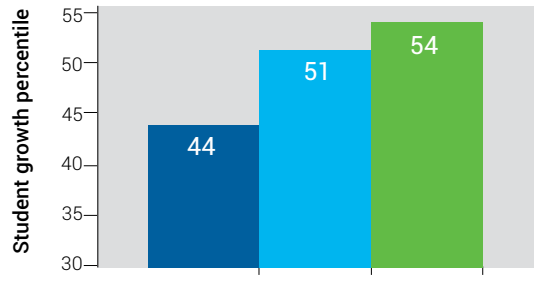
Figure 2. Students of varying demographics grew more using Accelerated Math®

Student growth relative to academic peers



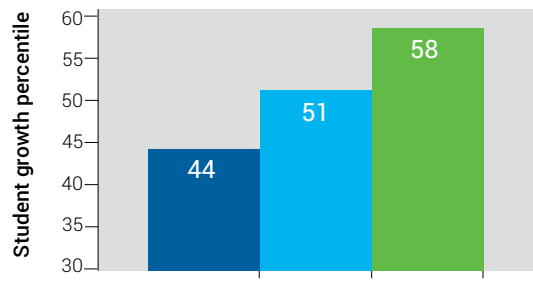
Students struggling with math (grades 1–12)

Student growth relative to academic peers



English learners (grades 1–12)

Student growth relative to academic peers



Free and reduced lunch (grades 1–12)

■ Non-Accelerated Math student ■ Moderate Accelerated Math use ■ Best Practice Accelerated Math use

College and career readiness:

In all grades, as compared to students who did not use Accelerated Math,

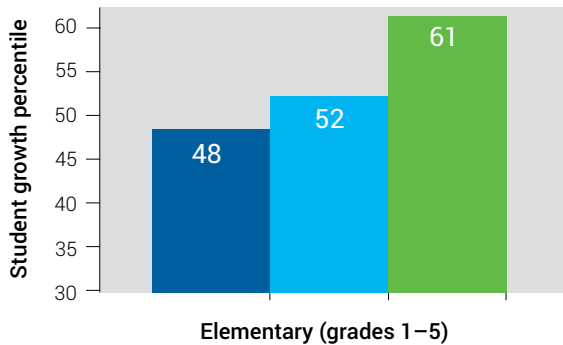
- **Students struggling with math who had moderate Accelerated Math use** were 1.8 times more likely to be college and career ready.
- **Students struggling with math who had best practice Accelerated Math use** were 2.6 times more likely to be college and career ready.
- **English learners who had moderate Accelerated Math use** were 1.4 times more likely to be college and career ready.
- **English learners who had best practice Accelerated Math use** were 2.4 times more likely to be college and career ready.
- **Free- and reduced-lunch populations who had moderate Accelerated Math use** were 1.5 times more likely to be college and career ready.
- **Free- and reduced-lunch populations who had best practice Accelerated Math use** were 2.1 times more likely to be college and career ready.

Elementary grades

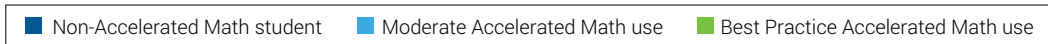
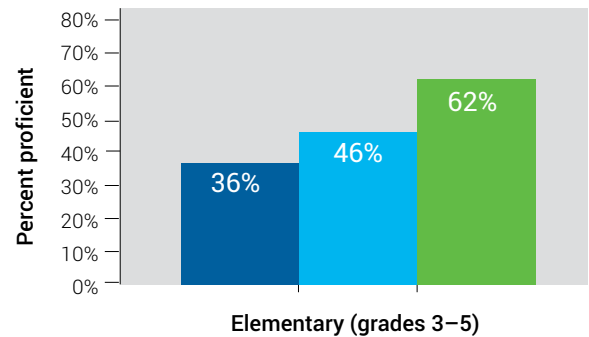
In the elementary grades, when we examined growth relative to students' peers, kids using Accelerated Math had higher SGPs, and the better the program was used, the more likely students were to achieve accelerated rates of growth. For grades 3 through 5 (where college- and career-readiness benchmarks begin), Accelerated Math users were more likely to be proficient, which rose with better use of the program (see figure 3).

Figure 3. Elementary students who used Accelerated Math® grew more

Student growth relative to academic peers



College and career readiness

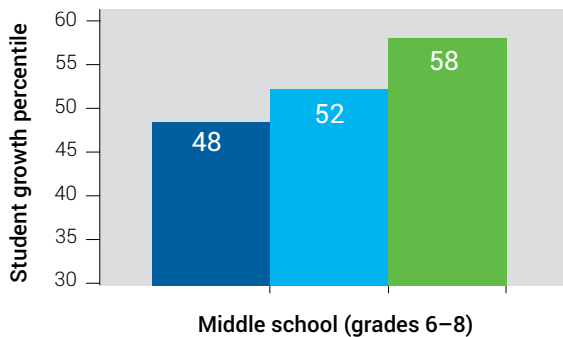


Middle school

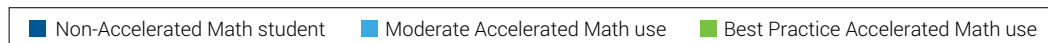
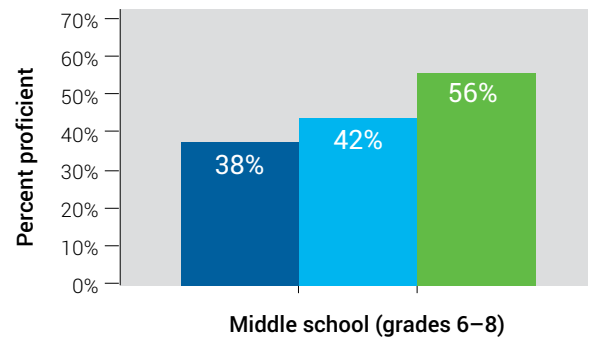
Figure 4 shows that in the middle school grades, students using Accelerated Math likewise had higher SGPs, and better use of the program was associated with greater growth. Again, the greater the quality of Accelerated Math use, the more students achieved college- and career-readiness benchmarks (which span grades 3 to 8).

Figure 4. Middle school students who used Accelerated Math® achieved greater growth

Student growth relative to academic peers



College and career readiness

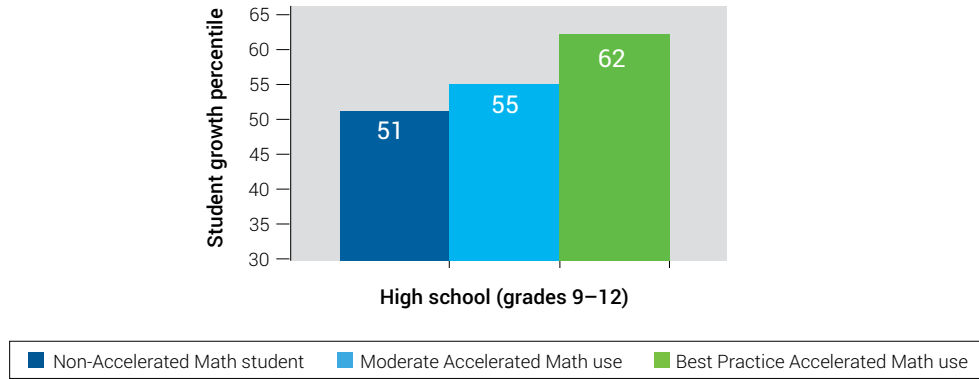


High school

The effect of Accelerated Math on students' math achievement continued into high school (see figure 5). In grades 9–12, kids using the program had higher SGPs, and the better Accelerated Math was used, the more they grew.

Figure 5. Positive math gains persisted in high school Accelerated Math® users

Student growth relative to academic peers



About Accelerated Math®

Accelerated Math software helps you personalize dynamic math practice for grade-level standards (whether state-specific or Common Core) and foundational skill development, by grouping students according to Star Math interim assessment data. You can monitor progress and manage assignments with the program to help differentiate instruction and move each student toward deep standards mastery.

Research support and accolades

Accelerated Math is one of the most heavily researched educational programs in the world. While the correlational trends we present in this report are helpful to understand patterns of growth, you should rely most heavily on causal evidence, which generally requires an experimental or quasi-experimental design. A wealth of causal studies, as well as peer-reviewed articles and independent evaluations, confirm the effectiveness of this program. The large evidence base supporting Accelerated Math comprises 100 studies and reviews, including **33 experimental or quasi-experimental research studies** (considered the strongest study designs), **90 independent studies**, and **22 articles published in peer-reviewed journals**,³ including these powerful studies:

Accelerated Math is one of the most heavily researched educational programs in the world.

- Nunnery and Ross (2007) found higher test scores for students in Texas could be attributed to Accelerated Math, and better use led to larger gains.⁴
- Ysseldyke and Bolt (2007) found students from more than 100 elementary and middle school classrooms whose teachers used Accelerated Math as intended had greater gains on two standardized tests than students with limited or no program use.⁵
- Ysseldyke and Tardrew (2007) found that students in grades 3–10 had increased achievement while using Accelerated Math, with gains 7–18 percentile points higher than comparison students.⁶

The research support for Accelerated Math continues to grow and has contributed to favorable reviews by external panels, including the Council of Administrators of Special Education (endorsed in 2016), the National Center on Intensive Intervention (highly rated mastery measure in review of Progress Monitoring Tools since 2012), and the National Dropout Prevention Center/Network (designated a “model” program with “strong evidence” in 2010), among others.

Conclusion

As this study of over 2.7 million students in grades 1–12 demonstrates, students using Accelerated Math grew significantly more than kids not using the program and were nearly twice as likely to be college and career ready. These results held true for all grades and populations of interest (kids who struggle with math, English learners, and students in free- or reduced-lunch programs) and rose with the integrity of program use.

Educators who use Accelerated Math and use it well can rest assured they are taking important steps towards readying their students for what is ahead, both in the classroom and beyond.

³ To learn more, see *Types of Education Research: Support for Accelerated Math*: <http://doc.renlearn.com/KMNet/R0058447CDCC9D26.pdf>.

⁴ Nunnery, J. A., & Ross, S. M. (2007). The effects of the School Renaissance program on student achievement in reading and mathematics. *Research in the Schools*, 14(1), 40–59.

⁵ Ysseldyke, J., & Bolt, D. M. (2007). Effect of technology-enhanced continuous progress monitoring on math achievement. *School Psychology Review*, 36(3), 453–467.

⁶ Ysseldyke, J., & Tardrew, S. (2007). Use of a progress monitoring system to enable teachers to differentiate mathematics instruction. *Journal of Applied School Psychology*, 24(1), 1–28.

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