RENAISSANCE LEARNING

April 2015

Special Report:

Trends in Student Outcome Measures: The Role of Individualised Maths Practice

ACCELERATED MATHS™ STUDY BY THE NUMBERS

Over 2.7 million students

50 states plus D.C.

Over 12,000 schools and 4,000 districts

Study overview

This study examined patterns of growth and expected college and career readiness according to the extent of individualised maths practice accomplished by students. Accelerated Maths (AM) helps teachers personalise standards-based maths practice and monitor student progress to make data-driven decisions that guide instruction. For the purpose of this study, we drew upon large databases comprising over 2.7 million U.S. students to compare independent maths practice as tracked by AM with the typical performance of students who do not use the programme. Whether examined by grade or by populations of interest (students struggling with maths, English learners, and students in free or reduced lunch programmes), AM was associated with better student performance and higher levels of annual growth. And notably, the better the programme was used, the better the outcomes were for students.

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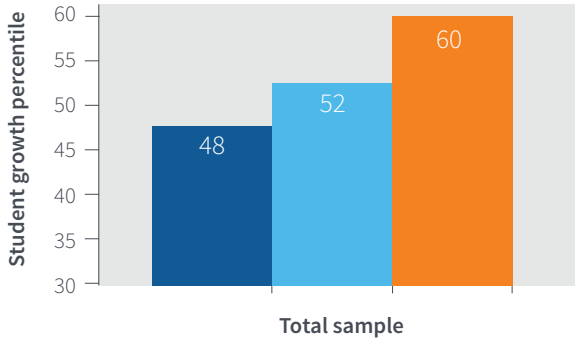
Outcome measures examined were student growth percentiles (SGPs), which conveyed how each student grew relative to their academic peers,[1] and percentile ranks (PRs) aligned to college- and career-readiness achievement levels (using the Smarter Balanced Assessment Consortium assessment), which revealed end-of-year performance.

Results: Overall, students using AM™ experienced better than expected growth

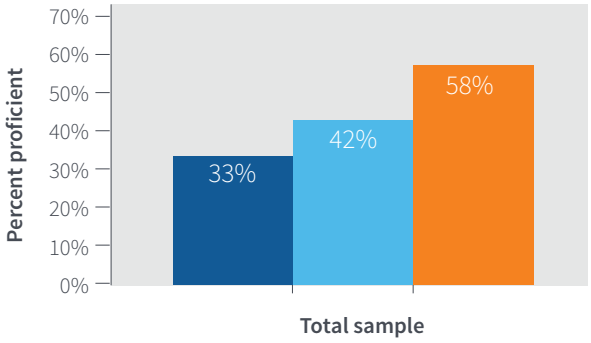
The median student growth percentile (SGP) was higher for students using Accelerated Maths, meaning AM students realised more annual growth than students not using the programme. The better AM was used, the more students grew. (See page 5 for more information on the outcome measures and AM use categories.)

Students using AM were also more likely to meet the college- and career-readiness benchmark. Nationwide, 30–40% of students in each grade are expected to meet new college- and career-readiness (CCR) benchmarks—consistent with these expectations, 33% of students not using AM met end-of-year benchmark PRs. The better AM was used—Moderate to Best Practice use—the more students were likely to be proficient.

Student growth percentiles



College and career readiness



Students using AM grow significantly more than students who do not use AM. The better AM is used, the more students grow.

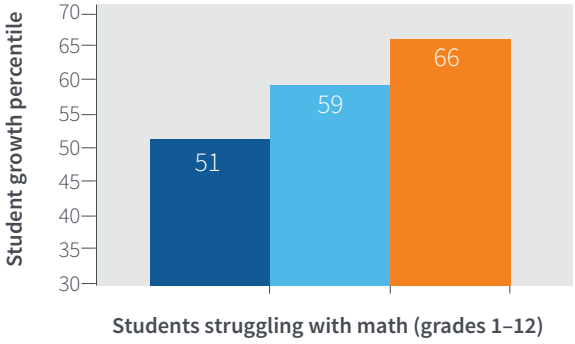
Students completing the recommended amount of subskills with AM are nearly twice as likely to be college and career ready as students not using AM. This means a much higher likelihood of success on the new summative tests.

1 SGPs range from 1 to 99, with higher values indicating more progress and 50 being typical annual growth. Academic peers are students in the same grade with similar pretest scores.

High-interest populations

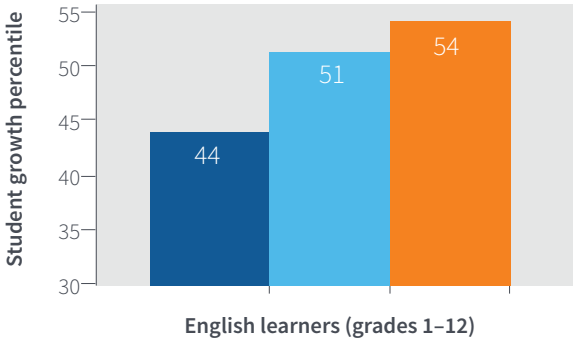
The same trends were observed for students struggling with maths (defined as students with a pretest PR of 25 or less), English learners, and students in free or reduced lunch programmes.

Student growth percentiles



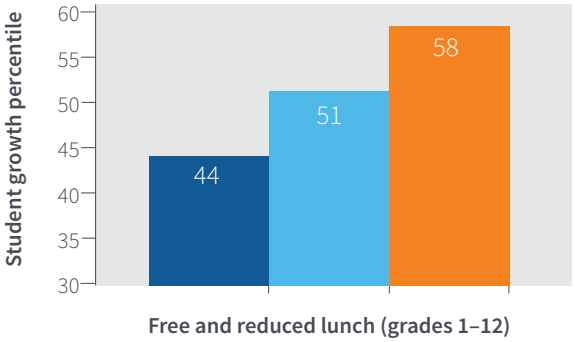
Students struggling with math (grades 1–12)

Student growth percentiles



English learners (grades 1–12)

Student growth percentiles



Free and reduced lunch (grades 1–12)

Non-AM student | Moderate AM use | Best Practice AM use

College and career readiness: Students struggling with maths, grades 1–12

Compared to students who did not use AM,

- **Moderate AM** users were **1.8 times more likely** to be college and career ready
- **AM Best Practices** users were **2.6 times more likely** to be college and career ready

College and career readiness: English learners, grades 1–12

Compared to students who did not use AM,

- **Moderate AM** users were **1.4 times more likely** to be college and career ready
- **AM Best Practices** users were **2.4 times more likely** to be college and career ready

College and career readiness: Free and reduced lunch, grades 1–12

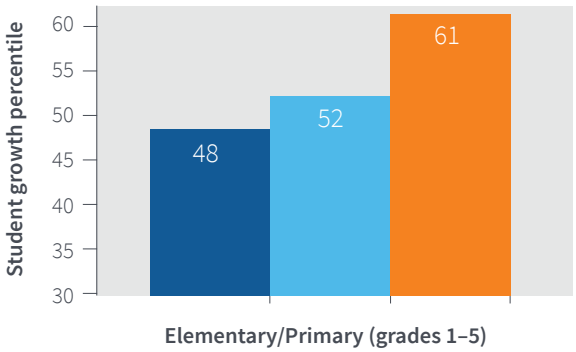
Compared to students who did not use AM,

- **Moderate AM** users were **1.5 times more likely** to be college and career ready
- **AM Best Practices** users were **2.1 times more likely** to be college and career ready

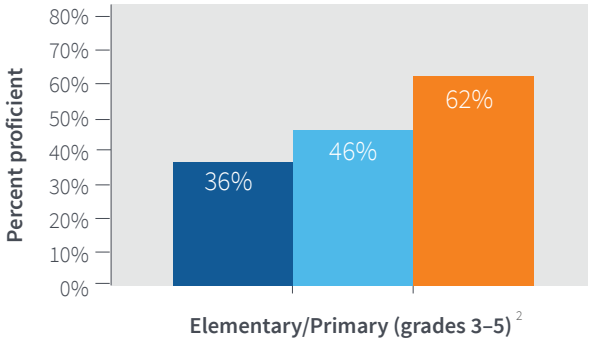
Results by grade: Elementary/Primary school

In elementary/primary school grades, quality of AM use was associated with more growth. AM students had higher SGPs, and the better AM 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, AM users were more likely to be proficient, which rose with better use of the programme.

Student growth percentiles



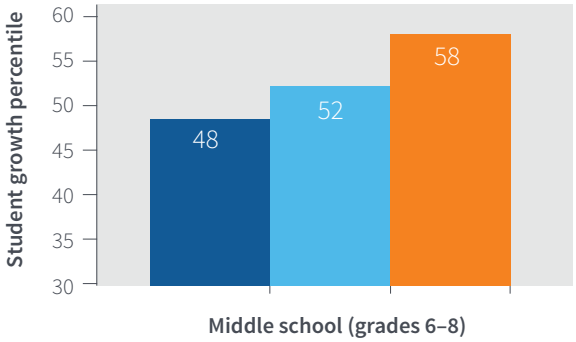
College and career readiness



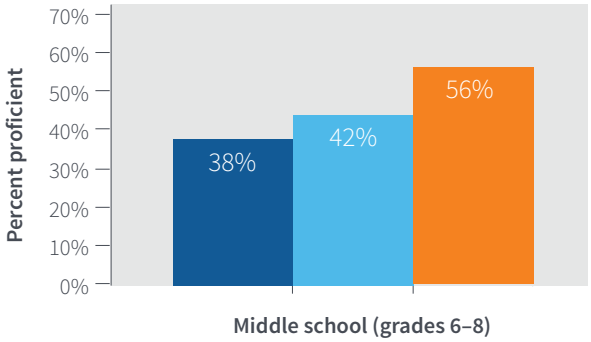
Results by grade: Middle school

In middle school grades, quality of AM use was associated with more growth. AM students had higher SGPs, and the better AM was used, the more students grew. AM quality was also associated with more students achieving college- and career-readiness benchmarks.

Student growth percentiles



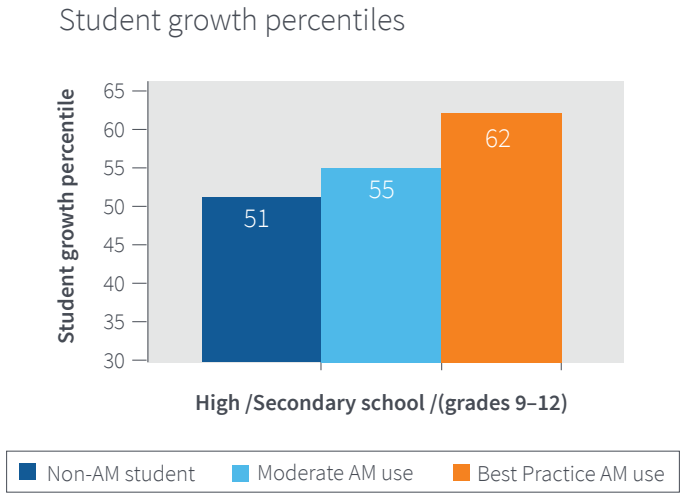
College and career readiness



2 College- and career-readiness benchmarks are available for grades 3–8.

Results by grade: High/Primary school

In high/secondary school grades, quality of AM use was associated with more growth. AM students had higher SGPs, and the better AM was used, the more students grew.



About the analysis

To explore how AM use relates to growth in general math ability, we explored Accelerated Maths and STAR Maths data from the 2013–2014 school year. The sample consisted of students who both participated in the AM programme and completed STAR Maths pre- and po[3]ttests.[7] The final dataset included information for over 2.7 million st[4] dents[8] in grades 1–12.

The sample was divided into three groups:

- **Typical students**: did not use AM
- Students with **Moderate AM use**: on average, mastered 1–3 subskills per week during the course of the school year
- Students with **Best Practice AM use**: utilised AM according to research-based recommendations—on average, mastered 4 or more subskills per week during the school year

We measured student growth using **student growth percentiles**. Interpreted much like percentile ranks, SGPs range from 1 to 99, with higher values indicating more progress and 50 being typical annual growth. Scores above 50 indicate accelerated growth, a particularly important outcome for students working below grade level who need to grow faster in order to catch up.

SGPs are a widely accepted indicator of student progress used by many states for a variety of purposes including instructional decisions and accountability reports. Though easily interpreted, SGP calculations are based on a sophisticated normative-growth analysis technique that both accounts for initial performance levels and provides appropriate context to evaluate whether students are growing at a typical rate.

In addition to measuring growth, we used percentile ranks (PRs) aligned to achievement levels on the Smarter Balanced Assessment Consortium (SBAC) college- and career-readiness assessment to evaluate end-of-year performance (see Gewertz, 2014).[5] Based on their posttest PRs, students 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.

3 Pretest was first assessment taken from August–November; posttest was last assessment taken from April–July.

4 *N* = 2,708,119

5 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-NEWS16

Note: Programme use was voluntary (students were not recruited nor randomly assigned to a particular comparison group) and results should be considered correlational, not causal. While trends presented are helpful to understand patterns of growth at a high level, educators should rely most heavily on causal evidence, which generally requires an experimental or quasi-experimental design. Such evidence is currently available for Accelerated Maths (see *Research base*, below).

Individualised practice with Accelerated Maths™

Accelerated Maths software helps teachers personalise dynamic math practice for both grade-level standards (whether Common Core or state-specific) and foundational skill development, grouping students according to STAR Maths interim assessment data. Teachers monitor progress and manage assignments to effectively differentiate instruction and move each student toward deep standards mastery.

Research base: AM™ stands out

Currently, the research base supporting AM comprises 100 studies, of which there are:

- 33 experimental or quasi-experimental studies (generally considered the strongest designs)
- 22 studies published in peer-reviewed journals
- 90 studies led independently

AM is one of the most heavily researched educational programmes in the world. Causal studies, peer-reviewed articles, and independent evaluations support AM's effectiveness.

The following are examples of independently conducted, peer-reviewed experimental studies of AM:

- Nunnery and Ross (2007) found higher test scores for students in Texas could be attributed to AM, and better use led to larger gains.[6]
- Ysseldyke and Bolt (2007) found students from more than 100 elementary and middle school classrooms whose teachers used AM as intended had greater gains on two standardised tests than students with limited or no AM use.[7]
- Ysseldyke and Tardrew (2007) found that students in grades 3–10 had increased achievement while using AM, with gains 7–18 percentile points higher than comparison students.[8]

Independent technical reviews

In addition to its large body of research support, AM has received favorable reviews from notable independent organizations:

- **National Dropout Prevention Center/Network (NDPC/N)**: AM has "strong evidence of effectiveness" for prevention and intervention (http://www.dropoutprevention.org/modelprograms/show_program.php?pid=307).
- **National Center on Intensive Intervention (NCII)**: AM is a highly rated Mastery Measure included in the review of Progress Monitoring Tools (http://www.intensiveintervention.org/chart/progress-monitoring-mm).
- **National Center on Student Progress Monitoring (NCSPM)**: AM meets the technical standards of a progress monitoring tool (http://doc.renlearn.com/KMNet/R004100821GG6E03.pdf).

6 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.

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

8 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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