



Evaluation Brief ST Math Pilot ~ Student Outcomes

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This report is an addendum to a previous brief – “Dreambox and ST Math Pilots—Preliminary Findings.” The preliminary findings were reported on April 1. At that time, student outcome data was unavailable. Stepping Stones Quarterly Assessments were administered during the months of February and April, and school level data was uploaded into the AIMS system at the close of the school year, making the analysis possible at that time. Dreambox, however, did not provide end-of-year student usage data to researchers, despite several requests, and data from several schools was removed or otherwise unavailable from the Dreambox website. As a result, this brief addresses only the outcomes of students using ST Math. It is important to note that the pilot was very brief in duration; therefore multiple factors besides program usage may have effected student outcomes.

Background

ST Math was piloted in 13 APS schools during the spring semester of the 2014-15 school year. Usage varied widely between schools and classrooms, both in terms of which students used the program, and for how long. Despite the very short timeframe of the pilot, researchers did find a positive correlation between ST Math usage and scores on the Spring administration of the Stepping Stones Quarterly Assessment (QA) for grades K-5. (Due to the small number of middle school students who used ST Math during the pilot, only elementary students were included in this analysis). Students at participating schools who did not use ST Math were used as the comparison group.

Key findings

- ST Math users scored higher on the Spring QA and saw greater growth from their Winter to Spring QAs than did their non-user counterparts.
- Furthermore, when grouping students by performance levels based on their Winter QA scores, ST Math users performed better within each level compared to non-users. The largest statistically significant gains were found among high users who began at the lowest performance level (Beginning Steps). On average, those students saw a gain of 33.6 percentage points between their Winter and Spring QAs.
- Findings revealed a trend of Special Education (SPED) ST Math users and English Language Learner (ELL) ST Math users gaining more percentage points from Winter to Spring than did their non-user counterparts. These findings were not statistically significant, but that may be a function of the small number of students in these groups.

Detailed Findings

All Users Compared to Non-Users

The Stepping Stones Winter Quarterly Assessment was administered in February 2015, around the time the ST Math pilot began (or in some cases, a few weeks after). Initial scores on the Winter administration of the test were not statistically different between ST Math user and non-user groups. Scores on the Spring administration were, however, statistically different between groups, with users scoring higher on average (72.1% correct compared to 68.7% correct). In addition, ST Math users gained an average of 4.5 percentage points from Winter to Spring, while non-users gained an average of 1.6 points (see Table 1).

Table 1. Mean Scores by Percent Correct, Winter and Spring Quarterly Assessments

	Mean Score: Winter QA	Mean Score: Spring QA*	Average Gain in Percentage Points*
ST Math Users (n=2139)	67.6%	72.1%	4.5
Non-Users (n=1817)	67.2%	68.7%	1.6

*Statistically significant (p value < .01)

Outcomes by Performance Level and Usage Level

Students were identified by the following performance levels, based on their Winter QA scores: Beginning Steps, Emerging, Basic Proficiency, Proficient, and Advanced. There was a trend across all performance levels indicating that ST Math users gained more points on average from Winter to Spring than did non-users (or in the case of Proficient and Advanced students, ST Math users lost fewer percentage points). This finding was statistically significant for students at the Emerging, Basic Proficiency, and Advanced levels (see Table 2).

Table 2. Gain in Percentage Points, Winter to Spring Stepping Stones Quarterly Assessments

Student Performance Level	Mean Gain in Percentage Points from Winter to Spring QA:	Mean Gain in Percentage Points from Winter to Spring QA :	Difference in Means between Users and Non-Users
	ST Math Users	Non-Users	
Beginning Steps (n=312)	22.6	21.2	1.4
Emerging* (n=562)	14.8	11.4	3.5
Basic Proficiency* (n=1093)	9.4	4.3	5.1
Proficient (n=1186)	-.7	-2.4	1.6
Advanced* (n=803)	-8.4	-11.2	2.8

*Statistically significant (p value < .05)

In addition, students were grouped into user levels based on their percent progress within the ST Math curriculum for their assigned grade level. Usage levels were as follows: Low (0.1% – 7.6% progress, n = 675), Medium (7.7% - 17.6%, n=730), and High (17.7%-100.0%, n=734), with a mean usage of 17.0% progress for all users.

Findings by usage level were not statistically significant, with the exception of high users compared to other users and non-users within the Beginning Steps performance level. Those students saw growth of 33.6 percentage points on average, compared to 21.2 points growth for non-users (see Table 3).

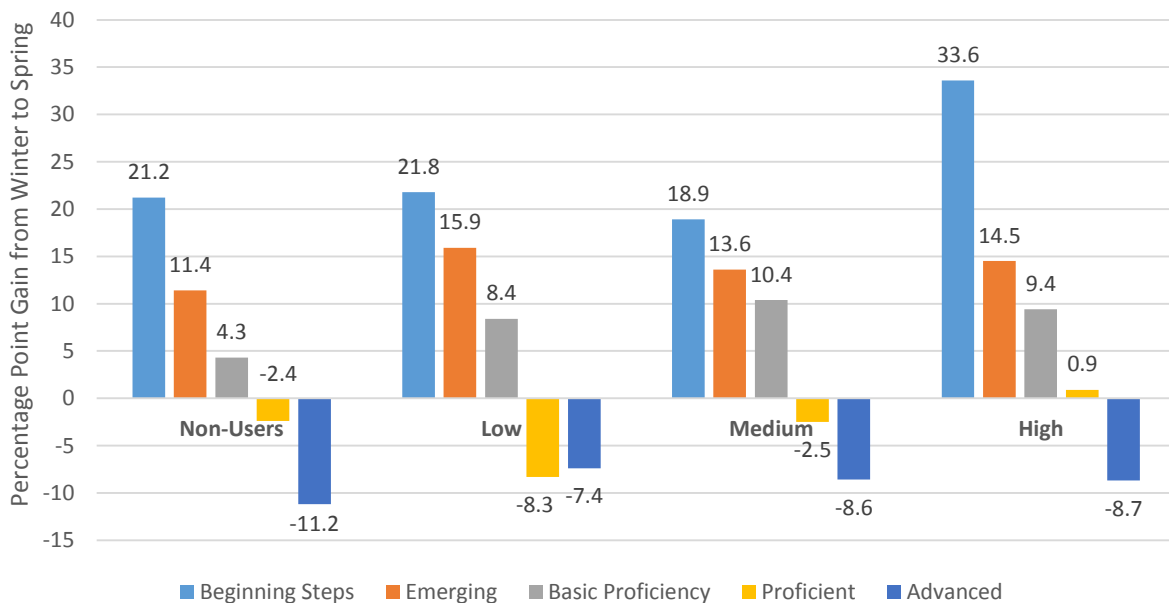
Table 3. Gain in Percentage Points by Usage Level for Beginning Steps Students

ST Math Usage Level – Beginning Steps	Mean Gain in Percentage Points, Winter to Spring QA
High (n=25)	33.6
Medium (n=54)	18.9
Low (n=93)	21.8
Non-Users (n=140)	21.2

*Statistically significant (p value < .02)

Although results by program usage in the other performance levels were not statistically significant, they still suggest a rough trend across most performance levels that with more ST Math usage, there is a greater gain in percentage points (or a smaller loss).

Figure 1. Gain in Percentage Points, Winter to Spring Stepping Stones Quarterly Assessments, by Usage Level



Special Populations

Although not statistically significant, trends indicate that SPED and ELL students using ST Math had greater gains from Winter to Spring than did non-users (see Table 4).

Table 4. Gain in Percentage Points, Winter to Spring Stepping Stones Quarterly Assessments, for Special Populations

	Mean Score: Winter QA	Mean Score: Spring QA	Average Gain in Percentage Points
SPED ST Math Users (n=115)	53.3%	58.6%	5.3
SPED Non-Users (n=119)	53.1%	54.9%	1.8
ELL ST Math Users (n=228)	53.0%	61.8%	8.8
ELL Non-Users (n=353)	60.7%	66.5%	5.8

Research Limitations

These findings are promising, indicating that usage of ST Math did in fact effect students' growth from Winter to Spring in terms of their Stepping Stones Quarterly Assessment scores. There are, however, important caveats to keep in mind. These include the following:

- Students were not assigned to treatment or non-treatment groups. At some schools, the administration determined how to implement the pilot (whether ST Math would be used with all students, or only those needing Tier 1b or Tier 2 interventions), while at other schools, teachers made that decision individually. Participation was optional; not all teachers participated, and classrooms started and ended their program usage at different points in the year.
- The pilot was very short in duration; there were other factors that may have impacted student scores besides ST Math usage.

If ST Math is adopted by APS, it is advisable to conduct a more in-depth analysis using a full year's worth of data.