Rapid Cycle Pilots:
Summer Ed-Tech Programs

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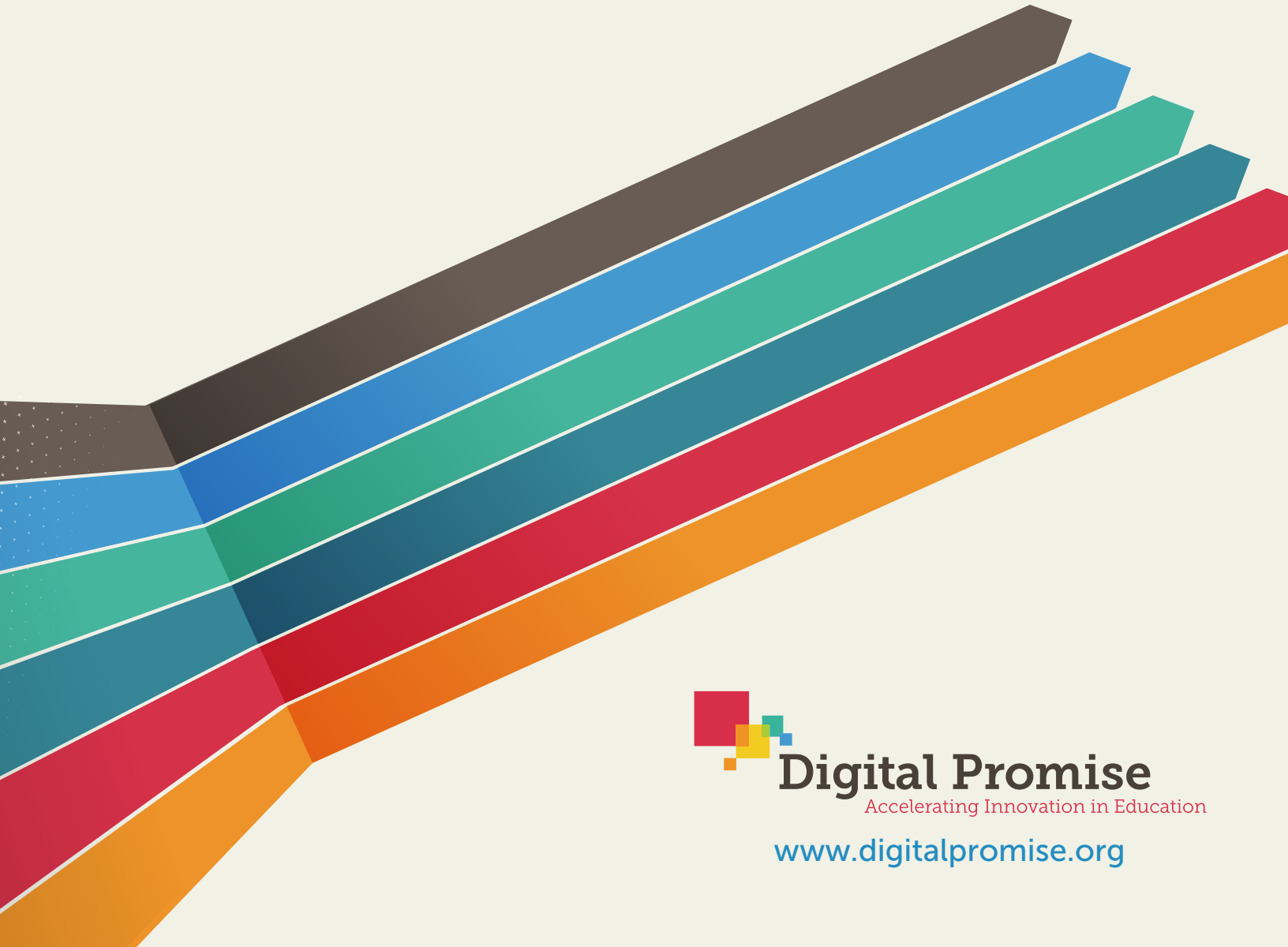

Digital Promise
Accelerating Innovation in Education
www.digitalpromise.org

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Introduction

Most students lose about two months of grade level equivalency in math, and low-income students lose more than two months in reading achievement during summer break[1]. In addition, differences in summer learning opportunities, including access to enrichment and learning programs, account for half the achievement gap[2].

Some districts have begun experimenting with providing students access to technology and research-based apps over the summer as a way to reduce this learning loss. While the research on virtual summer learning programs is limited, some preliminary pilots suggest that access to learning tools can help extend students' learning over the summer[3].

To further investigate this question, Digital Promise, with support from the Overdeck Family Foundation, performed three short-cycle evaluations of education technology (ed-tech) products during the summer of 2016.

Digital Promise conducted these studies to:

1. Develop a step-by-step process for districts seeking to conduct their own evaluations, and
2. Identify best practices for effectively leveraging ed-tech tools to curb summer earning loss.

School District and Product Selection

In April 2016, Digital Promise invited school districts from the League of Innovative Schools to participate in a study to determine whether students who use ed-tech tools experience less summer learning loss than their peers. In order to participate, districts needed to have the ability to send web-enabled devices home with students over the summer break.

The three school districts that engaged with Digital Promise in this study were guided through an initial discussion about their instructional priorities and what they hoped to learn from the study. All districts were interested in finding engaging ways to help students at risk of falling behind over the summer review their skills. Rather than try a completely new ed-tech tool with students over the summer, each district chose to implement a tool their teachers and students used during the regular school year (see Table 1 for more information on each district).

1 Cooper, H., Nye, B., Charlton, K., Lindsay, J., & Greathouse, S. (1996). The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. REVIEW OF EDUCATIONAL RESEARCH, 66(3), 227-268.

2 The Achievement Gap. (2016). National Summer Learning Association http://www.summerlearning.org/wp-content/uploads/2016/06/AchievementGapInfographic.pdf

3 How a Breakthrough School Beat Summer Learning Loss. (2015). Citybridge Education. http://www.citybridgefoundation.org/how-a-breakthrough-school-beat-summer-learning-loss/

Program and Product Implementation

Table 1:

District Information

School District	Elizabeth Forward, PA	Kettle Moraine, WI	Vista Unified, CA
Product	*Amplify Games and eSpark*	*TenMarks*	*Mathspace*
Students (n)	18	147	27
Teachers (n)	2	2	1
Grade Level	3rd and 6th	6th to 8th	7th
Duration	July 11-August 18	June 13-August 15	July 11-August 15
Pilot Goal	Ease transition from 2nd to 3rd and 5th to 6th grades for students at risk of summer learning loss in reading.	Maintain math knowledge over the summer for middle school students who opt into the program.	Determine whether providing students access to technology devices and ed-tech programs improves math learning for students at risk of summer loss.

Since teachers and students knew how to use each tool, professional development was not needed. Districts provided funding to support educators in designing the virtual summer programs, and if desired, to host a limited number of in-person events to support and encourage students' use of the tools.

Districts took different approaches in how they chose to engage students over the summer. In Kettle Moraine, teachers held three optional open house sessions for students to get in-person help, but attendance was low. Elizabeth Forward held an optional culminating event to recognize students who participated, and although event attendance was high, the majority of students had not engaged with their ed-tech tools regularly. Vista did not host any in-person sessions for students over the summer.

The duration of the studies and number of student participants also varied across districts. Because Elizabeth Forward and Vista experienced delays with distributing devices, their programs were limited to roughly five weeks in duration and participation was lower than they anticipated. In Kettle Moraine, interest in the program was more robust and the program lasted nearly two months.

Student Demographics

Elizabeth Forward

Elizabeth Forward is a small, suburban district outside of Pittsburgh, PA. The district serves 2,400 students and 40 percent qualify for free or reduced lunch. For the summer learning study, 11 rising 6th grade students used one tool and seven rising 3rd grade students used another, and two teachers participated.

Kettle Moraine

Kettle Moraine is a small district in Wales, Wisconsin. The district serves over 4,000 students across 10 schools. For this pilot, there were 147 6th-8th grade student participants; 6.8 percent received free or reduced price lunch, and 9.5 percent had a disability. In this district we obtained NWEA MAP Scores from a large comparison group of middle schoolers who did not receive access to TenMarks as part of the pilot. This group of 730 middle school students was demographically similar to the participant group.

Vista

Vista Unified School District is a large district in southern California. It serves 22,000 students across 29 schools. More than half of the students in Vista speak a language other than English at home and 87 percent qualify for free or reduced lunch. For this pilot, 27 rising 7th grade students and one teacher participated.

Methodology

Instruments and Data Collection

Digital Promise sought to capture changes in teacher and student knowledge, attitudes, and skills over the course of the pilot implementation period. Using student and parent surveys, teacher and administrator interviews, product usage data, and existing student learning measures (i.e., NWEA MAP and STAR benchmark scores, see Table 2), we gathered information before and after students used the ed-tech product.

Table 2:
Data Collection Measures

District	Student Knowledge	Student Skills and Attitudes	Student Engagement	Teacher Attitudes
Elizabeth Forward	NWEA MAP end of year and beginning of year scores	Student pre-post survey	Student pre-post survey; product usage data	Teacher interviews
Kettle Moraine	NWEA MAP end of year and beginning of year scores	Student pre-post survey	Student pre-post survey; product usage data	Teacher interviews
Vista	STAR end of year and beginning of year scores	Student pre-post survey	Student pre-post survey; product usage data	Teacher interviews

The student surveys, administered online in mid-June and late August, gathered self-reported skills and attitudes about learning and technology, and engagement with the ed-tech program(s). The online parent surveys, teacher and administrator interviews, and product usage data were all gathered in August at the end of the summer programs. The usage data included information about the amount of time students devoted to the tool and the learning progress made. Student benchmark scores from the end of the year (administered in May) and the beginning of the year (administered in September) were compared to determine changes in student learning over the summer.

Because these pilots were conducted remotely and students were responsible for completing activities and surveys at home, we experienced some difficulty maintaining compliance over the summer. For example, we started the pilot in Kettle Moraine with 147 students and obtained MAP data for 139, product usage data for 134, and survey data for 112. However, student identification numbers were inconsistent across data sources, presumably because of student entry errors, so we ended with a complete data set for only 53 students.

Analysis

For each of the three quantitative outcome measures —assessments, student surveys, and product usage data — we used descriptive statistics to look at group-level trends and changes from pre to post. Where comparison groups were not available (Elizabeth Forward and Vista), we performed t-tests on pre and post scores to determine whether or not there was a significant difference in scores. In Kettle Moraine, we generated a matched comparison group using one-to-one without replacement, where each participant was matched with a comparison group student of the same grade and gender. Then we constructed a linear model to predict score changes on the NWEA MAP (for treatment v. comparison groups), controlling for baseline score, grade, gender, race, and free/reduced-price lunch status.

Reporting

Our goal was to provide districts with information about both the summer program's implementation and the ed-tech product in use. Each district received a case study report identifying changes in teacher and student attitudes and learning over the course of the study.

In addition, we produced product briefs for each pilot; these are available at edtech.digitalpromise.org, and in Appendix A.

District Results

Student Knowledge

In one district, there were statistically significant gains from the end-of-year to beginning-of-year benchmark assessments for students engaged in the summer learning program. Students' scores were not significantly different in the other two districts (see Figure 1).

As noted previously, Kettle Moraine was able to provide a comparison group, so additional analysis was possible (see Table 3). The analysis showed that the summer program had no effect on participants' learning.

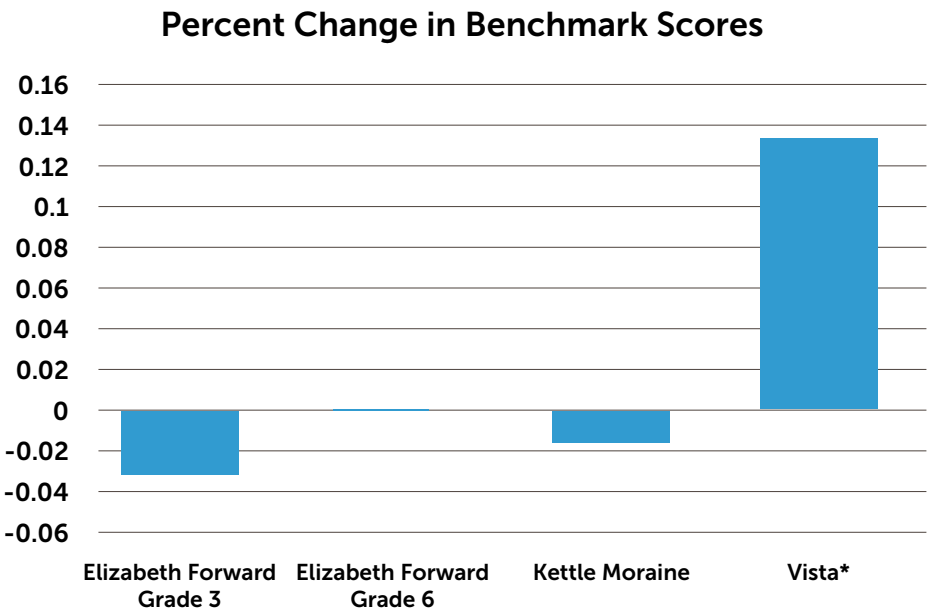

Figure 1:

Changes in benchmark scores (May to August)

*Note: * indicates statistical significance at p < 0.05.*

Table 3:

Kettle Moraine Matched Comparison NWEA MAP scores

Mean Scores at Baseline (May) and Follow-up (August)

	Number of Students	Spring 2016	Fall 2016
Mean Scores- Pilot Participants	139	233.3 (14.8)	229.1 (16.0)
Mean Scores - Control Group	668	237.1 (15.2)	234.8 (15.8)

Student Attitudes

Digital Promise captured changes in student attitudes through pre-post surveys, teacher interviews, and in one district, parent surveys. After the summer program, students reported feeling much more excited to learn, ready to try hard to complete projects, and confident in their problem solving abilities (see Figure 2). While the summer learning program may have contributed to their increased motivation and confidence, summer vacation in general may also have improved students' feelings about learning and school.

Engagement

Digital Promise measured changes in Student Engagement through surveys and interviews, program retention and attendance data, and product usage information. Each district's virtual summer learning program had fewer participants than organizers had hoped. Recruiting students to participate and gathering parent permission proved difficult in each district. Both Elizabeth Forward and Vista enrolled 50 percent of the number of students they hoped to recruit. Kettle Moraine was able to recruit the expected number of students, but regular participation was low and fewer than a dozen students attended the optional in-person meetings.

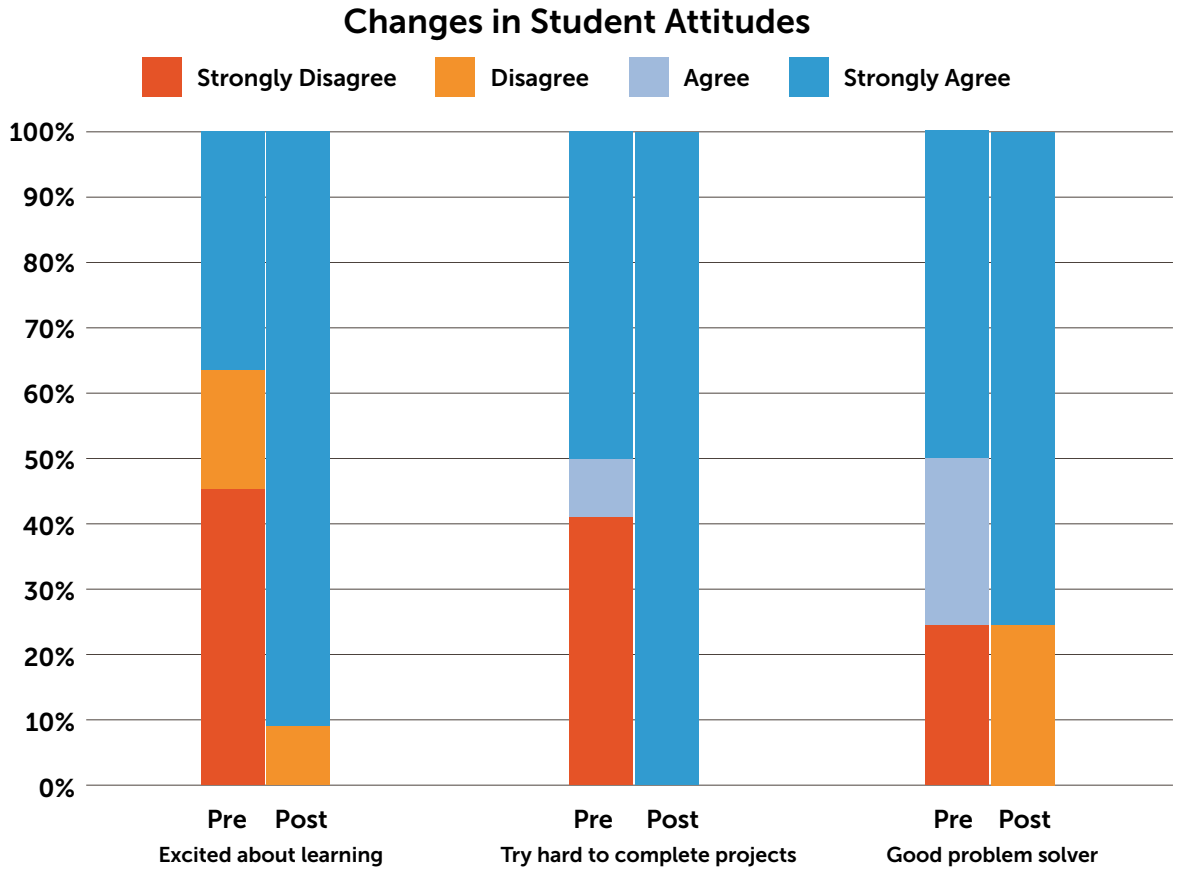

Figure 2:

Changes in student attitudes about learning, pre-post

**Note: All changes significant at the p < 0.05 level.*

Some parents felt strongly that summer vacations were important breaks for their students and did not want to encourage more screen time during those months. Others had concerns about the liability of taking a school-owned device home for the summer.

Students were encouraged to use their assigned educational tool for a minimum amount of time (roughly three hours per week). However, few students maintained the minimum level of engagement throughout the summer. As one teacher in Kettle Moraine said, "The program was too flexible. When we looked at how many students were in the program compared to how many actually did the work, it was very small." In some cases, students spent less than an hour all summer using their ed-tech tool.

For instance, students at Kettle Moraine engaged with TenMarks for an average of 54 minutes per week over 11 weeks in the summer, which is less than a third of the recommended three hours per week (see Figure 3). In addition, usage declined from week to week, suggesting that student motivation dwindled as time passed. Despite that, the number of active weekly users of TenMarks remained relatively stable throughout the summer (see Figure 4).

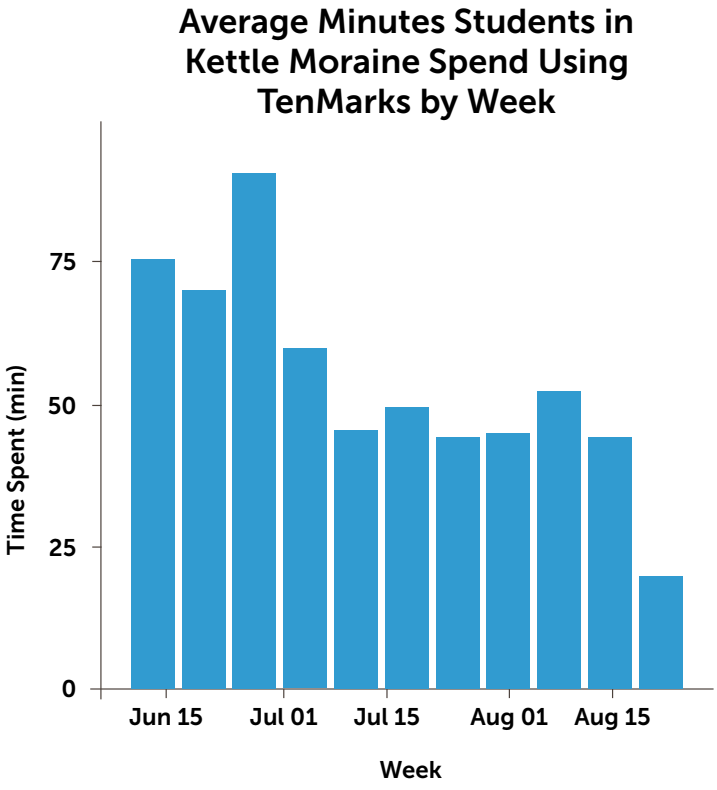

Figure 3:
Average student engagement with TenMarks

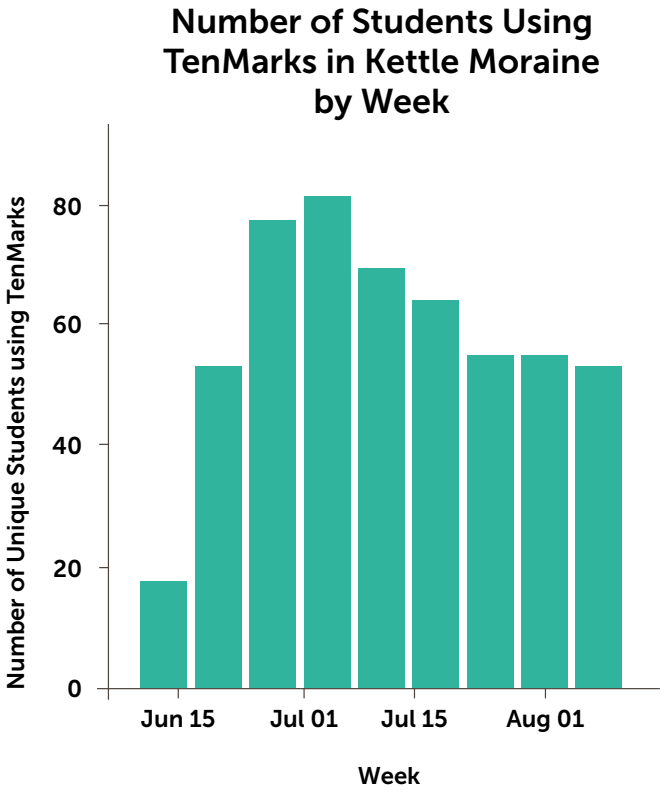

Figure 4:
Number of unique active students per week

Students in Vista struggled to maintain usage as well. Only a quarter of students reported using Mathspace for at least six of the seven weeks in the program (see Figure 5). In addition, half of students engaged with the tool for less than one hour a week (see Figure 6). Although Vista students showed modest learning gains, it is possible that learning may have improved even more, had students used the tool for longer time periods.

Teachers at each site struggled to motivate students to complete assignments. In Elizabeth Forward, students who met the minimum participation threshold were offered tickets that could be used for rewards, including technology accessories such as ear buds. This incentive seemed to work well, as Elizabeth Forward students came closest to meeting the minimum engagement hours.

Despite their higher engagement compared to peers in other districts, logins for Elizabeth Forward students decreased dramatically over the five week summer program (see Figure 7).

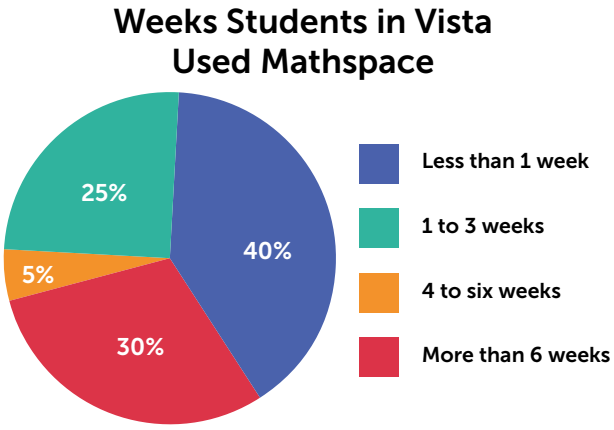

Figure 5:
Weeks students spent using tool

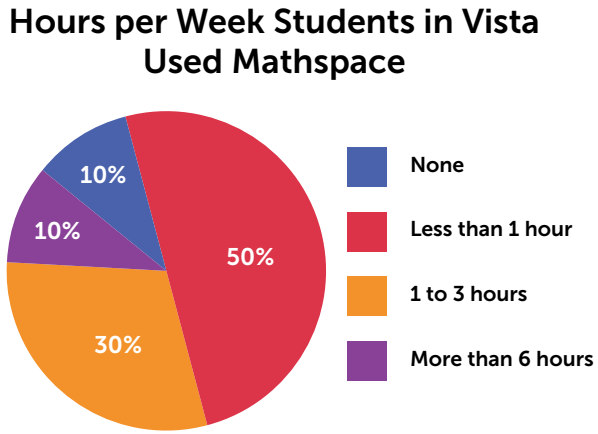

Figure 6:
Hours per week students spent using tool

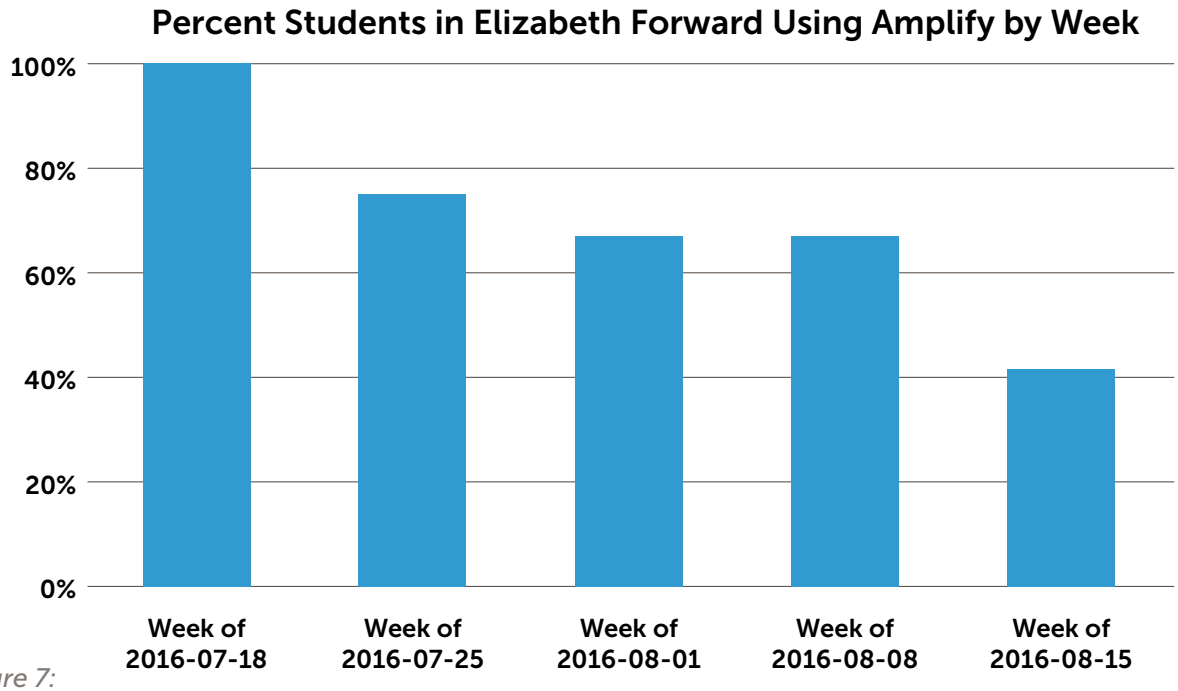

Figure 7:
Students using tool each week

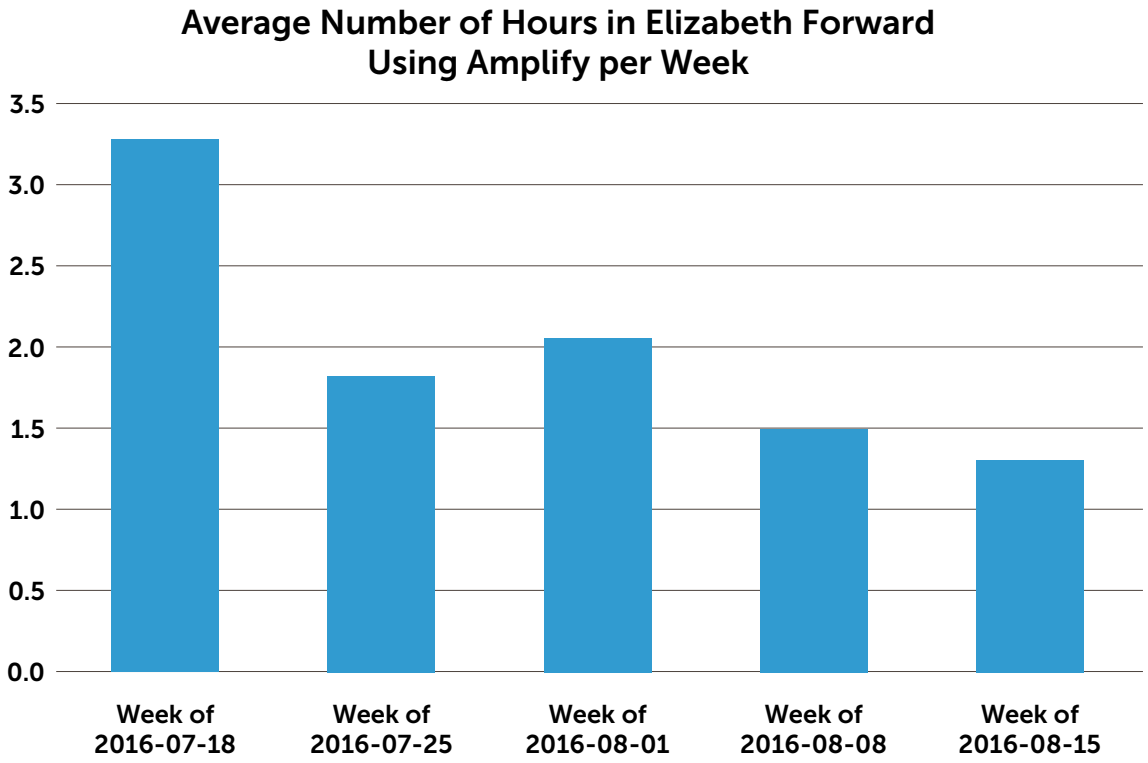

Figure 8:
Hours per week students spent using tool

In addition, among students logging into the tool, the amount of time using the tool each week decreased from close to 3.5 hours to just over one hour a week by the end of the summer (see Figure 8). These low rates of usage may have contributed to the lack of gains in student learning.

Despite some parents' reluctance to enroll their students in the program, and other parents' limited engagement with motivating learners, a dozen parents reported that they liked that students had access to educational tools, and most felt the programs helped their students think about learning over the summer. While a few parents said it was difficult to motivate students the majority were positive about the experience. A parent from Elizabeth Forward said, "My child was very attentive to the program and enjoyed taking part. I like the idea of keeping students abreast in a fun way for just a few hours a week so they have an easier transition back to school."

Teacher Feedback

The teachers who coordinated the summer learning programs thought the ed-tech tools had the potential to be effective, but that it was very challenging to motivate students to participate without in-person meetings. They would have liked more support from parents, more time with students, or both. One teacher observed, "To make a summer program a success, you have to start early and change the mindset of the community. People here feel like summertime is off-time from learning."

Because most districts waited until school was nearly over to promote the program, there was not enough time to get students and families interested in the opportunity. For this reason, all teachers agreed it would have been better to start the program earlier. Further, one teacher observed that the district's more popular summer programs included live meetings that, in some cases, provided lunch to students.

Particularly in low-income areas, the extra incentive of a school lunch meal in the summer could encourage families to participate.

Despite the challenges with parent and student engagement, teachers appreciated the opportunity to help familiarize students with ed-tech tools they would be using during the coming school year. Teachers were optimistic about the opportunity for students to review content over the summer, even if engagement was lower than expected. For instance, one teacher said, "Even the students who have used the tool sporadically will come back a few steps ahead of their counterparts who haven't. Their brain hasn't shut off the math. Even those who do some things just before school starts will get back into the groove in time to perform better as they transition into school." They felt strongly that the ed-tech programs themselves were effective learning tools, but that changes were needed in the program implementation.

Process Results

Districts learned important lessons about conducting digital summer learning programs. Specifically, districts reported key takeaways related to parent involvement, program recruitment, technology support, and blended learning models.

Parent Involvement

Teachers from every district cited limited parent involvement as a challenge. Since all the programs were entirely virtual, parents (rather than teachers) were responsible for holding students accountable for completing assignments. One teacher observed that, "A lot of parents have great expectations of doing summer learning and then the summer gets busy. This was free and they had nothing invested." Without parent involvement to encourage students to keep up with assignments, students fell behind and, in some cases, neglected to log into the learning programs for weeks.

Parent involvement is also essential at the recruitment phase. Many parents did not initially want their students to participate in a virtual learning program over the summer. With clear communication in the spring, long before the school year ends, districts could better prepare parents and respond to their concerns.

Program Recruitment

Two districts recruited specific students to participate in the virtual learning program. These students had struggled with summer learning loss in the past, but were also motivated learners. In creating a restricted pool of student participants, those districts limited themselves to a very small number of users. On the other hand, the third district offered the opportunity to any interested student. In this district, engagement was low and not all students understood the program's expectations. Although there were advantages and disadvantages to both strategies, districts recommend keeping the program enrollment as open as possible and requiring students to commit to clear program expectations.

Technology Support

Since the programs were entirely virtual and asynchronous, it was difficult to resolve students' technical challenges. When issues with logins, forgotten passwords, or internet connectivity cropped up, it could take several days for districts to resolve them. To alleviate these problems, districts recommend starting summer programs before the school year ends, so teachers and tech staff can help students set up accounts and become comfortable using the tool.

Blended Learning Model

Educators agreed that it was nearly impossible to monitor student engagement and motivate young learners during the summer without regular in-person meetings. Several teachers noted that face-to-face interactions are also meaningful for social reasons, and could help make the experience feel less like review and more like a fun summer game. One teacher suggested a blended model that might include weekly physical check-ins to hold students and parents accountable, and offer opportunities to distribute prizes or other incentives. Each district plans to explore ways to incorporate blended learning experiences in future summer programs.

Conclusion

The limited time students spent using their assigned ed-tech tools suggests that the program's implementation, and not necessarily the tools themselves, led to largely stagnant results for student learning.

Qualitative data from student and parent surveys and teacher interviews suggest that technology-enhanced summer learning loss programs are worth pursuing, but more frequent in-person interaction is needed. This recommendation aligns with The Wallace Foundation's finding that the most successful summer learning programs make learning fun and stimulate students through hands-on experiences[4]. Summer learning programs that blend technology use with in-person interactions could increase student engagement and lead to improved outcomes for students.

In addition to incorporating in-person sessions, educators also recommended a districts provide clear information to parents earlier in the spring in order to improve recruitment efforts and set clear expectations for participants. They also suggest finding ways to make the experience fun for student participants, so it sparks their creativity and excitement.

Given the limitations of this study, and the lack of research on technology and summer learning loss, it is still unclear whether virtual ed-tech programs can prevent summer learning loss. However, our findings suggest a blended approach that combines virtual practice with live interaction and collaboration may limit summer learning loss. This aligns with the research that shows the effectiveness of in-person summer learning programs[5].

Districts implementing summer learning programs using ed-tech tools may want to consider ways to deliver a more structured, blended program that includes in-person meetings with educators. Additionally, districts should consider implementing ed-tech products with features that are fun and engage students in collaboration and interaction. While it may be easier to use ed-tech tools students and teachers are familiar with, student fatigue with curricular products is a potential risk.

4 Terzian, M., Moore, K.A., Hamilton K. (2009) "Effective and Promising Summer Learning Program Approaches for Economically-Disadvantaged Children." Wallace Foundation. http://kflickcurriculumdevelopmentaction.pbworks.com/f/Summer+Learning+Program+for+ED+Children+and+Youth.pdf

5 Cooper, H., Nye, B., Charlton, K., Lindsay, J., & Greathouse, S. (1996). The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. REVIEW OF EDUCATIONAL RESEARCH, 66(3), 227-268.

Acknowledgements

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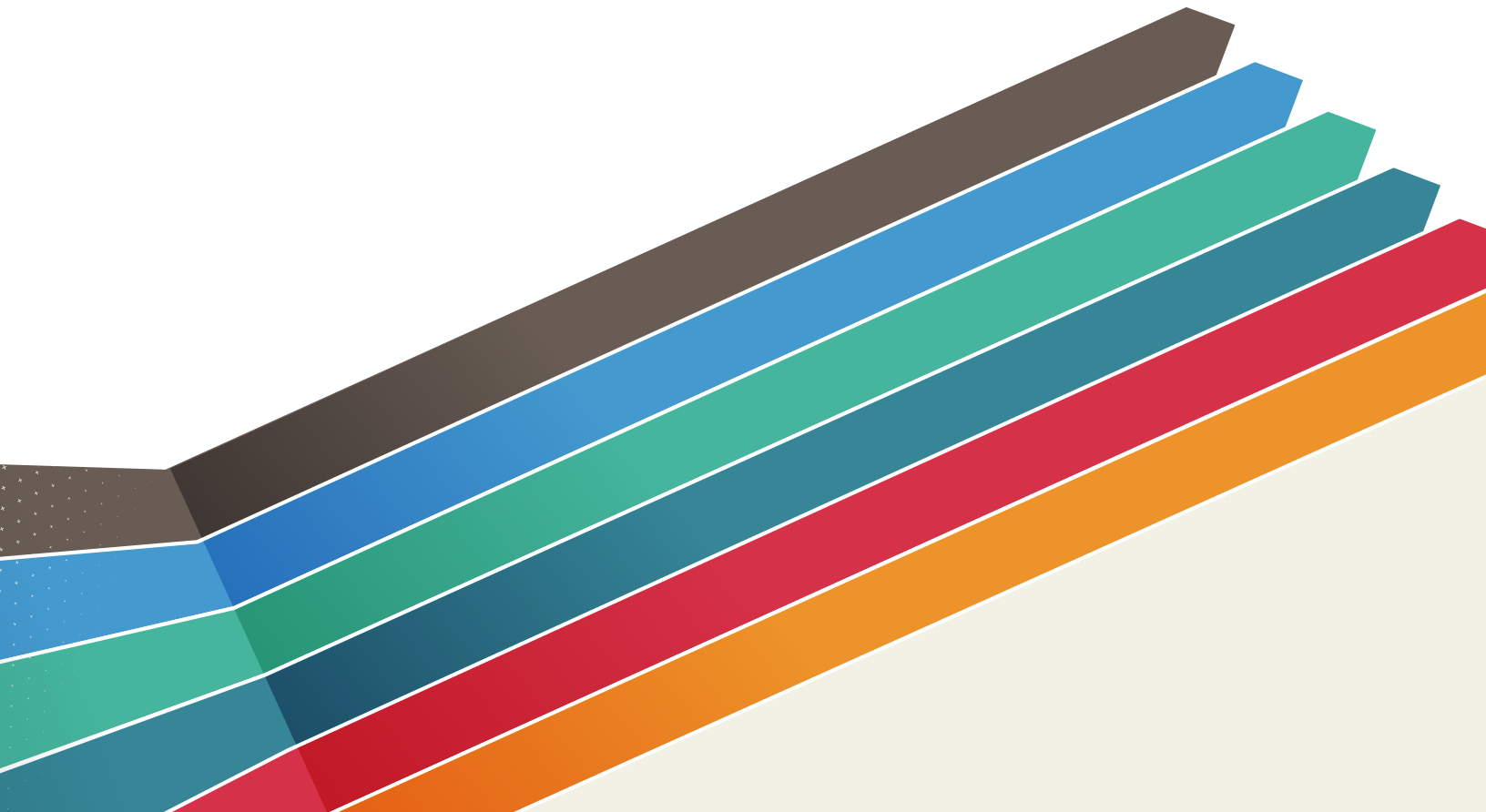

Appendix A:
Pilot Study Briefs

Amplify Games
Summer Learning Study Brief

Product Description

A suite of more than 30 games that help strengthen skills in ELA, math and science, along with an integrated digital library of more than 600 books

Learning Focus: Middle school reading and math

Student Usage Minimum: Flexible

Device Specifications: Web-enabled iPads

District Context

District demographics: 2,400 students served; 40% Free/Reduced Lunch suburban Pittsburgh; 1:1 computing since 2013

Pilot demographics: 11 rising 6th grade students, 1 teacher, 1 middle school

Pilot Goal

Ease transition from 5th to 6th grade for students at risk of summer learning loss in reading.

Implementation Plan

Duration: July 11-August 18, 2016

Quality of Support: The educator leading the implementation had already used Amplify during the previous school year, so no professional development was offered. The educator was enthusiastic about this paid summer assignment and felt supported by administrators.

Implementation Model: Students were assigned to use Amplify Games 30 minutes a day at home to practice literacy skills and prevent summer learning loss. Amplify Games have been shown to improve student engagement with learning but are not meant to serve as core curricular learning tools.

Data collected: Student pre-post online surveys, teacher interviews, parent surveys, pre-post benchmark student learning data, and product usage data,

Findings

Actual implementation: None of the students met the recommended usage goal of 30 minutes daily. Students engaged with Amplify Games for two hours each week on average.

Educator engagement: The educator monitored student usage and sent reminders to students via email, encouraging them to practice. Students who exceeded expectations

for usage were awarded tickets which could be exchanged for rewards at an end-of-summer celebration.

Educator satisfaction: The educator was satisfied with the support received from Amplify Games, which included updates about student usage and ideas for how to incentivize student usage.

Student engagement: The educator attributed students' low usage to the virtual-only program model, not deficiencies in the tool itself. In the future, the district plans to offer a blended summer learning model to encourage students to collaborate and meet in person at regular intervals.

Student satisfaction: Students enjoyed using the program and showed statistically significant gains in their attitudes about learning from the beginning to the end of the summer.

Outcome

Student learning: The change in student reading benchmark scores from May to August was not statistically significant. Scores neither increased nor decreased in a meaningful way.

eSpark
Summer Learning Study Brief

Product Description

Source of third-party apps, videos, and quizzes curated to help them learn and practice skills in math and reading.

Learning Focus: Reading and Math

Student Usage Minimum: 30 minutes a day

Device Specifications: web-enabled iPads provided by school

District Context

District demographics: 2,400 students served; 40% Free/Reduced Lunch suburban Pittsburgh; 1:1 computing since 2013

Pilot demographics: 7 rising 3rd grade students, 1 teacher, 1 school

Pilot Goal

Ease transition from 2nd to 3rd grade for students at risk of summer learning loss in reading.

Implementation Plan

Duration: July 11-August 18, 2016

Quality of Support: The educator leading the implementation was familiar with eSpark after using it during the school year. She felt ready to implement it, supported by administration, and excited to take on this summer program responsibility.

Implementation Model: Students were assigned to use eSpark for reading 30 minutes per day throughout the summer.

Data collected: Student pre-post online surveys, teacher interview, pre-post benchmark student learning scores, and product usage data.

Findings

Actual implementation: Students did not meet the minimum usage threshold. They were not able to collaborate with others or share their learning synthesis directly with an instructor.

Educator engagement: The educator monitored student use and sent reminders to parents if students were not using the tool for the recommended amount of time but it was difficult to monitor quest completions virtually.

Educator satisfaction: The educator was satisfied with the tool, but found it challenging to implement virtually because it was new to students. Additionally, while exposing students to a program they will use throughout the school year might be beneficial, the educator

worried that students might be bored with the tool by the time school started.

Student engagement: Students did not use the tool as much as expected, but evidence suggest this was not because of the tool, but rather the lack of in-person contact with peers and an educator during the summer months. However , parents did report that students were more prepared for the beginning of the school year after using eSpark over the summer.

Outcome

Student learning: While student learning increased over the summer, the change was not statistically significant. eSpark may have contributed to student learning, but because of the small number of participants, limited usage, and lack of a comparison group, it is difficult to draw a link between the tool and student outcomes.

Mathspace
Summer Learning Study Brief

Product Description

Adaptive math program that offers step-by-step feedback to students as they complete problems

Learning Focus: Grades 5-12 mathematics

Student Usage Minimum: 30 minutes, 3 times a week

Device Specifications: web-enabled iPads provided by school

District Context

District demographics: 22,000 students served by 1,100 teachers across 29 schools. Two-thirds of students identify as Hispanic, and 55% speak English at home.

Pilot demographics: 27 rising 7th grade students participated; 87% qualified for Free/Reduced Lunch; 42% speak English at home. One teacher and one middle school participated.

Pilot Goal

Determine whether providing students access to technology devices and ed-tech programs improves math learning for students at risk of summer learning loss.

Implementation Plan

Duration: July 11-August 15

Quality of Support: Professional development was not offered to the educator leading the implementation because she had already used the tool during the school year.

Implementation Model: Students were encouraged to use Mathspace for 30 minutes, 3 times a week.

Data collected: Pre-post student online surveys, teacher interview, and pre-post student benchmark learning data.

Findings

Actual implementation: Students did not consistently engage with Mathspace for the minimum recommended amount of time.

Educator engagement: The educator sent email reminders to students who were not actively using the math program. The summer program was exclusively virtual and there were no in-person help sessions or celebrations during the summer months.

Educator satisfaction: The educator was not satisfied with Mathspace as a virtual summer learning program because it was not highly engaging or gamified, and did not encourage in-person collaboration.

Student engagement: Only half the participating students used the tool regularly, and of this group, students used the tool for less than an hour each week.

Outcome

Student learning: Despite the educator's concerns about student engagement, students who participated in the Mathspace summer learning program showed statistically significant gains in their math scores from the beginning of the summer to the end. Because participation and engagement was low, these results should be treated with caution.

TenMarks
Summer Learning Study Brief

Product Description

A web-based math curriculum built to align with Common Core and state standards.

Learning Focus: Middle school math

Student Usage Minimum: 3 hours a week

Device Specifications: web-enabled iPads provided by school

District Context

District demographics: 4,117 students; 10 schools; 91% white; 17:1 student:teacher ratio; 13% free/reduced lunch; 0.5% English Language Learners,

Pilot demographics: 145 students in 6th through 8th grades; 48% female, 94% white, 7% free/reduced lunch, 10% with disabilities; 2 teachers

Pilot Goal

Maintain math knowledge over the summer for middle school students who opt into the program.

Implementation Plan

Duration: June-August 2016

Quality of Support: The educators implementing TenMarks had already used it during the school year, so no professional development was offered.

Implementation Model: Students were asked to complete 3 hours per week of practice with TenMarks. They had the opportunity to attend three voluntary two-hour in-person sessions with teachers participating in the pilot.

Data collected: Pre-post student online surveys, teacher interviews, pre-post student benchmark learning data, product usage data, and student demographic data.

Findings

Actual implementation: Students did not use the tool as much as expected and only 20% attended one of the three in-person sessions during the summer. Students completed an average of 54 minutes per week over 11 weeks.

Educator engagement: Educators monitored student usage throughout the summer and offered technical assistance via email in between the three live help sessions.

Educator satisfaction: Educators felt the tool was a good fit for a summer learning program, but that students and parents needed more incentives to keep using the tool.

Student engagement: On average, students completed less than the minimum recommended amount of time using TenMarks.

Student satisfaction: At the end of the summer, students reported more positive attitudes about learning, and more motivation to try hard in school.

Outcome

Student learning: We found no effect of TenMarks on NWEA MAP Math scores pre and post compared to a control group who did not use the program. Because of limited student engagement, results should be treated with caution.