

LIGHTSAIL RESEARCH STUDY

SummerSail 2015



SummerSail

"The implications of this study are really profound," said Pam Allyn, the founder of LitWorld, a global literacy initiative serving children across the United States and in more than 60 countries.

"Based on Lexile growth, the research suggests the students who read on LightSail over the summer for 30 minutes or more, returned to school at a reading level projected for November versus where we'd expect to see them lose ground - this is a meaningful gain of five to eight months over the devastating 'summer slide' scenario."



Evaluation of LightSail in the New York City Department of Education:
SummerSail 2015 Program

Jennifer R. Morrison, Ph.D.
Steven M. Ross, Ph.D.
Alan C. K. Cheung, Ph.D.
Jane M. Eisinger, M.S.
Rhianna K. Toner, B.S.

Center for Research and Reform in Education (CRRE)
Johns Hopkins University

April 2016

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EXECUTIVE SUMMARY

Evaluation of LightSail in the New York City Department of Education: SummerSail 2015 Program

The purpose of the present mixed-methods study was to evaluate the implementation of LightSail in the New York City Department of Education’s Middle School Quality Initiative (“MSQI”), a focused effort to expand the number of middle schools that prepare students for college and career success, during the summer of 2015 (the SummerSail program).

LightSail’s SummerSail program was developed as a way to reverse “summer slide”¹ by giving students access to great books and engaging them in interactive reading experiences. During the program, students use LightSail at home to independently read books of their choosing and annotate texts with their thoughts, while teachers respond directly through the application. In MSQI’s implementation, students and teachers also met four times throughout the month of July to practice reading strategies, discuss books, and share experiences.

Research questions focused on three areas of interest: (a) the impact on student learning, (b) the impact on reader identity, and (c) participant perceptions of the LightSail program. Results pertaining to each will be briefly reviewed and discussed in the sections below, but in reverse order given that student and teacher perceptions directly influence program usage, which should, in turn, directly impact student learning.

Participant Perceptions

Students, teachers, and MSQI coaches overall were very positive about LightSail. Most noticed and appreciated by students was the appeal of technology and general program design that facilitated navigation. Similarly, teachers and MSQI coaches appeared to be highly satisfied with the implementation of LightSail and were generally positive towards the program both in terms of support offered and the perceived positive impact on student learning and engagement. It is expected that if MSQI schools were to implement LightSail during the school year, most students and teachers would also view the program favorably and as a valuable resource to encourage student reading. Curating robust digital libraries and ensuring instructors possessed baseline technology knowledge would likely further enhance LightSail use.

Impact on Reader Identity

The impact on reader identity, or students’ perceptions of themselves as readers, was measured through The Reader Self-Perception Scale (Henk & Melnick, 1995) at the start and end of the SummerSail program. Findings indicated there was not a significant impact of LightSail use on reader identity, and students’ scores on the survey remained relatively stable. This finding is not surprising given the relatively short duration of the SummerSail program. Further, as

¹ Students in low-income communities typically lose 2-3 months of learning during the summer months, a well-documented phenomenon known as “summer slide,” while their peers generally maintain literacy skills or grow during the same time period. Summer slide is cumulative and accounts for more than half of the achievement gap by the time students are in ninth grade (Alexander et al, 2007; Cooper, 1996).

reader identity is affected by interactions with peers, family members, and teachers (McDermott, Goldman, & Varenne, 2006), it may be unreasonable to expect a significant impact during the summer months.

Impact on Student Learning

While student usage of LightSail during the SummerSail program fell below original expectations in terms of time spent reading and the number of annotations created, students exhibited significant gains in Lexile measures through using LightSail. Importantly, Lexile growth for the three reading groups mirrored the amount of time spent reading; those students who spent the most time reading (30 minutes or more per day), had the highest gains in Lexile measures followed by the medium group and then the low reading group. The effect size² for those students reading 40 minutes or more each day during the SummerSail program was strong (.59) and those reading 30 minutes or more each day was moderate (0.37) in magnitude. These findings are quite meaningful given the duration of LightSail use (averaging 7 weeks) during the summer. In addition, the weighted average of students' Lexile growth per week was significantly higher than that of MetaMetrics "typical" growth per week as established by Williamson (2015), however, caution should be exercised in interpreting these findings due to differences in Lexile metrics and likely differences in student demographics.

Conclusions and Recommendations

Based on the findings and the foregoing interpretations, overall conclusions are:

- Teachers and MSQI coaches reacted positively to LightSail with regard to the support provided and the program's effectiveness on engaging students and positively impacting student learning.
- Student learning, as measured by the program, was positively affected through LightSail use, most notably for students reading 30 and 40 minutes or more each day. This finding supports encouraging increased reading time for students reading fewer than 30 minutes per day.

Recommendations are that the provider and MSQI leadership team should strive to:

- Curate robust digital libraries and ensure instructors possess baseline technology knowledge.
- Review strategies for the early identification of and support for LightSail readers struggling to meet the weekly time commitment.

² An effect size indicates the number of standard deviations by which the post-Lexile mean differs from the pre-Lexile mean. An effect size of +.50 standard deviations is considered a strong and highly meaningful effect.

Evaluation of LightSail in the New York City Department of Education: SummerSail 2015 Program

LightSail’s literacy application embeds instructional tools and a variety of assessment types into the texts, delivering instant, actionable data and accelerating student growth. Within the LightSail program, students access a library of digital texts on their individual devices. While reading, students respond to embedded reading comprehension assessments (multiple-choice, short-response, and cloze). Students and their teachers are able to view student progress data, including the number of books read, performance on embedded assessment items, student Lexile measures, and real-time data on reading behaviors (e.g., what book a student is reading, a student’s current reading speed). One key assessment type, the cloze, utilizes The Lexile® Framework for Reading, developed by MetaMetrics, which is a measure of an individual student’s reading ability as well as a measure of text complexity. As the student’s Lexile measure changes, the digital library for that student automatically updates to showcase “just right” texts, meaning any texts within +/-100 Lexile measures of the student’s demonstrated reading ability.

LightSail was first implemented as a summer program in 2014 within the New York City Department of Education’s MSQI as an initiative to reduce “summer slide³”. Students enrolled in the SummerSail program were provided with iPads, the LightSail literacy application, and a WiFi hotspot in order to encourage choice independent reading during the summer break. Following the success of that first summer, the program was repeated and expanded in summer 2015. This study examines the implementation of LightSail in MSQI during summer 2015. The focus of the research is to inform LightSail program developers and MSQI of the program’s impact on student achievement and participants’ perceptions of the program for broader implementation.

The research questions addressed by the study are:

1. To what degree does use of LightSail impact “summer slide”?
 - a. To what degree do students’ Lexile measures change through LightSail use?
 - b. How does the change in Lexile measures of students using LightSail compare to MetaMetrics’ average “typical” summer learning loss for middle school students?
2. To what degree does LightSail use affect student Reader Identity?
3. To what degree did students use the program?
 - a. On average, how many sessions per week, how many minutes per session, and how many weeks in total are students reading on LightSail?
 - b. How much did students annotate and answer short responses and multiple choice questions?
4. To what degree do teachers and MSQI coaches perceive the program and its strategies to be effective in supporting LightSail’s defined goals and benefiting students?
5. What are the areas of relative program strengths and weaknesses?

Method

³ Students in low-income communities typically lose 2-3 months of learning during the summer months, a well-documented phenomenon known as “summer slide,” while their peers generally maintain literacy skills or grow during the same time period. Summer slide is cumulative and accounts for more than half of the achievement gap by the time students are in ninth grade (Alexander et al, 2007; Cooper, 1996).

Design

The present study evaluated the impact of LightSail on student outcomes in rising seventh, eighth and ninth grade students (note: a rising seventh grade student just completed sixth grade) within MSQI schools. The mixed-methods evaluation design involved the collection of data including LightSail-collected data, student and teacher surveys, and a MSQI coach focus group. The sample included 17 MSQI schools that implemented the program during the summer months. LightSail was used by one classroom teacher within each of these schools at various durations, beginning as early as June 2015 and ending as late as September 2015. This report presents the findings from LightSail-collected data, the student and teacher surveys, and the MSQI focus group.

Participants

The study involved 17 schools in the MSQI program within the New York City Department of Education. These schools were selected by the MSQI team based on prior successful participation in SummerSail 2014 and during the 2014-15 school year, responsiveness, and interest in the program. Overall, the MSQI schools had high concentrations of minority students, with Hispanic (51.54%) and Black (33.47%) students comprising the majority. These schools also had a high concentration of economically disadvantaged students, with 88.81% eligible for free or reduced price lunches; five of the schools had all enrolled students eligible for this service. Demographics of students within the 17 MSQI schools are presented in Table 1.

Table 1

MSQI school demographics for the 2014-15 school year.

School	Total Enrollment	Race/Ethnicity				Free/Red. Price Lunch	English Language Learners
		White	Black	Hispanic	Other ¹		
04M007: P.S. 007 Samuel Stern	385	4.16%	28.83%	63.64%	1.56%	100.00%	13.51%
07X223: M.S. 223 The Laboratory School of Finance & Technology	502	0.60%	21.12%	77.89%	0.00%	97.01%	8.57%
07X296: South Bronx Academy for Applied Media	349	0.57%	36.68%	61.03%	1.15%	100.00%	12.32%
09X241: The Urban Assembly School for Applied Math and Science	619	0.97%	34.25%	63.33%	0.65%	93.38%	9.53%
09X361: The Highbridge Green School	269	0.37%	24.16%	74.72%	0.00%	97.77%	20.07%
10X390: M.S. 390	397	0.50%	16.62%	81.86%	0.25%	88.66%	28.46%
11X370: School of Diplomacy	234	3.85%	54.27%	35.04%	1.71%	94.44%	17.52%
12X273: Frederick Douglass Academy V. Middle School	273	1.83%	32.23%	64.47%	0.00%	93.41%	8.42%
12X383: Emolior Academy	241	1.24%	26.97%	64.73%	4.98%	84.23%	17.84%
15K088: J.H.S. 088 Peter Rouget	1252	9.82%	11.66%	59.35%	0.64%	82.19%	13.90%
16K057: J.H.S. 57 Whitelaw Reid (Ron Brown Academy)	179	0.00%	70.95%	26.26%	1.12%	100.00%	7.26%
16K385: School of Business Finance & Entrepreneurship	82	2.44%	71.95%	23.17%	1.22%	100.00%	10.98%
17K340: I.S. 340 North Star Academy	200	1.50%	85.00%	11.00%	1.00%	89.50%	1.00%
17K354: The School of Integrated Learning	226	1.33%	80.53%	13.72%	1.33%	92.48%	8.85%
22K014: J.H.S. 014 Shell Bank	549	21.49%	52.64%	14.94%	0.91%	88.34%	16.39%
27Q319: Village Academy	328	1.52%	71.34%	24.39%	1.22%	100.00%	15.24%
31R051: I.S. 051 Edwin Markham	1245	24.58%	22.33%	46.02%	1.37%	74.38%	8.27%
Total	7330	8.28%	33.47%	51.54%	6.71%	88.81%	12.71%

¹“Other” includes the following race/ethnicity categories: American Indiana/Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, and Two or More Races.

Students. A total of 322 students were originally enrolled in the SummerSail program but 280 students actually participated in the program. Students that participated were rising seventh, eighth, and ninth graders. Table 2 provides a summary by grade of the participating students.

Table 2

Student participants in the SummerSail program

Grade	<i>n</i>
Rising seventh	128
Rising eighth	119
Rising ninth	33
Total	280

In order to participate in the program, students agreed to read on LightSail at least four hours per week from the last day of the 2014-15 school year until the first day of the 2015-16 school year. Students also attended four instructional school days, which occurred one day per week during the month of July and lasted for four hours each. Students were required to make a minimum of four high-quality annotations within the e-books each week.

Teachers. Teachers ($n = 17$) that participated in the program attended a four-hour LightSail professional development session prior to the start of the SummerSail summer. The training included instruction on LightSail use and lesson suggestions for teachers to incorporate during their weekly sessions with students. Teachers then led their assigned SummerSail groups one day per week during the month of July and agreed to track student data on a weekly basis for the entirety of the summer, including spending five hours per week tracking students' reading and responding to students' annotations. These teachers also consulted with an MSQI coach for 20 minutes per week throughout the summer to identify areas of focus based on LightSail data.

MSQI coaches. Five MSQI coaches participated in the SummerSail program; four of the five coaches had been in this position for more than a year. Only one of the four coaches had participated in the SummerSail program previously. The coaches attended the teacher professional development session and supported teachers' use of LightSail through site visits and weekly phone calls with teachers to review implementation and growth data.

Measures and Data Sources

LightSail program data. The program collected data related to student activities within LightSail (e.g., number of books read, number of minutes spent reading, number of short response assessment items answered and graded). In addition, the LightSail platform assessed students' Lexile growth, a measure of an individual students' reading ability, throughout the program.

Student SummerSail Pre-Survey. The SummerSail Pre-Survey, developed by NYC DOE, solicits students' prior digital access, typical reading activity, family literacy involvement,

and reading activity during prior summers. The pre-survey (see Appendix A) was administered to all students at the start of SummerSail.

SummerSail Post-Survey. The SummerSail Post-Survey, developed by LightSail, solicited students' experiences using LightSail. The survey (see Appendix B) was administered to all students at the end of SummerSail.

Reader Self-Perception Survey. The Reader Self-Perception Scale ("RSPS") (Henk & Melnick, 1995) was administered at the start and end of the SummerSail Program. The RSPS consists of 33 questions rated on a five-point Likert-type scale. Thirty two survey items measured four scales: progress ($n = 9$), observation comparison ($n = 6$), social feedback ($n = 9$), and physiological states ($n = 8$) related to reading in addition to one general item ("I think I am a good reader"). Reported internal consistency alpha reliabilities of the instrument ranged from .81 to .84 for each of the four scales (Henk & Melnick, 1995).

Teacher Reaction Survey. The teacher survey was developed by CRRE, with input from LightSail, and was administered online to teachers participating in the summer implementation. The survey consisted of Likert-type ratings items and open-ended questions regarding teacher perceptions of LightSail and the impact on student learning. The survey was administered by MSQI in September 2015 to all 17 teachers and was completed by six teachers (35.29% response rate). Frequencies and descriptive statistics for teacher survey items are presented in Appendix C.

MSQI Coach Focus Group. MSQI coaches were invited to participate in a virtual focus group at the end of the SummerSail program. The five coaches were solicited their reactions to topics such as program implementation, student impact, and perceptions of LightSail (see Appendix D for focus group questions).

MetaMetrics growth values. MetaMetrics, the creators of The Lexile® Framework for Reading, established "typical" growth values based on an average growth curve for more than 100,000 North Carolina students in Grades 3-11 from the years 2002 through 2010 (Williamson, 2015). Year-to-year gains were established for each grade based on state assessment data and these values were divided by 52 weeks to provide values for "typical" Lexile growth per week.

Results

Prior Exposure: Reading and Technology in the Home

Students ($n = 140$) reported typical summer reading behaviors prior to participating in the SummerSail program. On average, students reported reading 8.63 ($SD = 14.04$) books the past summer and spending 7.61 ($SD = 39.20$) hours per week reading. They reported having 2.44 ($SD = 3.41$) books in their homes. In terms of the types of materials read on paper, the majority (77.14%) selected books, followed by comic books (45.71%), magazines (33.57%), and newspapers (19.29%).

Students also reported the types of computing devices they had in their homes. Most students indicated having a desktop/laptop (80.00%) and/or tablet (73.57%) and fewer (16.43%) had a reading device such as a Kindle. A minority (4.29%) indicated not having any devices at home. The majority of students (72.86%) indicated having a personal cellphone and roughly two-thirds of these students with a personal cell phone indicated the cell phone was a smartphone. Nearly three quarters (73.57%) of students indicated using an electronic device (e.g., smartphone or tablet) for reading. For students with an electronic device for reading, more than half indicated they read books (58.57%) or used social networking sites (52.86%). Less often did students read comic books or magazines (28.57%), news articles or blogs (26.43%). Nearly all students (94.29%) reported having Internet access in their homes. In terms of which websites students visited at least once per week, the majority visited video sites (80.71%), followed by social networking (49.29%), gaming (45.71%), and informational (22.14%) sites.

In addition, students were asked to provide information on their parents' reading habits. Students indicated their parents regularly read websites (39.29%), books (38.57%), newspapers (34.29%), and magazines (32.14%). A third of students (32.86%) were unsure. The majority of students (97.76%), though, reported that their parent or guardian encouraged them to read at home.

Student Use of LightSail

Data collected by LightSail were used to examine student use of LightSail and to what degree students' Lexile measures changed from using the program. Data related to student use of LightSail included time spent within the program, student activities (e.g., embedded assessments answered, annotations created, books read), and teacher activities (e.g., grading of embedded assessments, feedback on student annotations). Data related to student learning included Lexile growth throughout the duration of the program. Only students with pre and post Lexile measures ($n = 229$; 81.79% of students participating in the SummerSail program) were included in the following analyses.

Students used LightSail up to 11 weeks with an average of 7.08 weeks ($SD = 2.81$) and read an average of 18.20 ($SD = 12.80$) minutes per day within LightSail during the SummerSail program. Students accessed an average of 16.89 books and completed an average of 7.57 books (44.82% completion rate). There was a significant, positive relationship between the amount of time students spent reading within LightSail and students pre-Lexile, $r(229) = .249, p = .01$ and post-Lexile measures, $r(229) = .234, p = .01$. Students with lower Lexile measures at the start of the SummerSail program tended to spend less time reading within LightSail in comparison to those with a higher beginning Lexile score, indicating that struggling readers may need additional supports to encourage more consistent program use. Further, increased reading time had a positive relationship with improving Lexile measures at posttest.

Impact on Student Learning

Lexile growth. A paired-samples t -test was used to evaluate the differences between pre and post program Lexile measures as assessed through the LightSail program. The t -test was significant, $t(228) = 2.85, p < .001$. The post Lexile measures ($M = 975.00, SD = 211.31$) were

significantly higher than the pre Lexile measures ($M = 940.02$, $SD = 201.31$), indicating that use of LightSail positively impacted students' Lexile measures.

One-sample t -tests were conducted to assess differences between SummerSail students' Lexile growth per week of use and MetaMetrics' "typical" growth guidelines⁴. The average Lexile growth for rising seventh grade ($M = 30.10$), rising eighth grade ($M = 43.55$), and rising ninth grade ($M = 25.81$), was divided by the average weeks of use for these grades ($M = 7.35$, 6.80 , and 7.00 , respectively) to determine the Lexile growth per week. Due to the relatively small sample size, growth was aggregated across sample grades and the weighted SummerSail sample mean was compared against the weighted MetaMetrics "typical" growth for the same grades. The SummerSail sample ($M = 4.94$) growth per week was significantly higher than the MetaMetrics weighted "typical" growth per week ($M = 1.78$), $t(228) = 2.70$, $p = .007$.

Student Lexile growth was also examined based on cumulative number of minutes read. Students were divided into three groups: Low ($n = 159$; fewer than 20 minutes per day), Medium ($n = 55$; 20 to fewer than 40 minutes per day), and High ($n = 15$; 40 minutes or greater per day). These reading groups were suggested by LightSail based on the program expectation of 4 hours per week with daily reading and past LightSail evidence indicating that program reading time of 20 minutes per day drives student growth. Paired samples t -tests were employed to compare differences between pre and post Lexile measures for each reading group (see Figure 1). Though all three groups exhibited improved post Lexile measures, the differences for those in the Low (pre Lexile: $M = 916.26$, $SD = 209.21$; post Lexile: $M = 943.55$, $SD = 220.24$) and Medium group (pre Lexile: $M = 1005.27$, $SD = 162.32$; post Lexile: $M = 1045.73$, $SD = 184.39$) were not significant ($p = .08$ for both). The post Lexile measures for students in the High reading group ($M = 1049.00$, $SD = 109.16$) were, however, significantly higher than the pre Lexile measures ($M = 952.67$, $SD = 202.77$), $t(14) = 2.43$, $p = .03$ with a large effect size (.59). A one-way analysis of covariance (ANCOVA) revealed significant differences in post Lexile measures, controlling for pre Lexile measures, between the three reading groups, $F(2, 226) = 10.62$, $p = .005$. Pairwise comparisons indicated that students in the High reading groups had significantly higher post Lexile measures than those in the Low reading group, controlling for pre Lexile measures ($p = .007$). No other group differences were significant.

⁴ Readers should be cautioned in making any conclusions based on the comparison between students in the SummerSail program and MetaMetrics "typical" growth. First, North Carolina demographics are likely to be different from New York City school demographics in terms of ethnicity and free/reduced price lunch eligibility. Second, Lexile growth is based on different measures between the two groups. Specifically, the "typical growth" values are based on state assessment data whereas the LightSail growth values are based on program-captured data. Third, MetaMetrics "typical" growth values span 52 weeks, including summer weeks, whereas SummerSail values averaged seven summer weeks.

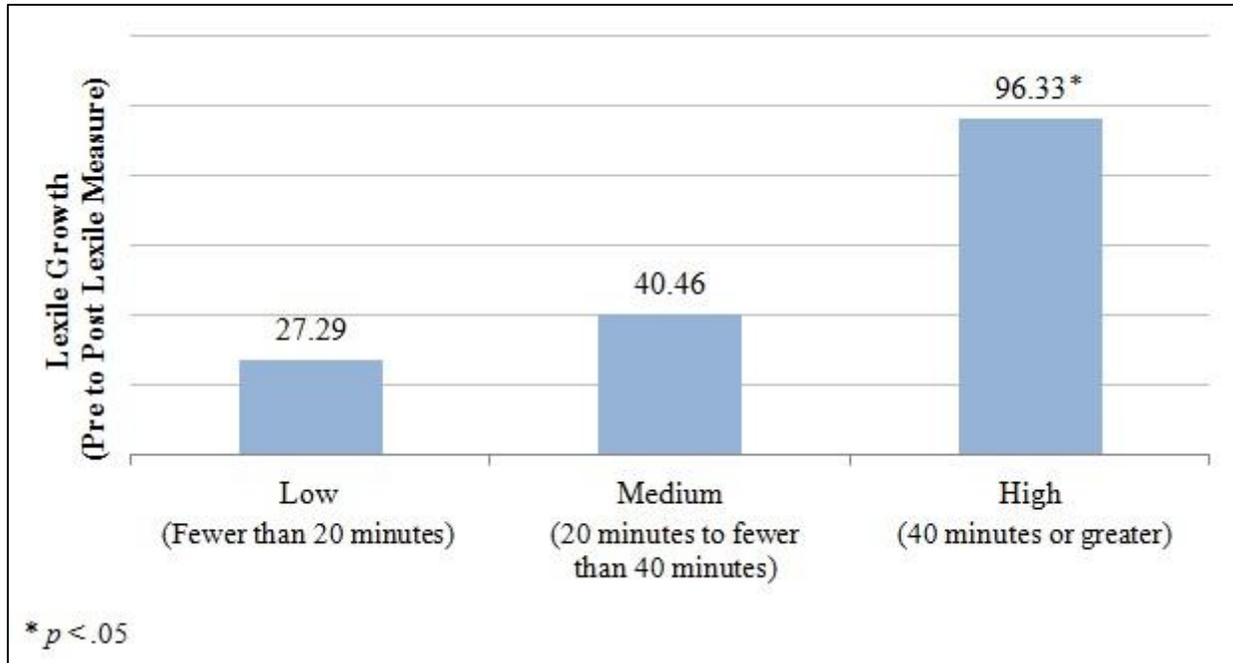


Figure 1. Lexile growth based on cumulative reading time groups.

LightSail explored the data, noted the small sample in the High reading group ($n = 15$) and requested alternative reading groups. Accordingly, students were divided into three newly defined reading groups: Low (fewer than 15 minutes per day; $n = 119$), Medium (15 minutes to fewer than 30 minutes; $n = 77$), and High (30 minutes or greater per day; $n = 33$). Paired samples t -tests were employed to compare differences between pre and post Lexile measures for each reading group (see Figure 2). Though all three groups exhibited improved post Lexile measures, the differences for those in the Low group (pre Lexile: $M = 918.70$, $SD = 215.83$; post Lexile: $M = 936.39$, $SD = 237.61$) were not significant, $t(118) = 1.01$, $p = .31$. The post Lexile measures for students in the Medium reading group ($M = 994.42$, $SD = 161.69$), however, were significantly higher than the pre Lexile measures ($M = 947.34$, $SD = 178.59$), $t(76) = 2.23$, $p = .03$ with a small effect size (0.28). Post Lexile measures for students in the High reading group ($M = 1068.94$, $SD = 179.79$) were also significantly higher than the pre Lexile measures ($M = 998.85$, $SD = 189.00$), $t(32) = 2.44$, $p = .02$ with a moderate effect size (0.37).

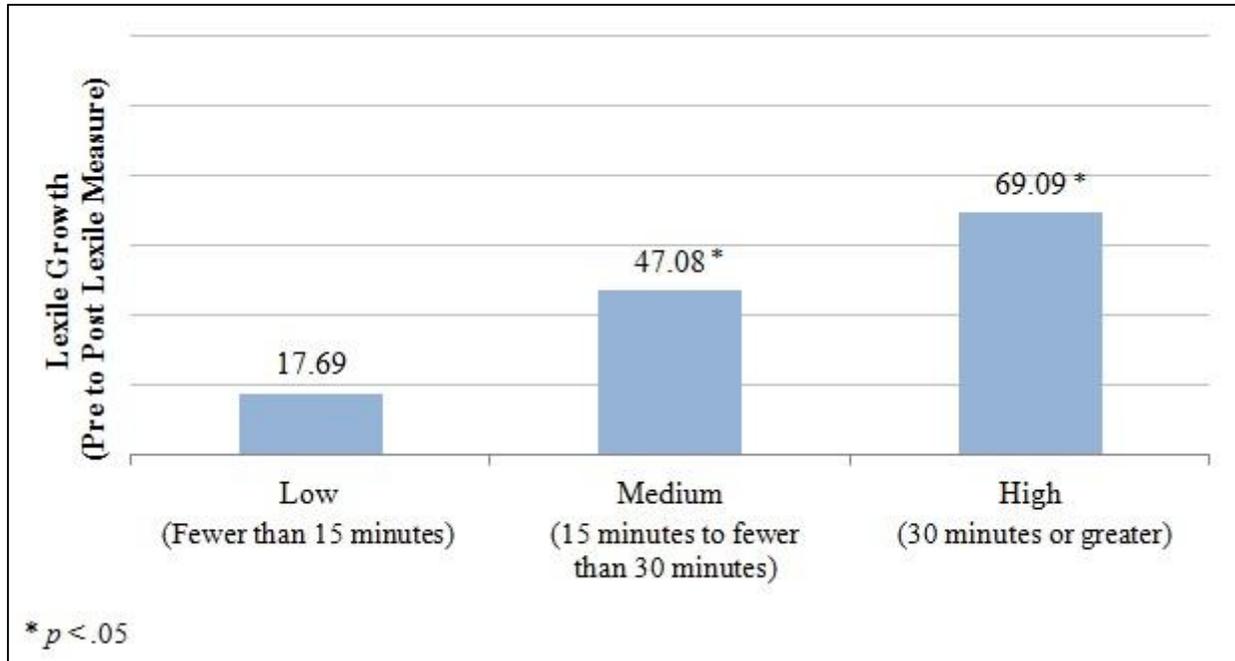


Figure 2. Lexile growth based on revised cumulative reading time groups.

Student activities. Students created annotations within text and also responded to short-response and multiple-choice questions (see Table 3). While multiple-choice items were automatically scored by the program, teachers needed to score students' short-response questions, using a question-specific rubric supplied within the LightSail program.

Table 3

Student activities within LightSail

Activity	Average per student	Teacher responded	Average score
Student annotations	18.66	49.11%	
Short-response questions answered	11.28	78.46%	0.52
Multiple-choice questions answered	24.96		0.67

Note: Short response questions were graded on a scale of 1 to 4 and multiple-choice questions were either correct (1) or incorrect (0).

Exploratory Pearson Correlation analyses were conducted to examine the relationships between students' activities within LightSail and Lexile growth, the difference between pre and post Lexile measures (see Table 4). Student activities did not significantly relate to students' Lexile growth with the exception of the average score on embedded multiple-choice questions. This variable did have a significant positive relationship with Lexile score change, $r(229) = .251$, $p < .01$.

Student activities were also examined in relationship to reading time through Pearson correlation analyses (see Table 4). All student activities were significantly positively related to time spent reading ($p < .01$). The strongest relationships included number of short-response and multiple-choice questions answered. In addition, the number of student annotations was significantly positively related to amount of time spent reading, though students averaged slightly less than one annotation per book read.

Teacher activities. Teacher activities also appeared to significantly relate to the amount of time students spent reading, but not to growth in Lexile measures. Of the teacher activities examined, the number of short-response questions teachers scored had the strongest positive relationship with reading time. In addition, the amount of teacher feedback on student annotations positively related to the amount of time students spent reading. That is, as teacher feedback on annotations increased, so did the amount of minutes student read within LightSail. On the one hand, if teachers are providing more feedback and scoring more items, students might be more stimulated to increase reading time. On the other hand, if students are spending more time reading, they might be answering more questions and annotating more frequently, and, in turn, receiving more teacher feedback.

Table 4

Pearson correlation coefficients for student and teacher activities

	Minutes read
Number of student annotations	.490**
Teacher feedback on annotations	.428**
Number of short-response questions answered	.601**
Number of short-response questions teachers scored	.538**
Average score on short-response questions	.345**
Number of multiple-choice questions answered	.595**
Average score on multiple-choice questions	.182**

** $p < .01$

Summary. Students exhibited gains in Lexile measures during the SummerSail program as evidenced through the significant differences between pre and post Lexile measures. Though reading time did not significantly relate to Lexile growth, those students spending high amounts of time (e.g., 15 minutes or greater per day) reading within the program had significant differences between pre and post Lexile measures. The only factor that did appear to significantly relate to Lexile growth was the average score on multiple-choice questions. Additional student and teacher activities did, however, relate to reading time. The strongest significant relationships with reading time included the number of short-response questions answered by students, these items graded by teachers, and the number of multiple-choice questions answered.

Impact on Reader Identity

Students completed the Reader Self-Perception Scale (“RSPS”) (Henk & Melnick, 1995) at the start and end of the SummerSail program. Only students with both pre and post survey results ($n = 66$) were included in the analysis. Paired samples t -tests were conducted on students’ responses for each of the four RSPS scales, progress (pre-program: $M = 39.74$, $SD = 4.82$; post-program: $M = 38.95$, $SD = 5.34$), observational comparison (pre-program: $M = 23.06$, $SD = 4.19$; post-program: $M = 24.32$, $SD = 9.41$), social feedback (pre-program: $M = 33.94$, $SD = 4.93$; post-program: $M = 33.24$, $SD = 5.39$), and physiological states (pre-program: $M = 32.35$, $SD = 5.95$; post-program: $M = 32.73$, $SD = 5.66$). Differences in pre- and post-program scores were not statistically significant on any of the four scales. It is not surprising that participation in SummerSail for a relatively short duration (an average of seven weeks) did not have a significant impact on reader identity.

Perceptions of the program

Student perceptions. Open-ended and closed-ended survey items solicited students’ ($n = 72$) degree of satisfaction with LightSail and their SummerSail reading activities.

Student satisfaction. Nearly three-quarters (72.22%) of students indicated that reading on LightSail was more fun than reading printed books and a quarter indicated reading was the same between formats. Half of students indicated they found some interesting books and 41.67% found many interesting books to read in the digital libraries curated by the schools. Students were asked to provide titles of books they would like to read in LightSail that they were unable to access. Most frequently reported titles (all of which are available in LightSail but may not have been selected by schools during the digital library curation process) included:

- *Diary of a Wimpy Kid*
- *The Fault in Our Stars*
- *Divergent* series

Though titles were not provided, students also indicated they would like to read mystery, realistic fiction, and non-fiction/informational books.

Students were favorable towards the program’s ease of use with the majority (81.69%) indicating the program was easy to use; nearly two thirds (63.38%) indicated LightSail was very easy to use. They were asked to elaborate on why they thought LightSail was easy or hard to use through open-ended survey items. In terms of why LightSail was easy to use, students indicated the following:

- **Ease of navigation.** Many students felt that the program was easy to use because it was easy to understand and navigate. One student reported:

LightSail's library system is simple to use when it comes to navigating, finding a book and reading it.

Another student stated:

LightSail was easy to use because everything was so organized and it made it easy to access.

- **Product features.** Others drew attention to program features that they found useful including the dictionary, text questions, annotation, tracking, and the wide choice of books available at reading level. One student noted:

It's easy because when you are reading and you don't know what a word means you just click and it will give you the definition for it.

Another commented:

It was easy because the books I knew and love are in LightSail.

- **Technology appeal.** Finally, numerous students commented on their liking/love for technology as being the reason for their finding LightSail easy to use. Student comments included:

LightSail was easy because it had 2 things I love, technology and reading.

LightSail was easy for me to use and understand because I know how to work technology.

The vast minority of students who reported finding LightSail hard to use stated that they had difficulty with technology related to the program's use. Examples of feedback included, "LightSail was complicated to use because it is not like reading a regular book because it is on the iPad" and "LightSail was a little hard for me because it would buffer a lot and I would forget how to highlight a sentence." A small number stated that they found LightSail hard to use because they could not find books that they wanted to read. LightSail indicated, though, that schools were responsible for curating robust libraries for SummerSail use.

Student reading activities. Students also reported on their reading activities beyond usage data provided by LightSail. The majority (90.28%) indicated they selected books to read on their own and fewer indicated books were suggested by teachers (27.78%), a friend or classmate (19.44%), or parent (5.56%). Few (13.88%) indicated their parent or guardian read with them at home, though many said their parent/guardian or teacher encouraged them to read on LightSail (68.47% and 97.22%, respectively). In addition to reading books within LightSail, students self-reported reading an average of 6.31 ($SD = 6.14$) books over the summer outside of LightSail.

Teacher and MSQI coach perceptions. Teachers ($n = 6$) responded to closed-ended and open-ended survey items regarding their perceptions of support provided by LightSail, as well as their degree of satisfaction with the program. MSQI coaches ($n = 5$) also provided their perceptions of LightSail during the focus group.

Support and implementation. Teachers were generally highly satisfied with the technical support and instructional support provided by LightSail. All teachers agreed (83.33% strongly agreed) that they found it easy to effectively use all of LightSail's major features, including

reading, annotating, and responding to annotations. In addition, nearly all (83.33%) strongly agreed that they felt supported from a technical support and account management perspective and two thirds of teachers strongly agreed that they felt sufficiently supported by LightSail from an instructional perspective. Teachers' open-ended responses corroborated survey responses. They overwhelmingly indicated their technical and account management needs were met. One teacher commented that, "[LightSail] met all of my needs by being readily available whenever I needed assistance," while another stated, "Every time I emailed or called I was given a response same day."

While teachers' perceptions of professional development and support from LightSail were very positive, MSQI coaches described challenges with implementation, though many concerns were independent of the LightSail program. Coaches indicated that teachers struggled with the creation of the initial student library. Specifically, teachers were dissatisfied with the books available to students at the start of the SummerSail program and had to determine how to obtain additional books in order to engage students. According to LightSail, MSQI was responsive to this feedback and allocated additional funds mid-summer for teachers to select more titles. Coaches also conveyed the need for a stronger emphasis in parent communication on establishing expectations for student reading within LightSail outside of class sessions. Relatedly, coaches conveyed that students were provided with Barnes and Noble gift cards to purchase paper books during the final celebration, which occurred prior to the end of the SummerSail program. This factor may have led students to read outside of LightSail, affecting the usage data reported previously.

In addition, coaches explained that not all teachers were comfortable with the use of technology to communicate with students, such as responding to student annotations and providing feedback on embedded assessment items. For example, a coach commented:

Because of their own discomfort in using technology that way, individuals [teachers] were waiting for face-to-face meetings [with students] and not being aware of the process of responding to students using the platform to communicate with students.

MSQI coaches did comment, however, on the resource binder created by LightSail and provided to teachers and coaches. The binder contained suggested lesson activities and multiple lesson plans for teachers to use during class sessions, as well as breakdowns of features of the program teachers could use to communicate with students within the program. They found this binder to be an effective coaching tool when teachers were struggling with responding to students outside of class sessions. One coach noted:

I found [the binder] really helpful to coach into when a teacher wasn't holding up her side of the bargain. I could go to the binder and coach into it to give her suggestions for those lesson plans.

Additional concerns expressed were the depletion of the allowable monthly data plans provided through WiFi hotspots, and the need for technical support for teachers, including WiFi issues within schools. In terms of the former, coaches surmised that students or family members may have used iPads for tasks other than reading on LightSail, depleting the available data and

potentially affecting the amount of time students spent reading outside of class sessions. According to LightSail, the current version of LightSail does provide for offline reading of texts, negating the need to constantly be connected to the Internet in order to use the application. Further, LightSail indicated that many of the technical support tickets were attributable to local Internet bandwidth issues unrelated to the LightSail application. In these instances, LightSail provided phone and onsite support and worked with the New York City Department of Education IT Department in order to address these foundational technology issues.

Product. Nearly all teachers (83.33%) strongly agreed that LightSail’s major features (e.g., reading, annotating, responding to annotations) were easy to use. Two-thirds (66.67%) strongly agreed that LightSail was easy to integrate into lesson plans. Teachers offered multiple views regarding the impact the program had on their ability to determine student progress and needs. In their open-ended responses, one teacher described the ability to view student progress within LightSail in order to monitor engagement. The teacher offered, “I was able to see up to date information on the student, and I was able to assess if the student needed any assistance.” Other teachers, however, indicated contrasting views. One teacher noted student reading hours in the beginning were inaccurate, making it difficult to gauge progress, whereas another commented, “it was impossible to access the progress of ELL students. There was no tool to measure or determine their [students] progress and needs.”⁵

Impact on student engagement and learning. Teachers were also asked survey items related to the impact on student engagement and learning. All agreed (83.33% strongly agreed) that students were engaged in reading in LightSail and indicated through open-ended comments that student engagement in reading was increased through LightSail as compared with paper books. One teacher commented, “The students were engaged so much more, and they enjoyed reading on the iPad. It was difficult to stop them when they were reading.” Attributes of LightSail that teachers indicated positively affected engagement included:

- Access to definitions within e-books
- Breadth of books available
- Peer and teacher electronic communication

MSQI coaches also conveyed that students were highly engaged with LightSail. One coach commented, “LightSail served as an opportunity for [students] to engage with books in a way they were excited about.” The coaches did, though, note that student engagement was tied to the availability of high interest books at the start of the SummerSail program. Coaches expressed concerns that many of the initial books selected and purchased by schools were not of great interest to students, which may have affected their level of interest in reading early in the program. A coach stated, “If there weren’t books that they wanted to read then they weren’t interested in some of the titles that were made available.” LightSail confirmed that many of the SummerSail titles had been purchased for use during the academic year, but that MSQI was responsive to the issue and allowed teachers to select and purchase additional titles mid-summer to pique student interest.

⁵ LightSail notes that teachers have multiple ways of tracking progress and determining needs of all students, including ELL students. This teacher’s comment may speak more to a need for product training rather than a gap in the product itself.

Teachers were also very positive regarding the impact on student learning. All teachers strongly agreed that using LightSail is effective for increasing student achievement and reducing summer slide. Further, all agreed (66.67% strongly agreed) that LightSail helps promote higher-order learning such as critical thinking or problem solving and nearly all (83.33%) strongly agreed the program supports personalized learning for students. Coaches also indicated that LightSail positively impacted student learning. A coach commented:

What was nice... seeing an impact on [students] was seeing their own reading level and [having] the understanding of what they were reading translated to growing their own Lexile level.

Another noted in the importance of teacher communication within the program, stating,

When teachers were engaging through the platform, when they're [teachers and students are] communicating through reading responses and comments, thoughts, and annotations, I noticed the more teachers respond...that encouraged students to think more.

Program strengths and weaknesses. Teachers were asked to provide the aspects or features they liked best and least within the LightSail app. Teachers referenced the following components:

- **Communication.** Teachers valued the ability to interact with students through the program. One teacher noted, "I really enjoyed the ability of being able to respond to students' thinking, as it created a very meaningful reading experience."
- **Progress monitoring.** Teachers referenced the ability to monitor student reading behaviors as a strength of the program. A teacher commented, "I like that I can keep track of their reading times and short responses" while another noted, "I liked the calendar that allowed me to track students' reading each week."

MSQI coaches also described as a valuable feature the ability for teachers and students to communicate in the program through annotations. In addition, coaches referenced students' ability to monitor their own progress through the Lexile predictor feature and their ability to digitally sign out books they were excited about as valuable components.

Though two teachers did not have any aspects or features they liked least about the program, other teacher comments referenced technical aspects, including the inability of the program to be accessed on different devices and the requirement of Internet connectivity to read in the program. LightSail conveyed that the application is also available on Android and Chromebook as of spring 2016. In addition, the current version of LightSail provides for offline reading of texts, negating the need to constantly be connected to the Internet in order to use the application.

One teacher also commented on the availability of data, stating, "I did not like the glitches we experienced. It made it difficult to conference with students when the data was not

always reliable.” LightSail notes that consistent Internet connectivity is required in order for teachers to access real-time student data. MSQI coaches referenced the initial library and selection of books chosen by schools as aspects they liked least about LightSail. The only features or functionality suggestions mentioned was that offered by one teacher, which was to allow LightSail to be available on other devices beyond iPads. An MSQI coach also offered this same suggestion. Another coach indicated the desire for school leadership or coaches to be able to have a “global view of all classes in a school” within the platform, beyond the weekly reports provided by LightSail.

Teachers overwhelmingly indicated they would like to use LightSail in the future (all strongly agreed) and would recommend LightSail be used by their school in the future (83.33% strongly agreed). Reasons for doing so echoed the positive reactions in teacher survey responses, such as the positive impact on student engagement and interest in reading and the ability to monitor student progress within the program. One teacher commented:

It is engaging and fun. It allowed students to pick their own books from an array of collections that were age appropriate.

Another teacher offered:

It makes tracking and monitoring students' work habits and progress so easy. Additionally, it makes the students want to read more, because they enjoy reading on the iPad. Lastly, it keeps the kids so involved in their progress with constant Lexile updates and immediate feedback on multiple choice [questions].

MSQI coaches also recommended that LightSail be acquired by the district and used in future SummerSail programs, though they did express concerns regarding the availability of LightSail to only work on iPads and the potentially prohibitive cost for some schools. In terms of the former, LightSail indicated the release of its application on Android and Chromebook in the spring 2016. These coaches also suggested more initial training to enable teachers to better understand and use the available features within the program, as well as providing MSQI coaches additional time with teachers prior to implementation in order to better facilitate the class sessions. In addition, a coach conveyed a desire for the schools to remain open throughout August in order to be able to offer more class sessions and further encourage student reading time.

Conclusion

Research questions for the current mixed-methods study of LightSail in the Middle Schools Quality Initiative SummerSail program focused on three areas of interest: (a) the impact on student learning, (b) the impact on reader identity, and (c) participant perceptions. Results pertaining to each will be briefly reviewed and discussed in the sections below, but in reverse order given that student and teacher perceptions directly influence program usage, which should, in turn, directly impact student learning.

Participant Perceptions

Students overall were very positive about LightSail and, importantly, many indicated greater enjoyment in reading through LightSail over printed books. Relatedly, a reason students found LightSail easy to use was the appeal of technology and the general program design that facilitated navigation. Similarly, teachers appeared to be highly satisfied with the implementation of LightSail and were generally positive towards the program. In terms of support and implementation, teachers indicated that not only was the program easy to use, they also felt sufficiently supported for any technical problems that occurred. In addition, they indicated that LightSail's major features were easy for them to use, though they did express challenges at times with viewing and interpreting student data within the program. These challenges primarily concerned inaccuracies with initial data and data specific to ELL students. MSQI coaches further indicated challenges with teachers' implementation of the program, most importantly the use of technology for student feedback and communication, as well as teachers lacking understanding of curating initial student libraries. Teachers' low quantity of short-response questions answered (62.16%) and feedback on student annotations (48.33%) may be explained by teachers' not being as familiar or comfortable with the use of technology for student communication and feedback. The coaches were very positive towards the professional development offered by LightSail at the start of the SummerSail program and through ongoing support such as the LightSail binder they used for coaching teachers. Increasing professional development related to building digital libraries and ensuring instructors possess baseline technology knowledge would likely further enhance LightSail use.

Teachers were quite positive about the impact of LightSail on student engagement and learning. They commented that students were eager to read using LightSail due to the breadth of books available and interactive features such as accessing definitions and electronic communication with peers and their teacher. The perceptions of MSQI coaches regarding the positive impact on student engagement corroborated teachers' perceptions. As a consequence of increased student engagement in reading, both teachers and coaches indicated that student learning was positively affected. It is expected that if MSQI schools were to implement LightSail during the school year, most students and teachers would also view the program favorably and as a valuable resource to encourage student reading.

Impact on Reader Identity

The impact on reader identity, students' perceptions of themselves as readers, was measured through the RSPS (Henk & Melnick, 1995) at the start and end of the SummerSail program. Findings indicated there was not a significant impact of LightSail use on reader identity and students' scores on the survey remained relatively stable. This finding is not surprising given the relatively short duration of the SummerSail program. Further, as reader identity is affected by interactions with peers, family members, and teachers (McDermott, Goldman, & Varenne, 2006), it may be unreasonable to expect a significant impact during the summer months.

Impact on Student Learning

Student usage of LightSail during the SummerSail program fell below original expectations as students read roughly two hours per week as compared with the minimum

expectation of four hours per week. They also created just under three annotations per week as compared with the expectation of four per week. A factor that may have influenced students' time spent reading within LightSail was the timing of the reading celebration. Students were provided with gift cards for paper books at this celebration and may have opted to read with these books rather than within LightSail. As previously mentioned, students self-reported reading an average of 6.31 books over the summer outside of LightSail. Further, the issues with WiFi hotspots, as referenced by MSQI coaches, may have affected the amount of time students were able to read outside of classroom sessions.

Despite falling below usage expectations, students exhibited significant gains in Lexile measures through using LightSail. Importantly, Lexile growth for the three reading groups mirrored the amount of time spent reading; those students who spent the most time reading (30 minutes or greater per day) had the highest gains in Lexile measures followed by the medium group and then the low reading group. The effect size⁶ for those students reading 40 minutes or greater each day during the SummerSail program was strong (.59) in magnitude and is quite meaningful given the duration of LightSail use (averaging seven weeks) during the summer. Further, those students reading 30 minutes or more per day resulted in a moderate effect size (.37). In addition, the weighted average of students' Lexile growth per week was significantly higher than that of MetaMetrics "typical" growth per week; however, caution should be exercised in interpreting these findings due to differences in Lexile metrics and likely differences in student demographics.

Interestingly, pre-program Lexile measures were significantly positively related to the amount of time spent reading, indicating that teachers should monitor reading time particularly for struggling readers. Reading time was also significantly positively related to several student activities including the number of student annotations and embedded assessment items (e.g., multiple-choice and short-response questions). These findings are not surprising as the more time students spend reading, the greater the number of embedded assessment items encountered. Further, those students spending a greater amount of time reading may be more inclined to annotate text.

While Lexile measures were significantly impacted by LightSail use, additional research is warranted to examine the impact of LightSail on student learning, either as measured by standardized tests such as state assessments that are independent of the LightSail program or relative to norms based on identical Lexile measures.

Conclusions and Recommendations

Based on the findings and the foregoing interpretations, overall conclusions are:

- Teachers and MSQI coaches reacted positively to LightSail with regard to the support provided and the program's effectiveness on engaging students and positively impacting student learning.

⁶ An effect size indicates the number of standard deviations by which the post-Lexile mean differs from the pre-Lexile mean. An effect size of +.50 standard deviations is considered a strong and highly meaningful effect.

- Student learning, as measured by the program, was positively affected through LightSail use, most notably for students reading 30 minutes or more each day. This finding supports encouraging increased reading time for students reading fewer than 30 minutes per day.

Recommendations are that the provider and MSQI leadership team should strive to:

- Curate robust digital libraries and ensure instructors possess baseline technology knowledge.
- Review strategies for the early identification of and support for LightSail readers struggling to meet the weekly time commitment.

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Appendix A: Student SummerSail Pre-Survey

1. How many books did you read last summer?
2. How many hours per week in the summer do you usually spending reading?
3. How many books do you have in your home? *(choose one)*
 - a) Less than 10
 - b) 11-50
 - c) 51-100
 - d) More than 100
 - e) I don't know/I'm not sure
4. What kind of reading do you do on **paper**? *(choose all that apply)*
 - a) Newspapers
 - b) Magazine articles
 - c) Books
 - d) Comic Books
 - e) I read other things on paper: (please name):
5. Which of the following devices do you have in your home? *(choose all that apply)*
 - a) Desktop or laptop computer
 - b) A tablet (such as an iPad, Kindle Fire, Galaxy tablet, etc.)
 - c) A reading only device (such as an e-ink Kindle, Nook, etc.)
 - d) I do not have a computing device in my home.
6. Do you have a personal cell phone that only you use? *(choose one)*
 - a) Yes
 - b) No
7. If you have a personal cell phone, is it a smartphone such as an iPhone, Android, or Blackberry? *(choose one)*
 - a) Yes
 - b) No
8. Do you use an **electronic device** such as a smart phone or tablet to read? *(choose one)*
 - a) Yes
 - b) No
9. If you use an electronic device to read, what kind of reading do you do on your **electronic device**? *(choose all that apply)*
 - a) I read social networking posts (such as Facebook, Twitter, Instagram, etc.)
 - b) I read news articles
 - c) I read magazine articles
 - d) I read books
 - e) I read comic books
 - f) I read blogs
 - g) I read other sites: (please name):

10. Do you have access to the Internet at home? (*choose one*)
- a) Yes
 - b) No
11. If you have access to the Internet at home, what types of websites do you visit **at least once a week?** (*choose all that apply*)
- a) Social networking sites (such as Facebook, Twitter, Instagram, etc.)
 - b) Gaming websites
 - c) Video sites (Youtube, Netflix, Hulu, etc.)
 - d) Informational and how-to pages (Wikipedia, About.com)
 - e) Other websites: (please list):
12. Which of the following does your parent/guardian read regularly? (*choose all that apply*)
- a) Newspaper
 - b) Magazine
 - c) Books
 - d) Websites
 - e) I'm not sure.
 - f) Other (please describe):
13. Does your parent/guardian encourage you to read at home? (*choose one*)
- a) Yes
 - b) No

Appendix B: Student SummerSail Post-Survey

1. Compared to reading printed books, I found reading with LightSail: *(choose one)*

- a) More fun
- b) The same
- c) Less fun

2. How easy or hard was it for you to use LightSail? *(please circle your number choice)*

1	2	3	4	5	6	7	8	9	10
Easy									Hard

Please describe why LightSail was easy and/or hard to use.

3. What did you think of the books on LightSail? *(choose one)*

- a) I found many interesting books to read on LightSail.
- b) I found some interesting books to read on LightSail.
- c) I did not find many interesting books to read on LightSail.

4. What are the titles or topics of some of the interesting books you found on LightSail?
What book titles or topics would you like to see on LightSail?

5. How did you select books on LightSail? *(choose all that apply)*

- a) I selected the books on my own.
- b) My teacher suggested books for me to read.
- c) My parent suggested books for me to read.
- d) My friend or classmate suggested books for me to read.

6. My parent/guardian read at home with me using LightSail. *(choose one)*

- a) Yes
- b) No

7. My parent/guardian asked me about my reading on LightSail. *(choose one)*

- a) Disagree
- b) Agree
- c) I'm not sure

8. My parent/guardian encouraged me to read on LightSail. *(choose one)*

- a) Yes
- b) No

9. My teacher encouraged me to read on LightSail *(choose one)*.

- a) Yes

b) No

10. **Not counting the books you read on LightSail**, how many books did you read this summer?

Appendix C: Teacher Survey Descriptive Statistics and Response Frequencies

Survey item	Strongly Disagree %	Disagree %	Neutral or Undecided %	Agree %	Strongly Agree %	<i>M</i>	<i>SD</i>
I found it easy to effectively use all of LightSail’s major features (reading, annotating, responding to annotations, etc.)	0	0	0	16.67	83.33	4.83	0.41
I felt sufficiently supported by LightSail throughout the summer from an instructional perspective.	0	0	16.67	16.67	66.67	4.50	0.84
I felt sufficiently supported by LightSail throughout the summer from a technical support and account management perspective.	0	0	0	16.67	83.33	4.83	0.41
LightSail was easy to integrate into my lesson plans.	0	0	16.67	0	66.67	4.60	0.89
My students were engaged in reading in LightSail.	0	0	0	16.67	83.33	4.60	0.41
Using LightSail is effective for increasing student achievement and reducing summer slide.	0	0	0	0	100	5.00	0.00
LightSail helps promote higher-order learning such as critical thinking or problem solving.	0	0	0	33.33	66.67	4.67	0.52
LightSail supports personalized learning for students.	0	0	0	16.67	83.33	4.83	0.41
I would like to use LightSail for my classes in the future.	0	0	0	0	100	5.00	0.00
I would recommend LightSail to other teachers.	0	0	0	16.67	83.33	4.83	0.41

Appendix D: MSQI Coach Focus Group

Context:

1. Before we get into your experiences with LightSail, can you provide some information on how long you have been an MSQI coach?
2. What was your role with SummerSail?
3. Did you participate in SummerSail last year?

Implementation:

1. Describe your experiences assisting teachers with implementing LightSail. Was it easy to implement? What changes in practice or professional development is required of educators? What student activities (if any) are involved?
2. What, if any, were the implementation challenges encountered such as with the product itself or related implementation challenges?
3. Did you feel prepared to launch the SummerSail program after the Implementation Workshop? What worked? What didn't?

Student Impact

1. To what degree do students appear engaged with the product?
2. What do you perceive to be the impacts on student learning?
3. What impact, if any, has the program had on students' interest in reading?

Product Perceptions:

1. What aspects/features did you like best about the LightSail application?
2. What aspects/features did you like least?
3. What changes, if any, do you recommend in the product design or operation to make it more effective for use schools?
4. Would you recommend that the present product be acquired by schools and the district for use by teachers? Why or why not?
5. Would you recommend the LightSail application be used again for summer school next year? What worked? What didn't? What changes would you recommend?