An analysis of the Association of Alaska School Boards 2011 - 2012

"iPad for Literacy" Project

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Executive Summary
Association of Alaska School Boards 2011 - 2012 "iPad for Literacy" project

The Association of Alaska School Boards, with the assistance of a legislative appropriation, implemented an "iPad for Literacy" demonstration project in Alaska House District 6. The intention of the project was to document increased student achievement in the areas of language acquisition and reading fluency for participating students. The program that was applied to both staff and students was a strategic combination of training in the implementation of accessible iPad technology, and professional development in the use of highly-effective teaching instruction that complimented powerful learner differentiated literacy software.

Nine school districts participated in the project and documented 824 active student users between grades 2 - 12. The formal assessment plan for the demonstration specified additional quantitive analyzes of 135 active third grade cohort users to further substantiate key findings and benefits to students.

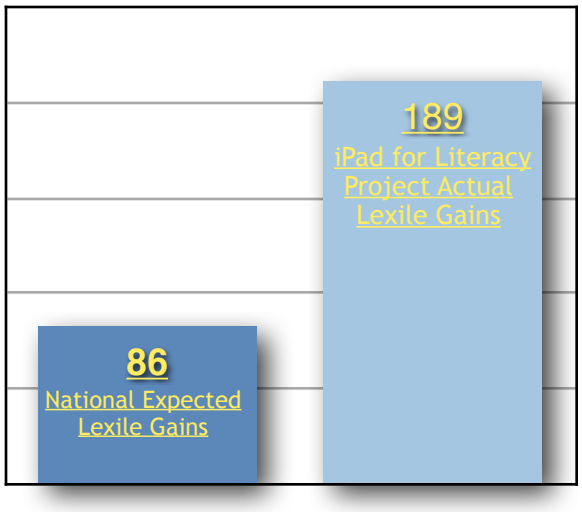
An analysis of Alaska students participating in the study compared to nationwide averages substantiated statistical significance in students grade 2 - 12 at the $p<.05$ level (95% confidence). The subset of students in the third grade cohort demonstrated gains approaching three times the nationwide average.

Achieve3000 Solutions® was used to measure Lexile gains and usage totals. Lexile measures are recognized as the most widely used reading metrics for connecting learners of all ages with materials at the right level of challenge. Lexile is a numeric representation of an individual's reading ability and text's readability or difficulty.[1] National averages and expected gains for grade levels have been established and were used to compare the growth of students in the project.[2]

Overall "iPad for Literacy" Student Key Findings Compared to the National Average

- All Students who participated in "iPad for Literacy" exceeded their expected Lexile growth by an average of 103 points - more than doubling the expected growth norm.
- Students who participated in "iPad for Literacy" at least twice a week exceeded their expected Lexile growth by an average of 130 points - two-and-a-half times beyond the expected growth norm.
- Students in the "iPad for Literacy" project who were behind in reading by two or more grade levels improved on average 132 points - two-and-a-half times the expected Lexile gains.
- Based on pre-and post-Lexile scores, 11% more students are on track for College and Career Readiness after participating in the project.

iPad for Literacy Overall Lexile Point Gains



Executive Summary
Association of Alaska School Boards 2011 - 2012 "iPad for Literacy" project

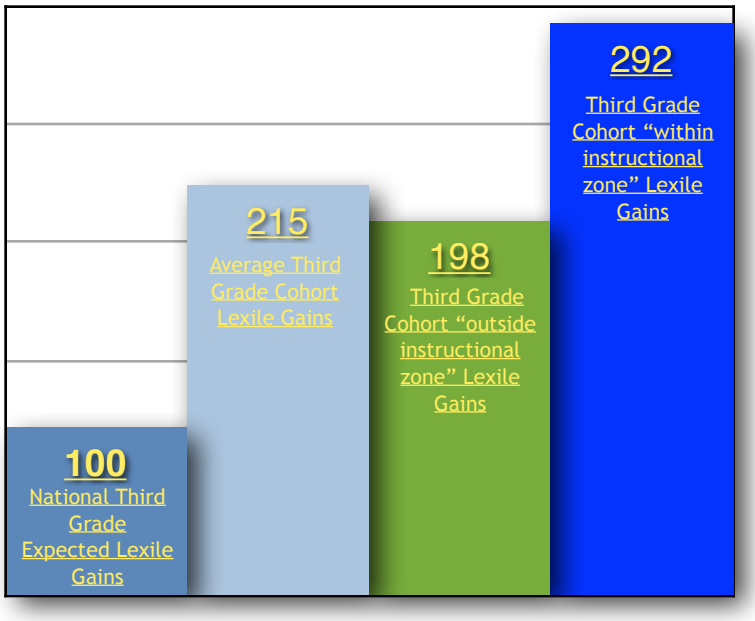
Third Grade Cohort "iPad for Literacy" Key Findings Compared to the National Average

- Third Grade Cohort students who participated in "iPad for Literacy" exceeded their expected Lexile growth by an average of 115 points more than third grade students on a nationwide level[3] - more than doubling the expected growth norm.

- Third grade cohort students who participated in "iPad for Literacy" at least twice a week and averaged 65%-90% on the multiple choice portion of the Five-Step Literacy Routine (i.e., applied themselves and focused on the activity) scored 292 points - and exceeded their expected Lexile growth by an average of 192 points beyond their nationwide peers - approaching three times beyond the established growth norm.

- Third grade cohort students in the "iPad for Literacy" project who were behind in reading by two or more grade levels (84 of the 135 participants) improved on average 143 points - two-and-a-half times the expected national Lexile gains.

Third Grade Cohort Lexile Point Gains



- The amount of reading students do during out-of-school hours is a predictor of their in-school academic achievement.[4] Access to interesting, motivational technology and ability appropriate applications was deemed critical in promoting 62% of students in the "iPad for Literacy" project to log on during after-school hours. The students in the project logged on 6,281 times in after-school hours. The third grade cohort participants, on average, logged on 126 times compared to the national average of 47 times.

The success that students achieved in language acquisition and reading fluency correlates to increases in College and Career Readiness. It was deemed that the "iPad for Literacy" project fostered technology work-readiness skills, and increased time-on-task. Additional highlighted strengths of the project included: one-device-per-student access to interesting technology (iPads), software applications on the iPads that was not reliant on web-based access or internet speed, early training in software and reading instructional strategies, and on-going support in the project implementation.

(1) Fry, Edward B. 2006. "Readability." Reading Hall of Fame Book. Newark, DE: International Reading Assn.
(2) Expected gains are based on MetaMetrics' annual expected Lexile gains for third grade students.
(3) An analysis of the impact of Achieve3000 on third grade HD6 project participants' Lexile growth, based on a nationwide comparison of n=95,522 third grade students using Achieve3000 Solutions.
(4) MetLife Foundation Afterschool Alert. (2011, November). Literacy in afterschool: An essential building block for learning and development (Issue Brief No. 53). Washington, DC: Author.

Project Description

The Association of School Boards, with the assistance of a legislative appropriation sponsored by Representative Alan Dick of House District 6, implemented a demonstration project entitled "iPad for Literacy". The intention of the project was to validate a model of mobile device usage in the classroom that adapted the best instructional practice from around the country for implementation in unique Alaska geography and culture. This study documents key findings and shows increased student achievement in the areas of language acquisition and reading fluency.

The project included nine school districts within the geographic region of House District 6 and impacted 520 students in 94 classrooms.

The project was a hybrid model that was synthesized from current research and promising practices and provided students and teachers access to best practice instructional strategies using iPad mobile device technology. The comprehensive design of the model included: training in instructional strategies, policy and procedure recommendations, hardware and software management techniques, and expertise in effective utilization of mobile devices.

Participation in the project was predicated on the school district agreeing to a Letter of Understanding that outlined the design of the one year project and specified: three days of prescribed vendor-approved staff professional development, an assurance that targeted strategies would be implemented during the instructional day, a technical review of the school's hardware infrastructure, an evaluation process that included periodic formative assessment using common assessments between districts, and implementation of Apple iPad mobile technology.

Professional development was delivered to the staff via face-to-face and distance delivery sessions. The face-to-face training included one day of "Apple iPad Basics and Classroom Management", one day of "Apple iPad in Language Acquisition", and one day of orientation to the Kidbiz3000® differentiated reading comprehension program. Additionally, one day of technical support services to analyze the school network was specified as a district requirement.

The distance delivery training was provided as a resource to teachers for classroom management and technical issues. A teacher mentor was hired as a technology interventionist for grades K – 6 to hold web-conferences on Wednesday and Thursday afternoons through GoToMeeting, maintain a resource wiki, and respond to individual technical assistance inquiries.

The project encouraged teachers to incorporate the iPad in the classroom as a powerful instructional tool to enhance delivery of the existing curriculum, and create student generated products. Strategies that were incorporated into the training utilized the mobile device for voice recording and playback of current reading material, a differentiated reading program for reading comprehension, and math applications for practice of math numeracy. As stated in the project proposal the following guidelines to incorporate iPads into the classroom instructional practices

were put forward:

> Reading Literacy
> Targeted Goal: Audio recording of reading text 2-3 times per week and 2 Milly and Molly books by Christmas. These recordings can be from text kids are reading now; current reading materials, worksheets, etc. The goal of the audio recording is so that students can hear themselves, assess their own reading, and do self corrections to gain fluency. A baseline recording for assessment purposes and then again later on in the quarter are great ways to document progress.
>
> Milly and Molly series books enable the students to read the story, hear the story, tap on words to hear the word, and record the story into the app over and over again.
>
> Reading Comprehension
> Targeted Goal: 40 lessons in KidBiz 3000 by Christmas. Achieve 3000 states that 40 completed lessons is the benchmark where students show significant gains. Getting those in before Christmas means about 3 assignments a week. That may be tough to do but having that as a goal is something to strive for.
>
> Math Numeracy Practice
> Targeted Goal: 6 minutes per session 3 times a week - Evidence is showing that just having students "play" math with apps targeted toward specific learning goals can increase their achievement. The math apps previously recommended offer that practice in basic numeracy.

The cost of the project was shared between grant funds and school district match. After purchasing associated hardware, software and professional development the percentage of contribution amounted to approximately 75% grant funds and 25% district match funds. Cost efficiency strategies were explored in every aspect of the project. In some cases, in order to maximize the efficiency of training and implementation of technology, school districts purchased additional sets of iPads and accessories to provide access to the technology for all the teachers and students in the classroom or school.

Through participation in the project, nine school districts were able to positively impact 94 classrooms by providing the following equipment, professional development and services; 594 iPads (with supporting hardware), 9 days of school technical review services, 9 days instructional professional development in the management of iPads in the classroom, 9 days instructional professional development of iPad in Language Acquisition, 9 days of instructional professional development of iPad in Math, 54 online KidBiz sessions, 360 KidBiz subscriptions, continuous distance delivered monitoring/coaching/mentoring, iPad software applications, and evaluation compilation.

The timeline for implementation of the components of the project was very aggressive and some school district calendars were adjusted to accommodate professional development and to provide for testing dates to have a baseline of academic performance from students before the equipment was distributed.

Study Methodology

Dr. John Monahan was consulted at the conclusion of the demonstration project to review the data and quantify the findings. After a thorough collection and review of the existing data, Dr. Monahan concluded that in part, due to the quick implementation of the project, there was not enough suitable pre and post DIBELS and AIMs Web data received from the schools to conduct a longitudinal matched-pair analysis. To ensure that the results are meaningful, it is essential to match the individual student to the results of different test instruments and then be able to compare the results. The lack of sufficient matching pre and post data made a comparison study between instruments that measured "oral reading and retell fluency" and "reading comprehension and writing proficiency" not a viable option. For the purposes of this demonstration project, the only valid and reliable longitudinal student performance data came from the raw data set of the differentiated literacy software called, KidBiz3000®.

Students in the project from 3rd - 5th grade were provided access to the KidBiz3000® as part of a suite of software called Achieve3000®. This software package is a web-based, differentiated literacy solution that includes KidBiz3000, TeenBiz3000, and Empower3000. The program is a proprietary software that distributes grade-appropriate assignments to the entire class but tailors them to reach every student at his or her Lexile reading level.[1] Because students are able to access the program via a desktop machine or a mobile device each time a student logs into a reading exercise very precise analytics can be employed that document specific student gains.

The Achieve3000® raw data was reviewed and cross-referenced with active school sites in the study. The 992 active users in the data set were cross-referenced by both the District Letter of Understanding Agreement and a comprehensive equipment list by school to verify that the site was an active participant in the study. This list of students was then cross-referenced to assure that the teachers were active participants in the study and that each student had access to an iPad. This process removed 168 of the cases that were considered invalid for statistical purposes. The final step in "cleaning" the data was to review each student and assure that they were in the program for a specific period of time (a minimum of one month) and assure that they had completed a pre and post Lexile test. This final comparison removed another 304 cases and left remaining 520 valid cases for analysis. Within the 520 valid cases, there was a "Third Grade Cohort" subset of 135 students with valid pre and post scores.

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[1] http://www.achieve3000.com

Table 1 - District Overall and Third Grade Cohort Valid Users

District	Overall Users with Valid Test Scores	Third Grade Cohort with Valid Test Scores
Alaska Gateway Schools	90	17
Copper River Schools	56	12
Delta-Greely Schools	105	50
Iditarod Area Schools	84	12
Kuspuk Schools	89	19
Nenana City Schools	30	5
Tanana City Schools	6	2
Yukon Flats Schools	30	10
Yukon-Koyukuk Schools	30	8
Totals	520	135

At the beginning of the project it was decided that the study would focus on a Third Grade Cohort to substantiate key findings and benefits to the students. Because of the nature of small rural Alaska communities in House District 6 (Interior Alaska) many of the schools operate similarly to the traditional single-room schoolhouse, with multiple grades being taught by the same teacher. In many cases, the Interior rural schools are divided up between early elementary (pre-K - 2nd grade), elementary (3rd - 8th grade), and high school (9th - 12th grade).

In schools that had enough students to have a "straight" 3rd grade classroom, only the 3rd grade students were included in the study. But in classrooms of mixed grades, students in the 3rd, 4th and 5th grade were included in the "cohort".

Grouping the 3rd, 4th and 5th grade students together as a cohort was based on a review of national expected Lexile gains for each particular grade levels. Because students in the 2nd grade experienced a higher anticipated lexile gain of 300 points, whereas students in 3rd - 5th grade are expected to gain 100 Lexile points annually.[2] It was determined that including 2nd grade students in the cohort would have disproportionately weighted the results of the cohort group of students.

Lexile measures are recognized as a widely used reading metric for connecting learners of all ages with materials at the right level of challenge. Lexile is a numeric representation of an individual's reading ability and text's readability or difficulty. A learners Lexile score grows each

[2] http://www.lexile.com/about-lexile/lexile-overview/

year and in the 11th to 12th grade is generally expected to be at a lexile level of 1100 - 1300.[3] National averages and expected gains for grade levels have been established and were used to compare the growth of students in the project.

Table 2 and 3 - Nationwide Annual Expected Lexile Gains and Lexile Levels of Common Books[4]

Grade	Annual Expected Lexile Gains
2	300
3 - 5	100
6 - 7	70
8 - 9	50
10 - 11	25

Title	Author	Lexile
The Cat in the Hat	Dr. Seuss	260L
A Farewell to Arms	Ernest Hemingway	730L
The Hobbit	J.R.R. Tolkien	1000L
A Brief History of Time	Stephen Hawking	1290L
“iPad for Literacy” report	John Monahan	1540L

For purposes of having a meaningful and valid comparison with the Third Grade Cohort, Dr. Monahan worked with Dr. Karen Hussar, Achieve3000, Director of Research & Effectiveness to confirm the methodology of establishing the cohort and then the researchers worked together to identify variables and conduct statistical analyses that were meaningful when compared to a comprehensive national set of participants (this raw data set is proprietary and not publicly accessible). For example, a comparison of how well the third grade students did compared to the remainder of the iPad students is not valid because of the natural tendency for younger students to acquire a higher lexile gain than older students and that all the students were potentially impacted by the project. Whereas a comparison of the Third Grade Cohort to a National Third Grade Cohort of active users (n=95,389) was considered to be a meaningful comparison.

Key Findings

The key findings of the report focus on the Third Grade Cohort of the “iPad for Literacy” project.

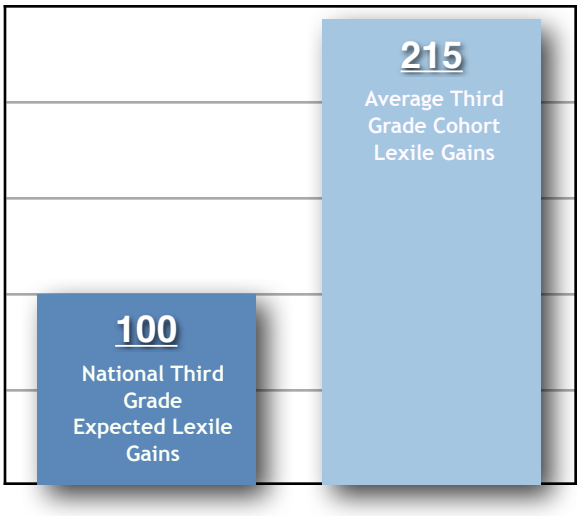
[3] http://www.lexile.com/about-lexile/lexile-overview/

[4] http://www.lexile.com/fab/

House District 6 iPad for Literacy Project

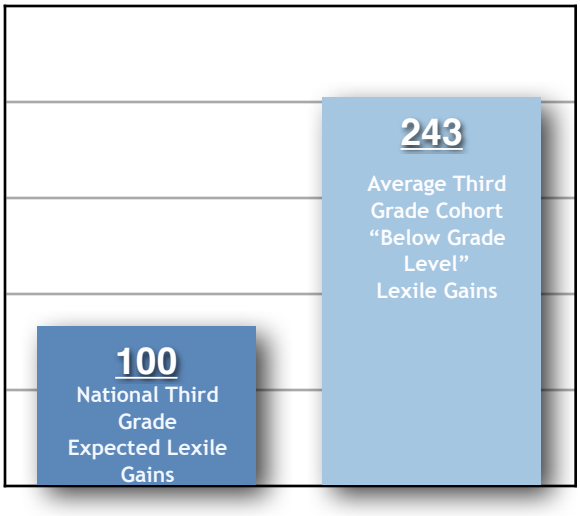
Bar Graph 1 - Third Grade Cohort "iPad for Literacy" Average Lexile Point Gains

Third Grade Cohort students who participated in the "iPad for Literacy" project exceeded the Nationwide expected Lexile growth of an average third grade student by 115 points - more than doubling the expected growth norm.

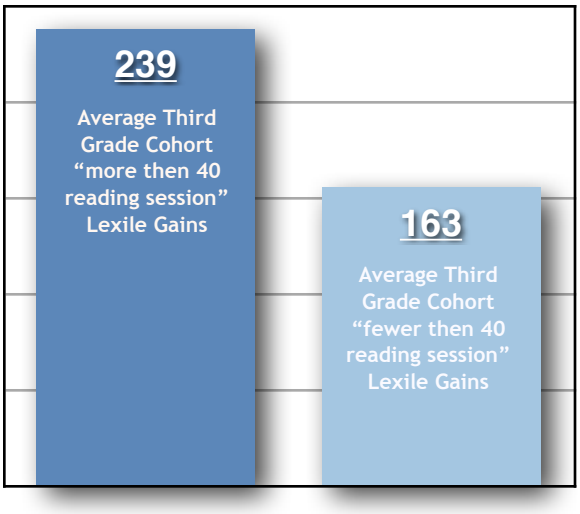


Bar Graph 2 - Third Grade Cohort "Below Grade Level" Average Lexile Point Gains

Third grade cohort students in the "iPad for Literacy" project who were behind in reading by two or more grade levels (84 of the 135 participants) improved on average 143 points beyond the Nationwide expected Lexile growth of an average third grade student - two-and-a-half times the expected national Lexile gains.

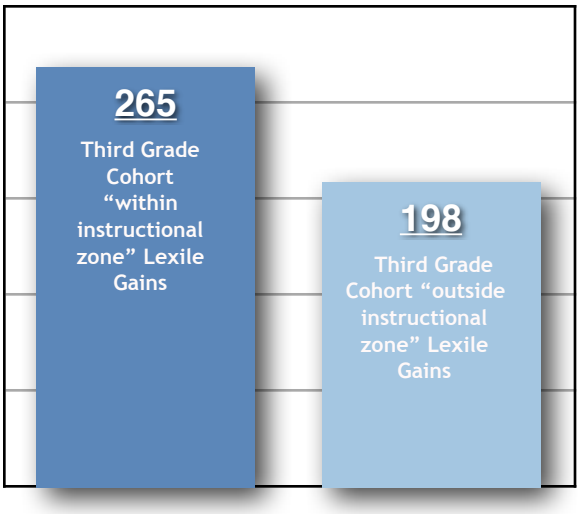


Bar Graph 3 - Third Grade Cohort "+ /- 40 Reading Sessions" Average Lexile Point Gains



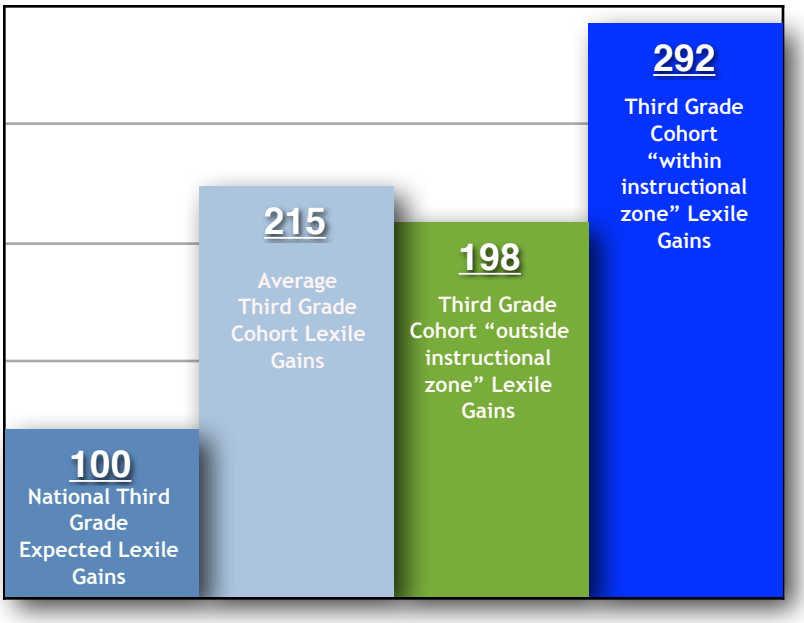
When a comparison of means was performed between the students who completed more or less than 40 reading sessions, a statistical significant difference was found, t(133) = 2.00, p. 0.05. Students who completed more than 40 reading sessions in the KidBiz3000 (n=92) outperformed students who completed fewer than 40 reading sessions (n=43) on average by 76 points.

Bar Graph 4 - Third Grade Cohort "Within/Outside Instructional Zone" Average Lexile Point Gains



When a comparison of means was performed between students who averaged between 65% and 90% on the multiple choice portion of the reading activities and students who were less than 65% or greater than 90%, there was a statistically significant found t(133) = 1.63, p=0.10. Students who were "within" (n=33) outperformed students who were "outside" (n=102) on average by 67 points.

Bar Graph 5 - Third Grade Cohort Comparison of "Within Instructional Zone" and "+ 40 Reading Sessions" to Average Lexile Point Gains



Third grade cohort students who participated in the "iPad for Literacy" project at least twice a week (+40 reading sessions) and averaged between 65% and 90% on the multiple choice portion of the reading activities (i.e., applied themselves and focused on the activity) had a gain of 292 points. This group of students exceeded their expected Lexile growth by an average of 192 points beyond their nationwide peers - approaching three times beyond the established growth norm.

Third Grade Cohort Average Total Logins Compared to Nationwide Average

Third Grade Cohort students logged into KidBiz3000 on average 126 times and engaged the software for 50 hours of usage, compared to the average third grade student across the country who logged in 47 times and log in 22 hours.

Third Grade Cohort Average Multiple Choice Activities Completed Compared to Nationwide Average

Third Grade Cohort students completed on average 83 KidBiz3000 Multiple Choice Activities, compared to the average third grade student across the country who 49 Multiple Choice Activities.

Limitations of the Study

While there are numerous indications that the school districts facilitated the hardware and software training with teachers, there are no reliable indicators that demonstrate the level to which the teachers understood what was being asked of them or that they conducted the program in the classroom as intended.

It is generally agreed that while the iPad is an intuitive device that students pick up quickly, the role of the teacher to smoothly integrate the iPad into the classroom instruction is a cumulative skill that is acquired over time. The distance delivered support assured that teachers had access to assistance and resources on a continuos basis, which mitigated the problem, but a longer study would be necessary for the teachers to fully integrate the devices in a thorough fashion.

The "iPad for Literacy" project is a multifaceted "treatment" that implemented training in Apple iPad hardware and software, hands-on instructional uses of the iPad in the classroom, software applications that resided on the iPad, and web-based differentiated software (KidBiz3000). The final results of the study have to be considered as a whole program and no one component of the project can take full credit for the final results.

In reviewing the raw data start and end dates, some of the schools and students were not exposed to the "treatment" for a long duration of time. In a future study, all students should be exposed to the treatment for a period long enough to validate that the program and not some other outside influence produced the results.

In a future project, ideally the study would engage a mixed methods evaluation procedure that triangulates the quantitative and qualitative findings and strengthen the confidence in the attribution and key findings of the project.