

# Exploring the Effectiveness of Online Education in K–12 Environments

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## Chapter 13

# Challenges and Opportunities in the First Year of a 1:1 iPad Initiative in a High- Poverty, Highly Diverse Urban High School

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### ABSTRACT

*The digital divide between technology-mediated instruction for students in low versus high socio-economic schools is a serious equity issue with repercussions for student learning. While there is a growing body of research on blended learning and 1:1 mobile devices, there seems to be little research on the potential of iPads to reduce disparity of access and impact student learning in high poverty schools. This chapter reports first year results of a 1:1 iPad project on teachers' attitudes and experiences and on high school students' technology access and use. Using iPads resulted in blended learning opportunities for some but not all students. Those who had an individually assigned iPad to use at school and home reported significantly higher satisfaction and proficiency with technology. These students also reported significantly greater use of online iPad applications and technology activities for instruction both during class and outside of school.*

### INTRODUCTION

The digital divide between technology-mediated instruction for students in low versus high socio-economic schools is a serious equity issue with repercussions for student learning. While there is a growing body of research on blended learning

and on 1:1 mobile devices, including the iPad in K-12 schools, there seems to be little research on the potential to reduce disparity of access and impact student learning in high poverty schools.

The purpose of this chapter is to investigate the degree to which a 1:1 iPad initiative in a high-poverty, diverse high school reduces the disparity

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of technology access, provides opportunity for blended learning, and improves student achievement. The author is working with an urban high school in the Pacific Northwest in a multi-year, mixed-method study of how students access and use individual iPads for learning and the resulting impact on these students' attendance, behavior, and academic achievement. This chapter focuses on two of the research questions: What is the impact of the 1:1 iPad project on teachers' attitudes and experiences with instructional uses of iPads? What is the impact of the 1:1 iPad project on students' access, skills and experiences, and use of technology?

## **THEORETICAL FRAMEWORK**

The National Education Technology Plan (U.S. Department of Education, 2010), calls on teachers to "leverage [technology] to provide engaging and powerful learning experiences and content, as well as resources and assessments that measure student achievement in more complete, authentic, and meaningful ways" (p. ix). Despite near universal access to high-speed Internet connections in most public school classrooms (NCES, 2006), the digital divide between the instructional opportunities for students in low and high socio-economic status (SES) classrooms remains. DeWitt (2007) found the curriculum and technology taught by teachers in higher SES schools was more intellectually rigorous and provided more opportunity for creativity and higher-order thinking skills than curriculum in lower SES schools. He concluded, "[Students'] social class appears to influence teacher beliefs about the implementation of instructional uses of computers" (p.300). More recently, Boser (2013) reported "students from high-poverty backgrounds were far less likely to have rigorous learning opportunities when it comes to technology" (p.2).

Similarly, Talley (2007) noted that searching, summarizing, and evaluating complex information on the Internet is more challenging than navigating social media. He cautioned: "Ignoring the literacy demands of new technologies may have especially dire consequences for children in disadvantaged homes and schools" (p. 315).

There seems to be little research on how iPads can reduce the digital divide in high-quality technology instruction and access experienced by low income, racially and linguistically diverse students. The New Media Consortium Horizon Report: 2013 K-12 Edition (Johnson, et al., 2013) forecasts mobile-learning as a "near-term horizon" technology to have a large impact and mainstream use in K-12 education within the next twelve months. The report also cites the importance of access to these devices as the equalizer for low-income students.

More research is also needed on the potential of technology and its measureable impact on K-12 student learning. According to recent federal guidelines (U.S. Department of Education, 2010), the ultimate result of technology integration must be an increase in student achievement. Three meta-analyses of published articles on mobile learning provide an overview of research findings in the last decade. Pollara and Broussard (2011) reviewed 11 studies published between 2005 and 2011 and reported that the benefits of using mobile devices included increased student achievement, productivity, motivation, and engagement.

Wu et al. (2012) conducted a meta-analysis and synthesized 164 studies from 2003-2010. They found that mobile phones and PDAs were the most widely used mobile devices, noted in 75% of the studies. Over half of the studies evaluated the effects of mobile learning, and the majority indicated positive outcomes. However, while over half of the studies examined mobile learning in higher education, research in elementary and sec-

ondary schools represented only ¼ of the studies. This is not surprising as K-12 schools have been slow to embrace mobile learning and until recently restricted students' use of mobile phones.

Most recently, Liu et al. (2014) reviewed 63 studies of mobile learning in K-12 schools from 2007 to present. The authors concluded that existing research was primarily exploratory and focused on understanding the educational affordance of using mobile devices in instructional practices. Most of the studies were conducted on a small scale with a single class. The majority of the schools were located in Asia with only seven schools in the United States. Slightly over half of the articles focused on mobile learning in elementary schools while only 1/5 reported mobile learning in high schools. Liu and colleagues (2014) also noted that mobile phones and PDAs were most often studied. Researchers examined student perceptions of technology, participation, and engagement and described learning outcomes. Nine of the 13 articles that compared the effectiveness of mobile learning to traditional learning showed positive learning gains for students who used mobile technology compared to students without mobile access. The authors concluded, the "ability to access content and communication with peers and teachers at any time proved to be an important benefit of using mobile devices" (p.13).

Among the articles in the Liu et al. (2014) meta-analysis, several are especially pertinent to this chapter. In an experimental study, Brown (2009) found that using mobile phones to pre-teach vocabulary significantly improved ninth grade students' reading comprehension and motivation over students who received traditional instruction. Hwang and Chen (2012) reported that when English Learner students used PDAs, they increased their English language practice and improved language acquisition. The school-provided mobile devices extended learning from the school to the home and resulted in positive outcomes. Kalloo

and Mohan (2011) found that using a mobile learning math application on their smart phones resulted in high school students' improved math performance. Ferrer, Belvis and Palmes (2011) found that lower SES students benefitted more than higher SES students from 1:1 tablet PC's in terms of achievement, and the technology helped to reduce socio-economic inequalities among the elementary students.

Several articles examined the impact of using mobile learning to increase student and teacher communication. Hung, Lin and Hwang (2010) found that when instructors provided individualized feedback and support for students while they used PDAs in guided and independent science field observations, students' skills improved. Rau, Gao and Wu (2008) reported the positive effects of instant messaging on student-teacher relationships and high school students' motivation.

Despite the accelerating purchase of iPads for use in K-12 schools (Kaufman, 2012), there has been little scholarship on the effectiveness of iPads for learning and teaching (Government of Alberta Minister of Education, 2011). Norris, Hossain and Solloway (2012) examined 1:1 laptop initiatives and reported that when computing devices are used as "essential" curriculum tools, student achievement increased; however, when the devices are "supplemental" there is no impact on student learning. However, most of the research on 1:1 iPad initiatives in K-12 education focuses on teacher reports of instructional applications of iPads and student reports of engagement and satisfaction (NAACE, 2012; Reid & Ostashewski, 2011; Virginia Department of Education, 2011). According to a recent large study of 1:1 initiatives in 19 European countries, "only a very few identified improved learning outcomes as a project rationale" (Balanskat et al., 2013, p. 19).

Recently, Lundy (2013) conducted an experimental study comparing the use of digital and print texts in high school social studies classrooms and

found that use of the digital text with an iPad supported high poverty students' technological fluency and creation of more sophisticated learning products. The iPads also provided differentiation for multiple learning styles, a more supportive reading experience and supported increased student engagement for racially diverse students.

## **METHODOLOGY AND DATA SOURCES**

The Technology Immersion Pilot (TIP) is a multi-year, mixed-method study involving concurrent and interactive qualitative and quantitative data (Creswell and Plano Clark, 2011) on the impact of providing a 1:1 mobile device (iPad) to each ninth and tenth grade student in a high poverty, urban high school. "Nearly 80% of the students qualify for free and reduced lunch, 30% meet the federal definition of homeless, 68% are from an identified minority group, and only 37% are completing the necessary credits for graduation" (District, 2010, p.5). The TIP is designed to improve the quality of and access to technology tools and resources, which are essential to the curriculum and may result in greater student achievement.

The district technology initiative is situated within the context of blended learning. Staker and Horn (2012) define blended learning as "a formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace and at least in part at a supervised brick-and-mortar location away from home" (p.2). This chapter describes a high school that uses a "station-rotation model" of blended learning (pp. 8-9). Within an individual class period students are directed by the teacher to use iPads to complete a variety of online activities; at other times during the class period students are engaged in small group or whole class instruction without the iPads.

## **Sample and Data Collection Procedures**

The sample for the research study includes all 426 students who were enrolled in ninth and tenth grade in the 2012-2013 academic year. Detailed demographics are included in Table 2. The qualitative data sources include classroom observation notes (Appendix 1) and a teacher focus group (Appendix 2). The quantitative data sources include student technology skills and experience surveys conducted at the beginning and end of the school year (Appendix 3); student technology use surveys conducted in spring (Appendix 4); a teacher survey (Appendix 5), and district confidential data for ninth and tenth grade students enrolled in 2012-13. These data include identification number, demographics, ELL/home language status, special education status, attendance rates, discipline records, standardized assessment results, GPA and high school credits in core academic subjects.

During the 2011-2012 academic year, the author observed iPad training for the teachers, assisted the district instructional technology department in refining the evaluation parameters for the grant, helped develop the student and teacher surveys, and created the focus group and classroom observation protocols. During the 2012-2013 academic year, the author conducted nine classroom observations of student use of iPads, facilitated a focus group with seven classroom teachers and began preliminary data analysis of student technology experience and use surveys and teacher surveys.

High school technology staff administered a survey of technology experience, skills, and attitudes to each ninth and tenth grade student at the beginning and end of the 2012-2013 school year (Appendix 3). Beginning in January, 2013, the high school teachers were encouraged to have students complete a brief online survey of their iPad use at the end of each class when iPads

were used for instruction (Appendix 4). District technology staff administered a teacher survey in fall, 2012 (Appendix 5).

## **Data Analysis Procedures**

The first research question investigates the impact of the 1:1 iPad project on teachers' attitudes and experiences with instructional uses of iPads. Teachers completed an anonymous survey in fall, 2012, about their familiarity with the iPad and their attitudes toward integrating technology as well as their frequency of technology use and observation of student behavior when using technology in the classroom. Classroom observations and a teacher focus group provided additional data. Descriptive and correlational analysis was used to discover statistical relationships in the survey data, and classroom observation and teacher focus group notes were examined for possible confirmation of the teacher survey findings.

The second research question examines the impact of the 1:1 iPad project on students' access, skills and experiences, and use of technology. Three data sets helped to answer this question. The first is assignment of a Take Home iPad (THP) that could be used by the student throughout the school day and at home. In order to have a THP the student and a parent/guardian had to sign a technology consent form and pay a \$40 insurance fee. Students who did not have a THP could use an iPad or laptop in the classroom, when directed to do so by the teacher. Chi square analysis was conducted to determine if there were significant differences by gender, race, ethnicity, home language, and identified academic needs between the two groups: those who had a THP and those who did not.

The second component of this research question focused on students' responses to the technology skills and experiences survey (Appendix 3).

Responses were reported on a four point Likert scale. The survey included self-report of overall proficiency and satisfaction with use of the iPad. Student experiences included questions on the helpfulness and ease in using the iPad for academic tasks at school and the frequency of iPad use at school and at home for various tasks.

The author hypothesized students who were assigned a Take Home iPad (THP) and could use it throughout the school day and at home would report greater satisfaction, proficiency, frequency and ease of use and helpfulness of the iPad than students who could only use technology in the classroom when prompted by the teacher. A *t* test was used to compare the means for the two groups to determine if the differences in technology skills and experiences between students who had a THP and those who did not were statistically significant.

The third component of this research question focused on students' responses to the technology use survey (Appendix 4). The researcher created an index of the number of reported technology uses including types of applications and purposes of iPad uses from the surveys. For each student who completed one or more technology use surveys, the total number of applications (e.g., Web Browser, Educreations) was combined with the total number of purposes (e.g. created multimedia presentation, did research) to create a numerical index of Technology Use. There were 30 different applications that students could report and 14 different purposes for using the iPad in class with a possible index ranging from 0-44. The author hypothesized that students who were assigned a Take Home iPad would report greater use of iPads in their classes, including more applications and a greater variety of purposes. A *t* test was used to compare the means for the two groups to determine if the differences in technology use reported by students who have a THP and those who do not were statistically significant.



## PRELIMINARY FINDINGS

### Impact of the 1:1 iPad Project on Teachers' Attitudes and Experiences with iPads

In early fall, 2012, teachers were asked to complete a survey (Appendix 5) about their attitudes and experiences with iPads in the classroom. The survey was conducted when most of the iPads were still assigned to a classroom cart, not to individual students. A total of 38 teachers completed the survey (75% response rate) representing math, science, English, social studies, ESL, special needs, and other subjects. Two-thirds of the teachers reporting being familiar or very familiar with iPads, while 72% reported feeling comfortable or very comfortable integrating technology into their classrooms. Interestingly, while 62% felt they had received enough professional development to use the iPads in their classroom, 84% wanted additional training.

The majority of teachers (77%) reported they integrated technology into their lessons either once a week or two to three times a week while 20% reported they integrated technology daily. However, the survey question did not specify if technology was being used by the teacher or the students or both.

The survey also asked teachers to rate student behavior, engagement, writing, and higher order thinking when students used technology in their

classes. Overall, the majority of teachers (87%) reported behavior problems decreased or there was no behavior change when students used technology. Over 90% of the teachers reported that student engagement increased when students used technology. However, only about ½ of the teachers (53%) reported student writing increased when students used technology, and still fewer (46%) reported student higher order thinking increased when students used technology.

A chi square test indicated that teacher responses differed significantly by subject area when reporting student engagement with technology (Table 1). ESL/SPED, math, and science teachers reported higher student engagement when using technology than teachers of English, social studies, or other subjects. However, there were no other significant differences by subject area.

There were significant associations between teachers' comfort with integrating technology in the classroom and their report of student behavior, higher order thinking, and student writing when using technology (Table 1). Teachers who were most comfortable integrating technology reported student behavior problems decreased when their students used technology. Similarly teachers who were most comfortable integrating technology also reported student higher order thinking increased while teachers who were less comfortable reported no change in student higher order thinking. Finally, teachers who were most comfortable integrating technology also reported student writing increased

*Table 1. Student response to technology by teacher attribute (N= 38)*

Student Response	Teacher Attribute	Chi-Square	p-value
Student Engagement	Subject Area	$\chi^2 (18) = 47.41$	<.001
Behavior Problems	Confidence	$\chi^2 (6) = 13.74$	<.05
Higher Order Thinking	Confidence	$\chi^2 (6) = 14.19$	<.05
Student Writing	Confidence	$\chi^2 (9) = 20.47$	<.05
Student Writing	Frequency of Tech Integration	$\chi^2 (9) = 17.25$	<.05



when using technology. Not surprisingly, teachers also reported student writing increased when they integrated technology more frequently.

Seven teachers responded to the invitation to participate in a focus group in April, 2013 (Appendix 2) representing English, ESL, math, science, and social studies. Five of the teachers had served on the technology cadre that year and were considered by the technology coach to be early technology adopters who had explored and used iPads in a variety of ways with their students. Key ideas from the taped, transcribed discussion focused on strengths and limitations of the iPad project, effects of the iPads on student behavior and attendance, the need to reduce the disparity of student access, and increase technology professional development.

Teachers were enthusiastic about the variety of applications which engage students in new ways and allow students to proceed at their own pace and self-differentiate. For example one teacher reported: "Some students are finding ways to engage in the content in a way that is better for them." The iPads also supported organization of student materials and resources, promoted communication between teachers and students, and enhanced formative feedback during class.

Limitations of the iPads focused on three areas: access, technology training for students, and professional development for teachers. Teachers were frustrated by the inability to implement systems they had suggested to ensure every student would have a personal iPad. Also the high school student population has a higher than average turn-over rate, and teachers were concerned about the lack of technology instruction for students, especially those who entered the school midyear. They suggested a weekly orientation for new students with the technology staff to set up the iPad and provide basic instruction.

Recognizing that the learning curve for teachers and students is steep, teachers were concerned about the lack of agreement on common applications to be used school-wide. Teachers

recommended increasing technology professional development to twice a month, focusing on a few iPad apps that everyone would learn with substantial time to practice using an app after it was introduced. One teacher whose students used iPads frequently commented, "I get the impression that the administration thinks we have a training and then it's solved. They don't understand the complexity of using the iPads."

Teachers noted there was less distracting behavior and fewer side conversations, but some students were still off task with iPads. Teachers definitely needed to incorporate appropriate iPad use into classroom management routines. They also acknowledged, "Part of our job is to teach kids to be successful with technology." There were minimal effects on student attendance: "Kids who were able to take an iPad home have family support and good attendance. Kids who miss a lot of class don't have a Take Home iPad."

Overall teachers viewed the iPads as a positive enhancement. "Students are coming to [school] for iPads; they are a sustainability device." Noting that the high school had multiple reforms that year (new humanities curriculum, diversity, technology), they recommended a sustained focus on instructional strategies using iPad applications. "Systemic reform takes three years; we need two more years of sustained effort."

Classroom observations (Appendix 1) in spring were used to confirm the teacher survey and focus group data. Seven teachers responded to the request to observe their classes in English, social studies, science, math, and ESL. During all nine observations students used iPads for at least part of a class period. In general, most students were on task the majority of the time, although this varied with the classroom management skills of the teacher.

Students accessed teacher websites (Weebly, Schoology, Edmodo) for instruction, resources, and learning tasks. Frequently students used Google docs to write essays and Google forms to respond to quizzes and took notes with Notability.

They also used their iPads to watch podcasts or videos and scanned QR codes to access online references. Students used some subject-specific applications such as Geometers Sketchpad.

Those students who had individually assigned iPads (THP) could and, according to teacher comments, did continue to work on assignments at home. They frequently used their iPads to look up definitions and search for information during class.

Several teachers used the application Doctopus to push out assignments to students and to review and comment on their work. Teachers also used Explain Everything and Educreations to support lectures. Most of these applications were modeled in the iPad training the previous year and during monthly technology cadre professional development. The only class that used the iPad for drill and practice was the ESL class for newcomer immigrant students who did not speak English and were using the Quizlet App to support vocabulary development. These students also used Raz-Kids to access e-books and improve reading comprehension.

In some classes there were missed opportunities to incorporate iPads. For example students were asked to create a graphic organizer about the main themes of a novel on paper, rather than using a drawing application. In many classes students wrote notes in their own paper journals rather than on iPads because the majority of the students did not have their own THP.

### **Impact of the 1:1 iPad Project on Students' Access, Attitudes, and Experiences with Technology**

The original intent of the project (District, 2010) was for every ninth and tenth grade student to have a personally assigned iPad that could be used at school and at home. Given the delay in implementing check-out procedures at the beginning of the 2012-13 school year and the requirements for allowing students to take an iPad home, only 40% of the students (171) were assigned a Take Home

iPad (THP) by April, 2013. The remaining 60% of students had the opportunity to use an iPad on a cart in their humanities classrooms and in some math and science classrooms. However, students could not take these iPads out of the assigned classroom to use in other classes or at home. The unintended consequence of the iPad distribution procedures was that students' opportunities for blended and online learning were limited. Staff acknowledged the initial roll-out was problematic. During the spring focus group teachers commented: "We were supposed to have the iPads the first six weeks." "We lost momentum because kids didn't get their iPads right away."

### **Inequity of Assignment to iPads by Disaggregated Groups**

Disaggregated data on iPad assignment by student grade level, gender, race, ethnicity, first language, academic needs, and GPA indicated some differences in iPad access across categories. Table 2 reports Chi Square analysis of disaggregated iPad assignment data during the 2012-2013 school year. There was a significant association between grade level and iPad assignment. Tenth graders were somewhat less likely to be assigned a Take Home iPad (THP) than ninth graders. There was also a significant association between race and iPad assignment. In general, white students were more likely to be assigned a THP than non-white students. While there was not a significant association between students who had an IEP or were identified TAG and their iPad assignment, there was a small significant association between ESL services and iPad assignment. Students who received ESL services were somewhat more likely to be assigned a THP compared to those who were not receiving ESL services. In the focus group interview an ESL teacher commented: "For my sheltered class it has helped some of them because otherwise they would never have access to an iPad. They carry that iPad around and it is amazing. We use the iPads almost every day."

## Challenges and Opportunities in the First Year of a 1:1 iPad Initiative

Table 2. Assignment of Take Home iPads (THP) by student category (N= 426)

Student Category	THP	No THP	Chi-Square	p-value
<b>Grade</b>				
9th	113 (46%)	133 (54%)		
10th	58 (32%)	122 (68%)	$\chi^2 (1) = 8.13$	<.01
<b>Gender</b>				
Female	79 (44%)	102 (56%)		
Male	92 (54%)	153 (62%)	$\chi^2 (1) = 1.61$	.205
<b>Ethnicity</b>				
Hispanic	60 (41%)	87 (59%)		
Non-Hispanic	111 (40%)	168 (60%)	$\chi^2 (1) = .04$	.836
<b>Race</b>				
White	107 (45%)	133 (55%)		
Non-White	64 (34%)	122 (66%)	$\chi^2 (1) = 4.52$	<.05
<b>First Language</b>				
English	101 (39%)	159 (61%)		
Spanish	47 (43%)	63 (57%)		
Other Lang	22 (42%)	30 (58%)	$\chi^2 (3) = .97$	.808
<b>Special Education</b>				
IEP	41 (48%)	45 (52%)		
No IEP	130 (38%)	210 (62%)	$\chi^2 (1) = 2.55$	.111
<b>ELL Status</b>				
ELL Service	22 (55%)	18 (45%)		
ELL Monitor	12 (40%)	18 (60%)		
ELL Refused Service	0	7 (100%)		
Not ELL	137 (39%)	212 (61%)	$\chi^2 (3) = 8.48$	<.05
<b>TAG</b>				
Yes	12 (46%)	14 (54%)		
No	159 (40%)	241 (60%)	$\chi^2 (1) = 4.17$	.519
<b>Academic Priority</b>				
Yes	88 (35%)	164 (65%)		
No	83 (48%)	92 (52%)	$\chi^2 (1) = 7.0$	<.01
<b>GPA Fall 2012</b>				
0-.99	6 (21%)	22 (76%)		
1-1.99	26 (24%)	81 (76%)		
2-2.99	73 (48%)	80 (52%)		
3-3.99	54 (46%)	63 (54%)		
4.0	12 (67%)	6 (33%)	$\chi^2 (4) = 25.86$	< .001

There was also a significant association between identification as an Academic Priority student and iPad assignment. Students thus identified were less likely to be assigned a THP compared to students who were not so identified. While the district did not provide free/reduced lunch data on individual students due to FERPA regulations, Academic Priority has been considered a proxy for low income. In 2010 the district established the Academic Priority Zone to support elementary and secondary students with the greatest needs to help close the achievement gap for race and poverty. The high school in this study is included in the Academic Priority Zone because in prior years the school failed to make adequate yearly progress and a high percentage of the students (nearly 80%) qualified for free/discounted meals.

Finally there was a strongly significant association between students' GPA at the end of fall semester and their iPad assignment. Students with a GPA of 2.00-3.99 were twice as likely as those with lower GPA's to be assigned a THP, and students with a 4.0 GPA were three times more likely as those with GPA's below 2.00 to have a THP. A t-test of individual students' GPA and iPad assignment confirmed these results. Thus an unintended consequence of the iPad distribution was the inequity of opportunity to participate in online learning both during and after the school day.

In the focus group teachers commented that the large percentage of students who did not have a take home iPad (THP) was a limitation of the project. One teacher noted: "Kids who do have an iPad checked out can use Notability; they can really make it their own. It's more complex for the students without an iPad assigned to take home." Another teacher commented: "There are fundamental shifts out there, but the problem is not all our kids have them [iPads]. I have 15 or 16 for the department in my room. It needs to be the student's iPad and take ownership of it."

## **Differences in Student Technology Attitudes and Frequency of Use**

When students were assigned an iPad, they were to complete an online survey (Appendix 3) regarding their access, satisfaction, proficiency, and experience with technology. The survey was intended to serve as a pre-post assessment each year of the project. However, the initial survey was not administered to every student at the beginning and end of the year as planned. The fall survey was completed by 243 students (57% response rate), but only 106 students (25% response rate) completed the spring survey. The difference in response rates was due to lack of staff/faculty support for administering the online surveys during class time in the spring. Survey results suggested differences between students who were assigned a take home iPad (THP) and those who could only use an iPad or laptop in the classroom when assigned by the teacher.

Of 298 individual students who responded to the survey in fall and/or spring, 81% reported access to a home computer, 84% reported Internet access at home; while 78% reported wireless Internet access at home. These statistics were somewhat higher than the district technology staff had previously researched (personal communication, July 17, 2013). Chi square analysis revealed no significant association between the type of iPad assignment (THP) and students' access to technology at home.

However, there were significant associations between THP assignment and students' technology experiences (Table 3). Students who were assigned a THP were more satisfied with using the technology than those who did not have a THP. Similarly, students with a THP also reported a higher level of proficiency with technology than those who did not.

There was a highly significant association between THP assignment and frequency of use.

Students who had a THP reported more frequent use of the iPads at school. In the classroom observations, the author noted that students who had a THP used the iPad to access information for group projects and to complete homework in other classes when the rest of the class was not using the iPads on a cart. Since only the ninth and tenth grade humanities classes and a few math and science classrooms had iPad carts, students who had a THP were at an advantage. These students could benefit from the opportunity to access digital content and instruction online even if there were no iPads or laptops available in the classroom.

Note. 243 students took the online survey in fall 2012 representing 57% of the ninth and tenth grade students. Due to problems with survey

administration only 106 students took the online survey in spring 2013 representing 25% of the ninth and tenth grade students.

### **Differences in Student Report of Usefulness of the iPad**

Table 4 summarizes students' report of the degree to which the iPad was helpful in completing academic tasks. Preliminary survey results suggest significant differences between the fall and spring administration for students with a THP and those without.

In the fall, students' responses about the iPad's helpfulness for academic tasks did not differ significantly between those who had a THP and

*Table 3. Technology satisfaction, proficiency, and frequency of use compared to iPad assignment*

	N	Mean	Std. Dev.	Std. Error Mean	T-Test
Technology Satisfaction 1=Not Satisfied 4= Very Satisfied					
No THP Fall	140	3.49	.62	.05	
THP Fall	103	3.64	.54	.05	t(233.87)= -2.08 p=.04
No THP Spring	67	2.99	1.01	.12	
THP Spring	38	3.68	.47	.08	t(100.15)= -4.83 p=<.001
Technology Proficiency 1= Not very Good 4= Very Good					
No THP Fall	140	3.28	.71	.06	
THP Fall	103	3.56	.59	.06	t (241)= -3.31 p= <.01
No THP Spring	68	3.21	.84	.10	
THP Spring	38	3.53	.73	.12	t (86.31)= -2.06 p=<.05
Frequency of iPad Use at School 1= no classes/week 2= 1-2 classes/week 3= 3-5 classes/week 4= every class/week					
No THP Fall	140	2.16	1.00	.08	
THP Fall	103	2.20	1.07	.11	t (241) = -.296 p= .77
No THP Spring	68	1.96	.44	.05	
THP Spring	38	2.50	.83	.13	t (104)= -4.42 p=<.001

# Challenges and Opportunities in the First Year of a 1:1 iPad Initiative

Table 4. Helpfulness of iPad for academic tasks compared to iPad assignment

Academic Task 1= not helpful 2= somewhat helpful 3=helpful 4=very helpful	N	Mean	Std. Dev.	Std. Error of Mean	t-Test
iPad Helpful with Homework					
No THP Fall	140	3.10	.84	.07	
THP Fall	103	3.20	.72	.07	t(241)= -1.01 p=.31
No THP Spring	68	2.52	1.03	.12	
THP Spring	38	3.26	.76	.12	t(96.02)=-4.27 p=<.001
iPad Helpful with Writing Assignments					
No THP Fall	140	3.18	.81	.07	
THP Fall	103	3.22	.77	.08	t(241)= -.436 p=.66
No THP Spring	68	2.96	1.06	.13	
THP Spring	38	3.58	.55	.09	t(103.64)= -3.99 p= <.001
iPad Helpful with Communicating/ Collaborating					
No THP Fall	140	2.99	.83	.07	
THP Fall	103	3.15	.80	.08	t(241)= -1.51 p= .13
No THP Spring	68	2.62	1.04	.13	
THP Spring	38	3.18	.83	.14	t(91.06)= -3.07 p=<.01
iPad Helpful with Organizing Schoolwork					
No THP Fall	140	3.06	.86	.07	
THP Fall	103	3.01	.86	.08	t(241)= .49 p= .63
No THP Spring	68	2.29	1.02	.12	
THP Spring	38	3.12	.91	.15	t(104)= -4.21 p=<.001
iPad Helpful with Doing Research					
No THP Fall	140	3.61	.63	.05	
THP Fall	103	3.58	.68	.07	t(241)= .29 p=.77
No THP Spring	68	3.59	.67	.08	
THP Spring	38	3.66	.53	.09	t (104)= -5.48 p=.58
iPad Helpful with Staying Motivated					
No THP Fall	140	3.08	.87	.07	
THP Fall	103	3.15	.78	.08	t(241)= -.62 p= .54
No THP Spring	68	2.56	1.03	.12	
THP Spring	38	3.18	.87	.14	t(104)= -3.17 p= <.01
iPad Helpful to Access Information					
No THP Fall	140	3.50	.67	.06	

continued on following page

Table 4. Continued

Academic Task 1= not helpful 2= somewhat helpful 3=helpful 4=very helpful	N	Mean	Std. Dev.	Std. Error of Mean	t-Test
THP Fall	103	3.58	.63	.06	t(241)= -9.68 p=.33
No THP Spring	68	3.23	.77	.09	
THP Spring	38	3.50	.65	.11	t(104)= -1.79 p=.08

Note. 243 students took the online survey in fall 2012 representing 57% of the ninth and tenth grade students. Due to problems with survey administration only 106 students took the online survey in spring 2013 representing 25% of the ninth and tenth grade students.

those who could only use an iPad in the classroom. However, by spring there was a significant association between iPad access and helpfulness for the following academic tasks: homework, writing assignments, communication and collaboration, organizing school work, and staying motivated and engaged. Students who had a THP reported a significantly higher mean score for the iPad's helpfulness for these academic tasks. However, there was not a significant association in the spring between iPad access and helpfulness for doing research and accessing information. In the classroom observations the author noted these online activities were most frequently completed at school.

## Differences in iPad Use in School

Table 5 summarizes the frequency of iPad use in school on the student technology use survey (Appendix 4) from January to May, 2013. Over 550 student technology use surveys were completed by 204 individual students, representing 48% of the ninth and tenth grade students in the sample. A *t* test indicated a statistically significant difference between students who had a THP and those who did not. The mean score for total number of technology applications reported by students with a THP was double the mean score for students without a THP. Similarly, the mean score for technology activities by students with a THP

Table 5. Technology use in school compared to iPad assignment N=150

	N	Mean	Std. Dev.	Std. Error of Mean	t-Test
iPad Applications					
No THP	85	2.12	1.94	.21	
THP	65	4.59	4.70	.57	t (85.17) = -4.07 p=<.001
iPad Uses					
No THP	85	5.29	4.91	.53	
THP	65	9.74	12.28	1.49	t (84.10) = -2.81 p= .006
Combined iPad Application/ Use Index					
No THP	85	7.41	6.02	.65	
THP	65	14.32	16.06	1.95	t (82.06) = -3.37 p=.001



### ***Challenges and Opportunities in the First Year of a 1:1 iPad Initiative***

was almost twice that of students without a THP. Also, the mean Technology Use score for students with a THP was twice that of students who did not have a THP. The survey results clearly indicate that students who had a THP had a significantly greater opportunity to benefit from blended and online learning opportunities.

Students reported using eleven different iPad applications. The top four were web browser; presentation tools, e.g., Educreate, Explain Everything and Slide Shark; Google tools; and learning management systems, e.g., Schoology and Edmodo. Students also reported using note taking applications such as Notability and assessment applications, e.g., Socrative and Quizlet.

Students reported 15 purposes for using the iPad applications. Doing research and using references was reported most frequently, followed by reading, writing, taking notes, and producing media, e.g. taking digital photos and videos. Students also reported creating multimedia pre-

sentations, listening to music and playing games, working on collaborative projects, and to a lesser extent watching videos. Students reported using their iPads to solve math or science problems or communicate by email least often.

In 2012-2013, students from a minority of teachers accounted for the majority of technology use surveys. Of the 559 surveys completed, six out of 22 teachers whose students completed the survey accounted for 79% of the surveys. Two of the teachers taught ESL, one each taught science, math, social studies and English. Students were most likely to report using iPads in one science teacher's class, but not in other science teachers' classes. This science teacher was a member of the technology cadre and the most enthusiastic proponent of iPads as instructional tools. Students were also more likely to report using iPads in their ESL classes and in one of the math teacher's classes. These teachers were also members of the technology cadre.

*Figure 1. iPad applications by percent*

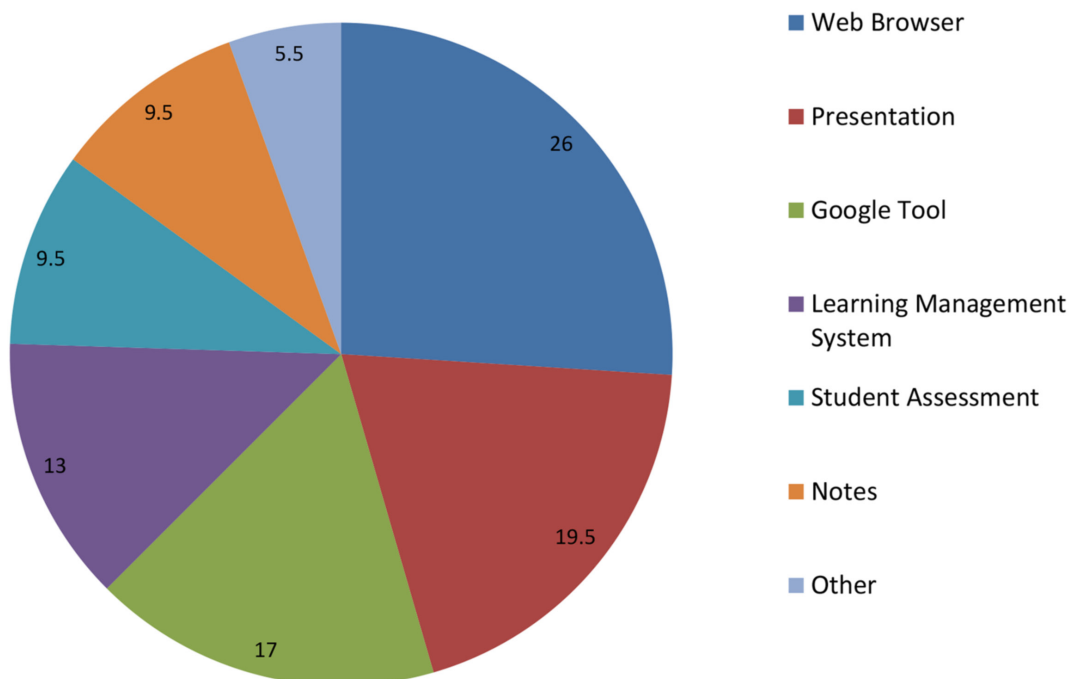
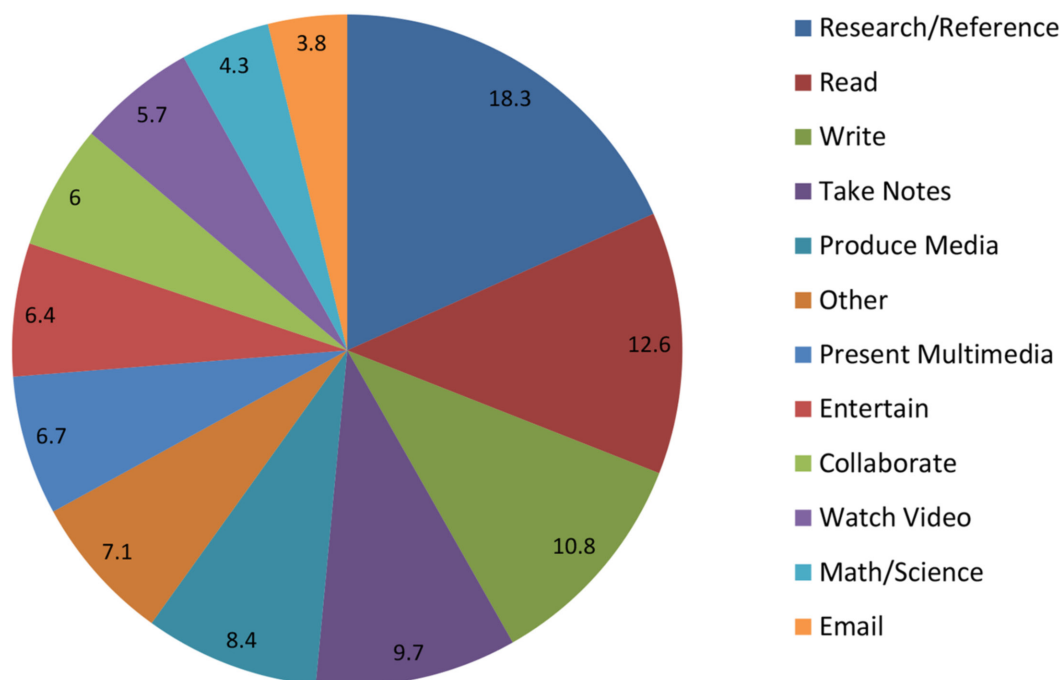


Figure 2. Uses of the iPad by percent



### Differences in iPad Use Outside of school

Table 6 summarizes students' report of the frequency of iPad use outside of school. There were significant differences in students' responses between the fall, 2012 and spring, 2013 surveys. On seven of the eight indicators, there were no significant differences in the fall between students who had a THP and those who used an iPad from the classroom cart. However, the fall survey does indicate a small significant association for using the iPad outside school for social media.

On the spring, 2013 survey, there was a significant association between iPad access and all eight indicators. Students who had a THP reported significantly higher use of the iPad outside of school for doing homework, communicating and collaborating, creating videos and presentations, accessing information, watching videos, playing

games, listening to music, and using social media than did students who could only use the iPad on a classroom cart.

Overall, 29% of the students who completed the technology experience survey reported they used their iPads (or laptops) at home to do homework 2-3 times/week while another 18% reported they used technology to do homework every day. There was a difference between students who had a THP and could use the iPad at home versus those who could only use an iPad at school. In general, students with a THP reported using iPads to do homework more often; 47% reported 2-3 times a week, and another 34% reported using an iPad to do homework every day. However, only 18% of students without a THP reported using technology to do homework 2-3 times per week and only 10% reported using technology to do homework daily. Thus the opportunities for online learning were limited for students without a THP.

# Challenges and Opportunities in the First Year of a 1:1 iPad Initiative

Table 6. Frequency of iPad use outside of school compared to iPad assignment

iPad Use 1= never 2= once/week 3= 2-3times/week 4= every day	N	Mean	Std. Dev.	Std. Error of Mean	t-Test
Do Homework					
No THP Fall	140	2.71	1.13	.10	
THP Fall	103	2.64	1.20	.12	t(241)= .488 p= .63
No THP Spring	68	1.81	1.07	.13	
THP Spring	38	3.13	.78	.13	t(96.82)= -7.32 p=<.001
Communicating/ email, blog, chat					
No THP Fall	140	2.59	1.11	.09	
THP Fall	103	2.57	1.11	.11	t(241)= .09 p=.93
No THP Spring	68	1.75	1.04	.13	
THP Spring	38	3.03	1.00	.16	t(104)= -6.14 p= <.001
Create videos, presentations					
No THP Fall	140	2.22	1.05	.09	
THP Fall	103	2.18	1.01	.10	t(241)= .28 p= .78
No THP Spring	68	1.77	1.07	.13	
THP Spring	38	2.53	.95	.15	t(104)= -3.66 p= <.001
Find information					
No THP Fall	140	2.99	1.03	.09	t(201.61)= .57 p=.57
THP Fall	103	2.90	1.18	.12	
No THP Spring	68	2.15	1.21	.15	
THP Spring	38	3.45	.65	.10	t(103.83)= -7.20 p=<.001
Watch videos					
No THP Fall	140	2.90	1.11	.09	
THP Fall	103	2.72	1.18	.12	t(241)= 1.23 p=.22
No THP Spring	68	1.87	1.09	.13	
THP Spring	38	3.32	.74	.12	t(100.06)= -8.11 p= <.001
Play games					
No THP Fall	140	2.56	1.15	.10	
THP Fall	103	2.45	1.16	.11	t(241)= .79 p=.43
No THP Spring	68	1.77	1.17	.14	
THP Spring	38	3.03	.82	.13	t(98.64)= -6.47 p= <.001
Listen to music					
No THP Fall	140	3.09	1.17	.10	
THP Fall	103	2.89	1.25	.12	t(241)= 1.27 p=.20
No THP Spring	68	1.94	1.21	.15	
THP Spring	38	3.13	1.04	.17	t(104)= -5.10 p= <.001

continued on following page

Table 6. Continued

iPad Use 1= never 2= once/week 3= 2-3times/week 4= every day	N	Mean	Std. Dev.	Std. Error of Mean	t-Test
Use social media					
No THP Fall	140	2.91	1.20	.10	
THP Fall	103	2.53	1.22	.12	t(241)= 2.37 p=<.05
No THP Spring	68	1.77	1.15	.14	
THP Spring	38	2.92	1.08	.17	t(104)= -5.09 p=<.001

Note. 243 students took the online survey in fall 2012 representing 57% of the ninth and tenth grade students. Due to problems with survey administration only 106 students took the online survey in spring 2013 representing 25% of the ninth and tenth grade students.

## DISCUSSION

### Opportunities Provided by 1:1 iPad Project

In the first year of the project, the 1:1 iPad initiative resulted in blended learning opportunities for some, but not all students. Classroom observations, the teacher focus group, and student surveys indicated that in some classrooms students were engaged in a variety of online activities. Moreover, the 40% of students who had an individual THP could choose when and where to complete assignments and also to extend their learning. According to Liu et al. (2014) expanding learning opportunities beyond the schoolhouse and school day is one of the key benefits of mobile devices. However, the iPad distribution significantly limited expanded online learning opportunities for students who did not have a Take Home iPad. Thus a key affordance of mobile devices was underutilized.

Student surveys confirmed that students used iPads most often to research information, read, write, take notes, and produce media. A key feature of blended learning is that “what the students learn online informs what they learn face to face” (Staker & Horn, 2012). In a 90-minute class period students often received direct instruc-

tion, collaborated with peers in a discussion or problem-solving activity and used iPads to support and differentiate their learning through online instruction. Students accessed teacher webpages to view short informational videos and were able to work at their own pace. They could follow links for definitions and more detailed information, highlight and take notes in the online texts.

The opportunity to extend learning time was especially important for English Learners. One of the ESL teachers emphasized the importance of newcomer immigrant students being able to access the teacher’s website and resources from home. “Students with a THP and Internet have 24/7 access to continue learning even when I’m not around. Students access class material from home or after school programs, and often choose to review old material in addition to practicing new material.” Even after one student left the high school, she still logged on to the teacher’s website and continued to improve her English skills. Her teacher commented, “iPads provide a way for students to access everything and open up the world for them.” The iPads also improved teacher/student communication, particularly when teachers provided individual feedback online either during class or after the school day. This is a key benefit of mobile devices in a blended learning environment.

## **Challenges for the iPad Project**

Both the district and high school staff intended for the 1:1 iPad project to improve the quality of technology tools and reduce the disparities in technology access and instruction among low-income students by providing every ninth and tenth grade student an individual iPad. However, THP distribution significantly varied by grade level, race, and academic ability, i.e., designation as an Academic Priority student or GPA.

The importance of this digital divide in access was clearly shown in the student surveys when students with a THP reported significantly higher satisfaction and proficiency with technology than those who did not. Students with a THP also reported significantly greater use of iPad applications for a higher number of technology activities in school and a significantly higher use of the iPad outside of school for academic purposes.

In order for students to benefit from online learning, each must have a mobile device. While this seems obvious, the district underestimated the challenge of ensuring that every student would have an individually assigned iPad. Initial communication with families focused on the financial and legal obligations associated with the iPads but did not emphasize the benefits of the iPads to support student online learning during and after school.

While the majority of teachers reported they were familiar with iPads, and felt comfortable integrating technology into their classrooms, and did so at least weekly, student technology use surveys painted a different picture. The majority of these surveys were completed in six teachers' classrooms; many of these teachers were considered to be early adopters of technology and some were members of the technology cadre that provided professional development to their colleagues. One caveat to this finding is the student technology use surveys were voluntary, and classroom

observations indicated that sometimes students used their iPads regularly but were not asked to complete the survey by their teachers.

The teacher focus group clarified another challenge. Given the delay in implementing check-out procedures and the requirements for students to have a THP, only 40% of eligible ninth and tenth graders were assigned an individual iPad. One teacher's comment represented the focus group concern: "If I spend hours developing an activity, and the kid doesn't have an iPad and doesn't even know how to email it to me. All these things play into why we are using technology as a notebook or a presentation." Previous research (Norris, Hossain & Solloway, 2012) suggests that 1:1 devices need to be used as essential curriculum tools rather than supplemental devices in order to impact student learning. In the first year of the project, instructional use of iPads varied considerably across the school.

The need for more technology professional development was a common refrain and substantiated previous findings with technology adoptions (Johnson, et al., 2013).

*All too often, when schools mandate the use of a specific technology, teachers are left without the tools (and often skills) to effectively integrate the new capabilities into their teaching methods. The results are that the new investments are underutilized, not used at all, or used in a way that mimics an old process....(p.9)*

During the year prior to iPad distribution teachers were given release time with paid substitutes to attend workshops on iPad use presented by Apple certified trainers and by state technology cadre members and district staff. In the first year of iPad distribution to students, the high school technology cadre teachers provided technology instruction in monthly after school department meetings. However, teachers seemed to have a

strong desire for more professional development with iPads. Teaching in a blended environment with part of each class period devoted to online content and instruction takes a great deal of time to plan and create lessons and the development of new instructional skills for most teachers.

## **RECOMMENDATIONS FOR PRACTICE**

At a discussion in April, 2013, faculty shared their vision of the opportunities the 1:1 iPad project could provide students.

*It [educational technology] can give students and the communities they belong to a voice... They will learn how to use it to address their own academic, professional, and civic needs. This is cultural capital that students from more privileged families take for granted...It gives ALL students access to the tools they will need to be successful in college and the workforce, not just the students who have access to technology at home.*

Given these goals and the significant differences in access, attitudes, and experiences of students who were assigned an iPad to take home (THP) versus those who could only use an iPad on the classroom cart, it seems imperative for the high school to change the way in which iPads are distributed. Teachers insisted that from a social justice perspective, all students should have the opportunity for a THP. However, given the challenging conditions some of the students faced, e.g., homelessness and dire poverty, not every student was able to take an iPad home. For those students (estimated by teachers at less than 50), arrangements could be made for students to check their iPad in and out each day so it could be

available during school. The consequence of not changing the iPad assignment process is to perpetuate the digital divide that limits the academic opportunities and technological affordances of the 1:1 iPad initiative.

Furthermore, instructional use of iPads needs to be an essential curriculum tool that enables students to learn on a daily basis in ways that are not well supported through traditional instruction. The teacher focus group and limited classroom observations suggest that in the first year of implementation, only a few teachers substantively integrated iPads into daily instructional practice at the high school. Research on technology innovation and implementation (Ensminger & Surry, 2008; ISTE, 2012) emphasizes the need for positive administrative expectations, supervision, and support at all levels; expectations that all students will have equitable access to the technology; and ongoing professional development for teachers in using the technology as an integral tool for student learning.

This research focuses on an issue of digital equity that has not yet been studied in depth with 1:1 iPads. Many of the schools and districts that have purchased 1:1 mobile devices for students to take home are private schools or public schools that serve upper middle class students. This case study looks in depth at students' access, attitudes and experiences and use of iPads to support online learning in a high-poverty, highly diverse, urban high school. Analysis of student achievement data is continuing in the second year of the project with a more in-depth look at the types of online experiences students are having.

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## KEY TERMS AND DEFINITIONS

**1:1:** The provision of a technological tool such as a tablet computer, laptop, or iPad to each individual student rather than providing a lab or classroom cart where students share the technology.

**Blended Learning:** An educational experience that provides students a combination of independent online content and instruction and supervised classroom based learning.

**Digital Divide:** Refers to the gap between students who have access to instructional technology, such as computers and iPads, and the Internet both at school and at home versus those who do not.

**English as a Second Language:** Frequently abbreviated as ESL, this term refers to an educational program for students who are learning English as a second language.

**iPad Apps:** Software applications specifically designed for the iPad. As of October, 2013, there were almost ½ million iPad apps; about 65,000 apps were designed for education.

**iPad:** A type of tablet computer created by Apple, Inc. that uses the IOS operating system with a multi-touch screen, virtual keyboard, and built-in wireless connectivity.

**Mobile Learning:** Learning that takes place anytime and anywhere that the user has a personal electronic device such as an iPad that is portable and can access the Internet.

## APPENDIX 1. CLASSROOM OBSERVATION PROTOCOL INSTRUMENT<sup>1</sup>

Observation Date: \_\_\_\_\_ Time: \_\_\_\_\_ Grade: \_\_\_\_\_

Subject: \_\_\_\_\_ Teacher: (pseudonym) \_\_\_\_\_

Contextual Background and Activities: Briefly describe the lesson, classroom setting, technology resources, content or skills taught, teacher and student activities related to iPads.

Each time there is a major change in activity note the following: (a) time; (b) predominant type of activity; (c) predominant teacher role; (d) predominant student role. Also note how the iPads were used for instructional purposes and which specific applications were used.

*Table 7.*

Time	Activity	Student Role	Teacher Role

*Table 8. Teacher role*

Teacher Activity	With iPad/Laptop/ Other Technology	Without Technology
Lecturing		
Interactive Direction		
Facilitate/Coaching		
Modeling		
Moderate Discussion		
Other		

*Table 9. Student activities*

Learning Activity	With iPad/laptop	Without technology
Receive presentation		
Give presentation		
Create presentation		
Run simulation		
Research		
Information Analysis		
Write		
Take tests or quizzes		
Drill and practice		
Hands-on skills		
Student discussion		
Other (see notes)		

*Table 10. Student groupings*

	With iPad/Laptop	Without Technology
Individual		
Pair/Small Groups		
Whole Class		

Adapted from: Beyond Textbooks Schools Observation Protocol. Virginia Department of Education. (May, 2011). *Beyond textbooks: Year one report*. pp. 24-26. ISTE Classroom Observation Tool (ICOT v3.1). International Society for Technology in Education (August, 2012). <http://nets-assessment.iste.wikispaces.net/file/view/ICOT+Instructions+v3.1.pdf>

## **APPENDIX 2. HIGH SCHOOL TEACHER FOCUS GROUP PROTOCOL**

The purpose of our discussion is to share your experiences using the iPads with your students and your judgment of the impact of the technology on your students' engagement and learning.

Review Informed Consent Procedures.

Technology Cadre Focus Group Questions April, 2013:

1. In general, what have been the strengths of the iPad project so far?
2. What have been the limitations or frustrations of the iPad project so far?
3. What are some ways your students have used the iPads that seemed to engage them the most?
4. What are some ways your students have used the iPads that seemed to have a positive impact on their learning?

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5. To what extent has student use of the iPads noticeably affected student behavior in class?
6. To what extent has student use of the iPads noticeably affected student attendance in class?
7. To what extent has the 1:1 iPad project helped to reduce disparities in access to technology for your students?
8. To what extent has student use of the iPads affected the opportunity to individualize or differentiate instruction for your students?
9. If there is one thing this high school could do differently with the iPad project, what would it be?

### **APPENDIX 3. ONLINE STUDENT TECHNOLOGY SKILLS AND EXPERIENCES SURVEY**

High school staff asked students to follow a link on their iPad to complete the electronic survey when they received their personal iPad.

What is your student ID number? \_\_\_\_\_

What grade are you in?

\_\_9<sup>th</sup>

\_\_10<sup>th</sup>

What type of 1:1 technology have you been assigned?

\_\_iPad,

Please rate your overall proficiency with use of the iPad:

1 Low to 4 High

Do you have a home computer?

\_\_Yes

\_\_No

Do you have internet at home?

\_\_Yes

\_\_No

Please rate your overall satisfaction with use of the [iPad] technology?

1 Low to 4 High

What were the strengths of using the iPad? \_\_\_\_\_

What were the challenges of using the iPad? \_\_\_\_\_

How often have you used your iPad during school?

\_\_in no classes

\_\_in 1-2 classes a week

\_\_in 3-5 classes a week

\_\_in every class during the week

For the next set of questions the choices were:

\_\_not helpful

\_\_somewhat helpful

\_\_helpful

\_\_very helpful

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How helpful is your iPad in doing the following: homework?

How helpful is your iPad in doing the following: writing assignments?

How helpful is your iPad in doing the following: communicating and collaborating?

How helpful is your iPad in doing the following: organizing schoolwork?

How helpful is your iPad in doing the following: doing research?

How helpful is your iPad in doing the following: accessing information?

How helpful is your iPad in doing the following: staying motivated and engaged?

For the next set of questions the choices were:

☐ very hard to use

☐ hard to use

☐ easy to use

☐ very easy to use

How easy is it to use your iPad for the following: turning in homework?

How easy is it to use your iPad for the following: writing assignments

How easy is it to use your iPad for the following: creating content

How easy is it to use your iPad for the following: installing my own apps

How easy is it to use your iPad for the following: adding my own music

How easy is it to use your iPad for the following: taking care of the device

How easy is it to use your iPad for the following: communicate (IM,email, video chat, blog)

How easy is it to use your iPad for the following: connecting wirelessly at school

Any other comments:

For the next set of questions the choices were:

☐ never

☐ once a week

☐ 2-3 times a week

☐ every day

How often do you use the iPad outside of school to? Do homework

How often do you use the iPad outside of school? Communicate (IM,email, video chat, blog)

How often do you use the iPad outside of school? Create videos, presentations, or projects

How often do you use the iPad outside of school? Find information

How often do you use the iPad outside of school? Watch videos

How often do you use the iPad outside of school? Play games

How often do you use the iPad outside of school? Listen to music

How often do you use the iPad outside of school? Use social media (Facebook, Twitter, etc.



## **APPENDIX 4. STUDENT IPAD USE SURVEY**

High school staff asked students to follow a link on their iPad to complete the electronic survey.

Student Number:

Class Name:

Period:

1

2

3

4

5

6

7

8

After School

Which iPad Apps did you use during this period? If you don't know the name of the App ask your teacher:

\_\_\_3D Game Lab

\_\_\_30 Hands

\_\_\_Adobe Reader

\_\_\_ATT Scanner

\_\_\_Bookabi

\_\_\_Class Website

\_\_\_Dragon Dictation

\_\_\_Dropbox

\_\_\_Edmodo

\_\_\_Educreations

\_\_\_Email

\_\_\_Explain Everything

\_\_\_Google Drive

\_\_\_Google Maps

\_\_\_Google Translate

\_\_\_Haiku Deck

\_\_\_iBooks

\_\_\_iTunesU

\_\_\_Logger Pro

\_\_\_County Library

\_\_\_Notability

\_\_\_Pandora

\_\_\_Quizlet

\_\_\_Schoolology

\_\_\_Show Me

\_\_\_Slideshark

\_\_\_Socrative

- ☐ Synergy
- ☐ WebBrowser
- ☐ Youtube
- How did you use the iPad?
- ☐ Created multimedia presentation
- ☐ Did research
- ☐ Took photos
- ☐ Recorded audio or video
- ☐ Worked on a writing project
- ☐ Read
- ☐ Solved math or science problems
- ☐ Watched videos
- ☐ Collaborated on a project with others
- ☐ Communicated via email
- ☐ Listened to music
- ☐ Played games
- ☐ Took notes
- ☐ Used reference tools (e.g., dictionary, thesaurus)
- ☐ Other:

## **APPENDIX 5. TEACHER IPAD SURVEY**

This survey is for administrators and the project team to track the amount of time iPads are used in the classroom. District staff asked teachers to follow a link on their iPad to complete the electronic survey.

What grade(s) do you teach? (Check all that apply)

☐ 9<sup>th</sup> ☐ 10<sup>th</sup> ☐ 11<sup>th</sup> ☐ 12<sup>th</sup> ☐ Other

What subject do you primarily teach?

☐ arts ☐ ESL ☐ language arts ☐ math ☐ pe/health

☐ science ☐ social studies ☐ Special Ed ☐ world languages

Rate your familiarity with the iPad

1. unfamiliar 2. somewhat familiar 3. familiar 4. very familiar

How do you feel about integrating technology in your classroom?

1. very apprehensive 2. apprehensive 3. comfortable 4. very comfortable

How frequently do you integrate technology into your lessons?

1. never 2. once a week 3. 2-3 times/week 4. every day

How much have your technology skills improved in the last year?

1. not improved 2. improved a little 3. improved somewhat 4. improved a lot

When students use technology in my class I observe

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Compared to when not using technology,

☐decreases ☐no change ☐increase a little ☐increases a lot

student engagement

student writing

student higher order thinking

behavior problems

Do you feel you've received enough professional development to use the iPad in the classroom?

☐yes ☐no

Do you want additional training in integrating and using the technology in your classroom?

☐yes ☐no

Which apps do you use most in your class?

Please provide any other feedback regarding using the iPad in the classroom.