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The Impact of 1:1 iPad Devices on Student Engagement in the High School Classroom

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Abstract

A technology initiative was adopted in a Minnesota suburban school district integrating 1:1 iPad devices into the elementary schools, middle schools, and high schools. The purpose of this mixed methods study was to determine the impact 1:1 iPad devices had on student engagement within the high school classrooms. The research questions focused on how educators are using the 1:1 iPad adoption to impact student engagement, the most and least effective iPad engagement strategies found within the 1:1 adoption, and the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption. Through quantitative student and teacher survey results and qualitative student and teacher focus groups, the researcher was able to answer the research questions and provide further findings beneficial to consider when integrating 1:1 iPad technology into high school classrooms.

Results showed teachers are using strategies within their classrooms of which students find engaging. These include review games, note taking, and test taking. These were also found to be effective according to student survey results. Less effective strategies included graphic organizers and podcasts. Effective apps used with these strategies were Schoology, Notability, YouTube, and Kahoot! Less effective apps used with these strategies were NEWSELA and Google Calendar. Students and teachers agreed the iPads had an impact on student engagement when the effective strategies and apps were used. They also agreed games and social media

caused major distractions to students. Student and teacher perception were different in regard to the apps used in the classroom to impact engagement. The apps students found engaging were used by very few teachers. In addition, students and teachers disagreed on the preference of using several different apps for tasks such as obtaining assignments and posting homework. Students felt it was too confusing when all teachers used different apps for this purpose.

This study revealed 1:1 iPad devices impact student engagement within the suburban high school setting. The strategies and apps used within the classroom impact the level in which students are engaged.

This research is valuable to educators, administrators, and school district officials who are contemplating or have adopted a 1:1 iPad technology integration.

Dedication

To my children, Logan and Riley, who have inspired me through their love and support during this journey. To my Uncle Dave, who left this life too soon. His presence has and will continue to remain in my heart until we meet again.

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Chapter 1: Introduction

The use of technological devices in education has significantly increased within the last five years. According to the U.S Department of Education (2012), over one million students around the United States from elementary to high school participated in a form of online or blended learning. Blended learning refers to a mix of online and face-to-face interactions among students and teachers (U.S. Department of Education, 2012). More schools are integrating technology into the curriculum as the need for innovative teaching methods continues to be apparent in 21st century learning to meet the demands of the global economy. The term "global education" dates back to 1969 and has been used over the years to refer to international education or peace education (Peters, 2009). As education continued to transform around the world, American education leaders and political influences noticed a falter in U.S. students' performance in math and science compared to students in other countries (Peters, 2009). This led to the concept of "21st century learning," which can be described as an education centered on teaching specific skills needed for the workforce in the global economy and focused on the integration of technology (Framework for 21st Century Learning, 2011). This framework was developed through a partnership of people from the business and education sectors who promote and support the integration of technology into the American education system (Common Core Toolkit Aligns Standards …, 2011). In addition, the framework provides students with a foundation of skills needed to compete in the global

economy. The themes outlined within the framework are learning/innovation, information/media/technology skills, and life/career skills. Within each theme, specific skills are taught, including creativity, innovation, critical thinking skills, flexibility, adaptability, leadership, productivity, accountability, self-direction, and cross-cultural skills (Common Core Toolkit Aligns Standards …, 2011). Integrating technology into classrooms can provide students with learning experiences that foster the development of these skills.

As education has transformed into 21st century learning, teachers and administrators have been challenged to provide authentic and purposeful learning experiences in which students are engaged and educators have evidence of engagement and achievement (U.S. Department of Education, 2010). Clayton Christensen (2008) addressed the importance of acquiring 21st century skills and competencies in order to maintain a flourishing and competitive economy. The idea that these skills are important to learn is not a new concept. In his declaration regarding education first published in *The School Journal* in 1897, John Dewey discussed the importance of preparing children to develop their skills to their full capacity so they will be capable of adjusting to a variety of working conditions. Over a century ago, Dewey, an education reformer who is still known today for his ideas that transformed education in America, noted the importance of teaching skills that will prepare students for all aspects of life. Similar to Dewey's belief that students should be taught to develop their skills to their full capacity, Ella Flagg Young (1902) observed in her dissertation that public schools were focused on making students

productive members of society. In his 1968 journal article, Wayne Howell, Vice President of the Fund for Media Research, discussed how schools prepare students by providing them with essential information such as math, reading, and writing. He stressed the importance of considering the students' interests and providing them with the opportunity to explore and solve problems (Howell, 1968), which is a 21st century skill. Over 45 years later, educators are still addressing this need to teach students the skills currently addressed in the 21st Century Skills Framework (2011). The purpose in noting the ideas of well-known researchers and reformers is to show how the idea of preparing students to function effectively in society has been a part of educational history in America since the late 1800s. Twenty-first-century learning is not a concept that is new to education. Instead, the newness lies in the type of economy we need to prepare our students for.

Due to the demands of globalization, students need to be prepared to compete in the workforce by developing skills such as collaboration, adaptability, agility, and initiative, to name a few. The American education system must integrate into the classroom the technologies that students will need to be familiar with when they enter the work force after high school. These technologies give students the opportunity to develop vital skills in ways that were not possible prior to the Internet and web 2.0 tools.

In 2001, No Child Left Behind (NCLB), a reauthorization of the Elementary and Secondary Education Act (ESEA) of 1965, was enacted. The ESEA was originally passed to provide equal access to education for all students, establish a set

of standards and accountability, and close the achievement gap, which supports Dewey's (1897) stated beliefs about the focus of education. NCLB (2001) continued with the original purpose in mind but extended the accountability by using rigorous methods such as Annual Yearly Progress (AYP) and a focus on proficiency of state standards measured by high-stakes testing. The results of the testing provided information regarding students' readiness for college and careers and provided schools, districts, and states with data to determine student achievement. In this millennium, due to significant increases in technology, U.S. education is again transforming to provide learning to students that will make use of technologies similar to the ones they are familiar with in their personal lives and will be expected to use in their professional lives. Laurence Peters (2009) discussed the importance of relating content standards to global awareness. He pointed out the potential for web 2.0 technology to provide students with the ability to connect with other students around the world, become aware of the global challenges they face, and relate this knowledge to traditional classroom curriculum (2009).

In response to the two goals set forth by the Obama administration regarding closure of the achievement gap and increasing the number of college graduates, the National Educational Technology Plan (NETP) was developed to address the attainment of these goals. The NETP (2010) devised a 21st century model focusing on technology, learning, assessment, teaching, framework, and productivity. As mentioned earlier, the Partnership for 21st Century Skills, a national coalition composed of business leaders from corporations such as Apple Computer, Cisco

Systems, Education Networks of America, KnowledgeWorks Foundation, PMI Educational Foundation, and the National Education Association, developed a framework and strategies to address the educational needs of students for success in the 21st century (Department of Education, 2002). The Partnership was formed to address the gap between the knowledge and skills students learn in school to the knowledge and skills needed to succeed in the 21st century work force. The goal of the Partnership for 21st Century Skills has been the following:

> Synthesize research, insights, and best practices about 21st century knowledge and skills into a powerful vision; define a framework and create a common language for understanding and promoting 21st century skills; provide education leaders with tools, examples, and a strategy for action; and build consensus in the public and private sectors about the nature and need for 21st century skills. (Department of Education, 2002, p. 3)

The 21st century model addressed in the 2002 report supports NCLB and the goals of the NETP by including in its framework skills such as critical thinking, problem solving, communication, and collaboration, in addition to core instruction, (Framework for 21st Century Learning, 2011).

To ensure our education system is moving in the direction required to meet the goals of 21st century learning, it is imperative to measure the impact of technology integration within the classroom setting. Research has been conducted regarding the use of different technologies in the classroom; however little research has focused on the effects of technology, specifically 1:1 devices, on student engagement. As

educational reform continues to focus on technology integration and 21st century learning, research needs to be conducted to determine the effects of the reform on student engagement. It is not enough to integrate technology into the classroom without assessing the effects of the integration on engagement.

Statement of the Problem

Students are engaged when they use technology outside of school to create their own learning experiences. These experiences are completely different from what they are exposed to in the classroom (U.S. Department of Education, 2010). Educational reform is increasing the integration of technology into the classroom through 1:1 devices. This is giving students the opportunity to align their technology experiences outside of school to their experiences inside the classroom. Research has provided information regarding types of integration, barriers to integration, and stakeholder perceptions of the integration (Journell, 2010; Keane, Lang, & Pilgrim, 2012; Lam & Tong, 2012; Lee, Messom, & Yau, 2013; Pritchett, Pritchett, & Wohleb, 2013). However, there are gaps in the research regarding the impact that 1:1 technology has on student engagement.

Research supports the connection between student engagement and decreasing achievement gaps, reducing high school drop-out rates, and increasing college participation and graduation rates (Corso, Bundick, Quaglia, & Haywood, 2013). Thus, it is critical to measure the impact of technology integration, specifically the use of 1:1 devices, on student engagement. Through educational reforms, district initiatives, and stakeholder surveys, information has been obtained regarding 21st

century learning and how education needs to change in order to provide students with the skills necessary to compete in the global economy (Spires, Lee, Turner, & Johnson, 2008; U.S. Department of Education, 2010). However, the problem lies in the minimal number of studies that have been conducted to acquire stakeholder perceptions of the changes taking place and the effects on students' education. With this in mind, the purpose of this study will be to examine the impact on student engagement as a result of 1:1 iPad adoption within high school classrooms using a mixed methods approach.

Research Questions

1. How are educators using a 1:1 iPad adoption to impact student engagement in a suburban, Midwestern high school?
2. What iPad engagement strategies are found within the 1:1 adoption?
    - What are the most effective iPad engagement strategies found within the 1:1 adoption?
    - What are the least effective iPad engagement strategies found within the 1:1 adoption?
3. What are the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption?
    - What are the similarities between student and teacher perceptions regarding the engagement strategies?
    - What are the differences between student and teacher perceptions regarding the engagement strategies?

Significance of This Study to the Field of Education

This study is intended to provide feedback through student and teacher survey responses on the impact of iPad use on student engagement in the high school classroom setting. In a study conducted by Spires, Lee, Turner, and Johnson (2008), results indicated a link between technology use and engagement among middle school students. Moreover, students communicated their perceptions regarding this implementation. They expressed interest in having authentic learning experiences in school using technology and integrating research, problem solving, and project-based opportunities in courses such as language arts, mathematics, social studies, and science (Spires, Lee, Turner, & Johnson, 2008). In addition, Downes and Bishop (2012) pointed out students' use of technology show their ability to apply 21st century skills in their out-of-school lives. This further supports the need to research the impact of 1:1 devices on high school student engagement in order to continue moving forward to provide concrete evidence to support 21st century educational reform.

Researchers have identified barriers to integrating technology in the classroom, such as teachers' reluctance to use 1:1 devices and their lack of technology knowledge (Lam & Tong, 2012; Pritchett, Pritchett, & Wohleb, 2013). In a study conducted by Berrett, Murphy, and Sullivan (2012), administrators were surveyed to research leadership perspective on technology integration in a specific school district. Results indicated that lack of communication and understanding of the technology impacted successful implementation.

By answering the research questions, the study provides approaches to using technology that teachers have found effective in increasing student engagement, with the intent to decrease teacher reluctance to embrace new technologies. Within the last 10 years, school districts across the U.S. have spent over $7 billion on technology, believing it will impact student learning (Hew & Brush, 2007). This study provides insight as to the perceptions and approaches used to increase student engagement through the use of 1:1 devices to ensure this investment is being well spent.

Chapter 2: Literature Review

The vast increase in technology use has transformed classrooms from traditional to digital. Specifically, more classrooms around the world are integrating technology through the use of 1:1 devices. As this usage continues to become apparent in more classrooms, there is a need to examine the impact it is having on student engagement. The current literature addresses the many different devices and how students are using them, however; few studies have been conducted measuring student engagement as a result of technology usage. Moreover, little research has been done on the impact of technology use on student engagement in secondary high school classrooms. The following review of literature presents a general definition of student engagement, the increased use of technology in the classroom, the current research regarding the impact of technology on student engagement, and the hesitations and barriers to technology integration.

Student Engagement

The term *student engagement* has been used to describe a student's lack of interest and potential to drop out of school. It can be defined as the way in which students value their education, feel a sense of belonging school, participate in school activities, and invest in their learning (Willms, Friesen, & Milton, 2009). Furthermore, it is used to describe a student's persistent and constructive behavior within the physical environment as well as in relationships with others (Furrer & Skinner, 2003). Through several studies conducted during the 1980s, 1990s, and

current millennium, researchers discovered that the concept of student engagement stems from the basic human need for competence, autonomy, and relatedness (Carter, Reschly, Lovelace, Appleton, & Thompson, 2012), which can be found in Connell and Wellborn's (1991) self-systems model for motivation. Additional research conducted by Wang and Fredricks (2013) supports the self-systems model by asserting that the three dimensions of engagement—behavioral, emotional, and cognitive—play a role in stressors, struggles, and coping skills in the educational setting. This leads to the specific dimensions of student engagement, on which several studies have been conducted. Corso, Bundick, Quaglia, and Haywood (2013) defined student engagement as "a way that recognizes students' internal thoughts and beliefs about being engaged, as well as their external experiences with the various aspects of school life" (p. 52). This definition aligns with the results in Wang, Bergin, and Bergin's (2014) study, which found that there are three dimensions to engagement: cognitive, emotional, and behavioral. This is further supported by the research done by Lam et al. (2014). Some of the researchers refered to the dimensions of engagement using these terms, while others refer to them using the phrases: engaged in thought, engaged in feeling, and engaged in action (Corso, Bundick, Quaglia, & Haywood, 2013). After reading through the research previously conducted, it is noted that there is an agreement among the researchers regarding the multi-dimensions of student engagement, specifically cognitive, emotional, and behavioral engagement (Corso, Bundick, Quaglia, & Haywood, 2013; Lam et al., 2014; Wang, Bergin, & Bergin, 2014; Wang & Fredricks, 2013). These dimensions

involve the amount of effort students exert toward their education, their feelings and emotions toward teachers and peers, and the observable behaviors they display, such as attending class, completing assignments, and following rules. The significance of these findings is to assist educators in understanding the types of engagement so they can provide meaningful learning experiences that will increase and sustain student engagement.

Wang and Fredricks (2013) stressed the importance of student engagement by citing studies that link emotional engagement in school to a lesser likelihood of drug and alcohol use. Finally, Finn and Zimmer (2012) conclude that engagement includes cognitive, emotional, and behavioral dimensions and is necessary for learning to take place (as cited by Carter et al., 2012).

Several studies (Furrer & Skinner, 2003; Lam et al., 2014; Skinner & Belmont, 1993; Skinner, Wellborn, & Connell, 1990) have been conducted to determine contextual factors that promote outcomes of each dimension of engagement. Skinner and Belmont (1993) conducted a study to determine the relationship between teacher behavior (e.g., involvement, structure, and autonomy support) and students' emotional and behavioral engagement. Ten years later, Furrer and Skinner (2003) conducted a study to determine whether having a sense of relatedness impacts the emotional and behavioral levels of student engagement. In an international study measuring the dimensions of engagement using a scale created by Lam et al. (2014), the researchers discussed contextual factors such as student-teacher relationships influencing the outcomes of the emotional and behavioral dimensions of

engagement and supported the validity and reliability of their surveying instrument.

Results from Skinner and Belmont's 1993 study showed the effects of teacher involvement and autonomy on behavioral and emotional engagement of students. The researchers found a high correlation between students' low levels of engagement and lack of teacher support. It was also shown that students who were less engaged received negative attention from the teachers. Furthermore, teachers who presented clear expectations, feedback, and guidance had a higher level of behavioral engagement among students (Skinner & Belmont, 1993). Finally, in terms of emotional engagement, results showed that teachers who were caring and friendly had a higher level of emotionally engaged students (Skinner & Belmont, 1993).

Results from Furrer and Skinner's (2003) study showed that students who had a higher sense of relatedness to learning were more likely to be excited about their learning and were less likely to feel bad about themselves. According to the researchers, these positive feelings can lead to an increase in support from others, which in turn influences overall performance (Furrer & Skinner, 2003).

Results from the international study conducted by Lam et al. (2014) showed a relationship between teaching strategies and student behavioral engagement and between emotional support from teachers and emotional engagement (Furrer & Skinner, 1993). In addition, support from teachers also had a positive impact on students' interest in their learning. These findings supported several previous studies cited by Lam et al. (2014), which were conducted to determine the relationship, if any, between the way educators teach and student engagement (McCombs, 2010;

Meece, Anderman, & Anderman, 2006; Perry, Turner, & Meyer, 2006; Wentzel, 2010).

Skinner, Wellborn, and Connell's (1990) study found a correlation between perceived control, the belief in one's ability to affect educational outcomes and have control over one's own lives, and cognitive engagement. In addition, results supported the finding that the behavior of a teacher influences students' perceived control.

Wang and Peck (2013) studied the nature of student engagement, educational success, and overall mental health in their longitudinal study of 1,025 students in 9th grade, in 11th grade, and one year after graduation. Results showed that some students who were highly engaged cognitively and behaviorally were emotionally disengaged (Wang & Peck, 2013). This means they have the intellectual ability to do well in school but have no desire to participate. Students with lower levels of emotional engagement have a higher risk of mental health issues (Wang & Peck, 2013). A small percentage of students who were cognitively disengaged, meaning they were failing academically, had higher levels of behavioral and emotional engagement. Their risk for mental health issues was very low. The significance of these findings is extremely important for educators. Often teachers who observe students to be cognitively and behaviorally engaged assume they are not at risk for failure or for mental health problems. As Wang and Peck's 2013 study indicated, this assumption is not true if students are emotionally disengaged. Students who are disengaged emotionally are at a higher risk of dropping out or suffering from

depression. This example provides evidence as to the importance of understanding the multiple dimensions of engagement and understanding the importance of using strategies in the classroom to ensure students are engaged in all three dimensions.

In the several studies conducted, researchers provided evidence of the existence of multiple dimensions of engagement, explanations of each dimension, the impact engagement has on students' educational experience, and the risk that lack of engagement has on students behaviorally, emotionally, and cognitively. The purpose of researching and citing these studies is to expand awareness and provide targeted meaningful learning experiences through technology that will increase and sustain student engagement.

In summary, based on the definitions of engagement provided by several researchers, student engagement is defined as the continuous and productive behavior of students toward their education.

Technology Use in U.S. Classrooms

Throughout history, educators have incorporated technology into the classroom. The first method for teaching reading was patented in 1806 as an innovation to education (Benjamin, Jr., 1988). Over one hundred years later, Sidney Pressey, an educational psychology professor, invented a machine to teach spelling, which was labeled "Machine for Intelligence Tests" (Benjamin, Jr., 1988). Perhaps due to the timing of this innovation during the Great Depression, it was not a successful invention. Almost 30 years later, B.F. Skinner, inventor and psychologist, patented a similar innovation, which was integrated into U.S. classrooms in the 1950s

(Benjamin, Jr., 1988). The difference between Pressey's and Skinner's inventions was that the latter required constructive response, which has been shown to increase student learning and teach skills that are applicable to real-life situations. In the early 1980s American classrooms began to see computers present as this newer technology began gaining popularity. The computers were recommended to help students develop higher-order thinking and learning (Caldwell, 1980). According to Paul Saettler who wrote *The Evolution of American Educational Technology* (2004), educational technology is a process rather than a product. Specifically he states, "Educational technology is a complex, integrated process involving people, procedures, ideas, devices, and organizations, for analyzing problems, and devising, implementing, evaluating, and managing solutions to those problems" (p. 6). It is evident in the literature that this idea has been expressed since the late 19th century, throughout the 20th century, and now in the 21st century.

American classrooms in the 21st century are seeing 1:1 devices as the new form of technology, and according to previous research, comparable issues still arise with integration. Similar to current technology integration, previous integrations raised concern with usage, less human contact between teachers and students, ineffectiveness due to lack of teacher training, high cost, and the challenge of incorporating the technology into learning activities (Benjamin, Jr., 1988; Graesser, 2013). The reason for researching previous innovative technologies integrated into classrooms is to understand how they were used and the effects of their use to assist in moving forward with the current technologies that are being integrated into U.S.

classrooms today. As Benjamin, Jr., (1988) states, "If past behavior is a predictor of future behavior, then it seems unlikely that computers or any other teaching machines will play more than a supporting role in the classroom" (p. 711).

Individualized instruction, relevancy, choice, and communication are possible through the use of technology and are essential for an educational system to thrive (Howell, 1968). One may think this idea was stated in current research on technology in education. However, that is not the case. Throughout his research, Howell (1968) noted the importance of technology integration in the American education system. The difference is, however, the type of technology being integrated. A common theme found in Howell (1968) and Benjamin, Jr. (1988) is the importance of using the technology not as a replacement to human interaction but as an educational tool.

"Technology and the Internet have fostered an increasingly competitive and interdependent global economy and transformed nearly every aspect of our daily lives—how we work; play; interact with family, friends, communities; and learn new things" (U.S. Department of Education, 2010, p. 4). Furthermore, the demand for operating in a global economy and competing for jobs worldwide supports the need to establish a learning environment that engages students through the use of up-to-date technology. Dr. Virginia Jones (2012), executive director of Adult Education Programs, Online Learning, and Learning Architecture at Ferrum College in the state of Virginia, similarly points out that teaching must be integrated with technology to connect education with the rest of the world. Teachers must work to bridge the gap between their level of technical knowledge and students' levels of knowledge in order

to effectively develop curriculum that integrates technology using higher-order thinking skills.

The focus of integrating technology in the classroom should not be about jumping on the bandwagon to keep up with the rest of the world. Fullan (2001), Dean of the Ontario Institute for Studies in Education at the University of Toronto, informs leaders of the importance of innovating with integrity and fidelity. Immediately adopting every new innovation does not allow for a solid focus and integration consisting of depth and breadth. Instead, to innovate with fidelity, the focus must be on providing students with authentic and purposeful learning using higher-order thinking skills, which support 21st century learning, and on providing the opportunity to learn 21st century skills needed to succeed in a global economy. In order to do this, it is paramount for educators to be aware of effective uses of technology to promote and enhance students' ability to collaborate, problem-solve, communicate, and think critically. Some ways in which educators use 1:1 devices within their classrooms to promote higher-order thinking are through computer simulations, eBooks, online portals, and interactive whiteboards (Jones, 2012).

Chih-Yuan, Martinez, and Seli (2014) studied the effect of electronic feedback devices on student engagement and found that specific strategies increased student engagement. Pre-class activities provided the instructors with data regarding students' current level of knowledge of the topic for that day. The electronic feedback made it possible for the instructors to adjust and differentiate their lessons based on student knowledge. Students provided this feedback through web-based

surveys they took prior to class, which also increased their engagement during class time by activating background knowledge (Chih-Yuan, Martinez, & Seli, 2014). Dawson (2012) studied teaching practices of 353 teachers ranging from the elementary level to high school using action-based research. The study revealed that most teachers at all three age levels used technology to master content area learning outcomes (Dawson, 2012). In addition, teachers used technology to differentiate instruction to students based on ethnicity and socio-economic status. Furthermore, teachers reported a variety of teaching strategies, such as direct instruction, collaborative learning, hands-on learning, and independent seatwork (Dawson, 2012). In his book on global education, Peters (2009) provides examples of how teachers are using web 2.0 technologies in their classroom to meet the learning objectives of the 21st century curriculum. Some of these technologies are podcasts, wikis, blogs, videoconferencing, and Google documents. There are also several websites available that promote critical thinking, such as sites that provide hands-on science activities and projects where students are introduced to global issues and collaborate with others around the world. In addition, there are several sites available to help teachers access global lessons and activities.

In a 2009 survey of almost 300,000 K–12 American students, questions were asked to obtain information regarding the ways in which students are using digital resources in the classroom. Results showed 34% of high school students take tests online; 79% complete writing assignments using a digital device; 66% create slide shows, videos, or web pages; and 33% use textbooks online (Project Tomorrow,

2010). Interestingly, when asked how they are using digital devices outside of school, 65% of high school students reported they are using it for uploading and downloading videos, podcasts, or photos to the Internet. In addition, 51% participate in online games, while 40% create digital media (Project Tomorrow, 2010). These results show how students' technology lives differ from inside the classroom to outside the classroom. When asked about ways in which they could use online gaming for learning, 42% of high school students said it would allow them to go beyond the basics of an assignment, 53% reported it would be a more interesting way to complete assignments, 58% said it would be easier to understand difficult concepts, and 61% said they would be more engaged in the topic (Project Tomorrow, 2010). Students' perspectives are key to technology integration. Their voices should be heard and taken into consideration when planning 21st century learning.

Overall, the common use of technology in the daily lives of this generation of students makes it imperative to effectively integrate technology into classrooms. Incorporating technology skills that students have acquired in their personal lives into classroom learning will result in more engaged learners (Buckingham, 2007). However, it is important to remain focused on using the technology in a way that will provide authentic and purposeful learning experiences to students. Technology integration is a way to enhance learning experiences; it is not a replacement for instruction. When integrated effectively, it is a tool that can promote 21st century skills and provide students with the learning experiences that will make them a competitive force in the global economy. Guba (1962) emphasized the importance of

field-testing and providing feedback on the effectiveness of the teaching machines in order to understand how to put them to best use. This idea is present today as technology continues to be integrated into classrooms and studies are conducted to determine its impact and effectiveness on learning.

Impact of Technology on Student Engagement

Several articles have discussed individual teachers' perceptions of increased student engagement due to 1:1 devices. However, few studies have been conducted to support these perceptions. Prior to conducting their review of literature, Hepplestone, Holden, Irwin, Parkin, and Thorpe (2011) hypothesized that feedback through the use of technology increases student engagement because it provides teachers with the ability to respond immediately to a large number of students. The findings supported their hypothesis and assert that student engagement can be increased by providing timely feedback to students regarding achievement (Hepplestone, Holden, Irwin, Parkin, & Thorpe, 2011).

In a study conducted by Badge, Saunders, and Cann (2012), results indicated that the use of technology, specifically social support networks such as Facebook, increase student engagement in first-year undergraduate students. In a survey of student perceptions regarding e-learning, Journell (2010) found that this type of learning did not engage students but instead provided opportunities for rote memorization. However, Journell (2010) refuted the findings due to the lack of preparation and time put into the online instruction planning. The overall result of Journell's 2010 study emphasizes the importance of teachers' preparedness and

understanding of the technology being used in order to increase engagement.

Spires, Lee, and Turner (2008) conducted a study with middle school students to learn what they perceive as "engaging." The methodology included surveys and focus group data, which were synthesized to address student perceptions of specific types of engagement. In regard to their perceptions of technology, students wanted to use technology in a more creative way. They also wanted their teachers to understand their need for technology use in the classroom. Furthermore, students wanted their education to relate to their future careers as well as allow for student-centered technology usage that was interactive (Spires, Lee, & Turner, 2008). Similarly, in their quasi-experiment of laptops in the classroom, Trimmel and Bachmann (2004) found that students in classrooms with computers reported an increase in participation, interest, and motivation when compared to students in classrooms without computers.

Dewey (1897) stressed the importance that the role of student interest plays in student engagement. Interestingly, over one hundred years after Dewey's report, students emphasize the value of interest in regard to their learning and increased level of engagement. Over half of the high school students surveyed by the Speak Up National Research Project initiative since 2003 expressed the need for their classes to be more interesting (Project Tomorrow, 2010). In a longitudinal study conducted by Downes and Bishop (2012), student perceptions were gathered regarding their levels of engagement. The students reported that their level of engagement increases when they find the material interesting and relevant (Downes & Bishop, 2012). The

International Center for Leadership in Education introduced the Rigor/Relevance Framework, which illustrates a quadrant including Bloom's higher-order thinking skills on the vertical axis and William Daggett's continuum of knowledge application on the horizontal axis (Bloom, 1956; International Center for Leadership in Education, 2015). The Framework takes knowledge to the next level, from having the ability to think at a higher level to having the ability to acquire and apply that knowledge. According to this Framework, rigor and relevance are both necessary for students to achieve at a high level using complex thinking skills. The reports dating all the way back to Dewey, 1896, previous research of student perceptions and feedback of their education, and current frameworks identifying the connection between making education relevant while keeping it rigorous is important to consider As education continues to transform into 21st century learning with the integration of technology, it is important to consider findings from the research dating back to 1896 as well as findings from research of student perceptions and feedback.

In a study conducted by Lam and Tong (2012), results show that technology, specifically digital devices, increased student participation, motivation, exploration, and interactions. These findings are based on survey results obtained from student-reported responses. Additional findings emphasized the importance of developing meaningful activities to use with the technology, the importance of students' ability to maintain self-control and on-task behaviors, and the need for teachers to apply new teaching skills.

In addition to increasing student interest and relatedness, 1:1 devices also

make it possible for teachers to differentiate learning activities and materials. Differentiation also leads to an increase in cognitive and behavioral engagement. Students are able to work at their own pace and ability level rather than struggle through material that is too difficult and moves too fast or material that is too easy and moves too slow. Furthermore, students can access material to gain a deeper understanding of specific topics assigned by using their 1:1 devices (Bell, 2010). Although research shows that technology usage in the classrooms can increase student engagement, teacher hesitations can create obstacles to 1:1 integration.

Barriers to Technology Integration

Several barriers exist that prevent an increased use of technology in the classroom, such as levels of distractibility and lack of professional development (Lam & Tong, 2012; Pritchett, Pritchett, & Wohleb, 2013). Pritchett, Pritchett, and Wohleb (2013) studied barriers to technology integration and found that a lack of professional development decreased the likelihood of teachers to use technology. This is a detrimental outcome that is supported by the results from the study conducted by Spires et al. (2008) in which students stressed the need for their teachers to understand the technology. This is a major barrier and will impact student engagement if the teacher is not familiar with using the technology or hesitates to embrace students' digital lives.

In a national study of over 38,000 teachers, when asked about their hesitations with students using 1:1 devices, they reported concerns about the increased ability to cheat and to be easily distracted (Project Tomorrow, 2010). In addition, teachers

were concerned about how to best integrate the technology within their curriculum and instruction (Project Tomorrow, 2010). Although they were hesitant and expressed concerns, teachers recognized potential for 1:1 devices to increase student engagement. This is a step in the right direction since teacher attitudes and beliefs about the effectiveness of technology can be a major barrier to integration. Hew and Brush (2007) provide ways in which schools can work through these hesitations and overcome barriers to integration. In terms of resources, schools should provide technical support to teachers through the use of a specialist or student technology experts (Hew & Brush, 2007). To overcome barriers regarding attitudes and beliefs, schools should have a shared vision along with a plan for integration (Hew & Brush, 2007). The plan should include a clear vision, specific goals and objectives, professional development opportunities, technology training, and assessment procedures to determine areas of need and improvement regarding the integration.

Summary

Thus far the studies conducted have addressed student engagement through the use of computers and 1:1 devices. Furthermore, the studies have provided student perceptions of technology use leading to increased interest and overall engagement as well as teacher perceptions of their hesitations for using technology. Presently, very few studies have been conducted regarding the use of iPads in the high school classroom and their impact on student engagement. Hew and Brush (2007) identified knowledge gaps associated with 1:1 devices in their study, which examined these gaps of integrating technology into the classrooms and provided recommendations for

future research. At the time of the study, other research was limited to providing comparisons of the effects of 1:1 devices on student achievement. These studies had several limitations due to a lack of breadth and depth of the methodologies used. Hew and Brush (2007) recommended further research of the use of 1:1 devices and their use within the classroom setting to include a larger population and to avoid socially desirable answers, which tend to result from self-reported data (Hew & Brush, 2007). In their study on the perspectives of students, parents, and teachers on iPad and Netbook devices, Keane, Lang, and Pilgrim (2012) found that an important factor in using 1:1 devices in the classroom was the way in which the curriculum was presented. In addition to the use of 1:1 devices, Larkin (2011) conducted a study on the benefits of 1:2 devices in regard to learning, collaboration, and pedagogy. This ratio means that every two students would share one device. Results concluded that 1:2 devices had advantages and disadvantages in terms of student engagement. Larkin (2011) recommended further research on the use of 1:2 devices and their impact on student engagement.

Based on the review of literature, it is apparent that there have been too few studies conducted on the impact of 1:1 devices on student engagement within high school classrooms. There are gaps in the literature, which further emphasizes the importance of researching the impact of these technologies on engagement since schools throughout the United States are transitioning to 1:1 use.

Chapter Three: Methodology

Procedures and Research Design

When studying the impact of iPad use on student engagement, student and teacher surveys were administered to determine whether or not technology had a positive impact on the engagement of learners. Focus groups were conducted to obtain an in-depth investigation into the survey results. The focus groups provided additional insights into the perceptions of the two groups, with the intent of determining whether or not the perceptions were similar regarding the impact 1:1 iPad use had on student engagement in the classroom.

Research Method and Design

The proposed study incorporates a mixed methods approach for obtaining participant responses. This type of method includes collecting quantitative data to explain the "why" of the research and then gathering qualitative data to explain the "what" and "how," which is intended to increase understanding of the research questions (Creswell, 2014; Roberts, 2004). In other words, the qualitative method will provide additional data to analyze with the intent of gaining in-depth understanding of the participants' perspectives related to the research questions.

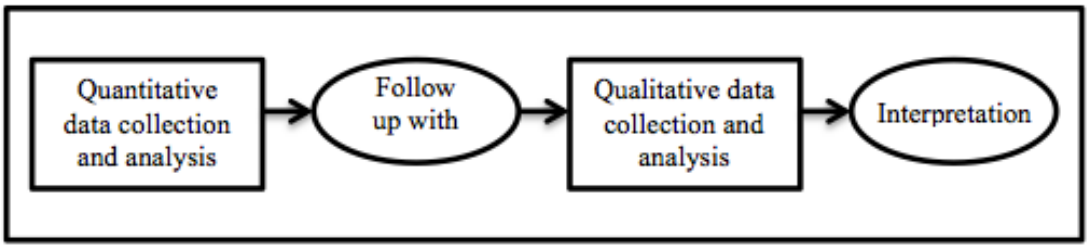
An Explanatory Sequential Mixed Method Design (see Figure 3.1) was used in the current study (Creswell, 2014). This design divided the research into two phases: quantitative data collection and qualitative data collection. Specifically a descriptive survey design was conducted using two types of Likert scales and one

open-ended question to answer the research questions. Analyzing the quantitative method using chi-square tests for independence provided evidence for the researcher to reject or fail to reject the first null hypothesis. Analyses using paired samples t-tests were conducted to determine whether or not the second null hypothesis could be rejected or fail to be rejected.

The qualitative focus groups provided the opportunity for the researcher to gain deeper understanding regarding perceptions of students and teachers in order to answer the final research question.

Figure 3.1

Explanatory sequential mixed methods



(Creswell, 2014, p. 220)

Research Questions

1. How are educators using a 1:1 iPad adoption to impact student engagement in a suburban, Midwestern high school?
2. What iPad engagement strategies are found within the 1:1 adoption?
    - What are the most effective iPad engagement strategies found within the 1:1 adoption?

- What are the least effective iPad engagement strategies found within the 1:1 adoption?

3. What are the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption?
    - What are the similarities between student and teacher perceptions regarding the engagement strategies?
    - What are the differences between student and teacher perceptions regarding the engagement strategies?

Hypotheses

$H1_0$: Educators are not using the iPad for engagement purposes.

$H1_A$: Educators will identify ways they are using the iPad for engagement purposes.

$H2_0$: There is no difference in the effectiveness of iPad engagement strategies.

$H2_A$: There is a difference in the effectiveness of iPad engagement strategies.

The third research question did not require hypothesis testing therefore a null and alternative hypothesis were not included in this study.

Sample

Participants included students and teachers from a large high school in a Minnesota suburban school district. Table 3.1 provides the demographic make-up of the student population of the high school studied.

Table 3.1

Demographic Breakdown of Student Population

Race/Ethnicity	% of Student Population
American Indian	0.9%
Asian/Pacific Islander	6.2%
Hispanic	9.1%
African American	8.0%
Caucasion	75.8%

All students in Grades 9–11 were surveyed, for a total of 1,332 students. All 9–12 classroom teachers in the high school were also surveyed. Two separate focus groups were created by randomly choosing six students from multiple grade levels for the student focus group and six teachers for the teacher focus group. This allowed for further discussion of differences or similarities of perceptions among participants.

The chosen student sample size was determined based on a confidence level of 95% and produces a confidence interval of five or less. This means the data represents a larger population of high school students, with 95% certainty it is accurate, and it is accompanied by a low margin of error. The sample size chosen for teacher participants yielded a 95% confidence level, with a margin of error of five or less.

Setting

The setting for the survey and focus groups was in a suburban Minnesota high school with a student population of 1,769 and a classroom teacher population of 95. The high school selected was in its second year of the 1:1 iPad adoption and was accessed through a face-to-face meeting with the Director of Research, Evaluation,

and Assessment (REA) as well as the building principal. The timing of this study fit in with the district's assessment plan of the 1:1 iPad adoption. This study provided the district with further data as to the impact of 1:1 iPad use on student engagement. In addition to the initial meeting with the REA director and the building principal, an official request outlining the study was sent to the REA director seeking permission to conduct the study.

Instrumentation

The student and teacher surveys were designed by the researcher to gather data specific to the current study's research questions (see Table 3.2). Prior to conducting the surveys, field and pilot tests were conducted to confirm the validity of data collected and the reliability of the surveys. In addition, field testers provided feedback regarding the format and wording of questions, offering suggestions for improvement. Their suggestions were taken into account and changes to the surveys were made accordingly. Pilot testers took the survey with the purpose of providing feedback as to the clarity of the questions. The data collected from the pilot test determined the reliability of the surveys and will be described in the following subsections.

Table 3.2

Research and Survey Questions

Research Questions	**Survey Questions** (S=student; T=teacher)
RQ1: How are educators using 1:1 iPad adoption to impact student engagement in a suburban, Midwestern high school?	S#9, S#12, S#13, S#15, S#17, S#18, S#19 T#7, T#10, T#14, T#15, T#16
RQ2: What iPad engagement strategies are found within the 1:1 adoption? • What are the most effective iPad engagement strategies found within the 1:1 adoption? • What are the least effective iPad engagement strategies found within the 1:1 adoption?	S#26, S#27, S#28, S#29, S#30 T#18
RQ3: What are the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption? • What are the similarities between student and teacher perceptions regarding the engagement strategies? • What are the differences between student and teacher perceptions regarding the engagement strategies?	S#20, S#21, S#22, S#23, S#24, S#25 T#17

Qualitative data was collected from student focus groups and teacher focus groups (see Appendices B and D). This data was intended to provide a deeper understanding of perceptual differences or similarities between students and teachers. In addition, the data collected also provided in-depth responses to the research questions. The questions for each focus group were adjusted based on results from both surveys.

Field test. Three district staff members were chosen to field-test the student and teacher surveys. Two of the staff members were chosen because of their experience with creating surveys and knowledge of vetting survey questions to ensure validity. The third staff member chosen was the Director of Research, Evaluation,

and Assessment, who had previously created surveys for the district in the area of the 1:1 iPad adoption. In addition to providing feedback regarding the surveys, the testers also provided feedback as to the instructions given to participants for taking the surveys and the length of each survey. All three testers had significant technology knowledge and survey creation experience.

Pilot test. The pilot testers consisted of twelve students in Grade 12 for the student survey and three district staff members for the teacher survey, with the purpose of assessing the reliability of the surveys prior to conducting the actual study. All pilot test participants were chosen from the population being studied but were not a part of the actual study.

Data Collection

Data from the actual study was collected through a mixed-methods approach using the teacher and student surveys designed by the researcher and can be found in Appendices A, B, C, and D. Creswell (2014) recommends a mixed-methods approach in order to gain an increased understanding of the research questions. However, he also cautions the researcher when choosing this method due to the extensive data collections and analysis required (Creswell, 2014).

Quantitative surveys were conducted on the same day in students' advisory classes. The rationale for this timing was to ensure as many students as possible would be present to take the survey. Advisory teachers read instructions to the participating students and informed them it was not mandatory to participate (see Appendix E). In order for the study to be representative of the larger student

population with a margin of error no higher than 5 and a 99% confidence level, a total of 444 student surveys needed to be collected. Teachers completed the surveys in their professional learning communities the week prior to the students. Similar to the student survey margin of error and confidence level, 83 teachers needed to complete the survey in order for the data to be representative of the larger teacher population.

Qualitative data was collected in both student and teacher focus groups. Six students ranging across the three grade levels were chosen to participate in a focus group during their study period. In addition, a group of teachers participated in a focus group and met after school hours. This group was composed of one teacher each from mathematics, science, history, special education, an elective, and an International Baccalaureate (IB) English course. Data collection occurred in two phases: surveys and focus groups.

Student and teacher survey. The first phase of data collection consisted of collecting quantitative and qualitative data through the use of the researcher's survey (see Appendices A and C) consisting of multiple-choice questions, rating scales using Likert, and an open-ended question. Participants took the survey online using the Qualtrics Survey Software. Staff were informed of the survey during the monthly staff meeting two weeks prior to the survey date, along with instructions for administering it to the students in their advisory class. The administration of the survey consisted of teachers providing students with the link to the survey after briefly informing them of the purpose for taking the survey (see Appendix E). In addition to the presentation instructions, teachers received an email with step-by-step

directions for administering the survey one week prior to the date of administration and then again the morning of administration with the link to the actual survey. The timing of these correspondences allowed for teachers to ask questions prior to the administration of the study. Teachers took the survey in their professional learning communities one week prior to conducting the student surveys. The survey had no identifiable information and therefore maintained anonymity in responses. Further in-depth qualitative data was collected during phase two of the study, student and teacher focus groups.

Student focus group. Bogdan and Biklen (2007) address the usefulness of focus groups, ranging from seven to 10 participants, for gaining perspectives on a general research topic. Using a purposive approach to ensure all participants were in the second year of the 1:1 iPad adoption, six students from Grades 9–11 were chosen to participate in the focus group. The goal of this method was to obtain data regarding perceptions of the final research question. The format included asking students to provide in-depth responses to questions listed in Appendix B and to clarify question 28 of the student survey (see Appendix A). The session was audio-recorded using the Voice Record Pro app on both the researcher's iPad and iPhone. Creswell (2014) recommends at least two methods of recording information during this type of data collection to prevent loss of data in the case of the audio recording device failure. Participants were identified using a coding system (S9A, S9B, S10A, S10B, S11A, and S11B) and responses were stored in the password-protected survey tool; only the researcher had access to the data. The coding system was chosen to be

able to identify grade levels of each student response when analyzing the qualitative data. The purpose in doing this was to determine if student preferences differed between grade levels.

Teacher focus group. One teacher each from mathematics, science, history, English, special education, an elective, and an International Baccalaureate (IB) course were chosen using the convenience/volunteer sampling technique. According to Vogt (2007), this type of sampling is the most commonly used technique, perhaps due to its level of ease for obtaining participants. The individuals of this focus group provided additional data for the purpose of clarifying question 17 of the teacher survey (see Appendix C). The researcher obtained participant responses to their perceptions of the 1:1 iPad adoption and its impact on student engagement, with the intent of answering the research questions. The focus group format was conducted with the purpose of enhancing the quality of data obtained for the study. Teachers were asked to provide information for questions listed in Appendix D. Similar to the student focus group, the session was audio-recorded using the Voice Record Pro app for the iPad as well as a Smart pen to take notes. Participants were identified using a coding system (T1, T2, T3…) and responses were stored in the password-protected survey tool; only the researcher had access to the data.

Data Analysis

Quantitative data collected from the student and teacher surveys was analyzed using descriptive statistics, chi-square tests for independence, and paired samples t-tests. The descriptive statistics included frequency distributions, mean, and standard

deviation. Responses of students and teachers were compared to measure the consistencies or discrepancies in perceptions. The researcher conducted a reliability test using Cronbach's alpha to determine the reliability level of the engagement questions from the student survey. The statistical analysis involved using the chi-square tests for independence to examine the relationship between the independent variable, 1:1 iPad use, and the dependent variable, student engagement. The value of p (>.05) determined the probability of the null hypotheses being accepted or rejected (Patten, 2012). The paired samples t-test was conducted to determine whether or not the iPad strategies were significantly different in terms of levels of effectiveness toward student engagement.

Qualitative data collected from open-ended survey questions, student focus groups, and teacher focus groups was coded and analyzed after transcribing each response (Creswell, 2014; Patten, 2012). Constant comparative techniques were used to analyze responses from the survey and the focus groups, looking for patterns and similarities among participant responses (Creswell, 2014; Merriam, 2009; Patten, 2012). This analysis answered the following research questions:

1. How are educators using a 1:1 iPad adoption to impact student engagement in a suburban, Midwestern high school?
2. What iPad engagement strategies are found within the 1:1 adoption?
    - What are the most effective iPad engagement strategies found within the 1:1 adoption?

- What are the least effective iPad engagement strategies found within the 1:1 adoption?

3. What are the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption?
    - What are the similarities between student and teacher perceptions regarding the engagement strategies?
    - What are the differences between student and teacher perceptions regarding the engagement strategies?

Participants were identified using a coding system (S9A, S9B, S10A, S10B, S11A, and S11B, T1, T2, T3, T4, T5, and T6) and responses were stored in the password-protected survey tool; only the researcher had access to the data.

Limitations and Delimitations

iPads are new devices being integrated into the classroom using a 1:1 approach. The school in which the study took place was entering its second year of integration. This limits the study since there are other variables that may influence the results, such as initial excitement about the iPad and early stages of professional development. These variables could sway results one way or the other in determining the impact on student engagement. It is recommended that further studies be conducted as schools enter into three or more years of implementation. Perhaps a longitudinal study would be appropriate to provide data over a period of time. This may yield results that limit the number of variables related to initial excitement with the use of a new device. Further limitations include the setting of the current study,

which is a Midwestern suburban high school. Results from this study may not represent an urban or rural high school setting with a more or less diverse population based on ethnicity and socioeconomic status. Additional research could include studying the difference between urban, suburban, and rural high school students' and teachers' perceptions of the impact 1:1 iPad devices have on student engagement. Variables may include types and frequency of professional development, strategies used to engage students, and frequency of 1:1 iPad use.

Another recommendation would be to study multiple 1:1 devices to obtain data as to which devices have the greatest impact on student engagement. With the constant changes in technological devices, it may be important to focus a study on the strategies used with the 1:1 device rather than the device itself.

Ethical Considerations

To ensure ethical standards are maintained throughout the current study, several procedures took place before, during, and after the study was conducted. First, the Institutional Review Board (IRB) reviewed and approved the survey and the process by which the survey was conducted (see Appendix J). Next, on the days the surveys were conducted, participants were informed that their names were not going to be used in the study. There was no identifying information that would link them to survey responses. They were also informed their participation was voluntary and they could opt out of participating in the survey at any time. Finally, once survey data had been collected using the IRB-approved Qualtrics online survey tool, it was stored in this tool, which was password protected by the researcher, so only the

researcher had access to the data.

In regard to the student and teacher focus groups, participants also remained anonymous and were informed of their right to withdraw from the focus group at any time. Prior to conducting the focus groups, the researcher informed participants of their anonymity in the study in order to assure them that their responses would not be traced nor held against them. The researcher had an unbiased role in the outcome of information pertaining to the research questions. Finally, the researcher participated in the collaborative institutional training initiative (CITI) and was certified upon completion of coursework (see Appendix K).

Chapter Four: Results

The purpose of this study was to examine the impact a 1:1 iPad adoption had on student engagement within high school classrooms. The study was divided into two phases of data collection: quantitative surveys and qualitative focus groups. The sample population included students in Grades 9–11 and high school classroom teachers.

The quantitative surveys were designed to answer the following research questions:

1. How are educators using a 1:1 iPad adoption to impact student engagement in a suburban, Midwestern high school?
2. What iPad engagement strategies are found within the 1:1 adoption?
    - What are the most effective iPad engagement strategies found within the 1:1 adoption?
    - What are the least effective iPad engagement strategies found within the 1:1 adoption?
3. What are the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption?
    - What are the similarities between student and teacher perceptions regarding the engagement strategies?
    - What are the differences between student and teacher perceptions regarding the engagement strategies?

The researcher designed both student and teacher surveys using the Qualtrics Survey Tool. Reliability testing was conducted using Chronbach's alpha to determine the reliability level of the engagement questions from the student survey. A Chronbach's alpha value of >0.70 means the survey tool has a high probability of being a reliable measure of student engagement. When conducting the test on the engagement questions from the student survey, the Chronbach's alpha value was 0.909. This means the survey tool was consistent and similar results would occur if the survey was given multiple times. Therefore, the researcher is confident the survey questions are a reliable measure of the impact 1:1 iPad devices have on student engagement.

The student and teacher surveys included the Consent Form (see Appendices E and F) at the beginning of the survey. Participants who gave consent to participate were directed to the first survey question by the Qualtrics software. For participants who did not give consent, the survey automatically closed.

Prior to conducting the study, the researcher field-tested each survey with three district staff members and pilot-tested the student survey with twelve students in Grade 12. Upon approval from Bethel University's Institutional Review Board (IRB) and the school district of the study's Research, Evaluation, and Assessment (REA) director, teachers were presented with the teacher survey and background information on the study at a monthly staff meeting. The survey remained active for three days after the meeting for teachers to complete. One week later, teachers presented the student survey to students in their Advisory class. At that time, students completed

the survey. The researcher deactivated the survey after the Advisory class period was over. The number of students asked to participate was 1,332. Of those students, 1,052 completed the online survey using their 1:1 iPads. This sample size yielded a confidence level of 99% and a +/- 1.8% margin of error. The population of teachers asked to participate in the survey was 95. The number of teachers who completed the survey was 85. This sample size yielded a 99% confidence level with a +/- 4.56% margin of error. Based on this information, the researcher is confident the results of this study are an accurate representation of the larger population.

The quantitative data was exported from the Qualtrics Survey Tool and imported into the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to analyze the three research questions. Chi-square tests of independence were used to determine whether or not the variables, student engagement and iPad use, are independent of each other. In addition, paired sample t-tests were conducted to determine whether or not there was a difference in the effectiveness levels of the iPad strategies used in the classroom. This provided the researcher the ability to reject or fail to reject the null hypotheses:

$H1_0$: Educators are not using the iPad for engagement purposes.

$H2_0$: There is no difference in the effectiveness of iPad engagement strategies.

The third research question did not require hypothesis testing therefore a null and alternative hypothesis were not included in this study.

The second phase of the study involved collecting qualitative data through student and teacher focus groups. The focus group questions (see Appendices B and D) were designed by the researcher to gain a deeper understanding of the perceptions of students and teachers in relation to the research. Six students from Grades 9–11 participated in the student focus group. The researcher asked participants the questions listed in Appendix B. Each student received a nametag using a coding system to protect identity. Students were referred to as S9A, S9B, S10A, S10B, S11A, and S11B. The numbers represent the grade level of each student participant.

Teacher focus groups were made up of one teacher each from mathematics, science, history, International Baccalaureate (IB) English, special education, and an elective. The researcher asked participants questions listed in Appendix D. Similar to the coding used to identify student participants, teachers were identified as T1, T2, T3, T4, T5, and T6.

Quantitative Results

Research question #1. How are educators using a 1:1 iPad adoption to impact student engagement in a suburban, Midwestern high school?

Hypotheses #1. Educators will identify ways they are using the iPad for engagement purposes.

Null hypotheses #1. Educators are not using the iPad for engagement purposes.

Data was collected from student and teacher surveys and analyzed using descriptive statistics.

Table 4.1

Likert Scale

Almost daily	Often	Sometimes	Seldom	Never
1	2	3	4	5

Student survey. Students were asked how often they used their iPads for specific purposes. Each response was rated using a Likert scale ranging from 1 for Almost Daily to 5 for Never (see Table 4.1). The number of students in Grades 9–11 who responded to these questions ranged from 1,022 to 1,096.

Table 4.2

Frequency of iPad Use

Student Survey Question	*Mean Response*	*Standard Deviation*
Q14.5: I am likely to use my iPad when I am outside the classroom to complete homework.	1.49	.836
Q10: I use my iPad in the classroom and/or to study classroom content.	1.59	.791
Q12.4: I use my iPad for research purposes that require seeking a solution.	1.96	.954
Q12.1: I use my iPad for research purposes that require investigating problems.	2.16	.992
Q16: My teachers encourage me to use my iPad while in the classroom to learn and to spark my creativity.	2.27	1.047
Q14.4: I am likely to use my iPad when I am outside the classroom to seek a solution.	2.29	1.119
Q14.3: I am likely to use my iPad when I am outside the classroom to research problems of interest that address specific content areas.	2.37	1.164
Q9: In my classes, I use my iPad to solve real-world problems or issues.	2.40	1.124
Q12.3: I use my iPad for research purposes that require making decisions.	2.41	1.030
Q14.6: I am likely to use my iPad when I am outside the classroom to watch videos.	2.48	1.285
Q14.1: I am likely to use my iPad when I am outside the classroom to work with others.	2.52	1.153
Q17: I use my iPad outside the classroom to learn and to spark my own creativity.	2.52	1.123
Q12.2: I use my iPad for research purposes that require forming an opinion.	2.64	1.051
Q14.2: I am likely to use my iPad when I am outside the classroom to communicate with others.	3.03	1.373
Q14.7: I am likely to use my iPad when I am outside the classroom to play games.	3.13	1.317
Q14.8: I am likely to use my iPad when I am outside the classroom to…(other).	3.29	1.337

Table 4.2 outlines the mean score for student responses regarding iPad use. The lower the score, the more often the iPad was used for the specified purpose.

On average, students used their iPads in the classroom almost daily for studying and for research. In addition, students used their iPads outside of the classroom to complete homework. However, when asked about using the iPad for higher-level thinking such as seeking solutions, making decisions, forming opinions, investigating problems, and solving real-world issues, students responded that they do not often do these with the iPad.

Table 4.3

Frequency of Assigned iPad Use by Teachers

Teacher Survey Question	*Mean (Average) Response*	*Standard Deviation*
Q14: I encourage students to use their iPads outside my classroom to support classroom instruction or to create further learning opportunities.	2.36	.949
Q13: I encourage students to use iPads while they are in my classroom to promote creativity and innovative thinking.	2.40	.941
Q6: Students in my classes engage in planned activities that involve the use of iPads to solve real-world problems or issues.	2.57	1.030
Q9: My students use iPads for research purposes that require them to investigate issues/problems, take a position, make decisions, and/or seek a solution.	2.86	.966
Q15: My students use iPads to engage in collaborative problem-solving opportunities either inside or outside my classroom.	2.92	.867

Teacher survey. Table 4.3 outlines the mean score for teacher responses regarding iPad use. Teachers were asked how often they have students use iPads for specific purposes. Each response was rated using a Likert scale ranging from 1 for Almost Daily to 5 for Never, similar to the student survey. The lower the score, the more often teachers had students use the iPad for the specified purpose. A total of 85 high school classroom teachers responded to these questions.

Results showed similarities to the student survey results as to how students are

using the iPads in their classes. On average, teachers had students engage in planned activities that involved the use of iPads to solve real-world issues, seek solutions, make decisions, form opinions, and investigate problems less than often and daily.

Table 4.4

Chi-square Tests of Independence – Impact of iPads on Student Engagement

		Q20: When teachers provide class activities using the iPads, it makes learning _____interesting to me.					
		Much More	More	The Same	Less	Much Less	Total
Q19: When my teachers have students use iPads at school, learning is _____engaging for me.	Much more	119	39	5	2	0	165
	More	66	266	72	4	1	409
	The Same	11	105	181	16	1	314
	Less	2	23	53	45	6	129
	Much Less	0	1	1	11	14	27
	Total	198	434	312	78	22	1044

Chi Square	1104.49
Degrees of Freedom	16
p-value	0.001

		Q21: I am _____engaged in my learning when using the iPad than I was before the iPad.					
		Much More	More	The Same	Less	Much Less	Total
Q19: When my teachers have students use iPads at school, learning is _____engaging for me.	Much more	119	36	8	1	1	165
	More	38	251	106	11	3	409
	The Same	6	55	189	60	4	314
	Less	1	7	30	69	22	129
	Much Less	0	0	1	4	22	27
	Total	164	349	334	145	52	1044

Chi Square	1295.96
Degrees of Freedom	16
p-value	0.001

		Q21: I am _____ engaged in learning when using the iPad than I was before the iPad.					
		Much More	More	The Same	Less	Much Less	Total
Q20: When teachers provide class activities using the iPads, it makes learning _____ interesting to me.	Much more	118	62	16	2	0	198
	More	41	222	135	32	4	434
	The Same	5	59	171	65	12	312
	Less	0	6	11	42	19	78
	Much Less	0	0	1	4	17	22
	Total	164	349	334	145	52	1044

Chi Square	943.97
Degrees of Freedom	16
p-value	0.001

		Q22: I feel _____ engaged in class when using iPads when compared to doing other activities.					
		Much More	More	The Same	Less	Much Less	Total
Q19: When my teachers have students use iPads at school, learning is _____ engaging for me.	Much more	103	44	14	3	1	165
	More	22	239	132	15	1	409
	The Same	3	49	199	59	4	314
	Less	1	8	32	72	16	129
	Much Less	0	0	0	6	21	27
	Total	129	340	377	155	43	1044

Chi Square	1273.17
Degrees of Freedom	16
p-value	0.001

		Q22: I feel _____engaged in class when using iPads when compared to doing other activities.					
		Much More	More	The Same	Less	Much Less	Total
Q20: When teachers provide class activities using the iPads, it makes learning _____interesting to me.	Much more	104	71	17	5	1	198
	More	21	210	162	38	3	434
	The Same	3	54	184	60	11	312
	Less	1	4	13	49	11	78
	Much Less	0	1	1	3	17	22
	Total	129	340	377	155	43	1044

Chi Square	982.14
Degrees of Freedom	16
p-value	0.001

		Q22: I feel _____engaged in class when using iPads when compared to doing other activities.					
		Much More	More	The Same	Less	Much Less	Total
Q21: I am _____ engaged in my learning when using the iPad than I was before the iPad.	Much more	100	54	9	0	1	164
	More	25	210	102	11	1	349
	The Same	4	65	216	47	2	334
	Less	0	10	47	80	8	145
	Much Less	0	1	3	17	31	52
	Total	129	340	377	155	43	1044

Chi Square	1302.92
Degrees of Freedom	16
p-value	0.001

The chi-square statistical test of independence was conducted to determine if the iPads impacted student engagement. As outlined in Table 4.4, using the iPads made learning more engaging for students (p=0.001). Students were more interested in their learning when using iPads for class activities (p=0.02). In addition, students were more engaged in learning when using the iPad compared to learning before

using the iPad (p=0.001).

Discussion. Results from the student survey showed students were more likely to use their iPad for research purposes that required seeking a solution, studying classroom content, and completing homework. The mean response for these survey questions ranged from 1.49 to 1.96 with standard deviations of <1. Results from the teacher survey regarding iPad use outside the classroom to support classroom instruction and create further learning opportunities showed on average, teachers have students use the iPad for this purpose often. These findings agree with the student survey results showing teachers had students use the iPads for homework and to further learning opportunities. On the other hand, teachers responded they were less likely to use the iPads to have students solve real-world problems or issues, investigate issues, take a position, make decisions, seek solutions, promote creativity and innovative thinking, and engage in collaborative problem-solving opportunities. Student survey results aligned with teacher results showing the majority of students often used their iPad in the classroom to learn and spark creativity.

Chi-square statistics showed statistical significance supporting the iPads made learning more engaging for students (p=0.001) and students were more engaged in learning when using the iPad compared to learning before using the iPad (p=0.001). Therefore, the null hypothesis, "Educators are not using the iPad for engagement purposes," can be rejected. Educators are using the iPad for engagement purposes however; high levels of use in terms of critical thinking skills and Bloom's Taxonomy (Bloom, 1956) are not yet being promoted.

Research question #2. What iPad engagement strategies are found within the 1:1 adoption? What are the most and least effective iPad engagement strategies found within the 1:1 adoption?

Hypotheses #2. There is a difference in the effectiveness of iPad engagement strategies.

Null hypotheses #2. There is no difference in the effectiveness of iPad engagement strategies.

Table 4.5

Activities Students are Most Interested In

Student Survey Question	*Number*	*Percentage*
Q25: Of the activities listed below, the two that keep my interest most in class are:	1096	100
Q25.3: Small group work	461	42.1
Q25.5: Completing worksheets, posters, study guides, textbook questions, etc.	398	36.3
Q25.4: Reading/working alone	357	32.6
Q25.6: Using iPad apps	338	30.8
Q25.1: Lecture/presentation by teacher	261	23.8
Q25.2: Large group work	247	22.5
Q25.7: Using computers (typing, researching, presentations)	178	16.2
Q25.8: None of these	40	3.6

Student survey. Table 4.5 outlines student response to activities that keep their interest the most. These included small group work; completing worksheets, posters, study guides, and textbook questions; and reading or working alone. More than 40% of students preferred to work in a small group. Less than 30% were interested in lectures by the teacher and large group work. The lowest activity of interest was using computers for typing, researching, and making presentations.

Table 4.6

Activities Students Learn Most From

Student Survey Question	*Number*	*Percentage*
Q26: Of the activities listed below, the two that I learn most from in class are:	1096	100
Q26.1: Lecture/presentation by teacher	502	45.8
Q26.5: Completing worksheets, posters, study guides, textbook questions, etc.	479	43.7
Q26.4: Reading/working alone	369	33.7
Q26.3: Small group work	348	31.8
Q26.6: Using iPad apps	209	19.1
Q26.2: Large group work	188	17.2
Q26.7: Using computers (typing, researching, presentations)	120	10.9
Q26.8: None of these	32	2.9

Almost half of all students who responded to the survey question asking which activities they learned most from answered lectures by teachers and completing worksheets, posters, study guides, and textbook questions (see Table 4.6). Only 19% said they learned most from using iPad apps and only 11% said they learned most from using computers for typing, researching, and making presentations. One-third of students said they learned best working in small groups or alone as well as reading alone.

Table 4.7

Student Preferences for iPad Use in the Classroom

Student Survey Question	*Number*	*Percentage*
Q27: If I were given the choice to complete an assignment with the iPad, I would choose (mark all that apply):	1096	100
Q27.2: Research	622	56.8
Q27.7: Creating videos	524	47.8
Q27.8: Taking tests/quizzes	506	46.2
Q27.6: Making presentations	503	45.9
Q27.3: Math	393	35.9
Q27.1: Writing an essay	345	31.5
Q27.5: Reading a novel	268	24.5
Q27.4: Reading a textbook	251	22.9
Q27.9: Other	148	13.5
Q27.10: None of these	55	5.0

Student preference for using the iPad included research as the most frequent response (see Table 4.7). Making presentations, creating videos, and taking tests/quizzes were the next most frequent responses to preferences for using the iPad. A less frequent response was for using the iPad to read a digital version of print textbooks or a novel.

Table 4.8

Preference for Specific iPad Apps

Student Survey Question	*Number*	*Mean*	*Standard Deviation*
Q29: Teachers were asked about specific iPad apps they use in the classroom. Please rank each app according to its impact on your engagement.			
Q28.11: Kahoot!	1022	1.24	.56
Q28.15: Notability	1022	1.24	.54
Q28.23: YouTube	1022	1.49	.71
Q28.2: Schoology	1022	1.58	.69
Q28.2: Discussion Boards	1020	1.58	.69
Q28.1: iMovie	1022	2.00	.93
Q28.20: Quizlet	1015	2.01	1.00
Q28.28: iBooks	1015	2.14	1.11
Q28.5: PicCollage	1018	2.18	.95
Q28.16: Prezi	1019	2.22	1.07
Q28.3: NEWSELA	1022	2.34	.88
Q28.27: Google Calendar	1019	2.50	.09
Q28.14: Socrative	1018	2.79	1.21
Q28.4: Educreations	1015	2.95	.97
Q28.6: iVideo	1013	3.17	1.07
Q28.26: EDpuzzle	1017	3.22	1.09
Q28.8: 30Hands	1020	3.45	.91
Q28.18: Haiku Deck	1010	3.46	.93
Q28.22: Virtual Science Lab	1013	3.54	.89
Q28.21: Brainscape	1013	3.58	.84
Q28.9: Comic Touch	1017	3.59	.81
Q28.7: Gone Google Story Builder	1015	3.60	.81
Q28.25: Aurasma	1014	3.61	.81
Q28.13: Padlet	1013	3.62	.80
Q28.10: Thing Link	1011	3.63	.78
Q28.17: Animoto	1015	3.63	.78
Q28.24: VMath	1016	3.66	.76
Q28.19: PowToon	1014	3.67	.76
Q28.12: Plickers	1017	3.70	.71

Students were asked to rank specific iPad apps teachers used in the classroom according to the level of engagement per app. There were a total of twenty-nine apps teachers used as seen in Table 4.8. Students rated each app as Very engaging, Acceptable, Does not work well for me, and Not familiar with this app. A mean score closest to 1 represents the app as very engaging.

When analyzing the data using descriptive statistics in the Statistical Package for the Social Sciences (SPSS), the researcher removed from calculations the fourth response to student survey question 28, "I am not familiar with this app." Results showed that students were very engaged when teachers use Schoology, Kahoot!, Notability, and YouTube. The following apps were rated by students as acceptable in terms of engagement: iMovie, Quizlet, iBooks, PicCollage, Prezi, and NEWSELA.

Table 4.9

Percentage of Teachers Using Specific Apps

Teacher Survey Question	*Number*	*Frequency*
Q17: Please list strategies you use with students in regard to the iPads.		
Schoology	85	15%
Notability	85	11%
Kahoot!	85	8%
Google Calendar	85	6%
NEWSELA	85	<1%
YouTube	85	<1%

Teachers responded to question 17 on the teacher survey (see Appendix C) with a variety of apps used in the classroom. In the interest of comparing apps students are more engaged in to the apps used by teachers, the researcher used descriptive statistics to determine how many teachers were using the highly engaging apps. Results showed the four favorite apps were only used by a small percentage of teachers. Specifically, 15% of teachers used Schoology; 8% used Kahoot!; 11% used Notability; and <1% used YouTube as seen in Table 4.9.

Table 4.10

Engagement Level of Specific Strategy Use

Student Survey Question	*Number*	*Mean*	*Standard Deviation*
Q29: Teachers were asked about specific strategies they use in the classroom with the iPad. Please mark the level of engagement each strategy has on your learning.			
Q29.3: Research	1022	1.65	.74
Q29.1: Note taking	1016	1.71	.74
Q29.2: Test taking	1022	1.76	.76
Q29.4: Graphic organizers	1022	2.12	.92
Q29.5: Podcasts	1022	2.93	1.06
Q29.6: Other	1022	3.06	1.25

Finally, students were asked to rank specific iPad strategies teachers used in the classroom according to the level of engagement per strategy. The strategies were obtained from teacher survey results, specifically open-ended question 17 (see Appendix C). The results provided several strategies teachers used, however, for student surveys, the researcher only included strategies over half of the teachers stated (see Table 4.10).

Students rated each strategy as very engaging, acceptable, does not work well for me, and not familiar with this app. A mean score closest to 1 represents the app as very engaging. When analyzing the data using the chi-square tests of independence in the Statistical Package for the Social Sciences (SPSS), the researcher removed from calculations the fourth response to student survey question 29, "I am not familiar with this strategy."

The average number of students responded to research, note taking, and test taking as very engaging strategies to use with the iPad. Using graphic organizers and

creating podcasts on the iPads were, on average, the lowest engaging strategies out of the top five strategies used in the high school classrooms.

Table 4.11

Chi-square Test of Independence – Effectiveness of iPad Strategies

		Teachers were asked about specific strategies they use in the classroom. Please mark the level of engagement each strategy has on your learning. – Note Taking				
		Very engaging	Acceptable	Did not work well for me	Not familiar with this strategy	Total
When my teachers have students use iPads at school, learning is ____engaging for me.	Much more	112	37	9	0	158
	More	185	183	31	3	402
	The Same	114	146	37	5	302
	Less	38	48	38	3	127
	Much Less	5	1	17	4	27
	Total	454	415	132	15	1016

Chi Square	197.68*
Degrees of Freedom	12
p-value	0.001

		Teachers were asked about specific strategies they use in the classroom. Please mark the level of engagement each strategy has on your learning. – Test Taking				
		Very engaging	Acceptable	Did not work well for me	Not familiar with this strategy	Total
When my teachers have students use iPads at school, learning is ____engaging for me.	Much more	101	43	12	2	158
	More	188	173	37	5	403
	The Same	92	161	43	5	301
	Less	36	50	37	4	127
	Much Less	5	6	12	4	27
	Total	422	433	141	20	1016

Chi Square	134.76*
Degrees of Freedom	12
p-value	0.001

		Teachers were asked about specific strategies they use in the classroom. Please mark the level of engagement each strategy has on your learning. – Research				
		Very engaging	Acceptable	Did not work well for me	Not familiar with this strategy	Total
When my teachers have students use iPads at school, learning is ____engaging for me.	Much more	118	30	9	0	157
	More	207	153	40	3	403
	The Same	131	133	32	5	301
	Less	41	59	21	5	126
	Much Less	6	9	8	4	27
	Total	503	384	110	17	1014

Chi Square	108.52*
Degrees of Freedom	12
p-value	0.001

		Teachers were asked about specific strategies they use in the classroom. Please mark the level of engagement each strategy has on your learning. – Graphic Organizers				
		Very engaging	Acceptable	Did not work well for me	Not familiar with this strategy	Total
When my teachers have students use iPads at school, learning is ____engaging for me.	Much more	78	46	21	11	156
	More	123	164	86	29	402
	The Same	66	139	67	29	301
	Less	21	42	51	12	126
	Much Less	4	4	14	5	27
	Total	292	395	239	86	1012

Chi Square	88.08*
Degrees of Freedom	12
p-value	0.001

		Teachers were asked about specific strategies they use in the classroom. Please mark the level of engagement each strategy has on your learning. – Podcasts				
		Very engaging	Acceptable	Did not work well for me	Not familiar with this strategy	Total
When my teachers have students use iPads at school, learning is ____engaging for me.	Much more	43	26	27	61	157
	More	53	98	85	165	401
	The Same	23	77	78	122	300
	Less	6	19	53	49	127
	Much Less	1	4	12	10	27
	Total	126	224	255	407	1012

Chi Square	74.74*
Degrees of Freedom	12
p-value	0.001

To determine whether or not there was a statistical significance between the dependent variable, student engagement, and the independent variable, iPad strategies, the researcher conducted a chi-square test of independence. Table 4.11 outlines the statistical data in order from most effective strategy to least effective based on the chi-square approximation and the *p* value. A *p* value of 5% or less shows a statistical significance in favor of the independent variable. Results showed all five strategies were effective towards student engagement ($p=<.05$).

Table 4.12

iPad Strategies Ranked from Most to Least Effective

Student Survey Questions	*Mean (Average) Response*
29.1. Teachers were asked about specific strategies they use in the classroom with the iPad. Please mark the level of engagement each strategy has on your learning.-Research	1.65
29.2. Teachers were asked about specific strategies they use in the classroom with the iPad. Please mark the level of engagement each strategy has on your learning.-Note taking	1.71
29.3. Teachers were asked about specific strategies they use in the classroom with the iPad. Please mark the level of engagement each strategy has on your learning.-Test taking	1.76
29.4. Teachers were asked about specific strategies they use in the classroom with the iPad. Please mark the level of engagement each strategy has on your learning.-Graphic organizers	2.12
29.5. Teachers were asked about specific strategies they use in the classroom with the iPad. Please mark the level of engagement each strategy has on your learning.-Podcasts	2.93

To determine whether or not there was a difference in the effectiveness levels of each strategy, paired samples t-tests were conducted which compared the mean score derived from the student survey results of each strategy to the other (see Table 4.12). The mean score was derived from responses from a Likert scale ranging from 1 for *This is a very engaging strategy* to 5 for *I am not familiar with this strategy*. A mean score closest to 1 represents the strategy as very engaging. When comparing note taking (mean score = 1.71) to test taking (mean score = 1.76), there was no significant difference between the effectiveness of each strategy (p=0.051). However, when comparing note taking to research (mean score = 1.65), there was a significant difference between the strategies in favor of researching being more effective towards engagement (p=0.021). This significant difference holds true for graphic organizers (mean score = 2.12) and for podcasts (mean score = 2.93) when

compared to note taking (p=0.001, p=0.001). When comparing test taking to research, graphic organizers, and podcasts, there were statistical differences between these strategies in favor of researching being more effective towards student engagement (p=0.001, p=0.001, p=0.001). Research was then compared to graphic organizers and to podcasts. These comparisons showed a significant difference between the effectiveness towards student engagement in favor of research (p=0.001, p=0.001). Finally, graphic organizers were compared to podcasts and results showed a significant difference in favor of graphic organizers being more effective towards student engagement ((p=0.001). These results show a statistically significant difference between the levels of effectiveness for each strategy.

Discussion. To answer research question 2, "What iPad engagement strategies are found within the 1:1 adoption?" and "What are the most and least effective iPad engagement strategies found within the 1:1 adoption?" results show teachers are using the iPads for strategies including:

- note taking
- research
- creating projects
- completing daily assignments
- small and large group work
- taking quizzes/tests.

Activities that students found the most interesting are:

- small group work

- reading/working alone and
- completing worksheets/posters/study guides/textbook questions.

Students were not interested in:

- lecture/presentations by teachers
- large group work and
- using computers for typing/researching/presentations.

When asked which activities they learn most from, almost half of all students responded to:

- lecture/presentation by teacher
- small group work
- reading/working alone and
- completing worksheets/posters/study guides/textbook questions

The activities students found most interesting and learned most from are similar except lecture/presentation by teacher. Although students said they did not find this interesting, they said they do learn from it. Interestingly, only 19% of students said they learned most from using iPad apps. When asked which iPad apps they prefered in terms of impact on engagement, students preferred Schoology, Kahoot!, Notability, and YouTube the most. However, only a small percentage of teachers used these apps.

Students responded that the most engaging strategy used with the iPads was note taking. The least engaging was creating podcasts. This data is beneficial to assist teachers in using activities and apps students find interesting and impactful

towards their overall engagement. Although all five strategies, note taking, test taking, research, graphic organizers, and podcasts were effective towards increasing student engagement, researching was the most effective and podcasts were the least effective of the five iPad strategies. Therefore, the null hypothesis, "There is no difference in the effectiveness of iPad engagement strategies" is rejected.

Research question #3. What are the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption? What are the similarities and differences between student and teacher perceptions regarding the engagement strategies?

Quantitative results:

Table 4.13

Student Responses to iPad Use in the High School Classroom

Student Survey Questions	*Number*	*Mean (Average) Response*	*Standard Deviation*
Q19: When my teachers have students use iPads at school, learning is _____ engaging for me.	1044	2.47	.984
Q20: When teachers provide class activities using the iPads, it makes learning _____ interesting to me.	1044	2.32	.935
Q21: I am _____ engaged in my learning when using the iPad than I was before the iPad.	1044	2.59	1.065
Q22: I feel _____ engaged in class when using iPads when compared to doing other activities.	1044	2.646	1.009
Q23: When it comes to learning, the following generally describes my experience with the iPads in class: a. The iPad helps me learn more. b. The iPad has a neutral impact; I learned the same whether I had an iPad or not. c. The iPad slows my learning.	1029	1.65	.671
Q24.1: The use of iPads in class helps me stay focused.	481	----	----
Q24.2: The use of iPads in class does not affect my learning.	579	----	----
Q24.3: The use of iPads in class seems to distract me.	300	----	----

Student survey. Table 4.13 outlines student responses in regard to the impact

of iPad use on their engagement and interest level. Students rated their levels on a scale of 1 being "Much more" to 5 being "Much less". Results showed there was a difference in student engagement when using the iPads. However, 53% of students said the use of iPads did not affect their learning. On the other hand, 44% of students said the iPads helped them stay focused while 27% said the iPads distracted them.

Table 4.14

Teacher Responses to iPad Use in the High School Classroom

Teacher Survey Questions	*Number*	*Mean*	*Standard Deviation*
Q16: As compared to lessons that do not include the use of iPads, to what extent do you agree or disagree with the following statements regarding the intentional use of iPads in the classroom:			
Q16.1: Students create higher-quality products.	84	2.23	.700
Q16.2: Students interact with each other more.	84	2.63	.902
Q16.3: Students are better able to grasp difficult concepts.	84	2.60	.604
Q16.4: Students put more effort into their assignments.	84	2.75	.742
Q16.5: Students develop a deeper understanding of the subject material.	84	2.52	.630
Q16.6: Students are better able to learn.	84	2.65	.703
Q16.7: I am better able to help students learn.	84	2.33	.750
Q16.8: I am better able to determine where students are in their learning.	84	2.20	.833

Teacher survey. Question 16 asked for teachers to respond to statements rating them from a 1 "Strongly agree" to a 5 "Strongly disagree". The mean score for each statement was between agree and disagree with a standard deviation of <1 as seen in Table 4.14. This means the data collected is a reliable measure of teacher perceptions regarding the use of iPads in the classroom.

On average, teachers agreed students created higher quality products and they were better able to help students learn and determine where they were at in their learning. On the other hand, teachers were more likely to disagree that students

interacted more with each other, were better able to grasp difficult concepts, put more effort into their assignments, developed a deeper understanding of the subject material, and were better able to learn when using the iPads.

Qualitative results:

Student focus group. Six students in Grades 9-11 participated in the focus group. The researcher asked specific questions relating to the use of 1:1 iPad devices in the high school classroom (see Appendix B). During the analysis phase, student responses were transcribed from the audio recording taken from the focus group session and typed into a Microsoft Word document. After the transcription, the researcher analyzed frequency of responses and categorized them into themes. The themes were broken down into four major themes each consisting of two subthemes and student recommendations.

Theme #1. iPads help with organization. The first theme that emerged from the focus group discussion was of student preference for the iPad for the purpose of organization. Specifically students S10A, S11A, and S11B stated they prefer not having to carry textbooks. However, according to student survey results, only 22.9% of students preferred reading a textbook on the iPad. Students in the focus group also said they prefer completing assignments on the iPad because they do not lose work as easily and can store it all in one place. On the other hand, student S10B replied saying it was less preferable to store all work on the iPad in case of technical issues. All students agreed backing up all work to their Google drive could solve this issue. Student S11A said using the iPad is much more efficient for doing

assignments because the work can be submitted online right away to the teacher. Student S11B replied, "This not only helps to avoid losing work but also helps to remember to turn in my assignments." All six students said they preferred using the app Notability to store their work because of its ease of use and variety of tools such as protractors, rulers, 3D imaging, customizable graphs, etc. Student survey results show 80.2% of students said Notability is a very engaging app. However, student S10A said he has difficulty writing on the iPad and would rather use a pencil and paper instead of Notability. He said it is too difficult unless he has a stylus to use when writing on the iPad.

They also agreed Schoology is their preferred site for taking tests and submitting assignments. They said their engagement level increases when they know they will receive immediate feedback in regard to tests. All six participants said they like Schoology because it gives them their score, showing which items were correct and incorrect. Of students surveyed, 51.8% said the app is very engaging while 39.6% felt it was an acceptable app. However, only 15% of teachers use Schoology. Students S10B and S11A felt strongly that all teachers should use the same site, specifically Schoology, for assignments and test taking. They said it is too confusing when they have to remember all the different sites and which teacher uses which site.

Theme #2. iPads increase the amount of distractions. Another theme from the student focus group addressed the level of distractions iPads cause students. All six students agreed the access to games, music, and social media that iPads provide are difficult to ignore. Students S9A and S9B stated they tend to focus more on the

games during class time instead of the educational activities they are supposed to be focusing on. Student S10B said the notifications for messages and Facebook cause the most distractions. Student S10A said, "Although some teachers use an app called Casper Focus that allows them to lock our iPads into a specific app, this causes problems when they forget to unlock them." Students said they have gone to other classes with a locked iPad and were not able to unlock it until the end of the school day.

Student S11A said he turns off his notifications to avoid being distracted and tempted to check his messages. When asked how to make the iPad less distracting, student S10A said, "I knew I had to delete my games and social media because it was too distracting. After I did this, my grades improved." Student S11B said she learned how to discipline herself to use the iPad for strictly educational purposes. She said she was not able to do this when she was a ninth grader.

Students S10A and S10B said freshmen struggle more so with the novelty of having the iPad and this is where the lack of self-control comes into play. They said it helps to see the upper classmen using the iPads less for games and more for schoolwork. Student S10B said, "They are setting an example for the younger students." However, this does not agree with the student survey data. Only 21% of freshmen students reported being distracted by the iPad while 38% of sophomores and 29% of juniors were distracted by the iPad.

The sophomore and junior participants agreed the second year of iPad integration has helped decrease the novelty factor. Once the novelty wears off, they

said they are more focused and less likely to play games. On the other hand, they said the beginning of the school year is difficult because they are relearning this discipline. Because they have not had access to their iPads over the summer, they said they tend to lose focus right away and play games or message with friends. Student S11B said this newness begins to wear off by the end of the first trimester.

The students recommended the district change the summer iPad policy and allow students to keep them throughout the summer. This stated it might alleviate the newness issue occurring at the beginning of each school year. Another recommendation made by the participants was to scaffold the iPad rollout from the start of the integration. Student S11A recommended giving 1:1 iPads to only the freshman and then providing guidance to teach them how to use iPads for educational purposes. He also recommended putting more restrictions on the iPad, setting expectations for use, and then having students earn usage rights. Students S9A, S10A, and S10B were concerned the rest of the student population would feel left out and find this process unfair.

Theme #3. Specific strategies and iPad apps increase student engagement. The third theme that emerged from the student focus group centered on using iPad apps for classroom activities and projects. All six students agreed they are more interested in learning when doing activities. They said teachers have been increasing the amount of activities since the iPad integration. One game all students preferred was Kahoot!. They said teachers use it for reviews prior to tests and promotes interaction among students as well as competition. Students S9A, S9B, and

S11A said they were more likely to be engaged when playing Kahoot! The other three students agreed saying it motivated them to stay on task more so than listening to the teacher review information. When asked which apps impacted engagement the most, student survey results show Kahoot! as the most impactful out of all of the apps teachers use. However, only 8% of teachers use this app according to results from the teacher survey.

Student S10B provided an example of an activity used in the science classroom, which involved individual students researching topics and posting online. She preferred this method because it was accessible at both school and home. She also stated this activity took the place of having students present their topic to the class during school hours and relying on their note taking skills to access information from home. She said that she learned more by having online access rather than listening to presentations during class time.

Student S11B said she preferred using Discussion Board over in-class presentations. She said after researching a specific topic, her teacher required students to post their information to the discussion. She liked this method because she said it leveled the playing field and held all students accountable for their work. She informed the focus group that Discussion Board only allows students to view other posts if they have posted their topic. She said this benefits the students who are doing their work and also helps the teacher see who is not participating. Overall, students expressed that the level of connectedness and collaboration with their peers increased when participating in activities that used these apps and sites.

In addition to using specific apps and websites, students S10A, S10B, S11A, and S11B said they prefer having the ability to look up information on the spur of the moment. For example, student S10B said she looks up words using Shakespeare Translator while reading in English class. She said this is helpful when the teacher is discussing Shakespeare or reading aloud and there is a word she does not understand, she can quickly type it in her iPad to find out the meaning. Student S10A said he uses this feature in his Spanish class when he is unsure of a word. He said he can quickly access the Spanish Dictionary online rather than thumbing through a book to find the answer. All six students agreed the iPad makes intentional and unintentional learning more efficient.

On the other hand, students stated the ability to cheat is greater and is definitely an issue for schools who use the 1:1 iPad devices. Student S11B said Airdrop on the iPad made cheating very easy and many students did so. However, student S11A said this function was removed from all iPads yet students are still finding ways to cheat such as emailing each other assignments or test questions. All six students agreed cheating is easy regardless of using iPads or not.

Theme #4. Logistical issues often occur with the iPads. The final theme that emerged during the student focus group was the logistic issues when using iPads. Student S9B said the Internet freezes often when too many students are trying to access the same site. The other five students agreed this has happened to them several times and has impacted their work for that specific class period. They say more often than not network problems make the iPads unusable. The students said

when this happens a lot of time is wasted trying to figure out the network issue. Student S9A added, "This can cause problems if the teachers are not prepared with hard copies or backups of the assignments or activities for that day."

In addition to network problems, students also discussed other logistical issues such as equipment failure. Student S9A and S10A said they have both had problems with their chargers. S9A said he would charge his iPad at night and it would only have a 15% charge in the morning. He said this caused several problems during the school day when his iPad's battery was dead. Student S10A said he had gone through three different chargers in one school year. Student 11B said the specific chargers and cords for the iPads are very expensive. At the time students are given an iPad, they are also given a charger and cord. They are responsible for the iPad, charger, and cord. If they lose or break the charger or cord, they are responsible for replacing it. All students are required to purchase an insurance plan when given the iPad, however, this plan only covers the cost of a broken iPad. It does not cover the iPad accessories.

Students S9A, S9B, and S10B pointed out when the seniors graduate, their iPads get handed down to the freshmen. Although inventory is taken on each iPad when turned in at the end of the year, students say some issues are difficult to detect such as iPad charging issues. Freshman students then receive these iPads and continue to have issues throughout the school year.

Student recommendations for logistical issues included having back ups of books, paper, and writing utensils in each classroom in case the network freezes and

students cannot access content on their iPads. In addition, regarding equipment failure, students recommended the insurance policy cover iPad accessories as well.

They also recommended spending more time being introduced to their iPad at the beginning of the year. The first week of school focuses on technology including how to use the iPad, expectations and rules, and lessons in digital citizenship. Students stated that teachers were not consistent in teaching this each day therefore they did not receive the information or forgot it after the week was over. Students recommended more time spent the first week of school dedicated to technology usage where students could become familiar with apps used by teachers, setting up accounts, familiarizing themselves with teacher websites, and learning digital citizenship.

Teacher focus group. Six teachers from math, history, science, special education, International Baccalaureate English, and an elective participated in the focus group. The researcher asked specific questions relating to the use of 1:1 iPad devices in the high school classroom (see Appendix D). During the analysis phase, teacher responses were transcribed from the audio recording taken from the focus group session and typed into a Word document. After the transcription, the researcher analyzed frequency of responses and categorized them into themes. The themes were broken down into four major themes each consisting of two subthemes and teacher recommendations.

Theme #1. iPads help with organization. The first theme that emerged from the focus group discussion was iPads help students stay organized. Teachers

agreed it is easier for students to keep track of assignments and are less likely to lose work when it is completed on the iPad. Teachers said this was the biggest advantage of the iPads for the freshmen students. However, all six teachers agreed it is difficult for struggling students to keep track of all the different passwords and codes given to them for logging into apps and submitting work to different teacher sites. They said students who are disorganized struggle with this and need assistance to remember the different apps and passwords. Teacher T2 said too often it is assumed students can handle the different apps and passwords.

Teachers T1, T2, and T4 recommended the technology integration should have allowed for more time away from curriculum to spend instructing on iPad usage, expectations, and to give students time to learn the different apps and sites their teachers use. Teacher T6 agreed and also said students should be provided time to complete logistics such as downloading certain apps required by their teachers and could occur during first hour for the first two weeks of school or during advisory classes; this time could also be used to teach students how to organize all of their materials for each class on the iPad. Teachers also said the iPad integration should be scaffolded in terms of which students initially use them and they should earn the use of iPads.

Theme #2. iPads increase the amount of distractions. Another theme that emerged from the focus group was the iPads cause major distractions to students. All six teachers agreed social media and games are the main cause of distractions for students with 1:1 iPad devices. Teacher T5 said students become so absorbed in the

games they do not pay attention to lecture or teacher directions. In addition to the games, all teacher participants agreed the availability of social media on the iPads also creates a distraction for students and they become absorbed in the drama of what is happening in their personal lives. All teachers agreed games and social media are an issue whether it is on the iPad or on students' phones. However, since the iPad is readily available on their desk, teachers said that students are easily interrupted from their educational work by notifications from the game or social media. Teacher T5 responded, "Several students do not have the discipline to ignore the notification." She said that she requires students to turn off notifications in their Settings on the iPad. Although an obvious solution, teacher T6 said it is time consuming to check all students' iPads to ensure they did this, which then takes away from educational opportunities.

Teacher T1 addressed the amount of personal things students keep on their iPad that are distracting them from school. She said, "Although several apps were blocked so students could not download them to their iPad, there were ways around it that students figured out. For those who could not download certain apps, they would download them on their phone and use their phone during class."

Teacher T4 recommended review of the District Policy in regard to cell phone use in the classroom. He also recommended the school have their own app store where students could only download apps from the school store. This may alleviate issues with students downloading apps that distract them from learning.

Teacher T2 felt that the younger students lacked the ability to switch between

apps without checking their Twitter, Pinterest, and other apps. She said that she noticed the older students seem to manage their iPads more but still show a problem with self control in terms of using the iPad for educational purposes.

Teacher T6 said the problem is not with the students but with the teachers and how they are having students use the iPads. She has noticed the iPads primary uses are for shuffling documents around, taking notes, and taking tests. "Students view this as boring therefore resorting to finding fun things to do on the iPad," she stated. She said if we, as teachers, find creative uses for the iPad, we will see fewer students distracted and more focused on learning. Teacher T4 agreed and said the greatest obstacle with the iPads is getting students to create using the iPad instead of using them as a glorified pencil and notebook. He felt distractions are increasing because students are bored. Teacher T5 agreed but also said it is very difficult to revamp the whole curriculum. She agreed it is possible with an investment in time and effort. However, with the many things already required of teachers, this is just one more thing they do not have time for. This is an issue that would go back to how technology integration is rolled out and the resources provided for teachers prior to putting iPads in the hands of students.

Theme #3. The iPad rollout impacts effectiveness of adoption. A third theme that emerged from the teacher focus group was the importance of how the iPad adoption is rolled out to teachers and students. Teachers T2 and T3 felt they did not have enough training with the iPads prior to students receiving them. Teacher T6 felt the roll out was not communicated to staff therefore not giving teachers time to learn

how to integrate the iPads into their curriculum. She said there was not enough professional development provided to teachers therefore causing frustration and a negative attitude towards these devices. Teacher T4 said that the decision-makers for the technology integration did not understand the level of difficulty and amount of time it would take for teachers to integrate iPads into their daily lessons. He said this led to several teachers not using the iPad and very few who were excited to integrate the device into their lessons. He also said teachers looked at this as a monumental task rather than a monumental opportunity.

In regard to negative perceptions, teachers agreed students pick up on these negative perceptions and in turn develop similar perceptions. This stresses the importance of providing professional development to teachers to alleviate the negative perceptions and frustrations caused by an integration that is not properly rolled out to staff. Teachers T1, T2, and T4 perceived a willingness from the majority of teachers in their building to learn how to use the iPads effectively and integrate into their classrooms.

Teachers recommended several ways to roll out a technology integration of this size. Teacher T4 suggested a smaller roll out including only teachers who want to use them. He felt the buy-in would be greater if iPads were put into the hands of teachers who had a choice in the matter. "They could be provided with needed resources such as professional development and time to plan for integrating the iPads into their daily lessons," he said. Teacher T3 said they would pilot the roll out by planning, implementing, and collecting data on what works and what does not work

when integrating the iPad devices. He further stated, "This information could then be shared with other teachers and slowly the roll out could expand to a larger number of teachers."

Another recommendation was made by teacher T1 who felt the integration should start with providing voluntary teachers with classroom sets of iPads rather than providing students with the iPads as 1:1 devices. She said when Smartboards were the new technological device in classrooms; only a select number of teachers had them because they had an interest in examining their full potential to impact student engagement. She added, "As Smartboards slowly made their way into more classrooms, students and teachers became interested because they saw how the initial classrooms were using them." She said if the iPads were rolled out in a similar fashion as the Smartboards, it could increase student interest and curiosity because the teachers would be more familiar with the device and how to get students to view them as an educational tool.

Teacher T3 stated, "We need to put the iPads in the hands of teachers who want them. This would create a generation of learners who demand teachers use them and would want this in the classroom because they have been exposed to good usage. When over half of the usage is not interesting students become bored and revert back to their 'fun' activities such as games." These recommendations could also solve the issue of distractions caused by iPad usage.

Theme #4. Students have more control over their learning and have the ability to increase their higher-level thinking skills. The final theme that emerged

from the teacher focus group was the iPads provided students the opportunity to have more control over their learning and increased higher-level thinking skills. Since the iPads provide immediate information, teachers said students are able to be in control of their learning rather than rely solely on the teacher for the information. "This creates independent learners and allows for students to take their learning to the next level," teacher T4 stated. Teacher T4 also said students have more of the decision making as to what and how they will learn. He said the ability to have information at their fingertips also allows for them to find answers to their own questions that they may not have been able to find in a textbook. All teacher participants agreed, however that the younger students struggle with the ability to do this. "They are used to relying on teachers to spoon-feed them information; they do not know how to find it for themselves," teacher T5 said.

Teacher T5 felt that the more open-ended questions or assignments given to the younger students lead to less success. She said that students need to be taught how to think on their own when it comes to their learning. "Students are used to information being given to them. If you ask them to express something they will ask 'how do you want me to express it?' You can give them options but they just want to know exactly what you want them to do," teacher T5 said. Teacher T4 added, "It is a huge transition for them to demonstrate their understanding in a new way without being given exact parameters or directions." Teacher T3 agreed and said he scaffolds instruction and assignments based on the grade level of his students. When he asks his sophomores to create using the iPad, he said that he offers more guidance and

instruction by grading the work throughout the process. Students consistently check in with him to make sure they are on the right track. He said the juniors need less guidance and the seniors are able to create independently.

In addition to scaffolding instruction, teacher T4 said using the iPads for the purpose of higher-level thinking and being creative is more likely to happen when students can see how the assignment relates to life outside of the classroom.

Teacher T6 applies the flipped classroom to her math courses. The format of this style is the teacher creates instructional videos posted on her website so students can access them at home. This is how they receive their math instruction and complete homework. Class time is then reserved for students to ask questions and for teachers to provide re-teaching. Teacher T6 said this promotes students to be in control of their learning because they are responsible for accessing the videos on their own and they can choose to watch videos on topics they are not familiar with and then skip over the videos of concepts they already know. Teacher T6 said the older students do well with this style of classroom but the younger students need more assistant in transitioning to this style. She has noticed students who participate in the flipped classroom have improved their work completion.

Teacher participants recommended scaffolding instruction to students based on their grade level to help them transition from the traditional way of learning in which the teacher provides all the information to teaching students how to find information based on their own questions. "This takes time away from teaching content but is an important life skill all students need to be taught," teacher T4 said.

Teacher T6 said the older students are already using higher-level thinking skills and are less apt to need concrete directions when asked to create. She said they tend to like demonstrating their understanding in this way. In terms of the younger students, she said that she feels more rushed with getting through the curriculum and does not have time to take away from teaching content to teaching skills needed to demonstrate their higher-level thinking. Because of this, she said the iPads tend to be used less for creating and more as a glorified notebook and writing utensil.

All teacher participants agreed that time is an issue, however teacher T1 recommended having students who are more independent learners paired up with students who need more guidance. She said this would create collaboration among students in addition to allowing the teacher to focus more on the content.

In terms of apps teachers recommend for promoting higher level thinking skills, teacher T2 said she uses animation apps in her science class when students are assigned labs. One example she gave is when students are learning about movement and frequency. "The original lab limits students' ability to see what the iPad is able to show them. With the iPad they are able to manipulate things to see more than they would if they were just swinging ropes like the original lab would have them do," said teacher T2. Overall teacher participants recommended scaffolding instruction to students when using the iPad to create and think independently as well as use iPad apps that promote higher level thinking skills rather than only using them for note taking, submitting work, and taking tests.

Discussion. To answer the third and final research question, "What are the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption?" and "What are the similarities and differences between student and teacher perceptions regarding the engagement strategies?" the researcher analyzed and synthesized data from both surveys and focus groups. Findings show that students perceived iPads as having a positive impact on their engagement. Teacher perceptions were similar in terms of the impact iPads have on student engagement.

In terms of learning, students thought iPad use had a neutral impact on their learning, neither positive nor negative. Teachers were also neutral on whether or not students created higher quality products, students interacted with each other more, students were better able to learn, students put more effort into their assignments, and students developed a deeper understanding of the subject material.

In terms of distractibility, a larger percentage of students felt the iPads helped them stay focused while 27% said they were easily distracted. Student focus group results show an agreement among all six participants that the iPads cause major distractions to their education. Participants of the teacher focus group also stated the iPads cause distractions, specifically the availability of games and social media.

Student and teacher perceptions matched in terms of distractors and perceiving the younger students as having a more difficult time staying focused and using the iPad as an educational tool. Both teacher and student participants pointed

out when students are bored they become less focused. This is when they resort to the distractions available on the iPad.

Both groups of participants agreed a smaller scale roll out of the iPad adoption would be beneficial for other districts to take into consideration when planning this type of technology integration. Both groups also mentioned scaffolding a roll out to students starting with ninth graders. They both said instruction as to how to use iPads would be beneficial as well as the option for students to earn the right to use an iPad.

In addition both groups of participants agreed the iPads allow for immediate feedback of which students said increases their level of engagement. This supports Hepplestone, Holden, Irwin, Parkin, and Thorpe's (2011) hypothesis that providing timely feedback to students regarding achievement can increase student engagement.

In summary, student and teacher perceptions are similar in terms of engagement strategies employed when using 1:1 iPads. Although iPads were said to be engaging, both groups perceived that only a few strategies are being used in the classroom to increase student engagement. In addition, the apps that students find engaging are being used by a small percentage of teachers.

Additional findings. As the researcher was analyzing the data, questions arose regarding specific survey questions and student responses. For the sake of providing additional information, the researcher conducted a chi-square test and statistically analyzed the survey items to find further information unrelated to the research questions and hypotheses.

The first set of data was disaggregated to see if students responded differently based on which year of the integration they were in. Results showed there was a statistical significance between students who were in the second year of the 1:1 iPad adoption and students who were in their first year using the school district issued iPads in terms of the frequency of iPad usage for specific tasks. Students in the second year of the 1:1 adoption were more likely to use their iPads for the following tasks almost daily:

- communicate with others
- seek a solution
- watch videos
- play games
- investigate problems
- form an opinion and
- make decisions

Table 4.15

Frequency of iPad Use Based on Years Participated

		I am likely to use my iPad when I am outside the classroom to... - Communicate with others					
		Almost daily	Often	Sometimes	Seldom	Never	Total
Which statement best describes how long you have used your school district issued iPad?	This is my second school year using the iPad issued to me by the school district.	138	164	163	170	169	804
	This is my first school year using the iPad issued to me by the school district.	49	55	53	65	26	248
	Total	187	219	216	235	195	1052

Chi Square	14.64
Degrees of Freedom	4
p-value	0.01

		I am likely to use my iPad when I am outside the classroom to... - Seek a solution					
		Almost daily	Often	Sometimes	Seldom	Never	Total
Which statement best describes how long you have used your school district issued iPad?	This is my second school year using the iPad issued to me by the school district.	213	265	200	78	48	804
	This is my first school year using the iPad issued to me by the school district.	84	86	56	18	4	248
	Total	297	351	256	96	52	1052

Chi Square	12.75
Degrees of Freedom	4
p-value	0.01

		I am likely to use my iPad when I am outside the classroom to... - Watch videos					
		Almost daily	Often	Sometimes	Seldom	Never	Total
Which statement best describes how long you have used your school district issued iPad?	This is my second school year using the iPad issued to me by the school district.	227	188	190	122	77	804
	This is my first school year using the iPad issued to me by the school district.	84	66	59	22	17	248
	Total	311	254	249	144	94	1052

Chi Square	9.93
Degrees of Freedom	4
p-value	0.04

		I am likely to use my iPad when I am outside the classroom to... - Play games					
		Almost daily	Often	Sometimes	Seldom	Never	Total
Which statement best describes how long you have used your school district issued iPad?	This is my second school year using the iPad issued to me by the school district.	118	121	187	217	161	804
	This is my first school year using the iPad issued to me by the school district.	49	45	80	50	24	248
	Total	167	166	267	267	185	1052

Chi Square	25.30
Degrees of Freedom	4
p-value	0.001

		I use my iPad for research purposes that requires... - Investigating problems					
		Almost daily	Often	Sometimes	Seldom	Never	Total
Which statement best describes how long you have used your school district issued iPad?	This is my second school year using the iPad issued to me by the school district.	225	302	194	54	29	804
	This is my first school year using the iPad issued to me by the school district.	70	108	63	6	1	248
	Total	295	410	257	60	30	1052

Chi Square	14.83
Degrees of Freedom	4
p-value	0.01

		I use my iPad for research purposes that requires... - Forming an opinion					
		Almost daily	Often	Sometimes	Seldom	Never	Total
Which statement best describes how long you have used your school district issued iPad?	This is my second school year using the iPad issued to me by the school district.	125	228	288	115	48	804
	This is my first school year using the iPad issued to me by the school district.	37	73	110	23	5	248
	Total	162	301	398	138	53	1052

Chi Square	13.31
Degrees of Freedom	4
p-value	0.01

		I use my iPad for research purposes that requires... - Making decisions					
		Almost daily	Often	Sometimes	Seldom	Never	Total
Which statement best describes how long you have used your school district issued iPad?	This is my second school year using the iPad issued to me by the school district.	164	273	254	77	36	804
	This is my first school year using the iPad issued to me by the school district.	56	80	93	16	3	248
	Total	220	353	347	93	39	1052

Chi Square	10.15
Degrees of Freedom	4
p-value	0.04

Table 4.15 disaggregates the data between students using the district issued iPad for a second year in a row and students using the district issued iPad for their first year. Overall, both groups of students watched videos and made decisions more often on their iPads than they did communicating with others, seeking a solution, and playing games. The results were not specific enough to determine whether the videos are educational or other.

Table 4.16

Student Grade Level and Engagement Level

		When my teachers have students use iPads at school, learning is _____ engaging for me.					
		Much more	More	The same	Less	Much less	Total
My current grade level is...	Freshman	78	149	113	31	8	379
	Sophomore	39	139	100	60	11	349
	Junior	48	121	101	38	8	316
	Total	165	409	314	129	27	1044

Chi Square	23.75
Degrees of Freedom	8
p-value	0.001

		When teachers provide class activities using the iPads, it makes learning _____ interesting to me.					
		Much more	More	The same	Less	Much less	Total
My current grade level is...	Freshman	86	168	92	25	8	379
	Sophomore	49	141	127	25	7	349
	Junior	63	125	93	28	7	316
	Total	198	434	312	78	22	1044

Chi Square	18.75
Degrees of Freedom	8
p-value	0.02

		I am _____ engaged in my learning when using the iPad than I was before the iPad.					
		Much more	More	The same	Less	Much less	Total
My current grade level is...	Freshman	68	135	123	40	13	379
	Sophomore	44	120	100	67	18	349
	Junior	52	94	111	38	21	316
	Total	164	349	334	145	52	1044

Chi Square	22.10
Degrees of Freedom	8
p-value	0.001

		I feel _____ engaged in class when using iPads when compared to doing other activities.					
		Much more	More	The same	Less	Much less	Total
My current grade level is...	Freshman	59	134	132	39	15	379
	Sophomore	36	115	116	68	14	349
	Junior	34	91	129	48	14	316
	Total	129	340	377	155	43	1044

Chi Square	20.69
Degrees of Freedom	8
p-value	0.01

The second set of data was disaggregated to find out if there was a statistical significance between students' grade level and their engagement levels when using the iPads in the classroom (see Table 4.16). Freshmen students were more engaged and interested in their learning when teachers had them use iPads in the classroom. When compared with the freshmen students, juniors were less engaged and interested in their learning when using the iPads.

Table 4.17

Engagement Level of Specific Strategies by Grade

My current grade level is...		Note Taking	Test Taking	Research	Graphic Organizers	Podcasts
Freshman	Mean	1.67	1.70	1.61	2.12	3.07
	N	370	370	371	368	368
	Std. Deviation	.724	.740	.742	.949	1.063
Sophomore	Mean	1.71	1.80	1.70	2.11	2.91
	N	343	344	342	342	343
	Std. Deviation	.724	.750	.726	.899	1.018
Junior	Mean	1.77	1.80	1.62	2.12	2.78
	N	303	302	301	302	301
	Std. Deviation	.789	.790	.750	.920	1.075
Total	Mean	1.71	1.76	1.65	2.12	2.93
	N	1016	1016	1014	1012	1012
	Std. Deviation	.744	.760	.739	.923	1.057

Chi Square	7.45*	6.60	6.59	6.66	32.23
Degrees of Freedom	6	6	6	6	6
p-value	0.28	0.36	0.36	0.35	0.001

Another set of data was disaggregated to see if there was a difference in grade level and the level of engagement for note taking, test taking, research, graphic organizers, and creating podcasts (see Table 4.17). Results showed there was no significant difference between grade levels. However, there was a significant difference between freshmen students' engagement level and the other two grade levels in terms of using podcasts. The freshmen were less engaged when using this strategy.

Table 4.18

Preferred Apps by Grade Level

My current grade level is...		Schoology	NEWSELA	Kahoot!	Notability	YouTube	Google Calendar	iBooks
Freshman	Mean	1.51	2.26	1.16	1.20	1.45	2.58	2.42
	N	371	372	371	369	370	371	369
	Std. Deviation	.675	.857	.430	.468	.658	1.130	1.158
Sophomore	Mean	1.61	2.12	1.29	1.24	1.49	2.47	2.00
	N	345	344	346	346	345	345	344
	Std. Deviation	.695	.778	.641	.556	.736	1.045	1.029
Junior	Mean	1.63	2.70	1.26	1.30	1.52	2.43	1.97
	N	304	304	303	304	303	303	302
	Std. Deviation	.683	.912	.594	.602	.749	1.083	1.059
Total	Mean	1.58	2.34	1.24	1.24	1.49	2.50	2.14
	N	1020	1020	1020	1019	1018	1019	1015
	Std. Deviation	.685	.880	.560	.542	.712	1.089	1.105

In terms of preferred apps by grade level, freshmen students preferred Schoology, Kahoot!, and YouTube while sophomores and juniors preferred Kahoot! and Notability as shown in Table 4.18.

Table 4.19

Pearson's Chi-square Tests for Independence Results – Teacher

		I encourage the use of iPads by my students to supplement the curriculum and reinforce specific classroom instruction.					
		Almost daily	Often	Sometimes	Seldom	Never	Total
How many years of experience do you have in education?	0-5	4	5	1	1	0	11
	6-10	10	8	7	1	1	27
	11-15	5	6	5	1	1	18
	16-20	10	7	3	0	0	20
	21-25	0	3	2	0	0	5
	26+	2	3	1	0	0	6
	Total	31	32	19	3	2	87

Chi Square	11.89*
Degrees of Freedom	20
p-value	0.92

		My students use iPads for research purposes that require them to investigate issues/problems, take a position, make decisions, and/or seek a solution.					
		Almost daily	Often	Sometimes	Seldom	Never	Total
How many years of experience do you have in education?	0-5	1	3	5	1	1	11
	6-10	1	8	13	4	0	26
	11-15	0	6	5	4	2	17
	16-20	2	6	8	4	0	20
	21-25	1	0	3	0	1	5
	26+	1	1	1	3	0	6
	Total	6	24	35	16	4	85

Chi Square	20.52*
Degrees of Freedom	20
p-value	0.43

		I encourage students to use iPads while they are in my classroom to promote creativity and innovative thinking.					
		Almost daily	Often	Sometimes	Seldom	Never	Total
How many years of experience do you have in education?	0-5	3	4	3	0	1	11
	6-10	3	13	8	2	0	26
	11-15	2	5	7	3	0	17
	16-20	6	9	5	0	0	20
	21-25	0	2	2	0	1	5
	26+	0	1	3	2	0	6
	Total	14	34	28	7	2	85

Chi Square	28.77*
Degrees of Freedom	20
p-value	0.09

		My students use iPads to engage in collaborative problem-solving opportunities either inside or outside my classroom.					
		Almost daily	Often	Sometimes	Seldom	Never	Total
How many years of experience do you have in education?	0-5	1	2	5	1	2	11
	6-10	1	6	15	2	1	25
	11-15	0	6	8	3	0	17
	16-20	2	3	11	4	0	20
	21-25	0	1	3	0	1	5
	26+	0	1	3	2	0	6
	Total	4	19	45	12	4	84

Chi Square	17.82*
Degrees of Freedom	20
p-value	0.60

The last set of data was disaggregated to see if there were any differences in

years of teaching and frequency of iPad usage (see Table 4.19). Results showed there was no statistical significance between the two variables meaning, teacher age was not a factor in whether or not iPads were being used in classrooms.

Summary

Research Question #1. Educators are using the 1:1 iPad adoption to impact student engagement. They are having students use iPads to support classroom instruction, complete homework, and take notes and tests. In addition, students are using the iPads for research, playing games, and watching videos.

Research Question #2. Teachers are using several different strategies with students using the iPads. These strategies include review games, note taking, large/small group work, and completing worksheets/posters/study guides/textbook questions. Note taking, test taking, researching, graphic organizers, and podcasts were all effective strategies in terms of student engagement. However, the most effective strategy among the five was researching and the least effective was podcasts.

In terms of interest level, students were most interested in small group work, completing worksheets/posters/study guides/textbook questions, and reading/working alone according to student responses. Of these, completing worksheets/posters/study guides/textbook questions were the most effective in terms of increasing student learning. Finally, students preferred strategies such as making presentations, creating videos, and taking tests/quizzes on the iPads. The only strategy that was similar for all three areas, interest, learning, and preference, was creating presentations.

Research Question #3. There were several similarities between student and teacher perceptions in regard to engagement strategies. Both groups agreed there are few strategies being used in the classroom to promote student engagement. In addition, the apps students find engaging are only being used by a small percentage of teachers. The perceptual differences lie in the area of engaging iPad apps. Several teachers are not using apps that students find engaging.

Chapter Five: Discussion, Implications, and Recommendations

Over the course of American education, technology has presented itself in the classroom in many different forms, from chalkboards to Smartboards and computers to iPads. These technologies gradually evolved from shared devices to individual devices. Within the last three to five years, iPads have become a popular device for 1:1 technology integration. Because of the recent influx of 1:1 iPad devices in the classroom, there is little research to show the impact it has had on student engagement, therefore serving as the purpose for this study.

Overview of the Study

The purpose of this study was to examine the impact on student engagement as a result of a 1:1 iPad adoption within high school classrooms using a mixed methods approach. Quantitative and qualitative data were collected to answer three research questions and to reject or fail to reject the null hypotheses for research questions one and two. The third research question did not require hypothesis testing. In addition, reliability testing was conducted using Chronbach's alpha resulting in a value of 0.909. Based on the reliability testing, the researcher feels confident the survey questions were a reliable measure of the impact 1:1 iPad devices have on student engagement.

The study was conducted in a Midwest suburban high school setting, which included 1,052 students in Grades 9–11 and 85 classroom teachers. Data was collected from student and teacher surveys as well as from discussion that took place

during student and teacher focus groups. Focus group participants consisted of six students from Grades 9-11 and one teacher from mathematics, science, history, International Baccalaureate (IB) English, special education, and an elective. The student focus group was held separate from the teacher focus group. Specific questions relating to the use of 1:1 iPad devices in the high school classroom were asked of the participants (see Appendix B and D). Responses were audio recorded using two separate devices, iPhone and iPad, and were later transcribed and typed into a Microsoft Word document.

The responses were analyzed in terms of frequency and then categorized into themes. The themes were broken down into four major themes each consisting of two subthemes and student recommendations. This qualitative data was used in conjunction with the quantitative data to answer the study's research questions.

Research Questions

The following research questions guided this study:

Research question #1: How are educators using a 1:1 iPad adoption to impact student engagement in a suburban, Midwestern high school?

Research question #2: What iPad engagement strategies are found within the 1:1 adoption; what are the most effective iPad engagement strategies found within the 1:1 adoption; and what are the least effective iPad engagement strategies found within the 1:1 adoption?

Research question #3: What are the perceptions of students and teachers

regarding the engagement strategies employed when using iPads in a 1:1 adoption; what are the similarities between student and teacher perceptions regarding the engagement strategies; and what are the differences between student and teacher perceptions regarding the engagement strategies?

Hypotheses

$H1_0$: Educators are not using the iPad for engagement purposes.

$H1_A$: Educators will identify ways they are using the iPad for engagement purposes.

$H2_0$: There is no difference in the effectiveness of iPad engagement strategies.

$H2_A$: There is a difference in the effectiveness of iPad engagement strategies.

Findings and Conclusions for Research Questions and Hypotheses

Research question #1. How are educators using a 1:1 iPad adoption to impact student engagement in a suburban, Midwestern high school?

Null hypotheses #1. Educators are not using the iPad for engagement purposes.

Hypotheses #1. Educators will identify ways they are using the iPad for engagement purposes.

Findings related to the use of iPads to engage students. The student survey revealed educators are having students use 1:1 iPad devices within their classrooms to take notes, take tests/quizzes, complete worksheets, review concepts, and research. Students are using their iPads in the classroom for studying purposes and to research.

Students are also using their iPads outside of the classroom to complete homework. However, when asked about using the iPad for higher-level thinking such as seeking solutions, decision making, forming opinions, investigating problems, and solving real-world issues, students responded that they sometimes use iPads for these purposes.

Results from the teacher survey showed similarities to the student survey as to how students are using the iPads in their classes. Teachers report they are not using the iPads often to promote higher-level thinking skills, however. Students reported they were more likely to use their iPad for research purposes that required seeking a solution, studying classroom content, and completing homework.

Teachers are having students use the iPad outside of the classroom to support instruction and create further learning opportunities. Student survey results showed teachers are having students use the iPads for homework and to further learning opportunities. Teachers responded they sometimes have students use the iPad to solve real-world problems or issues, investigate issues, take a position, make decisions, seek solutions, promote creativity and innovative thinking, and engage in collaborative problem-solving opportunities.

Both student and teacher survey results showed the majority of students often use their iPad in the classroom to learn and spark creativity. Additional findings showed years of teaching did not have an impact on how often iPad use occurs in classrooms.

Analysis using chi-square statistics showed using the iPads made learning

more engaging for students (p=0.001). Students were more interested in their learning when using iPads for class activities (p=0.02). In addition, students were more engaged in learning when using the iPad compared to learning before using the iPad (p=0.001).

Conclusion. Teachers are having students use the iPad in the classroom to impact student engagement. Several strategies and activities are being used, including note taking, test taking, research, review games, completing assignments, and posting homework. Survey results show both students and teachers perceive the iPads impact student engagement. Students find activities assigned and strategies used on the iPads engaging.

Perceptions differ as to the higher-level thinking skills being promoted and used through the use of the iPads. Teachers sometimes had their students use the iPad for activities that involved higher-level thinking skills, but not to the extent the researcher had hoped.

For the iPad to be a tool for learning, it is important to use it as more than a glorified notebook and pencil. Although having students post assignments and take tests online can benefit the classroom teacher by decreasing grading, these are not iPad uses that promote 21st century skills. The 1:1 iPad devices have the potential to provide students with opportunities to collaborate and communicate with students beyond the classroom. They also have the potential to provide students with the opportunity to critically think and problem-solve. Although the traditional classroom can provide these opportunities, integrating the 1:1 iPad devices into the classroom

provides easier access to apply these 21st century skills and a larger group of people to collaborate with.

Previous studies by Spires, Lee, Turner, and Johnson (2008) showed a link between technology use and student engagement among middle school students. In addition, Spires, Lee, Turner, & Johnson (2008) reported students expressing interest in having authentic learning experiences in school through the use of technology and integrating research, problem solving, and project-based opportunities in their classes.

Based on student and survey results, the null hypothesis "Educators are not using the iPad for engagement purposes" is rejected.

Research question #2. What iPad engagement strategies are found within the 1:1 adoption; what are the most effective iPad engagement strategies found within the 1:1 adoption; and what are the least effective iPad engagement strategies found within the 1:1 adoption?

Null hypotheses #2. There is no difference in the effectiveness of iPad engagement strategies.

Hypotheses #2. There is a difference in the effectiveness of iPad engagement strategies.

Findings related to engagement strategy effectiveness. Teachers are using several strategies within the 1:1 iPad adoption. These include research, note taking, test taking, graphic organizers, and podcasts. Specific apps teachers use with these strategies are Schoology, Notability, Kahoot!, Google Calendar, NEWSELA, and YouTube. Graphic organizers and podcasts were the least effective strategies used in

terms of engagement. Specifically, students did not prefer to use the NEWSELA and Google Calendar apps. Only 15% of teachers used Schoology, 8% used Kahoot!, 11% used Notability, and <1% used YouTube. This information is beneficial to teachers when planning lessons with the purpose of including engaging strategies and apps with the iPad. Students have willingly expressed their opinions of how teachers are using the iPads. It is imperative to listen to their opinions and use this information for planning purposes.

In addition to using iPad apps as a strategy, teachers had students use the iPads to work in small groups; complete worksheets, posters, study guides, and textbook questions; and read or work alone. Results showed students found note taking, test taking, research, graphic organizers, and podcasts very engaging. Based on statistical analysis using paired samples t-tests, researching was the most effective strategy towards students' engagement and podcasts were the least effective when compared to note taking, test taking, and graphic organizers. Making presentations, creating videos, and taking tests/quizzes were the next most frequent responses to preferences for using the iPad. A less frequent preference was for using the iPad to read a digital version of print textbooks or a novel. More than 40% of students preferred to work in a small group. Less than 30% were interested in lectures by the teacher and large group work. The lowest activity of interest was using computers for typing, researching, and making presentations.

Conclusion. Teachers are using the iPads in their classrooms for strategies that students find engaging such as small group work, note taking, and completing

daily assignments. Some of the strategies teachers used were not as interesting to students. However, in some cases, these activities were reported by students to be strategies they learn the most from.

Strategies that students see as interesting compared to what they learn most from do not necessarily align. Only 24% of students were interested in lectures/presentations by the teachers; however 46% of students reported they learn best from this format. On the other hand, completing worksheets/posters/study guides/textbook questions were activities students reported they are interested in and learn best from. Results showed all five strategies (note taking, test taking, research, graphic organizers, and podcasts) were effective towards student engagement (p=<0.05). Further results showed there was a statistical significance in the effectiveness of iPad strategies, some being more effective than others towards student engagement.

Although all five strategies were effective towards student engagement, researching was the most effective and podcasts were the least effective of the five iPad strategies. Therefore, the null hypothesis "There is no difference in the effectiveness of iPad engagement strategies" is rejected.

Research question #3. What are the perceptions of students and teachers regarding the engagement strategies employed when using iPads in a 1:1 adoption; what are the similarities between student and teacher perceptions regarding the engagement strategies; and what are the differences between student and teacher perceptions regarding the engagement strategies?

This question did not require hypothesis testing therefore a null and alternative hypothesis were not included in this study.

Findings related to student/teacher agreement. Although students reported the iPads as being engaging, the engagement level is not as high as would have been hoped because of issues such as distractions, boring lessons, iPad misuse, and logistics. Student and teacher perceptions were similar in that they thought the devices had an impact on student engagement when specific strategies and apps were used. Students agreed the devices caused major distractions to their learning, which is also in agreement with the teachers' perceptions of student distractibility. Not only did they say distractions were an issue, but S10A stated in the student focus group, "I knew I had to delete my games and social media because it was too distracting. After I did this, my grades improved." Perhaps this suggests the importance of teaching students how to use the iPads for educational purposes. In addition to games and social media causing distractions, both groups agreed that students are bored in class, which results in them playing games on the iPad or texting with friends.

Finally, both groups agreed that scaffolding a 1:1 iPad adoption would be beneficial. They suggested: start out with a small group of teachers who are interested in integrating the 1:1 iPad into their classrooms, choose a small group of students rather than the whole student population; increase professional development for teachers; and increase time spent instructing students on how to use the iPads for educational purposes.

Findings related to student/teacher disagreement. Student and teacher

perceptions differed in terms of the apps used for engagement purposes. Very few teachers use apps that a large majority of students find engaging. Another perceptual difference is the number of apps to use. Students preferred that teachers would agree on one app for posting assignments, taking tests, and obtaining homework. Teachers did not anticipate a need for this consistency; therefore, they used multiple sites, which students reported as being very confusing. Teachers were more likely to disagree that students interacted more with each other, were better able to grasp difficult concepts, put more effort into their assignments, develop a deeper understanding of the subject material, and were better able to learn when using the iPads.

Conclusion. Students reported the iPads are engaging; however, the level of engagement is not as high as the researcher had hoped due to distractibility, boredom, misuse, and logistical issues. The strategies used in the 1:1 iPad adoption are viewed similarly by both students and teachers as having a positive impact on engagement. However, only a few strategies are being used in the classroom to increase student engagement. The apps that students find engaging are being used by a small percentage of teachers. In addition, students reported confusion with the lack of consistency among teachers as to the apps used for obtaining work and posting assignments. Students felt it was too confusing to have one teacher require homework posted to one app while another teacher requires homework posted to a different app. Students said consistency among teachers might alleviate confusion for students and increase work completion rates.

Both teachers and students thought more professional development and iPad training would also decrease issues with distractions, boredom, and lack of homework completion. In addition, both groups felt a smaller-scale initial adoption would decrease student distractions and misuse of the iPads as well as increase higher-level thinking skills being promoted through the use of the iPads. Rationale for this was because teachers would volunteer to use the 1:1 devices in their classes rather than be required to do so. 1:1 iPads would be put into the hands of those who wanted to use them, which could lead to an interest in making them effective and impactful on student engagement. As the adoption increases in size, these teachers could assist in professional development to help other teachers integrate the technology into their classroom impacting student engagement in a positive way.

Additional Findings

Results showed a correlation between students' grade level and engagement levels when using iPads in the classroom. Using the chi-square statistical test, student survey results showed freshman students were more engaged (p=0.001) and interested in their learning (p=0.02) than sophomore and juniors when teachers had them use iPads in the classroom. Students from the focus group felt freshman were more engaged because of the novelty of having an iPad while juniors were less engaged and were less likely to find the iPads beneficial to their learning. Juniors did not find the iPads engaging to the extent that the freshman did.

In addition, the chi-square statistical test was conducted to determine whether or not there was a significant difference between grades in terms of the level of

engagement for specific tasks such as note taking, test taking, research, graphic organizers, and creating podcasts. Results showed there was no significant difference between grade levels when engaging in note taking (p=0.28), test taking (p=0.36), research (p=0.36), and using graphic organizers (p=0.35). However, there was a significant difference between freshmen students' engagement level and the other two grade levels in terms of using podcasts (p=0.001). The freshmen were less engaged when using this strategy. Furthermore, results showed app preferences were different based on the grade level of the students. Freshman students preferred using Schoology, Kahoot!, and YouTube apps while sophomores and juniors preferred using the Notability app.

Finally, additional analysis showed there was no difference in how many years one was teaching to how they were using iPads in the classroom.

These results are important to the field because they provide a breakdown between grade and engagement levels. Perhaps future adoption plans may focus on a select group of students to pilot the adoption. The researcher recommends beginning with the freshman students since this study showed they were more likely to be engaged and interested in their learning when using the iPads.

Implications

Several implications arose from this study. Perhaps the most beneficial are the perceptual differences between students and teachers regarding the strategies being used with the iPads. The results showed the strategies that students find engaging are being used by only a few teachers. In particular, the apps students find

most engaging are being used by only a small percentage of teachers. In addition, students reported the need for teachers to be consistent with the apps used to obtain assignments and to post work to. They said it was too confusing when teachers used different Learning Management Systems (LMS) and suggested agreement among teachers to use the same LMS. Students said this would help to increase work completion and reduce confusion when using the iPads to submit assignments.

Perceptual similarities between students and teachers include the following:

- iPads increase students' ability to stay organized.
- iPads are being used by students to support classroom instruction, create further learning opportunities, and spark creativity.
- Training prior to an iPad adoption is crucial.
- iPads can cause major distractions to students.
- Logistical issues arise often with the iPads.

These implications are worthy of taking into consideration when planning a 1:1 iPad adoption. School officials should take into consideration the perceptions of students and teachers obtained in this study when planning to integrate 1:1 iPad devices into the classroom.

Limitations

This study was substantial in population, offering the potential to generalize results to other suburban high school 1:1 iPad adoptions. However, caution may be necessary in applying these findings to rural or urban settings. In addition, this study

encompassed opinions from students and teachers using, specifically, 1:1 iPad devices in a second year of the technology adoption phase. It should be cautioned results might not be representative of other tablets or computers in 1:1 adoptions.

Furthermore, the surveys were designed to prevent subjectivity; however, results could be skewed by participant biases toward the iPads, either positively or negatively. In addition, although results showed a higher-level engagement among freshman students, it should be noted there are variables that could have impacted these results. For example, freshman students have different teachers than sophomores and juniors. There could be a discrepancy between teachers of differing grade levels and the way they are having students use the iPads.

Finally, although focus groups provided further in-depth data for the survey, the size of each group consisted of a small percentage of participants.

Recommendations for Practitioners

The following are recommendations made by the researcher based on the results of this study, focusing on student engagement, to schools/districts who are planning a 1:1 iPad technology integration.

- Organize a task force made up of district staff, building administration, and teachers to plan the adoption. Members should research other district 1:1 adoption processes, staff development, logistical issues, and evaluation plans.
- 1:1 technology adoptions often underestimate the amount of time that will be needed for teachers to re-design their curriculum and

instruction. A significant amount of time should be set aside for teachers to do this in order to effectively integrate the technology into their classrooms.

- Student/teacher surveys and focus groups, including a focus on student engagement, should be conducted at the end of each year during the adoption for the first five years.
- Consistent data collection, analysis, and communication with teachers should take place throughout the first five years of the adoption.
- Begin the adoption with a group of teacher volunteers consisting of five teachers from the elementary level, middle school level, and high school level. Provide professional development focusing on ways to use the 1:1 device to impact student engagement and to further learning opportunities rather than focusing professional development solely on available apps.
- Slowly enlarge the adoption by increasing the number of teachers at each level. Provide professional development similar to the first group of volunteers. Include the first group in the professional development to share their experiences of what worked and what did not work as far as using the 1:1 devices to impact student engagement.

This study revealed 1:1 iPad devices alone are not the solution to increasing student engagement within high school classrooms. Although they have the potential to be a powerful educational tool, the underlying factor to student engagement is the

process educators follow to teach 21st century skills including creativity, innovation, critical thinking, flexibility, adaptability, leadership, productivity, accountability, self-direction, and cross-cultural skills (Common Core Toolkit Aligns Standards with 21st Century Skills Framework, 2011). As an organization, it is important to integrate technology as a process rather than a specific product. Beyond providing teachers with apps to use with the iPads, professional development needs to encompass the whole process of technology integration.

Research needs to be done on how to use the 1:1 devices as a tool to promote higher-level thinking skills, creativity, problem solving, collaboration, and engagement. This means reviewing current curriculum, teaching styles, and assessments. Organizations need to be prepared to provide educators with the resources to promote these skills and activities and to further knowledge of integrating this with technological devices.

Earlier technologies were used to facilitate student learning by providing students with the means to represent their learning. These devices were not introduced to replace the classroom teacher. The first computers in the classroom were used to provide students with additional practice of the lesson taught by the teacher (Jonassen, Howland, Marra, & Crismond, 2010). As the computer programs increased in capability, use of these devices evolved. They became tools for producing work such as essays, spreadsheets, and databases. With the addition of the Internet, students have the opportunity to use the devices to significantly increase their learning. However, these devices are still being used as a tool for students to

learn *from*. Jonassen, Howland, Marra, and Crismond (2010) believe student learning can be more meaningful when these devices are used as tools students learn *with* to support, explore, construct, collaborate, and reflect.

To provide students with meaningful learning experiences using 1:1 devices, all parts of the integration process must be emphasized. Using iPads solely for note taking, test taking, researching, and submitting assignments does not teach nor enhance 21st century skills. The need for American education to focus on teaching these skills has become increasingly important as our society has evolved and the economy has globalized.

Literature dating back to 1897 stresses the importance of providing students with an education that teaches them to use their full capacities and prepares them to be productive members of society (Dewey, 1897; Young, 1902). Students will need highly developed skills in order to be a competitive force in the current job market.

Recommendations for Academics

The researcher suggests further investigation of the impact of 1:1 iPad devices to include the following:

- Survey students and teachers in suburban, rural, and urban settings to gain a broader perspective of data regarding the impact of 1:1 iPad devices on student engagement.
- Include students from elementary through high school levels, with a focus on whether age is a factor regarding the impact 1:1 iPad devices have on student engagement.

- Conduct focus groups containing at least ten students from each grade level being surveyed to provide a larger sample size for qualitative data collection and analysis.
- Separate focus groups by grade level to gain a clearer understanding of student perceptions based on grade levels.
- Conduct teacher focus groups with individual departments to gain a clearer perspective on the use of iPads in specific classes.
- Compare engagement levels of students using a 1:1 iPad device to engagement levels of students who are not using these devices.
- Design the study to encompass a variety of 1:1 devices beyond the iPad to allow for a comparison of effective vs. ineffective 1:1 devices.
- Research learning strategies that students do not find engaging but that they still learn from.

As several studies mention, computers, laptops, and iPads provide students with the capability of accessing apps, websites, and social media, which can increase student engagement. These studies fail to mention the complexity of the people involved, procedures, evaluations to analyze effectiveness, and problem-solving aspects of the technology integration. The device, although an important part of any implementation, is only part of the whole process. Although it will be a major undertaking, the American education system needs to evolve to meet the needs of diverse students in a global economy.

Concluding Comments

1:1 iPad devices have the potential to increase student engagement; however, the device alone is not the answer. Since the beginning of education in the United States, the device has transformed from chalk, paper, and textbooks to Smartboards, computers, and eBooks. The device will continue to change over time, which further supports the need to focus education on the process of learning and review current practices and instruction. Studies exist that include student voices as to what and how they want to learn. It is time to listen to them. Combining prior research, professional knowledge, teacher experience, and student opinions can create a powerful educational system that will prepare 21st century learners with the skills to be well-rounded citizens and with the tools to be a competitive force in the global economy.

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APPENDIX A: STUDENT SURVEY

The following survey contains information pertaining to student engagement through the use of iPad adoption within the classroom setting.

Demographic Questions

1. I primarily get the following grades on my report cards.

a. Mostly A's (4.0 or above GPA)
b. Some A's and some B's (3.5-3.9 GPA)
c. Some B's and some C's (2.5-3.4 GPA)
d. Some C's and some D's (1.5-2.4 GPA)
e. Worse than that (1.4 or lower GPA)
f. Do not really know

2. My current grade level is…

a. Freshman
b. Sophomore
c. Junior

3. My gender is…

a. Male b. Female

4. My overall comfort level with technology is…

a. I am very proficient, so much so that others often seek my advice.
b. I am able to work independently and can usually figure problems out on my own.
c. I can get by and rarely ask for assistance.
d. I am okay, but often ask for assistance.
e. I am unable to figure it out even with instructions.

5. I have used (more than once) the following mobile technologies (mark all that apply):

a. Cell phone or Smartphone
b. MP3 player (such as an iPod)
c. e-Book reader
d. Laptop computer
e. Tablet PC (such as an iPad)

f. None of the above

6. I own the following mobile technologies (mark all that apply):

a. Cell phone or Smartphone
b. MP3 player (such as an iPod)
c. e-Book reader
d. Laptop computer
e. Tablet PC (such as an iPad)
f. None of the above

7. My preferred mobile technology of choice is:

a. Cell phone or Smartphone
b. MP3 player (such as an iPod)
c. e-Book reader
d. Laptop computer
e. Tablet PC (such as an iPad)
f. None of the above

Current use of technology by students

8. Which statement best describes how long you have used your school district issued iPad?

a. This is my second school year using the iPad issued to me by the school district.
b. This is my first school year using the iPad issued to me by the school district.

9. In my classes, I use my iPad to solve real-world problems or issues.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

10. I use my iPad in the classroom and/or to study classroom content.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

11. Which classes use the iPads the most (mark all that apply)?

a. English
b. Mathematics
c. History
d. Science
e. Physical Education
f. Elective Courses
g. World Language

h. Other (please state)

12. I use my iPad for research purposes that require:

-Investigating problems

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-Forming an opinion

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-Making decisions

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-Seeking a solution

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

13. In my classes, students are allowed to use their iPads…

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

14. I am likely to use my iPad when I am outside the classroom to…

-work with others.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-communicate with others.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-research problems of personal interest that address specific content areas.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-seek a solution.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-complete homework.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-watch videos.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-play games.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

-other.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

15. My teachers promote, monitor, and model digital citizenship when using iPads in their classrooms.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

16. My teachers encourage me to use my iPad while in the classroom to learn and to spark my creativity.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

17. I use my iPad outside the classroom to learn and to spark my own creativity.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

18. I use my iPad to work with others to problem-solve either inside or outside the classroom.

a. Almost Daily b. Often c. Sometimes d. Seldom e. Never

The following statements will use the term "engaging." This is defined as the continuous and productive behavior of students toward their education.

19. When my teachers have students use iPads at school, learning is _____ engaging for me.

a. Much More b. More c. The Same d. Less e. Much Less

20. When teachers provide class activities using the iPads, it makes learning _____ interesting to me.

a. Much More b. More c. The Same d. Less e. Much Less

21. I am _____ engaged in my learning when using the iPad than I was before the iPad.

a. Much More b. More c. The Same d. Less e. Much Less

22. I feel _____ engaged in class when using iPads when compared to doing other activities.

a. Much More b. More c. The Same d. Less e. Much Less

23. When it comes to learning, the following generally describes my experience with iPads in class.

d. The iPad helps me learn more.
e. The iPad has a neutral impact; I learned the same whether I had an iPad or not.
f. The iPad slows my learning.

24. The use of iPads in class _____ (mark all that apply).

a. helps me stay focused.
b. does not affect my learning.
c. seems to distract me.

25. Of the activities listed below, the TWO that keep my INTEREST most in class are:

- Lecture/Presentation by teacher
- Large group work
- Small group work
- Reading/working alone
- Completing worksheets, posters, study guides, textbook questions, etc.
- Using iPad apps
- Using computers (typing, researching, presentations)
- None of these

26. Of the activities listed below, the TWO that I LEARN the most from in class are:

- Lecture/Presentation by teacher
- Large group work
- Small group work
- Reading/working alone
- Completing worksheets, posters, study guides, textbook questions, etc.
- Using iPad apps
- Using computers (typing, researching, presentations)
- None of these

27. If I were given the choice to complete an assignment with the iPad, I would choose (mark all that apply):

a. Writing an essay
b. Research
c. Math
d. Reading a textbook
e. Reading a novel
f. Making presentations
g. Creating videos
h. Taking tests/quizzes
i. Other
j. None of these

28. Teachers were asked about specific iPad <u>apps</u> they use in the classroom. Please mark the level of engagement each <u>app</u> has on your learning.

- **iMovie**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Schoology – Discussion boards**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **NEWSELA**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Educreations**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **PicCollage**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **iVideo**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Gone Google Story Builder**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **30hands**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Comic Touch**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **ThingLink**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Kahoot!**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Plickers**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Padlet**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Socrative**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Notability**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Prezi**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Animoto**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Haiku Deck**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **PowToon**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Quizlet**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Brainscape**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Virtual Science Lab**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **YouTube**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **VMath**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Aurasma**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **EDpuzzle**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Google Calendar**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **iBooks**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

- **Other app (please state)**

a. This is a very engaging app.
b. This is an acceptable app.
c. This app did not work well for me.
d. I am not familiar with this app.

29. Teachers were asked about specific <u>strategies</u> they use in the classroom with the iPad. Please mark the level of engagement each <u>strategy</u> has on your learning.

- **Note Taking**

a. This is a very engaging strategy.
b. This is an acceptable strategy.

c. This strategy did not work well for me. d. I am not familiar with this strategy.

- **Test Taking**

a. This is a very engaging strategy. b. This is an acceptable strategy.
c. This strategy did not work well for me. d. I am not familiar with this strategy.

- **Research**

a. This is a very engaging strategy. b. This is an acceptable strategy.
c. This strategy did not work well for me. d. I am not familiar with this strategy.

- **Graphic Organizers**

a. This is a very engaging strategy. b. This is an acceptable strategy.
c. This strategy did not work well for me. d. I am not familiar with this strategy.

- **Podcasts**

a. This is a very engaging strategy. b. This is an acceptable strategy.
c. This strategy did not work well for me. d. I am not familiar with this strategy.

- **Other Strategy (please state)**

a. This is a very engaging strategy. b. This is an acceptable strategy.
c. This strategy did not work well for me. d. I am not familiar with this strategy.

30. Is there anything specific you would like to tell us about the impact of iPads on making school more engaging?

APPENDIX B: STUDENT FOCUS GROUP

The following questions are draft items that will be revised once student surveys have been analyzed.

The following questions were asked of students in a group session consisting of eight students and the researcher. The purpose of this session was to gain further insight into student perceptions of iPad use in the classroom.

Open-Ended Response Questions

1. Describe how high school students are using iPads to provide the most ideal learning opportunities for themselves either inside or outside the classroom.

2. What do you feel are the biggest obstacles and/or challenges that the high school faces in their efforts to use iPads in classroom instruction?

3. As technology usage continues to advance, how are you using the iPad to create intentional (planned) or unintentional (spur of the moment) learning opportunities?

4. Describe your perceptions as to the advantages and disadvantages of using iPads in the classroom as a learning tool.

5. Describe your perceptions of the effectiveness of using iPads for learning on student engagement.

6. What could the school do (or have done) differently to make the iPad adoption more effective for students?

APPENDIX C: TEACHER SURVEY

The following survey contains information pertaining to student engagement through the use of iPads within the classroom.

Demographic Questions

1. How many years of experience do you have in education?

a. 0 to 5 b. 6 to 10 c. 11 to 15 d. 16 to 20
e. 21 to 25 f. 26+

2. Which category best describes your primary subject/specialty? (mark only one)

a. English b. History/social science c. Mathematics
d. Science/health e. Computers/Career & Technical Education
f. Fine/performing arts g. Physical education h. Other

3. What is your gender?

a. Male b. Female

4. Please choose your overall comfort level with technology.

a. If you give me instructions, I am still unable to figure it out.
b. I am okay, but often ask for assistance.
c. I can get by and rarely ask for assistance.
d. I am able to work independently and can usually figure problems out on my own.
e. I am very proficient, so much so that others often seek my advice.

5. I have used (more than once) the following mobile technologies (mark all that apply).

a. Mobile phone or Smartphone
b. mp3 player (such as an iPod)
c. PDA
d. e-book reader
e. Laptop computer
f. Tablet PC (such as an iPad)
g. None of the above

Current use of technology by students

For Questions 6 through 17 use the following scale: (a) never, (b) seldom (1 to 2 times per semester), (c) sometimes (1 to 2 times per month), (d) often (at least once a week), or (e) almost daily.

6. Students in my classes engage in planned activities that involve the use of iPads to solve real-world problems or issues.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

7. I encourage the use of iPads by my students to supplement the curriculum and reinforce specific classroom instruction.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

8. In my classroom, iPads are used only by the teacher and not by my students.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

9. My students use iPads for research purposes that require them to investigate issues/problems, take a position, make decisions, and/or seek a solution.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

10. In my classroom, students are allowed to use their iPads. ****

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

11. To the best of my knowledge, my students use iPads outside the classroom to…

-collaborate with others.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

-communicate with others.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

-research problems of personal interest that address specific content areas.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

-seek a solution.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

-complete homework.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

-watch videos.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

-play games.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

-other (please state).

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

12. I promote, monitor, and model the ethical use of iPads in my classroom.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

13. I encourage students to use iPads while they are in my classroom to promote creativity and innovative thinking.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

14. I encourage students to use their iPads outside my classroom to support classroom instruction or to create further learning opportunities.

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

15. My students use iPads to engage in collaborative problem-solving opportunities either inside or outside my classroom.
(Engagement is defined as the continuous and productive behavior of students toward their education.)

a. Almost daily b. Often c. Sometimes d. Seldom e. Never

16. As compared to lessons that do not include the use of iPads, to what extent do you agree or disagree with the following statements regarding the intentional use of iPads in the classroom:

- **Students create higher quality products.**
  a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

- **Students interact with each other more.**
  a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

- **Students are better able to grasp difficult concepts.**
  a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

- **Students put more effort into their assignments.**
  a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

- **Students develop a deeper understanding of the subject material.**
  a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

- **Students are better able to learn.**
  a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

- **I am better able to help students learn.**
  a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

- **I am better able to determine where students are at in their learning.**
  a. Strongly Agree b. Agree c. Disagree d. Strongly Disagree

17. Please list strategies you use with students in regard to iPads.

18. If you could do it over, what should you, or the school do differently to make the iPad a more engaging tool for students?

******Teachers who answer "never" will be redirected to the following questions rather than completing the rest of the survey:

1. **What is the primary reason that students are not allowed to use their iPads in your class?**

2. **What could you or the school do differently to make the iPad a more engaging tool for students?**

APPENDIX D: TEACHER FOCUS GROUP

The following questions are draft items that will be revised once student surveys have been analyzed.

The following questions were asked of teachers in a group session consisting of 10 teachers and the researcher. The purpose of this session was to gain further insight into teacher perceptions of iPad use in the classroom.

Open-Ended Response Questions

1. Describe how high school students are using iPads to provide the most ideal learning opportunities for themselves either inside or outside the classroom.

2. What do you feel are the biggest obstacles and/or challenges that the high school faces in their efforts to use iPads in classroom instruction?

3. As technology usage continues to advance, how are you using the iPad to create intentional (planned) or unintentional (spur of the moment) learning opportunities?

4. Describe your perceptions as to the advantages and disadvantages of using iPads in the classroom as a learning tool.

5. Describe your perceptions of the effectiveness of using iPads for learning on student engagement.

6. What could the school do (or have done) differently to make the iPad adoption more effective for students?

APPENDIX E: CONSENT FORM FOR LEVEL 3 RESEARCH -STUDENT

You are invited to participate in a study on the impact of iPad use on student engagement in the high school classroom. I hope to learn what strategies work well with students to increase engagement. I also hope to learn whether the perceptions of students and of teachers are similar or different regarding the impact iPad use has on student engagement. You were selected as a possible participant in this study because you are part of the high school 1:1 iPad adoption. The researcher conducting this study is a Doctoral candidate in Educational Leadership and Administration at Bethel University, MN, and is also a teacher at the high school being studied.

If you decide to participate, please click "Yes" below and you may begin the survey. There are a total of 30 questions and it will take you no longer than 15 minutes to complete. Please answer each question honestly so the results of the survey are accurate.

Your decision whether or not to participate will not affect your future relations with the school and district in any way. If you decide to participate, you are free to discontinue participation at any time without affecting such relationships.

This research project has been reviewed and approved in accordance with Bethel's Levels of Review for Research with Humans. If you have any questions about the research and/or research participants' rights or wish to report a research- related injury, please call:

Jennifer Middendorf, Researcher
(651) 768-3757
Dr. Michael Lindstrom, Advisor
(612) 209-1739

By clicking "Yes", you are giving consent to participate in this study.

APPENDIX F: CONSENT FORM FOR LEVEL 3 RESEARCH -TEACHER

You are invited to participate in a study on the impact of iPad use on student engagement in the high school classroom. I hope to learn what strategies work well with students to increase engagement. I also hope to learn whether the perceptions of students and of teachers are similar or different regarding the impact iPad use has on student engagement. You were selected as a possible participant in this study because you are part of the high school 1:1 iPad adoption. The researcher conducting this study is a Doctoral candidate in Educational Leadership and Administration at Bethel University, MN, and is also a teacher at the high school being studied.

If you decide to participate, please click "Yes" below and you may begin the survey. There are a total of 18 questions and it will take you no longer than 15 minutes to complete. Please answer each question honestly so the results of the survey are accurate.

Your decision whether or not to participate will not affect your future relations with the school and district in any way. If you decide to participate, you are free to discontinue participation at any time without affecting such relationships.

This research project has been reviewed and approved in accordance with Bethel's Levels of Review for Research with Humans. If you have any questions about the research and/or research participants' rights or wish to report a research- related injury, please call:

Jennifer Middendorf, Researcher
(651) 768-3757
Dr. Michael Lindstrom, Advisor
(612) 209-1739

By clicking "Yes", you are giving consent to participate in this study.

APPENDIX G: CONSENT FORM FOR LEVEL 1 RESEARCH - STUDENTS

You are invited to participate in a study on the impact of iPad use on student engagement in the high school classroom. I hope to learn what strategies work well with students to increase engagement. I also hope to learn whether the perceptions of students and of teachers are similar or different regarding the impact iPad use has on student engagement. You were selected as a possible participant in this study because you have been using an iPad in the high school classroom for a 2nd year in a row. The researcher conducting this study is a Doctoral candidate in Educational Leadership and Administration at Bethel University, MN, and is also a teacher at the high school being studied.

If you decide to participate, I will set up a day and time after school to meet with a group of 6-8 participants to discuss participant perspectives on the use of iPads in the high school classroom. I will notify you 2 weeks in advance of the day and time. In order to protect your privacy, you will be given a nametag with a "code" name in which participants will refer to you as. The session will be audio recorded and will be transcribed for reporting purposes. Snacks and refreshments will be provided.

Any information obtained in connection with this study that can be identified with you will remain confidential and will be disclosed only with your permission. In any written reports or publications, no one will be identified or identifiable and only aggregate data will be presented. The Voice Pro app will be used to audio record the focus group discussion. In addition, the researcher will be using a Smart pen to audio record while taking notes on paper. During the sessions, participants will not use their name. Furthermore, names will not be used when reporting data. The audio data will be stored on a password protected USB drive along with the Smart pen data. The hard copies of responses will be kept in a locked desk drawer and will immediately be shredded once it is transcribed. The data on the USB drives will be permanently deleted once it has been reported. Only the researcher will have access to all data collected.

Your decision whether or not to participate will not affect your future relations with the school and district in any way. If you decide to participate, you are free to discontinue participation at any time without affecting such relationships.

This research project has been reviewed and approved in accordance with Bethel's Levels of Review for Research with Humans. If you have any questions about the research and/or research participants' rights or wish to report a research- related injury, please call:

Jennifer Middendorf, Researcher
(651) 768-3757
Dr. Michael Lindstrom, Advisor
(612) 209-1739

You will be offered a copy of this form to keep.

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate. You may withdraw at any time without prejudice after signing this form should you choose to discontinue participation in this study.

_____ _____
Participant Signature Date

_____ _____
Signature of Parent or Guardian Date

APPENDIX H: CONSENT FORM FOR LEVEL 1 RESEARCH - TEACHER

You are invited to participate in a study on the impact of iPad use on student engagement in the high school classroom. I hope to learn what strategies work well with students to increase engagement. I also hope to learn whether the perceptions of students and of teachers are similar or different regarding the impact iPad use has on student engagement. You were selected as a possible participant in this study because you have been using an iPad in the high school classroom for a 2nd year in a row. The researcher conducting this study is a Doctoral candidate in Educational Leadership and Administration at Bethel University, MN, and is also a teacher at the high school being studied.

If you decide to participate, I will set up a day and time after school to meet with a group of 6-8 participants to discuss participant perspectives on the use of iPads in the high school classroom. I will notify you 2 weeks in advance of the day and time. In order to protect your privacy, you will be given a nametag with a "code" name in which participants will refer to you as. The session will be audio recorded and will be transcribed for reporting purposes. Snacks and refreshments will be provided.

Any information obtained in connection with this study that can be identified with you will remain confidential and will be disclosed only with your permission. In any written reports or publications, no one will be identified or identifiable and only aggregate data will be presented. The Voice Pro app will be used to audio record the focus group discussion. In addition, the researcher will be using a Smart pen to audio record while taking notes on paper. During the sessions, participants will not use their name. Furthermore, names will not be used when reporting data. The audio data will be stored on a password protected USB drive along with the Smart pen data. The hard copies of responses will be kept in a locked desk drawer and will immediately be shredded once it is transcribed. The data on the USB drives will be permanently deleted once it has been reported. Only the researcher will have access to all data collected.

Your decision whether or not to participate will not affect your future relations with the school and district in any way. If you decide to participate, you are free to discontinue participation at any time without affecting such relationships.

This research project has been reviewed and approved in accordance with Bethel's Levels of Review for Research with Humans. If you have any questions about the research and/or research participants' rights or wish to report a research- related injury, please call:

Jennifer Middendorf, Researcher
(651) 768-3757
Dr. Michael Lindstrom, Advisor
(612) 209-1739

You will be offered a copy of this form to keep.

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate. You may withdraw at any time without prejudice after signing this form should you choose to discontinue participation in this study.

_____ _____
Participant Signature Date

APPENDIX I: SCRIPT FOR SURVEY ADMINISTRATOR

Before participants begin the survey, the survey administrator will read the following directions.

The bold font is the script read to participants by the Survey Administrator.

"The purpose of this survey is to gather anonymous feedback as to the impact of 1:1 iPad devices on student engagement. The survey will be taken on your iPad using a link found on your Advisory website. You are not required to take this survey. It is optional.
Keep in mind the definition of student engagement is <u>the continuous and productive behavior of students toward their education.</u> You will come across this definition a couple times throughout the survey as a reminder."

Students must remove all items from their desk. Those who are participating should only have their iPads in front of them.

"At this time, please remove all items from your desk except for your iPad. You will have a couple minutes to log into your district email account and open the email labeled 'Student Survey'. Click on the link and wait for further directions."

Once all students participating are logged into the survey system, please instruct them to begin the survey. Once they are finished, they must close out the survey and turn their iPads over so you know who is finished. The total amount of time it should take students to complete the survey is fifteen minutes maximum.

"Please make sure to complete the survey providing accurate answers. Take your time. There is no time limit. When you have completed the survey, you must click 'SUBMIT.' Does anyone have any questions? …Okay, you may begin."

When all students are finished, walk around and check their iPad to make sure they exited out of the online survey system.

Thank you for taking the time to administer this survey. I greatly appreciate it. If you have any problems during the administration of the surveys, please contact my cell phone at (612)250-XXXX and I will immediately assist you.
Thank you,
Jennifer Middendorf

APPENDIX J: INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

BETHEL UNIVERSITY

Institutional Review Board
3900 Bethel Drive
PO2322
St. Paul, MN 55112

February 14, 2015

Jennifer Middendorf
Bethel University
St. Paul, MN 55112

Re: Project SP-4-15 The impact of 1:1 iPad devices on student engagement in the High School classroom

Dear Jennifer,

On February 14, 2015, the Bethel University Institutional Review Board completed the review of your proposed study and approved the above referenced study.

Please note that this approval is limited to the project as described on the most recent Human Subjects Review Form. Also, please be reminded that it is the responsibility of the investigator(s) to bring to the attention of the IRB any proposed changes in the project or activity plans, and to report to the IRB any unanticipated problems that may affect the welfare of human subjects. Last, the approval is valid until February 13, 2016.

Sincerely,

Peter Jankowski, Ph.D.
Chairperson Bethel University IRB

APPENDIX K: Collaborative Institutional Training Initiative Certificate

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)

DOCTORAL STUDENTS - BASIC/REFRESHER CURRICULUM COMPLETION REPORT

Printed on 05/07/2014

LEARNER	Jennifer Middendorf (ID: 4131106)
PHONE	651-768-3757
EMAIL	jem23386@bethel.edu
INSTITUTION	Bethel University
EXPIRATION DATE	05/06/2016

DOCTORAL STUDENTS - BASIC/REFRESHER

COURSE/STAGE:	Basic Course/1
PASSED ON:	05/07/2014
REFERENCE ID:	12853435

REQUIRED MODULES	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction	04/23/14	3/3 (100%)
Students in Research	04/23/14	10/10 (100%)
History and Ethical Principles - SBE	04/23/14	5/5 (100%)
Defining Research with Human Subjects - SBE	04/23/14	5/5 (100%)
The Regulations - SBE	04/23/14	4/5 (80%)
Assessing Risk - SBE	04/23/14	4/5 (80%)
Informed Consent - SBE	04/23/14	4/5 (80%)
Privacy and Confidentiality - SBE	04/23/14	5/5 (100%)
Research with Children - SBE	05/07/14	4/4 (100%)
Research in Public Elementary and Secondary Schools - SBE	05/07/14	4/4 (100%)
Internet Research - SBE	05/07/14	4/5 (80%)
Bethel University	05/07/14	No Quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Progam course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator