

TEACHER PERCEPTIONS AND STUDENT ATTITUDES OF IPAD INTEGRATION IN A
MIDDLE SCHOOL

by

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ABSTRACT

This research project is designed to address the recent push for technology in 21st century education. This is done by investigating how teachers are using iPads in a 1:1 implementation setting, what professional development teachers are given for iPads, and the attitudes of students using iPads in a 1:1 setting. Participants of the study include 30 eighth grade students and 4 teachers in a rural Western New York middle school. Each participant is currently involved in a 1:1 iPad implementation in the selected school district. The researcher gathered data in the form of a student survey, teacher interviews, and classroom observations. The results of this study concluded that teachers had a positive perception of using iPads for instruction. There were many benefits to the use of the technology in a variety of ways. Students were found to have positive attitudes when it came to the use of the iPads except when it came to reading on the iPad. This research may serve as a guide to districts who currently do not have a 1:1 iPad implementation, and are currently attempting to pursue that path of instruction in their school district.

Keywords: iPad, middle school, education, technology

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Introduction

Problem

This study investigates the use of iPads in the classroom. The new Every Student Succeeds Act in addition to the Common Core State Standards require the use of technology integration within the lessons of teachers. One way this can be accomplished is by one of the many features the iPad offers, which is the accessibility to a multitude of APPS. Oraib Mango (2015) conducted a study where iPads were used once a week for 30-45 minutes to work on mini-projects using various mini-projects that included: Educreations, Doodle buddy, Aviery, StoryKit, ShowMe, Screen Chomp, and Comic Life. The implementation of the new Common Core standards provides teachers with an opportunity to blend the integration of technology with the standards to promote higher level thinking as well as allowing students to learn through experience in American classrooms (Huseman, 2015; Mango, 2015).

The use of the technology in today's classrooms is changing. In past mindsets, the teacher used the technology to support their instruction in ways that supported them. Now, there is a push for students to become the focal point of the technology, using it to support their individual needs. Teachers can use technology such as iPads in order to help students learn as well as engage students more effectively during class activities (Blair, 2012; Mango, 2015).

George Posner (1992) was a curricula theorist who defines a traditional curriculum to be one that involves students being taught facts in schools, and then memorize those facts. The new Common Core State Standards move away from Posner's traditional approach and strives for a blend of a cognitive, experiential, and behavioral approach to curriculum. These theoretical perspectives strive to make students think more critically and for measurement of student learning, respectively (Huseman, 2015; Posner, 1992).

One area worth exploring is the attitudes and perceptions of the students who are often using these devices for learning. Students were found to see the iPad as an effective way to learn (Mango, 2015). Students felt the iPad helped them learn the material while serving as a learning aid. Students also indicated that they felt they were engaged while using the iPads for the various activities. The data indicated most students felt the iPads enhanced opportunities for them to collaborate with other students and kept their interests. It was also found most students felt they were not distracted while using the iPads during the activities, which is consistent with recorded records from observations (Mango, 2015).

Jordan Catapano also notes that one of the luxuries of using an iPad is the accessibility to the numerous APPS that are available for education. The author exclaims that “No matter what kind of task you want to do, or what kind of problem you encounter, it is likely that there is an educational app designed to help address that specific need” (Catapano, n.d).

Other uses for the iPad include the use of communication and visual aids for students with disabilities. Students who are nonverbal especially can use the iPad to finally feel as if they have a voice in the classroom. In recent years, iPads have taken over the Picture Exchange System that is primarily used with students who are nonverbal. Here, students are able to point to pictures to describe what it is they want or need (Wheeler, Mayton, & Carter, 2015). With the technology of today, research has found that students prefer the use of the iPad over traditional methods such as PECS, and that there are a multitude of APPS readily accessible for our students to use to communicate with their classmates, families, and teachers (Flores et al., 2012; Stone-MacDonald, 2014).

This study seeks to discover the different uses of iPads in the classroom for instructional purposes. There is much literature on the different ways to use iPads as interventions, yet none of

the research investigates the full implementation of a paperless classroom. Both the perceptions of teachers, as well as attitudes of students who use iPads on a daily basis will be investigated throughout the course of the research. Students surveyed by Lee and Spires (2009) revealed that the students are looking for ways to learn online using technology while in school. The students indicated that they want more out of school experiences with technology to be infused into their daily procedures and activities (Lee & Spires, 2009).

Technology is playing a critical role in education today. Kim et al. (2013) finds that there is a correlation between what a teacher believes about learners and how they teach. Teachers' perspectives on the integration of technology plays a large role in how the technology is implemented. The professional development aspect is essential to ensure that teachers are properly prepared to integrate the technology, so that they know what to expect and can maximize the technology to its full potential.

The current push for technology through the Common Core State Standards as well as federal legislation leaves the method for technology integration up to the teachers. Many teachers may not be optimizing the use of the technology available to them simply because they do not know how to use the technology (Kim et al., 2013; Lowther et al., 2012; Minshew & Anderson, 2015). This lack of knowledge has the potential to create a bias by teachers toward their view of using technology in their teaching.

Purpose

The primary purpose of this study is to investigate the different ways that iPads can be implemented into a school setting. The researcher is attempting to find different ways that iPads are used for instruction. Are they using iPads for whole group instruction, direct instruction, or individual student work? Research has shown that there are a multitude of APPS available for

educators (Arthanat, Curtin, & Knotak, 2013; Bryant, 2015; Eisele-Dyrli, 2011; Stone-MacDonald, 2014). It would be worthwhile to investigate what APPS are the most useful to teachers who use iPads to teach on a daily basis.

In addition, the researcher would like to discover how the students feel about the new use of technology in their classes? After all, this is their education. The researcher is seeking to administer a survey to students, to gain perspective as to their attitudes about using iPads on a daily basis for instruction. Furthermore, through interviews with teachers and observations of teacher instruction this study seeks to address the following research questions: How are iPads being used in Western New York middle school classrooms? What are Western New York middle school teachers' perceptions toward using iPads for daily instruction? Are Western New York middle school teachers properly prepared to use the technology readily available to them? What are the attitudes of Western New York middle school students that use iPads on a daily basis in school?

Significance

The implementation of technology is a growing development in the field of education. The iPad implementation started at the WNY school district where the research is being conducted during the 2014-2015 school year. The implementation began with 1:1 implementation with sixth grade in 2014, and all three grade levels were at a 1:1 implementation by the next year. Before the iPads, teachers were able to sign out mobile laptop labs to bring into their classrooms. It has been two years since the middle school fully went 1:1 with all of their students having iPads.

Research has already suggested that teachers be properly prepared for the implementation of technology (Kim et al., 2013; Lowther et al., 2012; Minshew & Anderson, 2015). This study

will investigate what is being done to prepare teachers, to see if the suggestion of previous research is being applied in public school districts in Western New York. The use of the iPad is said to be beneficial due to the abundance of educational APPS (Arthanat, Curtin, & Knotak, 2013; Bryant, 2015; Eisele-Dyrli, 2011; Stone-MacDonald, 2014). This study will investigate what educational APPS are best available for educators, coming directly from educators who use the devices on a daily basis. The perspectives of teachers will provide fellow teachers across content levels insight as to how the iPad implementation worked in their school, as well as what the teachers believe works or does not work.

Current research investigates views from students in regards to student learning and student engagement. Students have been found to view using technology such as iPads as a positive addition to their educational classrooms (Lee & Spires, 2009; Mango, 2015; Maxwell & Banerjee, 2013; Li, Snow, & White, 2015). This study will provide teachers who currently use iPads in education with perspectives from both students and teachers. The interviews with teachers will provide other teachers with different strategies for implementing iPads into daily instruction, relevant APPS that are found to be effective in education, professional development ideas, and any negative aspects to using the iPads. This study will provide useful information for other teachers and administrators who are currently using iPads or thinking about using iPads in the future. The teachers being interviewed have at least three years of experience using the iPads for daily instructions, and their insight will provide other teachers with both positive and negative experiences they have had during their time using the iPads.

The study will find how the iPads are being used in middle school class rooms, as well as the successes teachers have had while implementing iPads into daily instruction in their classes. In addition, Engelhardt (2014) notes the benefits to school districts themselves. The idea of going

paperless will save the district money in terms of printing materials such as ink and paper. In a school of 1,000 people this switch to paperless could save the district between \$3,000-\$4,000 each month (Engelhardt, 2014).

This study will provide information from personal experience to other teachers attempting to use iPads. This will provide them with ways of implementing the technology that is successful, and ways to avoid pitfalls these teachers have found in their own experiences. The attitudes of teachers and students will provide insight as well, and give information to how the use of iPads in the school can be improved for future use.

Literature Review

Teaching in The Modern World

21st century learning. Today's educational world is in the state of critical change. There is a driving force for teachers and students to be engaged in 21st century learning. Rich (2010) interviewed Karen Cator, who is a director for the United States Department of Education. Cator provides insight as to what exactly is necessary for our students to be successful in this learning of the 21st century. A major role in this type of learning is rooted in critical thinking skills as well as technology. Technology has rapidly enhanced the way both teachers and students operate in a school setting. Oso Senny Oluwatumbi (2015) found significant differences between a control and experimental group when researching the impact of technology. Students used various forms of technology such as computers, projectors, the internet, and online applications. The use of these technologies were found to positively enhance student performance if implemented appropriately (Oluwatumbi, 2015).

Technology is beneficial because it not only offers multitudes of information at any time day or night, but can also be used to teach social skills as well as prepare students for future employment. These skills are essential in today's competitive job market (Oluwatumbi, 2015; Rich, 2010). The use of technology in the 21st century classroom provides teachers with opportunities to benefit their students by more easily meeting the diverse needs of the learners (Oluwatumbi, 2015; Rich, 2010). The use of technology in the classroom allows students to work at their own pace, eliminates the one size fits all approach, and prepares students to be learners for life (Rich, 2010).

Kurt Eisele-Dyrli is a district administrator who is open to the inevitable change in classrooms. Today's schools are striving to implement technology as part of a daily norm to

students. This makes information more accessible as well as changes the way instruction is carried out each day in our schools (Eisele-Dyrli, 2011). School officials in various school districts were perceived to have a positive outlook on the technology integration. In order for students to continue growing in 21st century learning, they must become a part of the technological movement that is popular with the upcoming generations. This is a common feeling across the nation all the way down to those district employees who are coordinating the arrival of new technologies (Eisele-Dyrli, 2011).

The implementation of technology is an essential for today's 21st century learners. The conventional methods of instruction are not suitable nor meeting the needs of the learners in today's classrooms (Oluwatumbi, 2015). The implementation of such technology has found trends in achievement, and the findings of Oluwatumbi (2015) recommend that both the federal and state levels, the government should be assisting in making technological resources available to our students. The integration of technology in schools across the country can occur in many ways using various forms of technology. Today's technology ranges from hand held video game devices to smart phones to iPads. The researcher notes that there are many APPS on the iPads that not only help students conduct research in multiple content areas, but create and deliver presentations as well. Students in today's schools have had this type of technology available their entire lives, and now that it is being used in schools it can be used as an academic tool, as well as a social media outlet. (Eisele-Dyrli, 2011).

The Reform of Education

Elementary and Secondary Education Act of 1965. Educational reform began in the 1960s with the Elementary and Secondary Education Act of 1965. This was an act passed by Lyndon B. Johnson to give a defining role to the United States Government when it came to

education (Klein, 2015). The role of government is to make sure that all students have access to free and appropriate public education (FAPE). The word appropriate is what creates the controversy in this statement among different people across the nation (Chambers, 2008). What does an appropriate education entail? Typically, this is ensuring that students with disabilities are receiving services based upon their own individual needs. This could include special education services, the use of specific devices, smaller class sizes, resource room, a co-teacher, or even alternate education location. An appropriate education is one where the child is given any of the mentioned services based on their own individual needs to ensure they will be successful in public schooling, and after (Chambers, 2008). The implementation of this law places great emphasis on funding school districts to make sure they have necessary resources, promoting high standards, and ensuring Americans with a quality education by any means necessary for a particular student (Social Welfare History Project, 2016).

No Child Left Behind (NCLB). Until December 2015, the most recent updates to this document was the No Child Left Behind (NCLB) Act of 2001. No Child Left Behind was an initiative by the Bush Administration to begin holding schools more accountable and making the federal government's place in education more superior. This reform was an effort to raise the bar for American Education, and to put American Schools on the same playing field as that of other countries around the world (Klein, 2015). The emphasis of NCLB was to make sure that students who were not native to the English language, received special education services, or lived in poverty did not get left behind in the realm of education.

No Child Left Behind required standardized testing at each grade level to ensure that students were meeting the required state standards. This standardized testing allows the states to identify districts that needed improvement, and were used to determine the annual yearly

progress (AYP) of the district. The issue this created is that in order to meet their AYP states began to lower their standards so that scores were higher (Social Welfare History Project, 2016). States began focusing on solely test scores instead of the larger pictures which is student growth and achievement.

In addition to the focus on struggling students in American Education, the Act also sets the stage for the push for educational technology in schools. Part D of NCLB can also be referred to as the Enhancing Education through Technology Act of 2001 (No Child Left Behind [NCLB], 2002). This section of the federal document sets the primary goal to increase student achievement through educational technology, as well as provide funding opportunities for districts to increase the amount of technology resources in their schools (NCLB, 2002). Nearly fifteen years later, NCLB has been replaced with a new act that was signed into law in 2015.

Every Student Succeeds Act (ESSA). The new bill to take the place of NCLB is Every Student Succeeds Act (ESSA) which was signed by President Obama in December 2015. This bill is set to take full effect for the 2017-2018 school year. ESSA is a new bill that will have the federal government taking a step back from the strong role it played in NCLB (Klein, 2016). This includes teacher evaluations no longer being tied to student outcomes in standardized testing. Under NCLB if AYP was not made consecutively, the government would give directives to districts and push for incentives including more rigorous curriculum. The ESSA eliminates AYP and allows the states to determine how much weight to give assessments in holding their schools accountable, as well as what the consequences will be if there is poor performance (ASCD, 2015).

This also means more freedom for districts to choose how they spend the Title I money they receive from the federal government. Klein (2016) finds that one of the common themes

that is first seen in NCLB that makes another appearance in ESSA is the continuing push for educational technology. Under NCLB money was set in grant blocks for schools to provide a well-rounded education for their students. School districts could use the money for fine arts, physical education, school counseling, and 21st century community learning centers (ASCD, 2015). When ESSA takes effect in the fall of 2017, the government will have a new block of grant money available to districts. This money is calculated by a formula set by the government which is used to determine how much funding each district will obtain. This new money will allow districts to expand the use of technology in their school buildings (ASCD, 2015). The new grants under ESSA contains up to \$1.6 billion for many programs that districts can update or create which include the implementation of technology in schools (Klein, 2016).

Common Core State Standards (CCSS). In addition to federal legislation, the newly adopted Common Core State Standards (CCSS) not only require a more rigorous curriculum, but also require the need for technology in schools. The implementation of the Common Core was in fact a very political one, according to the Home School Legal Defense Association (HSLDA) (Home School Legal Defense Association, 2014). Although there are various laws in place that stop the federal government from dictating what states include in their curriculums, it seems there has been a loop-hole when it comes to states adopting the Common Core.

A nationwide incentive called Race to the Top (RTTT) was first mentioned in March 2009, where the federal government offered 4.35 billion dollars to be divided among states for educational funding. As previously stated, NCLB caused states to lower their standards. RTTT was aiming to get states to raise their standards so that American students were college and career ready, i.e. the Common Core State Standards. The Home School Legal Defense Association (2014) stated that “Not only did RTTT application criteria advance the Common

Core, but application deadlines forced states to rashly commit to the standards”. With these standards in place, states would now have rigorous curriculums as well as the accountability through standardized testing.

Criteria for RTTT applications stated that states needed to adopt a set a college and career ready standards. This is where the Common Core and technology integration comes into play. Although it is not specifically saying that the Common Core must be these standards, it becomes evident that this was the target for the program since 46 states at some point adopted the Common Core (Home School Legal Defense Association, 2014).

While teachers are attempting to teach the newly adopted standards nationwide, daily integration of technology is weaved throughout the standards forcing teachers to meet this technological requirement (Huseman, 2015). There has been a major change when it comes to the role of technology in education over the years (Blair, 2012). When technology was first included in teacher instruction, it served its purpose by making lectures more visually appealing to students through the use of PowerPoints and other means of presentations. The author argues that now the center of technology should be around the students, allowing them to use the technology instead of watching the teacher use it.

The Common Core Learning Standards (CCLS) not only require the use of technology, but provide a more rigorous curriculum. The author notes that a critical component to making technology integration work in the classroom is to use it to promote student engagement, and discussion of rigorous open ended questions. A truly effective lesson is found when students have the opportunity to create and discover (Blair, 2012). For the implementation of the CCLS, New York State provides its own textbook to assist teachers with the rapid change in the mathematics and English language arts curriculum.

The middle school scope and sequence for mathematics courses, *A Story of Ratios* (Engage NY, 2014) provides an opportunity for students to create and discover within its own text. These sections are called an Exploratory Challenge, and allow students to make discoveries on their own. In the NYS mathematics modules these parts of the lessons address the “Deep Understanding” shift of the CCSS (Engage NY, 2014). Instead of immediately modeling a problem for students, the exploratory challenge section of a lesson, usually at the beginning, will scaffold a pattern or relationship that builds off of previous knowledge. The challenge is broken into parts to guide students to recall what they already know and then apply that information to make the discovery of a law or property on their own.

The ELA modules also provide a similar instructional shift addressing text based answers (Engage NY, 2014). This shift is addressed through a slightly different method than the mathematics modules, but allows students to engage in collaborative and enriching conversations about the text that is being read. Engage NY (2014) also emphasizes the use of other collaborative evidence based strategies such as jigsaw activities among students. This type of activity allows students to collaborate with one group of peers and then instruct another group about a certain topic of theme in the current text (Engage NY, 2014).

Technology Integration in Schools

Funding technology integration in schools. One of the biggest ways schools are able to afford new technology is through federal funding and grants. Race to the top (RTTT) is one of the leading incentives for school districts to receive federal funds that can be used for technology. Ellen Ullman (2015) as well as Cynthia Okolo and Jeff Diedrich (2014) found that there are several ways to integrate technology in schools. Math and science seemed to be the most prevalent content areas when the technology was distributed. Technology funds gave

districts the opportunity to purchase high-tech probes that would allow science classrooms to monitor streams in nearby areas for their lab activities (Ullman, 2015).

With the new ESSA funding will also be changed. School districts will no longer need to compete for federal money, because the use of a formula will be used to assess the amount to be given to each district (ASCD, 2015). Previously, the initiative in RTTT was created because there was no funding given specifically for technology by the government under NCLB. Now, school districts will be able to use grant money from the government in order to update and implement technology in their districts (ASCD, 2015).

The mathematics classrooms that were investigated by Ullman (2015) were now found to have access to TI-Nspire calculators, interactive whiteboards, HP touchscreen devices, as well as iPads. The iPads were found to have the most use. Teachers were using the devices to assess students, take notes, as well as allow students to work collaboratively on class projects. Student engagement was also found to have been increased as a result of the implemented technology. Students no longer had to share one computer screen to complete a class project, as was done in years past. With the integration of the iPad, all students (using their iPads) could split up a project. Each student works on a different piece simultaneously, keeping all students engaged, and keeping behavioral issues to a minimum (Ullman, 2015).

Technology was also found to be integrated beyond the general education classroom, specifically with students with disabilities. Students with disabilities were found to use technology in schools more frequently than students without disabilities. Assistive Technology is a key factor in this finding. A major role in assistive technology is the opportunities it creates for nonverbal students, such as a student with Autism Spectrum Disorder, to communicate with others (Okolo & Diedrich, 2014).

Using technology as a learning tool. The findings of Teresa Franklin and Li-Wei Peng (2008), Lowther, Inan, Ross, and Strahl (2012), and Maxwell and Banerjee (2013) showed that a popular use for technology in schools is to use the technology as a tool for learning. Schools are using mobile devices as a means to support math instruction by providing videos to students through the device (Franklin & Peng, 2008). Results from students indicated that creating videos where students are actually teaching the math helped them to “think about the math” (Franklin & Peng, 2008, p. 75). The process of using the technology to create a video forced students to understand the concepts being taught, in order to re-teach it to their video viewers. Not only is this way of using technology to learn engaging for students, but students could again use the technology to go back to the videos and reference them later on if they needed to (Franklin & Peng, 2008).

Through the use of technology as a learning tool, students are also able to enhance their skills of collecting data, researching, word processing, and using the internet by using the devices for independent work time (Lowther et al., 2012). It was also found that technology such as computers can be used for lower level thinking activities such as drill and practice techniques. When the technology use also offers more than just independent opportunities for student learning, it also offers opportunities for collaboration and project based learning (Lowther et al., 2012). Maxwell and Banerjee (2013) also found that at the collegiate level technology was also being used for independent work. The researchers investigated a collegiate group of college freshman and nature of how they used iPads in educational learning. They sought to see if the use of the iPads was executed the way they were intended to be, or if the actual usage was for different reasons.

The use of technology, specifically tablets, is transforming higher education (Maxwell & Banerjee, 2013). The most popular uses for the iPads during the study was for the use of note-keeping during lectures. Other non-academic uses included using the tablets for entertainment such as social networking. When it came to using technology, students were found to be enthusiastic to use the technology for academics, even without any training prior to the study (Maxwell & Banerjee, 2013).

Technology is not only being integrated in public K-12 school districts, but the researchers above have also demonstrated the integration at the collegiate level as well. The use of the technology to be used as a tool to aid learning is a major role among the integration of technology in schools across the country (Franklin & Peng, 2008; Lowther et al., 2012; Maxwell & Banerjee, 2013).

Student attitudes toward technology integration. Lee and Spires (2009), Maxwell and Banerjee (2013), as well as Jia Li, Catherine Snow, and Claire White (2015) noted in their findings that students had positive attitudes toward the use of technology. Li, Snow, and White (2015) found in their survey responses that technologies are being used by students for academic and non-academic purposes. They also noted that there is a difference in technology use when students are in and out of the classroom setting. Students expressed that technology being used provides great opportunities for students to socialize and associate with their friends online (Li, Snow, & White, 2015). In fact, it has been found that 100% of college freshman that were surveyed on how they use technology said they used technology for social media (Maxwell & Banerjee, 2013).

Today's students are growing up with technology before them, and the use of technology comes to be native to many of our students (Lee & Spires, 2009). With this in mind, it is no

wonder that students are very observant as to how technology is being used for instruction in schools by their teachers. Students were able to recall what types of technology was being used and in what classes (Li, Snow, & White, 2015). Students so far have been using technology primarily for entertainment and personal purposes. However, research found that students were eager to use technology in their classrooms. Students expressed excitement at the potential of how technology could be used for academic purposes such as completing homework assignments and researching topics for ELA (Li, Snow, & White, 2015).

Students expressed that their attitudes toward technology use was that when being used in the classroom, it should mirror the use it provides outside the classroom (Lee & Spires, 2009). Outside of the classroom students are given freedom and creativity with technology. As opposed to traditional methods where students constantly complete worksheets, students can use the technology freely to accomplish tasks in a variety of ways (Lee & Spires, 2009). Studies have shown students using this freedom to accomplish curricular tasks. Studies have shown that one way students can freely use the iPad is through the use of video recording (Franklin, 2008; Hutchinson & Woodward, 2014). The study of Maxwell & Banerjee (2013) also demonstrated the use of technology also permits freedom of assignments where students can collaborate together on one assignment through file sharing on their devices, which aligns with the perspective Rich (2010) provides of technology allowing students to work at their own pace.

Teacher beliefs of technology integration. Studies conducted by Lowther et al. (2012), Kim, Kim, Lee, Spector, and DeMeester (2013), and Minshew and Anderson (2015) found that teacher beliefs of technology influence the way the technology is integrated in their classes, as well as the frequency of the implementation. In order for technology to be integrated successfully, teacher beliefs need to be considered, and their needs met first (Kim et al., 2013).

Teachers are unable to implement technology and offer students the benefits given by technology if they do not know how to use it.

Rhonda Christensen (2002) found that teachers who were receiving technology integration education had a more positive outlook on incorporating technology. The sample also expressed feelings and beliefs of technology playing a more important role after receiving proper education on technology implementation. Similarly, a correlation relating how teachers believe their students learn best, and their instructional practices. The beliefs of teachers about successful ways that students learn in turn affected the way they used technology to teach. The more developed and modernized a teacher's belief was, the easier it was for them to integrate technology (Kim et al., 2013). The findings of Christensen (2002) and Kim et al. (2013) imply that professional development for teachers would provide them with sufficient training to successfully implement technology in their classroom.

Professional development opportunities would benefit teachers because they would be taught how the use of technology can be maximized to benefit themselves as well as their students. These opportunities increased the confidence of teachers when it came to the use of technology in the classroom, as well as an increased outlook on technology integration. Professional development allowed teachers to learn not only how to use the technology, but gave them ideas as to how to implement it in their classes. (Lowther et al., 2012; Kim et al., 2013).

Lana Minshew and Janice Anderson (2015) investigated how teachers' perceptions on implementing technology, specifically iPads, were influenced. Teachers have different knowledge of the iPad technology. The different levels of technological knowledge influenced teacher perceptions of the technology itself. "When teachers only see the technology as a tool

they must use as opposed to a device that could enhance their instruction, the use of the device is limited” (Minshew & Anderson, 2015, p. 351).

Personal bias of teachers becomes a barrier when attempting to integrate technology into schools. This creates a problem because teachers that are not as in-tune with technology may not want to use it simply because they do not know how. This reasoning again presents for the need of professional development when integrating technology to ensure that teachers are properly prepared and able to use the technology to benefit themselves and their students (Kim et al., 2013; Lowther et al., 2012; Minshew & Anderson, 2015).

The Implementation of the Apple iPad

Use of the iPad as a 1:1 implementation. One way to implement iPads in schools is a 1:1 method, where each teacher and student has their own independent access to one of the devices (Bebell, Clarkson, & Burraston, 2014). Research has shown that there is no significant impact on the use of 1:1 iPad implementation in schools, according to several studies by Damian Bebell and Joseph Pedulla (2015), Jennie Carr (2012), as well as David Perry and Andy Steck (2015).

One way to determine if the 1:1 implementation method has made significant impacts is to look at student achievement. Bebell and Pedulla (2015), Carr (2012), and Perry and Steck (2015) all investigated the area of student achievement with a 1:1 iPad implementation in place. In addition to student achievement Perry and Steck (2015) also investigated student engagement and self-efficacy while using a 1:1 iPad implementation.

In the field of mathematics Perry and Steck (2015), Bebell and Pedulla (2015), as well as Carr (2012) found little to no effects when implementing iPads in the mathematics classroom. The data showed positive, non-significant, and in some cases negative results depending on

grade level of the implementation. Results for the measurement subtest showed a drastic change by each grade level in this study. Kindergarten students in the study of Bebell and Pedulla (2015) showed a negative trend for this subtest in each year of implementation. However, as the iPad implementation progressed the size of the negative trend decreased. First and second grade students showed positive trends, but the results when compared to pre-iPad years were typically the same (Bebell & Pedulla, 2015).

There were mixed and inconsistent patterns, especially in math when it came to the results of a 1:1 iPad implementation in mathematics class. These inconsistencies were seen within each grade level among the different subtest categories. Due to such inconsistencies of positive, negative, and no-significance in all of the mathematics subtests, it can be concluded that no evidence was presented of any actual gains in these areas (Bebell & Pedulla, 2015).

Similarly, when investigating differences between an iPad and non-iPad group, there was no significance difference between the groups based on student assessment scores (Carr, 2012; Perry & Steck, 2015). In addition, the study conducted by Perry and Steck (2015) found that both the control group and experimental group decreased in scores throughout the semester. Although both groups decreased, it was found that the experimental group (iPad group) decreased by about twice the amount that the control group did (Perry & Steck, 2015).

Slightly different from the findings in the mathematics area, there was little to moderate impact with the implementation of the iPad in ELA. Bebell and Pedulla (2015) found that the reading and writing subtests results yielded all positive trends of student achievement. The phonetic awareness subtest was mostly positive and showed that performance did increase each year. The listening subtest was generally positive and showed improvements, although they were fairly small gains. Although there were some differences in the subtests of ELA, researchers

Bebell and Pedulla (2015) noted that all gains were still positive. The researchers found that due to these tests yielding positive trends, there was a narrow measure of success in ELA achievement.

After exhausting the literature there are several implications that can be made from this data. First, previous studies address a 1:1 iPad, but do not investigate exactly how the iPads are being implemented or used throughout the instructional course of a school day. The studies specifically addressed the area of student achievement, and the implementation of the iPads did not seem to alter achievement. Furthermore, how were these iPads implemented and how can the students benefit from this technology? These are key elements this study will seek to discover. Also, the findings imply that the way the iPads are implemented should be investigated further. The following two sections address unique ways that iPads can be implemented for both students with disabilities as well as being used as a form of communication device for nonverbal students.

iPads used as an intervention to students with disabilities. iPads are not only proving to make an appearance in the general education classroom, but a study by O'Malley, Jenkins, Wesley, Donehower, Rabuck, and Lewis (2013), Bryant, Ok, Kang, Kim, Lang, Bryant, and Pfannestiel (2015), as well as Sajay Arthanat, Christine Curtin, and David Knotak (2013) found there were different uses for iPads when it came to working with students who had disabilities.

O'Malley et al. (2013) and Bryant et al. (2015) found that in each of their studies there was a slight increase the students' mathematical abilities. Individual student data had a wide range of impact, and researchers found the intervention may not have been effective for all students (O'Malley et al., 2013). Some students had a high positive impact, while others were low. This could also be due to reasons relating to a student's individual disability. Teacher attitudes toward the intervention involving the iPads were positive.

In addition to the above studies, Bryant et al. (2015) as well as Arthanat et al. (2013) also found students to succeed greater after iPad interventions with learning APPs. Math Drills APP was used as one means of intervention to help build fluency in mathematical skills. This allowed students to review previously learned facts as well as enter a practice mode where they could choose a specific level of multiplication to practice with. Math Evolve was also used as another practice device (Bryant et al., 2015). Both studies showed that there was improvement in the areas that were studied during the intervention.

The study that was conducted by Arthanat et al. (2013) specifically studied the use of the iPads used among students with disabilities versus the use of laptops. Some students were found to show tremendous change in engagement levels when used as an intervention tool among the students with disabilities (Arthanat et al., 2013). The changes in engagement were both positive and negative depending on the student. Three of the four students seemed to be distracted by the device, while one of the four students became more motivated to learn. Despite distractions found in the study by Arthanat et al. (2013), there were no solidified trends when comparing the use of iPads versus the use of laptops.

The preferred method of instruction with the iPads among students was found to be the combination of teacher instruction with the iPad applications (Bryant et al., 2015). Students mentioned that while the apps were fun and engaging, the instruction and feedback given from the teachers could not be replaced by technology (Bryant et al., 2015). The studies conducted by O'Malley et al. (2013) as well as Arthanat et al. (2013) also found students to become more engaged while using the implemented iPads. The response of students indicated that they enjoyed the use of iPads and there was positive feedback. The majority of students felt they were

more engaged in the lesson when receiving the iPad support (Arthanat et al., 2013; Bryant et al., 2015; O'Malley et al., 2013).

iPads as a communication tool to students with disabilities. New discoveries have found that iPads can be used as more than intervention tools, but as also tools for nonverbal students with disabilities to communicate (Flores et al., 2012; Stone-MacDonald, 2014). There is limiting evidence that suggests the use of the iPad delivers more communication from nonverbal students. In previous years, nonverbal students have used what is known as the Picture Exchange Communication System (PECS), and involves students giving pictures of items to adults to receive the item itself (Wheeler, Mayton, & Carter, 2015). Today's technology can allow iPads to be used in lieu of a hand-made picture system. Through observations, Flores et al. (2012) determined that students desired the iPad over using the former system of PECS. Students would enter the room, and search for the iPad if it was not immediately given to them, showing the desire to use it. There were not consistent patterns among all samples, but there was an increase in communication when using the iPad (Flores et al., 2012).

In addition to the PECS system, another form of communication among nonverbal students is using augmentative and alternative communication (AAC) devices. These devices are known as "electronic speech output devices" (Wheeler et al., 2015, p. 141) that allow students that are nonverbal to communicate if they are able to function that highly. The use of iPads in the field of disabilities can be used as AAC devices. These devices give students who are nonverbal the opportunity to have a voice while giving them the power of creativity through the use of literacy APPS (Stone-MacDonald, 2014).

The beliefs of teachers were found to be positive, in respect to using the iPad as a communication device for those with Autism (Flores et al., 2012; Stone-MacDonald, 2014). A

survey conducted by Flores et al. (2012) indicated that teachers preferred the use of the iPad over a picture system. The iPad was easy to use, easy to implement, took minimal time to prepare, and it was found to increase the speed of communication among the students (Flores et al., 2012). Creating the pictures and preparing sentence strips for students to use PECS was very time consuming. The iPad allowed teachers to quickly and effortlessly allow students to communicate, and then continue the use of the iPad for other classroom activities. Classroom observations also showed that students took a greater interest in using the iPad to communicate than the PECS (Flores et al., 2012). These APPS typically can cost anywhere from \$50 to over \$200, according to Stone-MacDonald (2014). These APPS provide the student with many customization options including different options for voice output. Libraries of vocabulary common to an adolescent are automatically included in most software and overall AAC APPS were found to be easily accessible on the iPad, iPhone, and even web APPS. This ease of accessibility as well as opportunity for nonverbal students to communicate is shown to be extremely beneficial in giving all students a voice (Stone-MacDonald, 2014).

iPads used to increase student engagement. Another reason for implementing iPads is the increase in student engagement (O'Malley et al., 2013; Boyce, Mishra, Halverson, & Thomas, 2014; Milman, Carlson-Bancroft, & Boogart, 2014). Milman et al. (2014) and O'Malley et al. (2013) have found that iPads are a practical way to reinforce skills that have already been taught by using APPs to drill and practice techniques and skills. Furthermore, the devices can be used to enhance the pre-designed curriculum to increase engagement and differentiate instruction (Milman et al., 2014; O'Malley et al., 2013). The drill and practice APPS are seen most in the areas of phonics and mathematics. These APPS were found to be effective in increasing student engagement because the technology allows students to work at

their own pace (Milman et al., 2014; Rich, 2010). Giving students this opportunity eliminates previous cases where students would be sitting there bored because the assignment is either too easy or too hard.

Students were also found to use iPads in the areas of writing and science. Milman et al. (2014) found that students were able to use a Google Earth APP to take a virtual trip around the world when discussing historic social studies events, or different climates in science. Instead of looking to an atlas or book, students are able to use these APPS too find the locations of various climates in a new innovative and engaging manner. When creating blogs or reports, students in the work of Milman et al. (2014) were able to add their own pictures using the iPad's camera feature. Students were also able to zoom in on pictures from internet sources to focus in on specific details which is how the students investigated in the work of Lee and Spires (2009) indicated they wanted to use the technology.

Boyce et al. (2014) found that intrinsic motivation is another source of student engagement when it comes to using iPads. Students were excited to be able to use the technology and while being able to use the iPads, students were found to have higher participation and take a more active role in class discussions (Boyce et al., 2014). Discussions and collaboration also play an important role in learning. Observations found that while using the iPads to work on assignments, students had an increase in participation while using the iPads to collaborate and work with other classmates on one common project (Boyce et al., 2014; Mango, 2015). The study conducted by Mango (2015) found that students not only collaborated with each other, but were found to take an active part in a variety of educational APPS to create different projects and work on their own. These findings also align with the previous results from Lee and Spires

(2009) stating that students wanted this kind of creativity and freedom when using iPads for educational purposes.

In addition to studies on engagement in the general education classroom, the use of the iPad has also been found to engage students with disabilities in a math setting (O'Malley et al., 2013). Through student observations, the data showed an increase in engagement from the students. Students are able to personalize visual representations of graphic organizers up close in the palm of their hand. They are also able to alter text so that it suits their own personal needs. In addition, engagement was found to be increased when students were given opportunities to show what they have learned through using the iPads.

Teachers also spoke in interviews that they felt the iPads had a positive effect overall both for them and their students. Teachers indicated that perhaps in the future the iPads could be used as an instructional tool in the classroom and not only as an intervention tool (O'Malley et al., 2013). The features of the iPad can be used beyond just an intervention tool, and are able to be used to enhance text and make connections for visual learners. This is beneficial for engagement because now these learners can take the next step in becoming a more active participant in class discussions thanks to the features the iPad offers with visual text and personalization (Boyce et al., 2014; Milman et al., 2014).

Benefits of the use of iPads. Several researchers including Hutchinson and Woodward (2014), Rossing et al., (2012), and Melhuish and Falloon (2010) all found that the use of the iPads provided instant access and advanced technology to their respective courses. The technology is right in the hands of our students, and gives them the ability to access any information almost instantly. The use of the iPad devices allowed the students easy access to

information, met different learning styles, is convenient to use, and provided for opportunities for students to collaborate with peers (Rossing et al., 2012).

In addition to instant access, the use of the iPad also enhanced the environment of the classroom and learning activities (Hutchinson & Woodward, 2014; Melhuish & Falloon, 2010; Rossing et al., 2012). The environment of the classroom was enhanced because of the new abundance of activities the iPads provided prompted new opportunities for student collaboration and conversations that otherwise would not have happened, according to Hutchinson and Woodward (2014). Their study resulted in student response videos as one of these activities the iPad allowed for, as suggested earlier by Franklin and Peng (2008). Activities such as this allowed for a more student centered classroom, as opposed to a lecture approach which resulted as another benefit of the implementation.

The environment and learning activities were also increased by the access that students had to applications (Melhuish & Falloon, 2010; Rossing et al., 2012). Not only are the applications easy to access, but Catapano (n.d.) previously notes the abundance of APPS for almost anything. Several other researchers have also used applications such as math interventions, ELA interventions, and as AAC devices (Arthanat et al., 2013; Bryant et al., 2015; Milman et al., 2014; O'Malley et al., 2013; Stone-MacDonald, 2014). Another benefit to the APPS themselves is that they allow for personalized learning and self-pacing. Many APPS can be tweaked so that they meet the needs of the students that are using them. It has also been found that there are APPS out there that will in essence walk students through problems step by step to teach them a topic or skill (Arthanat et al., 2013; Melhuish & Falloon, 2010).

Limitations and challenges of iPad implementation. One of the major limiting factors found when implementing the iPad is the opportunity for the device to distract students. The

opportunity for off task behavior is something that needs to be considered when implementing the devices (Arthanat et al., 2013; Perry & Steck, 2015; Rossing et al., 2012). Just easy as it was for students to find information on the internet, it could just as easily become a distraction; “In classes where students used the iPads without a clear purpose, the devices became more distracting than ‘fun’. Therefore, it is essential that educators design activities with clear instructions and student roles” (Rossing et al., 2012, p. 17).

Similarly, it has also been found that students would often times have trouble controlling impulses to play games after beginning activities. Students would begin activities effectively, but the availability of non-academic games unrelated to the content caused several students to become highly distracted (Arthanat et al., 2013). Furthermore, students would close out of the educational apps and just sit there often times staring into space or attempting to waste time to get the teachers to let them play games. This is why the importance of the design for activities is essential for success with the iPad (Arthanat et al., 2013; Rossing et al., 2012).

Another limiting factor to the use of the iPad was connectivity issues among the users of the devices (Maxwell & Banerjee, 2013; Minshew & Anderson, 2015; Rossing et al., 2012). There were reports in some instances where students were attempting to share and transfer files between apps or each other for collaboration purposes, and there would often be connectivity issues as well as compatibility issues between the apps (Maxwell & Banerjee, 2013).

Some APPS are required to run well with a reliable wireless infrastructure so as not to disrupt the activities that are supposed to be taking place on the iPad, most of which require the use of the internet (Rossing et al., 2012). The connectivity issues that occurred in turn limited the creativity and use of the iPad while students were supposed to have creative license during an activity (Minshew & Anderson, 2015).

Another common limitation of technology was the lack of technological knowledge among teachers (Hutchinson & Woodward, 2014; Minshew & Anderson, 2015). Suggestions implied that the initial lack of knowledge regarding the specific technology was the major constraint that created other limiting factors as well. Mainly, the lack of technological knowledge consisted of an unclear purpose for assignments (Hutchinson & Woodward, 2014). There were instances where teacher was unable to provide students with clear assignment expectations due to lack of teacher's knowledge of how to navigate the iPad. In addition to her inability to fully navigate the technology, she could not accurately predict how much time would be required for a given assignment (Hutchinson & Woodward, 2014).

This limitation reflects the exact situation mentioned previously of lack of technology creating personal bias when implementing technology (Kim et al., 2013; Lowther et al., 2012; Minshew & Anderson, 2015). The researchers mention the need for proper training and professional development, this is what Hutchinson and Woodward (2014) noticed would have benefited the teacher in their study. There was a lot of time lost due to unknowledgeable use of the iPad, whereas after the teacher figured out how to use the technology she was able to meet her intended learning goals (Hutchinson & Woodward, 2014). The ideas presented by Kim et al. (2013), Lowther et al. (2012), and Minshew and Anderson (2015) to provide staff with professional development would have proven very useful in this study and avoided the time that ended up being lost.

Methodology

This study uses a mixed-methods research approach, and investigated how middle school teachers are using iPads in their classrooms. The goal was to determine if teachers perceive the use of the iPad in a positive or negative connotation, if they feel they have been properly prepared, and how they are using iPads for instruction. In addition, the research also discovered the attitudes of the students that use the iPads on a daily basis with 1:1 implementation. The study was conducted in a Western New York State public school system that uses a 1:1 iPad integration program in grades 6-12. The researcher is currently a teacher in the district, and the sample that was used served as a convenience sample for the purpose of the study.

Research Design

The study followed a mixed-methods design, as it investigated the views of both teachers and students through the several data collection methods. The mixed-methods design contains elements of quantitative and qualitative designs all in one single study to gather a better understanding of the proposed research question(s) (Fraenkel et al., 2015). Student surveys were used to determine attitudes of students who use the iPads. The survey investigated how the students view using the iPads, and if they think of using it as an advantage or a hindrance. Quantitative data was gathered through the survey to answer this portion of the research question. Using a survey instrument with a Likert Scale approach, data from the survey can be used to determine the attitudes of students.

Qualitative data was gathered through teacher interviews and observations to find out how teachers perceive the use of iPads in their classroom, how they use the iPads, and if they have proper preparation to use the iPads. Through the process of interviews and observations, the

researcher has obtained insight from teachers that are using iPads, how they are using them, and how they view using the iPads during their classes.

Setting

The sample that was used for the given research will consist of 8th grade students in a rural Western New York public school district. The school district is located in a small village located in Western New York. The village itself has a total population of 2,574 and consists of the following demographics: 92.5% White, 2.8% Hispanic, 1.8% Native American, 1.4% two or more races, 0.9% Black, and 0.5% Asian (City-Data, 2016). The mean household income in the village is \$40,891.

The demographics of the student participants in the schools is slightly different than the demographics of the actual village, since the district is composed of multiple towns and the reservation. The school district is ranked as a low-income district and about half of the student population is eligible for free or reduced lunches. The student demographics in the school district are as follows: 74% white, 12% Native American, 7% Hispanic, 6% Multiracial, and 1% African American (New York State Education Department, 2016).

The teacher participants range from approximately 30-50 years of age. The teacher demographics is 100% white and each teacher possesses both a bachelor's degree, master's degree, and NYS teaching certification. Teachers consist of two male participants and two female participants in multiple content areas. The content areas include ELA, science, mathematics, and special education (self-contained math/resource room).

The district that was used to conduct the study also has a 1:1 iPad program that is funded with Title VII funds. The implementation began with 1:1 implementation with sixth grade students in 2014, and all three grade levels in the middle school were at a 1:1 implementation by

the next year. It has been two years since the middle school fully went 1:1 with all of their students having iPads, and now this initiative includes all students in the district that are in grades 6-12. Each student is given an iPad in the beginning of the year, and uses the iPad each day during the school year. Students are permitted to take the iPads home, but are required (as well as their parent/guardian) to sign the iPad Code of Conduct before obtaining their iPad.

Sample

The sample for the research was a convenience sample of the researcher's own students and colleagues who fit the criteria for the study. The student sample consists of male and female 8th grade students that are currently enrolled in the researcher's classes, and use the iPad daily in all of their classes. Teachers that were interviewed include middle school teachers that use the iPads during daily instruction in the areas of ELA, science, mathematics, and special education.

Participants

The participants in this study include the researcher's current 8th grade students (18 female students and 12 male students) enrolled at the described Western New York public school district, as well as middle school 2 general education teachers, 1 AIS teacher, and 1 special education teacher. The researcher was able to recruit one English Language Arts teacher, one Life Science/Biology teacher, one AIS Mathematics teacher, and one Special Education teacher (Resource Room/Self-Contained Math). The needed requirement to be a student participant in this study is that the student must participate in the given 1:1 iPad initiative in the district. Students must use the iPad daily in school, as required by their teachers. The requirement for a teacher participant in the study is that the teacher must use the iPad during their daily instruction. The amount of time the students or teachers have had with the iPad is not a requirement for this

study, for example if a student/teacher is new to the district and only has used the iPad for three months versus a student/teacher who has had the iPad for multiple years is not a requirement.

Data Collection

This research follows a mixed-methods approach. Qualitative information was obtained through teacher interviews and observations. The quantitative data was collected through student surveys to determine the attitudes of students who use iPads on a daily basis.

Interview. Teacher interviews were conducted in order to receive in-depth feedback among various content areas. Interviewing is a process of asking participants relevant questions to check the accuracy of impressions gained through observations (Fraenkel, Wallen, & Hyun, 2015). The author describes this as an effective way to understand what participants think. This allows the researcher to see different teacher perspectives among the different core subject areas in the middle school.

The interview questions were created by the researcher based on different themes obtained while reviewing the literature including: experience of the teacher and content area, professional development for the iPad, how the iPad is implemented, uses of iPad for instruction, benefits, and disadvantages to the iPad (Appendix E). In addition, permission to audio-record the interview was obtained prior to conducting the interview to confirm validity. Once the interview was completed, the author analyzed the data by transcribing the interview and coding the data. The data was coded using common themes that were present upon the analysis of the findings.

Survey. A survey is an instrument that asks a group of people a number of questions about a particular topic to find answers (Fraenkel et al., 2015). The student participants completed one survey (Appendix G). The survey began by asking students demographic information and frequency of technology use to obtain information about the sample (questions

1-5). Questions adapted from a Student Access and Technology Survey (Seattle Goodwill, 2014) were used to discover student demographics as well as attitudes of comfort and the overall feel students have when working with iPads (questions 9, 11, 12, 13). This survey was intended originally to collect data on student internet access and various forms of technology. Questions were modified to be applicable to the direct use of the iPad during the school day, as well as eliminating questions not relevant to the study.

Additionally, a survey by Mudanya (2012) was modified and used to discover student attitudes on the impact of technology in school. These questions include attitudes of what students know about using iPads, if they would like to learn more about using them, and the attitudes of using them during the school day (questions 6, 7, 8, 10, 14, 15, 16, 17, 18, 19). This survey was originally intended to collect data on various types of mobile devices and student learning. Questions were modified to fit the context of the current study by directing the purpose of the questions to be appropriate to iPad use. In addition, other questions were disregarded due to irrelevance to the study. The final two questions (20,21) were created by the researcher in order to allow students to give feedback in their own words about their personal experiences with the iPad.

After identifying the demographic information, a Likert Scale approach is used to gauge student attitudes for the remainder of the questions. A Likert Scale uses a scale that ranges from 1 (*strongly disagree*) to 5 (*strongly agree*). This allows students to express the attitude that best represents how they feel about a particular question relating to the topic (Fraenkel, Wallen, & Hyun, 2015). After collecting the survey, the Likert scale will be categorized by each question and the percent chosen for each response. The final two questions of the survey will ask students two open ended questions. These questions allowed students to provide more feedback as to their

particular likes and dislikes of using the iPad during the school day. These results are coded by themes that are common and found in the findings.

Observation. The researcher also conducted a participant observation, which is an observation where the researcher actually participates in the observation (Fraenkel, Wallen, & Hyun, 2015). The researcher for this study observed the classes of the teachers that were interviewed prior to the observations. The observations were conducted using the International Society for Technology in Education (ISTE) Classroom Observation Tool (ICOT) (International Society for Technology in Education, 2008). This instrument was developed by ISTE to evaluate the roles of teaching, learning activities, and need for technology in the classroom. The instrument was modified in order to fit the context of the research being conducted. The original instrument included an enormous list of possible technologies, some of which are not typically found in the school setting and are outdated. In an effort to make the protocol more appropriate for the research being conducted, portions of the instrument that were not relevant to the study were cut out and the instrument was shortened. The protocol was used to examine the technology used by the teacher, the students, as well as classroom activities that the technology was used for.

The researcher reviewed the protocol from each interview to find common patterns of instructional protocols, uses of technologies, and activities involving the technology to answer the proposed research questions.

Procedure

Obtaining consent. Before the researcher began could begin the study, the Board of Education at the district of study must approve the research. Consent from the Board of Education and HSR approval was granted, and then the researcher began to conduct the study.

All student participants are under the age of 18, and therefore consent forms were needed from both the students and their parent/guardian. Students that choose they are willing to participate in the study, will receive two parental consent forms. The students will receive two forms so that the parent/guardian may keep a copy for their records, and the other will be returned with the required signature to participate. All consent forms were collected, with or without signature.

Administration of surveys. Once all consent forms were returned, students who were eligible would take the survey in their scheduled meeting time for math class. The researcher administered the student survey (Appendix G) to 30 of the eighth grade students on February 17, 2017. There were 18 female participants and 12 male participants who had received parent/guardian consent and chose to take the survey for the study. Students took about 15-20 minutes to complete the survey. All surveys were collected and student identities were kept confidential.

Administration of interviews. There were four teacher interviews conducted with each individual teacher lasting approximately 25-30 minutes. Each teacher was individually interviewed in their respective classroom at the public school district where the study is taking place. There were 16 guiding questions for the interview (Appendix E). Each teacher was asked the same guiding questions during their interview.

Administration of observations. The researcher observed the classroom of each teacher that was interviewed after the initial teacher interview was concluded. While conducting the observation, the researcher recorded data using the ISTE protocol (Appendix F) previously mentioned. This gave data as to what technology the teacher used during the class, what technology the students used during the class, and what learning activities were used with the

technology. The observations occurred during planned class periods that were all 40 minutes in length.

Analysis of collected data. The collected data for the student survey will be organized in two ways. After collecting the survey, the multiple choice questions (1-5) as well as Likert scale questions (6-19) will be categorized by question in a bar graph. The total number of each possible response for every question will be tallied and uploaded into a database in Microsoft Excel. Then, the database will be used to create bar graphs to visually represent the responses of the student participants. The responses of the open-ended questions (20-21) will be coded by themes that are common and found in the findings. This will be presented in narrative form.

The teacher interviews seek to obtain the perceptions of teachers who use iPads for teaching on a daily basis. Once each interview is completed, the researcher will analyze the data by transcribing the interview and coding the data. The data will be coded using common themes that are present upon analysis of the findings, and presented in narrative form.

The researcher will use the observation protocol to find common themes and uses throughout the different content areas, as well as note differences between how the iPad is used in different classrooms. The researcher will record the different types of technology used by both teacher and student, and determine based on learning activities if the technology was useful or necessary for the instruction of the lesson. These findings will be presented in narrative form.

Results

The goal of this study was to investigate the following research questions: How are iPads being used in Western New York middle school classrooms? What are Western New York middle school teachers' perceptions toward using iPads for daily instruction? Are Western New York middle school teachers properly prepared to use the technology readily available to them? What are the attitudes of Western New York middle school students that use iPads on a daily basis in school? This will benefit future school districts to find out how students feel about using these devices, how teachers are trained, and how teachers are using the devices in their classrooms. This research can serve as a starting point for districts to look at if this is a new feature they plan to incorporate in their school district.

The research design had the goal of having 100% of the eighth grade students at the researcher's school district complete a survey to address the research questions "what are middle school students' attitudes toward using iPads during the school day?". Since iPads are being implemented to our students, it is beneficial to find out how they feel about using these devices. Of the 54 possible students, only 30 students returned consent forms. This could be due to the students being occupied with other extra-curricular activities, or simply forgetting to have their parents sign the consent form. The student also could have had the parent sign, but forgot to bring back the paper itself. The research design also called for thirty minute interviews with four teachers. The teachers that participated in the study were teachers in the following content areas: English Language Arts, Science, Mathematics, and Special Education/Mathematics.

Consistency Throughout Middle School Classrooms

Through the observations in ELA, AIS Mathematics, Science, and Special Education there has been a consistency of how the iPads are used by each teacher. Although the disciplines

are different, the mode of technology integration is not. The main method of iPads is to serve as paperless note-taking. The teachers are given necessary technology needed to project their own iPad allowing them to complete class notes together with the class. Students were seen using iTunes U and Notability in each observation. Notability is the primary APP used by students in order to record to take their notes in each class. Although the use of technology used in these observations was not necessarily essential, it did prove to enhance instruction. The technology was able to do so in ways mentioned by teachers in interviews such as color coding, organization, and saving time with a simple download.

Throughout these observations students seemed quite comfortable and familiar with operating the devices. Teachers have established routines for students to come in and download required materials for the day, and then begin working on various warm up activities. There was no incident of a student experiencing any kind of glitch or technical issue during any of the observed lessons.

Student Outlook on iPad Implementation

The survey portion of the study addressed the following research question: What are the attitudes of Western New York middle school students that use iPads on a daily basis in school? After sending out consent forms with students, I received consent from 18 female students and their guardians in addition to 12 male student consent forms and guardian consent. These students agreed to take a 21 question survey that would address the attitudes they felt about using the iPad. There were two themes in the survey: (1) student background/technology background and (2) student attitudes toward using iPads during the school day. The researcher imported the data into Microsoft Excel and organized responses by each question. The questions pertaining to student background in technology (question 4-5) indicate the number of hours the students used

with technology and the percentage of students based on their response. The remaining questions addressing student attitudes were organized by the attitude (Liker scale response) and the percentage of student answers.

Student background. The survey administered to students began by collecting data on the background of students. Questions 1-3 of the survey addressed student gender, age, and ethnicity. There were 30 participating students in the survey. Of the 30 participating students, 18 students were female and 12 students were male. All participating students were about the same age, 70% of participants ranging from 11-13 years old and 30% of participants ranging from 14-16 years old. All students are currently in eighth grade during the 2016-2017 school year when the research was conducted. The ethnicities of the students varied slightly and consisted of the following breakdown: White (83%), Native American/American Indian (11%), Hispanic/Latino (3%), and Multiracial (3%).

Questions 4 and 5 of the survey addressed students' technology background by asking students how many hours they use technology both in school and out of school, respectively; results are shown in Figure 1 and Figure 2. The data suggests that while in school students are using technology for at least half of the school day if not more. The data is significantly different and more wide-spread when looking at the amount of technology usage outside of school. This may be attributed to the low-income and poverty levels in the towns composing the school district. Some of the students may not have readily available access to technology except for the iPad that they are provided by their school district.

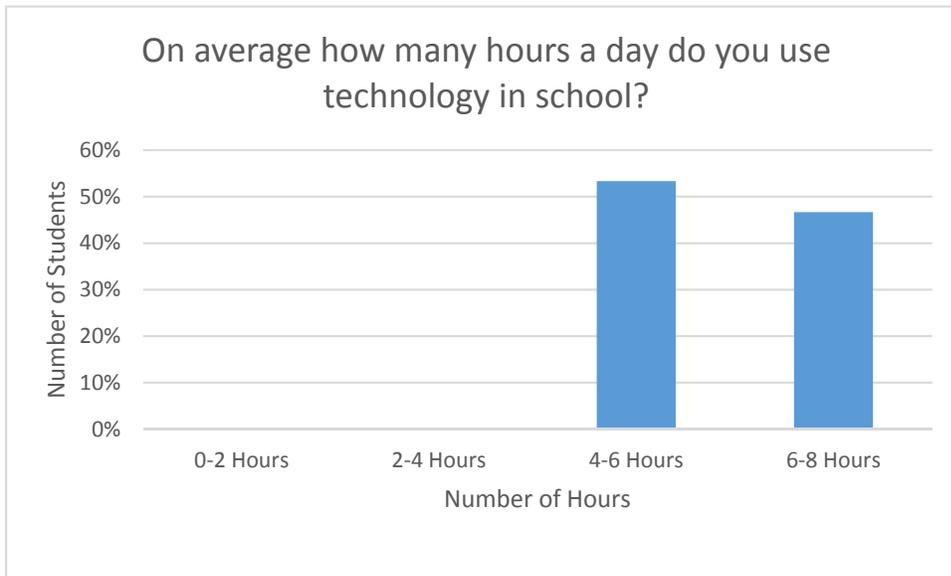


Figure 1. Student technology use in school.

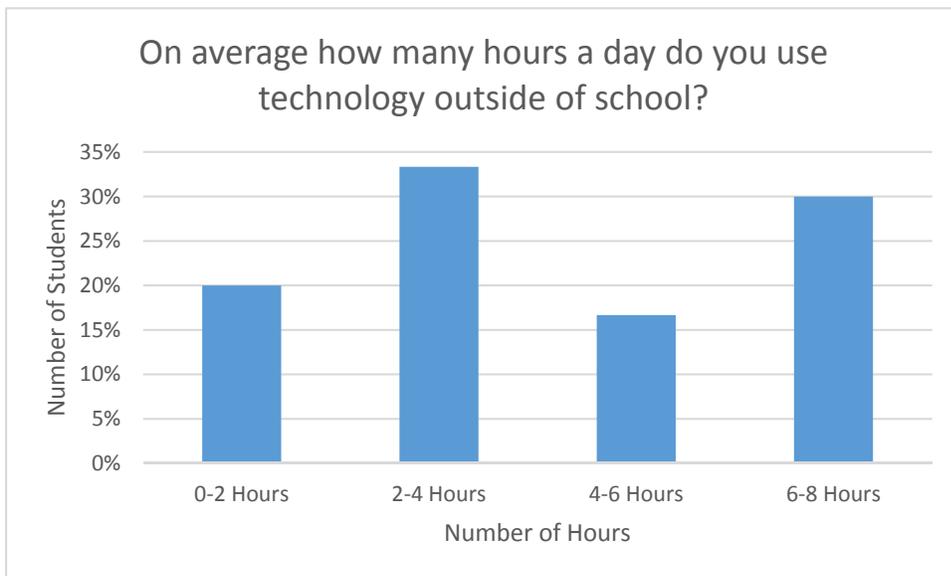


Figure 2. Student technology use outside school.

Students confirm positive outlook on iPad implementation. Questions 6-19 on the student survey were given to answer the research question about student attitudes. These questions were given in a Likert scale style and asked students questions that would be used to determine the attitudes of using iPads during the school day.

Question 6 asked students if they thought using iPads will help prepare them for the future, and the results can be shown in Figure 3. The data showed that 77% of participants showed a positive attitude toward this statement (50% agree and 27% strongly agree). There were 20% of students who answered that they were not sure about the topic, and only 3% responded that they disagreed and had a negative attitude.

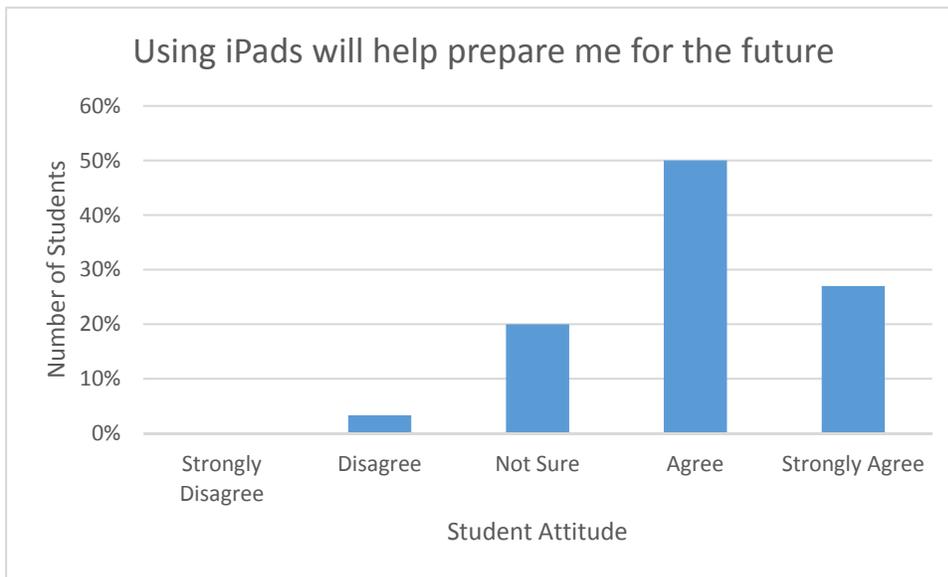


Figure 3. Technology prepares students for future.

Question 7 of the student survey aimed to find out if students would like to learn more about how to use iPads at school. The majority responded positively to this statement (37% agree while 13% strongly agree). There was 27% (10% strongly disagree while 17% disagree) of participants that responded negatively to this comment. However, a negative response to this question could mean that the student feel that they are already properly prepared for using the iPad during the school day.

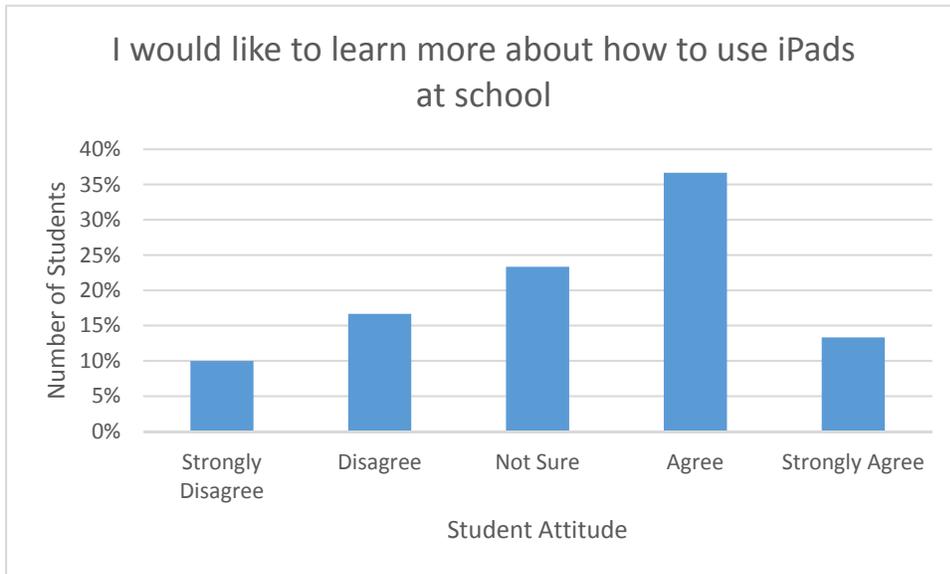


Figure 4. Learning more about iPads in school.

Question 8 of the student survey investigated whether or not students would want a career that would require them to use iPads. The results seen in Figure 5 show a split response from participants. The majority of participants (33%) said that they were not sure, while 33% responded negatively. This could be due to several factors. Students are still in eighth grade, and perhaps have not determined what career path they want to pursue yet. In addition, the majority of employment in this area is blue-collar, so students may wish to pursue a career in a more hands on field where technology may not be used as frequently.

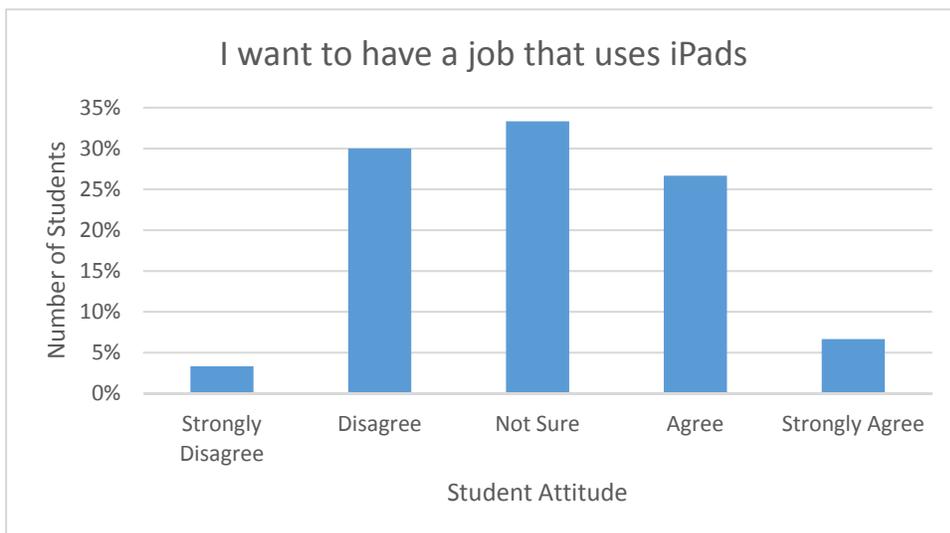


Figure 5. iPads for future career paths.

Question 9 investigated if students feel that the use of the iPad during the school day makes life easier for them, and the results can be found in Figure 6. The majority of students (30% agree and 47% strongly agree) responded positively. There were 10% of students who were not sure if the iPads made things easier and 13% of students felt that the iPad did not.

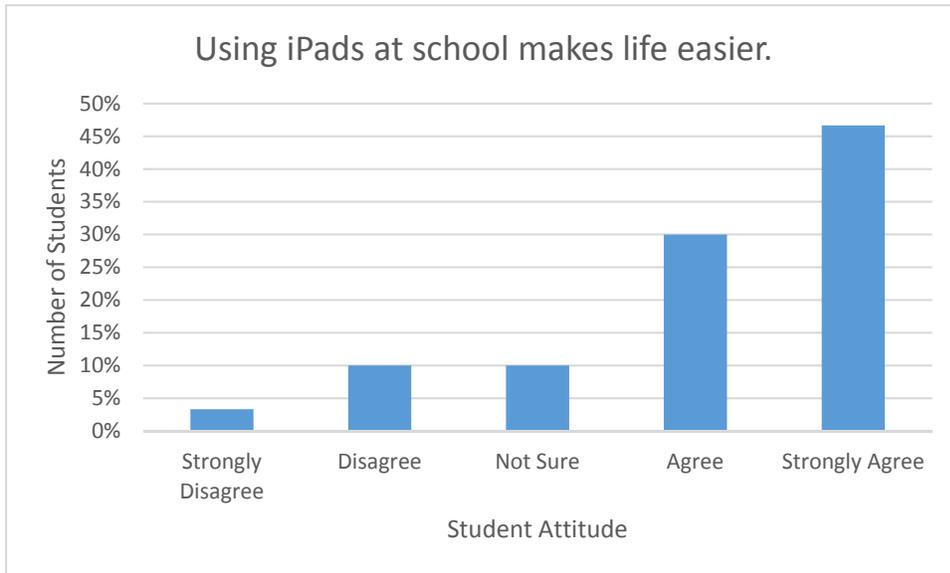


Figure 6. iPads make the school day easier.

Question 10 of the student survey investigated if students felt that knowing how to use technology, or specifically iPads was an importance to their life. The results in Figure 7 show that most students agreed and felt positively about the importance of being able to use technology. These students grew up in a technological world and were first hand able to see the importance. Only 3% of the participants strongly disagreed while 47% agreed and 37% strongly agreed. There was a small amount (10%) of participants who indicated they were not sure.

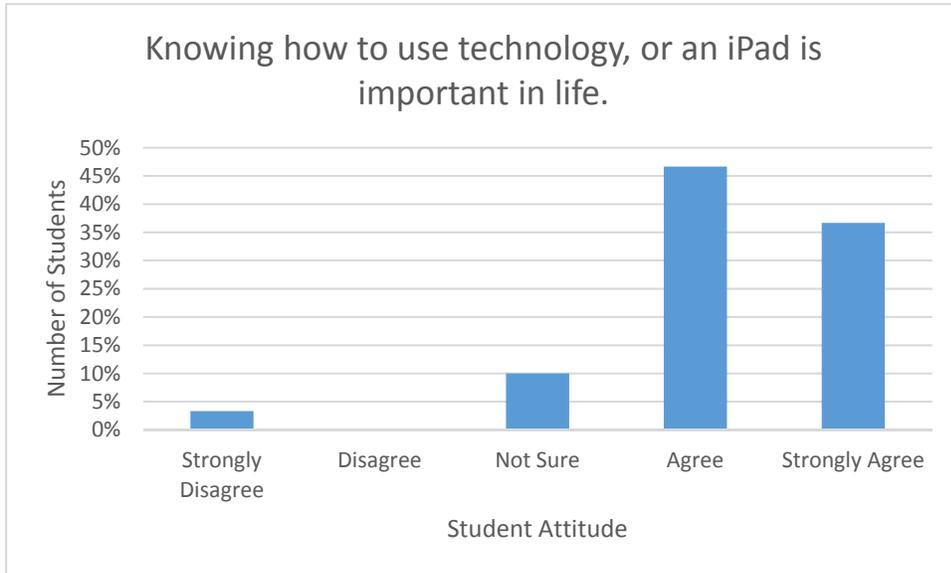


Figure 7. Importance of knowing how to use technology.

Question 11 of the student survey investigated if students felt that using iPads during the school day made school more interesting for them. Participants selected each option and the results that can be seen in Figure 8 show that the majority of students responded positively. There were 23% strongly agree and 23% agree. Meanwhile 23% disagreed with 3% strongly disagreeing. There were 27% of students that were not sure how they felt.

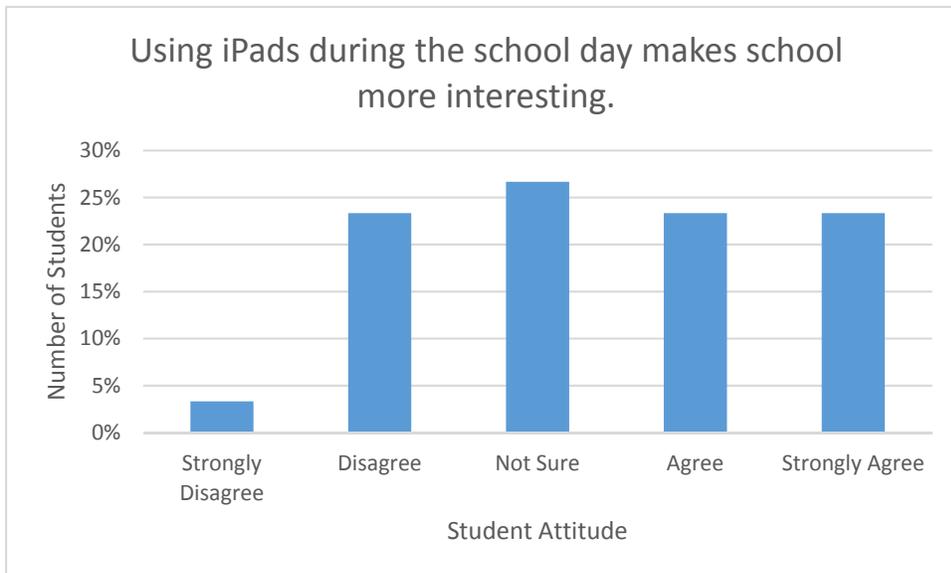


Figure 8. Using iPads at school makes school interesting.

The student survey investigated if students felt comfortable using iPads during the school day in question 12. The results shown in figure 9 indicate a high positive response from participants. There were 53% that said strongly agree and 37% said they agreed. Overall, that is a 90% response indicating a positive attitude toward comfortability of using the iPad during school. There were 7% of students who indicated they were not sure how they felt, and 3% said strongly disagree. No participants selected disagree.

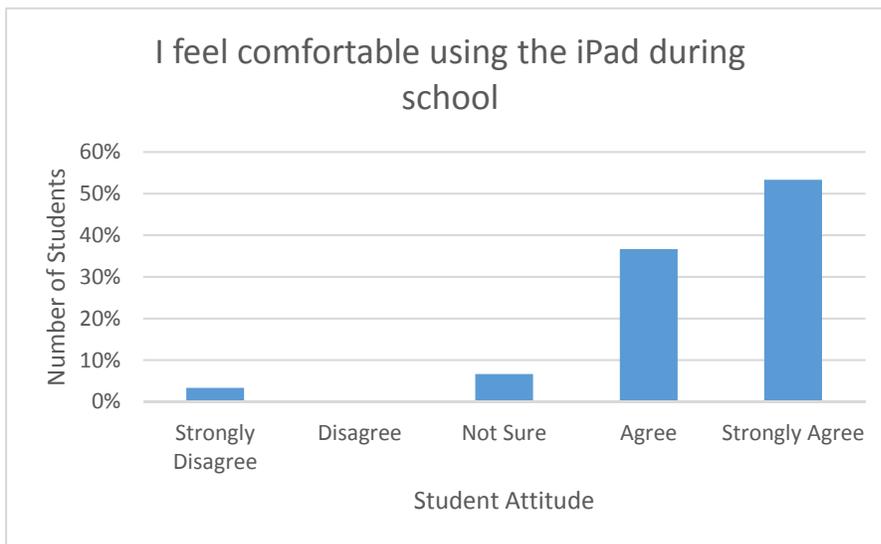


Figure 9. Student comfortability using iPads.

Question 13 investigated if students do or do not feel frustrated when they are using iPads during the school day; results displayed in Figure 10. The majority of students responded positively with 23% selecting strongly agree and 27% selecting agree. There were 27% of students who said they were not sure and 23% that disagreed and did feel frustrated. No students selected strongly disagree.

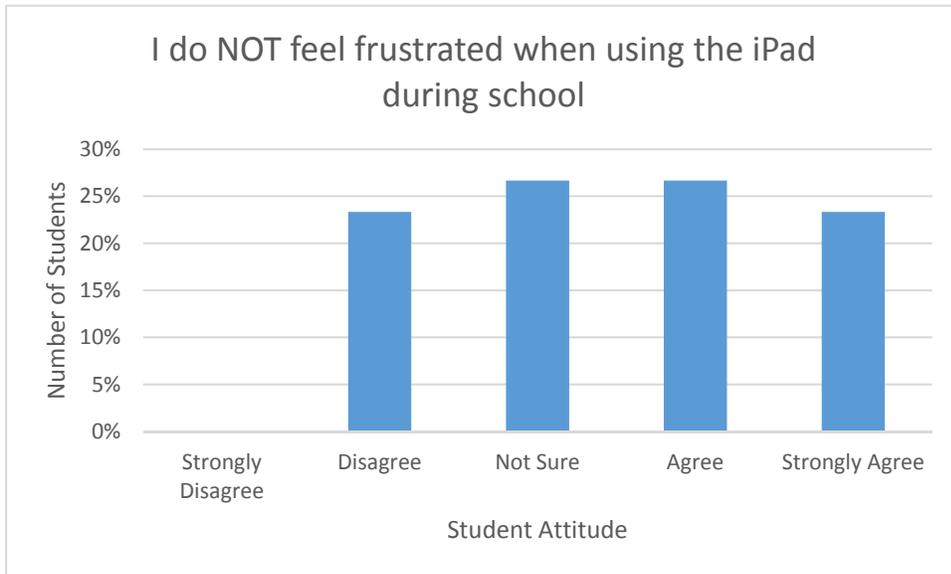


Figure 10. Frustration of using iPads.

Question 14 of the student survey sought to discover how students felt about using iPads specifically during the school day as opposed to other forms of technology. The results (displayed in Figure 11) indicate that the majority of students have a positive attitude toward this statement. There were 23% of participants who strongly agreed and 33% of participants who agreed. Almost a quarter of participants (23%) said they were not sure, while 17% disagreed and 3% strongly disagreed.

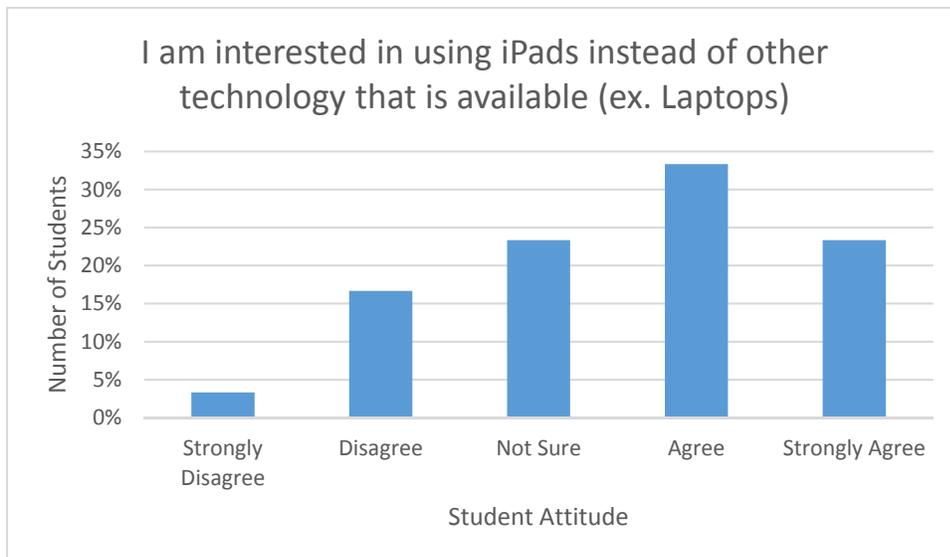


Figure 11. Student interest in using iPad technology.

Question 15 of the student survey investigated if students felt more engaged when using the iPad during class. There was a split between the response of not sure and a positive attitude. There were 23% of students who agreed and 20% who strongly agreed. Meanwhile 43% of students indicated they were not sure. This could be because of the vocabulary used in the question and what it meant to be engaged. There were 23% of students who disagreed. No student selected strongly disagree.

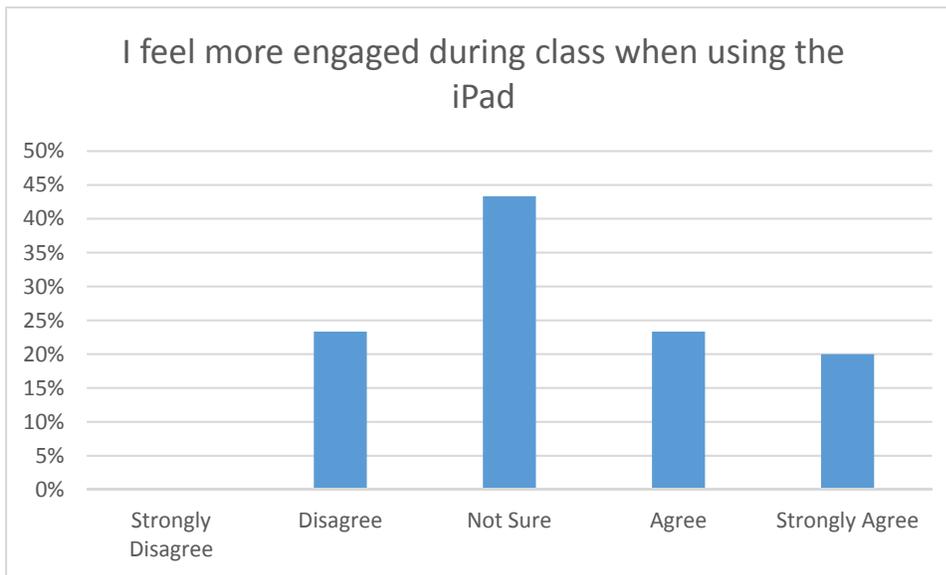


Figure 12. Student attitudes of engagement with iPads.

Question 16 investigated whether or not the iPad makes taking notes at school easier. There were 7% of students who disagree, while 27% agreed and 57% strongly agreed. There was no response for not sure or strongly disagree.

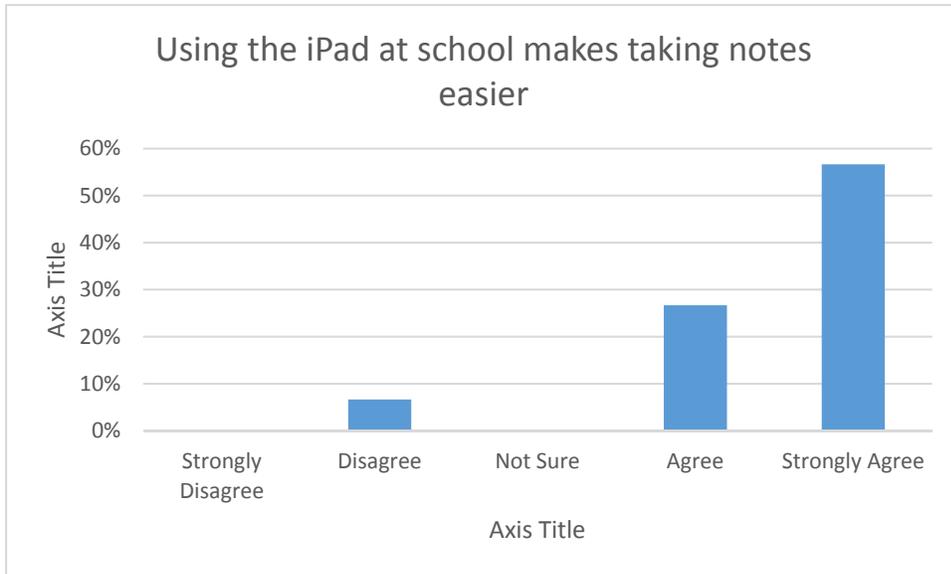


Figure 13. iPads for note taking.

Question 18 of the student survey asked if students found they were less off task during the school day when using the iPad. This question yielded results that were split between students not being sure and having a positive response. There were 37% of student participants who indicated they were not sure. Meanwhile 30% of students agreed and 7% strongly agreed. There were 26% of students who disagreed, and no students selected strongly disagree.

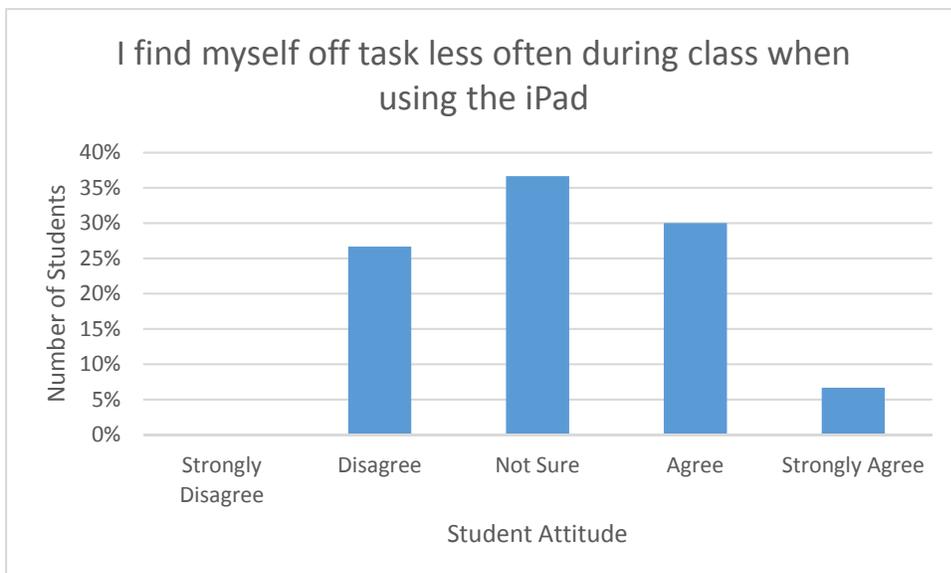


Figure 14. iPads and off-task behavior.

Question 19 investigated if students rarely experience technology issues during the school day. The majority of students agreed with this statement as 50% selected agree and 17% selected strongly agree. There were 10% of students who disagreed and 13% of students who strongly disagreed. Results showed 10% of students were not sure.

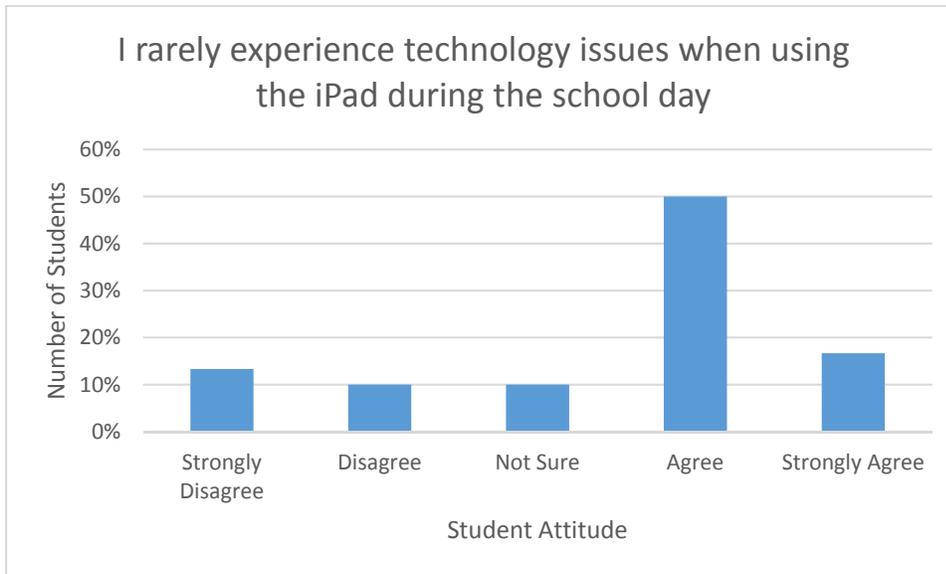


Figure 15. Student experiences with technology issues.

Reading made harder. Question 17 on the student survey sought to discover if students thought reading was easier on the iPad or on paper. This statement yielded a negative attitude where 13% of students strongly disagreed and 33% of students disagreed. On the other end there were 17% of students who agreed and 10% who strongly agreed. There were 23% of students who indicated they were not sure.

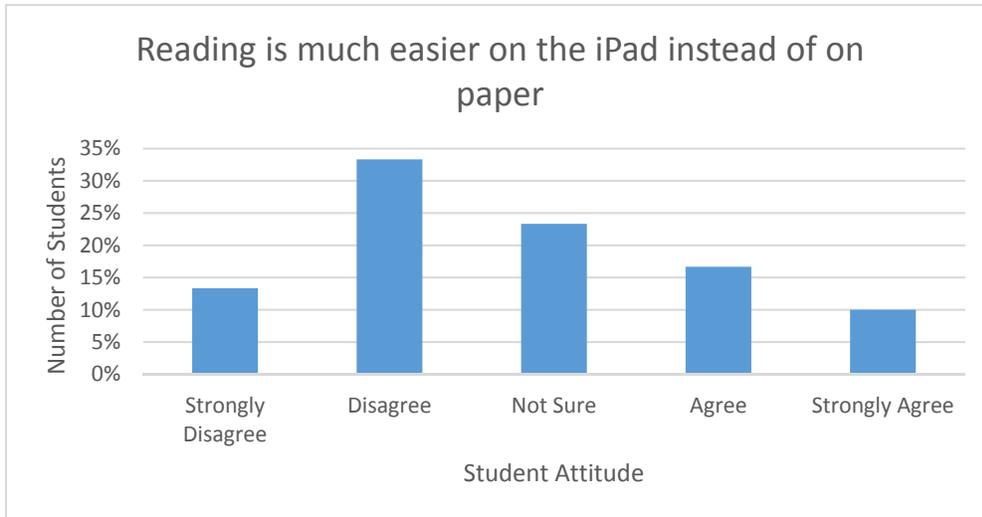


Figure 16. Reading on the iPad.

Student perceived benefits to iPad implementation. The student survey concluded with two open-ended response questions. Question 20 asked students to identify what activities during the school day they find the iPad to be beneficial for. The biggest benefit that students identified in this question was the ability to use the iPad to access different APPS. These APPS included iTunes to download files, PowerSchool, calculator APP, and the biggest one was the ability to take notes in the Notability APP. Students mentioned that they enjoyed the ability to be able to write with their hands or have the ability to type their notes out. Students also mentioned they enjoyed being able to use the different colors for highlighting and organizing their notes.

In addition to the access to different APPS students also mentioned the ease of organization that comes with having the iPad. Students find that it is easier to keep track of notes since they are not loose on paper and getting lost throughout the year. Notability holds all of their notes from September through June. While the APP does a nice job organizing everything, students also mentioned that they found it to be easy not to forget to bring anything home with them. The

“I forgot my homework” excuse is no longer valid because everything is literally at the touch of their fingertips.

Student perceived challenges to iPad implementation. The final question on the survey asked students to identify activities that are most difficult to them throughout the course of the school day. The biggest difficulty for students is the case of the iPad encountering a “glitch”. This unfortunately is something out of everyone’s control. The risk of running technology all the time is that from time to time it will glitch out and cause issues this way. Students mentioned that sometimes they will be taking notes during class and as soon as they are done writing something they scroll the screen down, and what they just wrote will erase itself. Students indicated this is one reason why they prefer to use the typing feature when applicable, and the only time that they can’t is during math when they are writing numbers and equations.

Aside from the occasional technical glitch another concern for students was not being able to access anything at home. Since all of the applications initially rely on Wi-Fi connection, students are not able to connect at home if they do not have internet. Wi-Fi is of course available at school, but for instance if a student is absent they cannot access any course materials until they are able to connect to an internet network.

The final drawback students found with the iPad is that when they are required to complete homework using the iPad, they said it is difficult to bounce back between documents. Since all writing that is done on the iPad is done in Notability, the student needs to manually switch between documents in order to look back at any in class notes. This causes issues when students are trying to read and answer questions in ELA/science, or are trying to look back at their math notes to complete their homework.

How Teachers View iPads as Instructional Tools

Teacher background. The interview portion of the data collection involved a thirty-minute interview with four teachers at the school district. These teachers all have a minimum of three years teaching experience with the iPad. To keep anonymity when discussing the findings from these teachers, Teacher 1 teaches English Language Arts, Teacher 2 teaches Science, Teacher 3 teaches Special Education/Self-Contained Mathematics, and Teacher 4 teaches AIS Mathematics. The researcher used the guided interview questions found in Appendix E to guide the conversation for the teacher interviews. This portion of the study is used to answer the following research questions: (1) How are iPads being used in Western New York middle school classrooms? (2) What are Western New York middle school teachers' perceptions toward using iPads for daily instruction? (3) Are Western New York middle school teachers properly prepared to use the technology readily available to them? The researcher audio-recorded the conversations to ensure validity in the interview responses, and imported notes taken during the interview for each teacher.

iPad implementation. The interviewed teachers explained that their district currently holds a 1:1 iPad implementation, meaning that every student and every teacher has an iPad. The students are given the iPad on the first day of the school year, and turn it back in on the last day. They started implementing during the first year with only 6th and 7th grade. The district provided teacher training to learn how to use APPS and set up courses with them. APPS such as notability and iTunes U were the big APPS that allowed the running of the digital course. Once 6th and 7th grade tried it for a year they brought 8th grade online the next year, and then the following year the high school was included as well. The implementation slowly built up from grade 6 through

grade 12, and the elementary school still does not have a 1:1 implementation. Students are introduced to the iPad learning in sixth grade when they enter middle school.

When asked about initial thoughts of the iPad implementation, each teacher interviewed expressed that there was a sense of nervousness. One of the overwhelming thoughts that was expressed by teachers was this confusion of “how on earth am I going to digitalize everything?!” Teachers were worried about how they were going to get all of their materials in a digital format in the race against time. Teacher 1 explained that “Time is the biggest enemy. Initially I felt really overwhelmed because I had multiple courses to prep because I teach Biology plus Life Science plus Horticulture and labs for each of those courses.” To support teachers, the district had given summer continuing education credit hours to come in and work on digitalizing their materials. This helped, and after the initial change over during the first year, the teachers admit that it was much smoother the second time around.

Other concerns from teachers included fear that students had prior exposure to the iPads before the eighth grade team of teachers. During the interview with Teacher 1, it was stated that “This was scary that the kids had prior iPad experience before I did, and that they would think I was a dinosaur who had no idea what he was doing”.

All of the teachers that were interviewed admitted that after the initial implementation, it got easier. Teachers felt the ease of no longer needing to carry home folders full of paper, but instead just taking home one iPad. This helped not only with teacher organization, but students felt that for this same reason they were able to be more organized and prepared for their classes.

The same teacher who mentioned fear ended up realizing that “the kids were even really helpful in the transition process”. The students would often be able to help a teacher learn a new

trick or show a teacher a new feature in the Notability APP that the teachers had no clue existed. After the teachers worked out these initial kinks, they all admit that the iPad saves time during instruction. Teachers no longer need to take time to hand out or collect homework assignments. In fact, teachers also noted that they are able to give students feedback immediately on the Showbie APP, which is used by students to turn in homework assignments.

The mathematics teacher interviewed mentioned that the graphing features are a great tool as well! The notability APP came out with an update that allows students to hold their finger down and the APP will make straight lines. Teacher 3 mentioned during the interview explicitly that “The straight line feature is excellent, especially when completing units that include linear functions and graphing”.

iPad training and professional development. During the interviews, teachers indicated that there was time allotted during Superintendent Conference Days for training on certain APPS for the iPad implementation. Teachers indicated that although the professionals that ran the workshops that were available were highly educated in the particular APP that they were presenting on, they were not teachers. This meant that although they could tell you how to use the iPad or a particular APP, they did not have the knowledge or experience of using these tools for instruction. Teacher 4 even noted while being interviewed that “The PD’s offered are pointless because they show you the absolute basics like checking your email, and they’re rarely relatable to classroom instruction”.

Teachers indicated that much of the learning came from experience. In fact, one of the teachers being interviewed indicated that just having time to experiment with the APPS and technology would have been more effective. Collaboration would play an enormous role in this implementation. Teachers that were more tech-savvy were turned to during this enormous

change in daily instruction. This type of sharing and collaborating among the middle school teachers is what really played the key role in learning how to use the different APPS. Teachers indicated that looking back there were a lot of instances that they wouldn't think they had an issue, or did not realize they did not know how to do something with the technology until they got to that point during one of their lessons. The time spent using and experimenting with the technology was the most valuable time during any of the trainings they received. This was commonly said to be the greatest benefit to any of the trainings provided.

In terms of continuing professional development, the teachers that were interviewed did not know of any, except one teacher. This teacher explained that there are workshops available, but it would require teachers missing instructional days to attend. He also said that having attended one himself at BOCES, it was not very helpful, similar to the initial trainings described previously. This also means that new teachers that are coming on board to the district are not given any type of mandatory training, and are left to turn to their new colleagues for advice. The teachers agreed that since the implementation it is commonly the same three APPS that really are the heart-beat and pulse of the paperless classroom: iTunes U, Notability, and Showbie.

iPads as an instructional learning tool. The main function of the iPad as a learning tool in the 1:1 setting is that it serves as the notebook/binder for all subjects. Students are most frequently using three main APPS: iTunes U, Notability, and Showbie. iTunes U is essentially one big digital binder. There is a link for every course they are enrolled in. Inside the course's link the teacher will upload any files that are necessary for in-class instruction or homework in a PDF format. This will then allow them to download the file, and transfer it to Notability. This is where students can separate the files and organize them by each class they are taking.

The notability APP has amazing features for taking notes. There are readily available colors and highlighters for students. They are able to insert pages and re-order pages if they run out of room. They can use a lasso tool which will allow them to move their writing around. Teacher 4 said in the interview that “The student no longer has to erase all of their work, then can simply move what they have down, and start from where they made their mistake. This is really helpful and saves a ton of time when trying to teach higher level problems”; this is really helpful if a student forgets a step in a problem.

The other main APP that is used is Showbie. This APP allows students to send their work in, and create a digital portfolio. Teachers said they have the option to write on the students work to give them feedback, and can grade the work right in the APP. They are then able to split-screen their iPads to have Showbie opened on one half of the screen and PowerSchool open on the other side easily transfer grades into the gradebook.

Aside from note-taking and homework turn in there are also other great features as well. In the field of mathematics APPS such as IXL can be used to generate problems for skill reinforcement. The APP allows students to access an extensive list of mathematical standards and practice questions pertaining to that skill. The data is recorded and teachers can access an analytics section on their website to view student progress. The data can easily be used for progress monitoring. In addition, the special education teacher who teachers self-contained mathematics indicated another APP she uses called Prodigy. Teacher 3 explained this APP as “a game that requires students to solve math problems in order to continue playing. They are basically tricked into practicing more problems in order to continue playing the game.” In addition to making math enjoyable for students, it also organizes the data for the teacher. It indicates skills by grade level, and provides teachers with strengths and weaknesses of students.

This ease of access to student data proves to be helpful in the process of creating annual IEP goals for special education students.

Benefits of using an iPad over paper and pencil. Throughout the teacher interviews there were several benefits that were mentioned by teachers when using the iPads in the 1:1 implementation. The first thing noted by teachers is that it really has made an impact on student organization. Students have everything on one device from the beginning to end of the year, Teacher 4 explains that “this eliminates students losing papers throughout the year in the endless black hole that is known as their locker”. This was found to be helpful especially when reviewing for exams at the end of the school year.

In addition to keeping materials the entire year and being able to refer back to them at any point, the students have everything in one place: on their iPad. This means that students only have to bring one thing with them to the majority of their classes. Instead of keeping track of multiple notebooks and folders, students only need to keep track of one device. Teacher 2 expressed that “students are much less likely to lose the iPad, especially since this will mean replacing it at their parent’s cost, than folders or notebooks”.

The iPad also has been found to be a time saver both inside and outside of the classroom. Since students usually will only need their iPad for class, this cuts down on the time required for middle school students to switch classes. Inside the classroom, teachers no longer have to spend time making and passing out copies. Teachers can make a PDF of a file and upload it to the iTunes U course folder. Here, students can come in and download the file to their iPad within seconds. This also makes sending students work when they are absent much easier for teachers as well.

The iTunes U and notability APP were mentioned as being essential to the paperless iPad classroom experience by each teacher that was interviewed. iTunes U is where all of the digital files are stored, and Notability is what allows students to take notes during class. Together, the digital notebook on the iPad is formed. Notability allows students to organize their material by class and even within each class, by chapter. There are different colors and highlighters that allow students to organize their notes within a particular file. Students are able to cut, paste, and make their writing smaller if they need more room. They are also able to add an unlimited number of “pages” to any file if they need more space for note taking. This eliminates the case of running out of room in a notebook.

Finally, the iPad gives teachers another tool to present material to students in an engaging way. The iPad is not essentially the classroom, but is indeed another tool for teachers to use. The science teacher that was interviewed shared with me a 4-D Anatomy APP that offers a variety of labs on the iPad. The way this works is that the teacher opens the APP and places a special piece of paper under the camera. The camera picks up certain points and creates a 4-D image on the iPad screen. The teacher showed me an example and it was of the human body. There was literally a 4-D living body on the screen of the iPad. The teacher was able to roll the body around as well as zoom in and out. The different body systems were given at the bottom with the ability to check or uncheck different systems. The unchecked systems were not shown, and you could bring the image down to just bones if you wanted to.

Teacher 2 went on to say that “The iPad certainly cannot teach the content by any means, but it is engaging APPS like the human body system APP that allows kids to become more engaged in the content that is being taught”. This especially will appeal to visual learners and allow them the opportunity to really see the different systems and interact with the way they

work. There are various other digital lab APPS that the teacher supplements into her curriculum as well. This type of activity could not be done without the use of the iPad.

Negative associations to using the iPad. The major issue with the use of the iPad is that it can become a big distraction to students who lack self-regulation skills. While there is an ease of access to a multitude of information or APPS, students may be found using the iPad for non-educational purposes. This will often be the result of students searching the web during class or playing online games. Students will be distracted when they are not engaged, but at least in the past there is the chance that students were staring at a poster that may help them whereas now they are able to have access to something completely irrelevant to the course they are in. This type of behavior takes away from the listening and learning from others.

Another concern brought up by teachers is the amount of screen time these students have on a daily basis. They are constantly going from screen to screen; students are looking at their iPad, cell phone, TV, video games, etc. all within the course of a day. Teachers expressed worry that this may cause damage to some students, or even tarnish their imagination. Students are so used to doing *everything* electronically that our ELA teacher fears they may not even be able to think for themselves soon. The fear that students may lose the ability to create and imagine is definitely one negative to the iPad use because of the multitude of other things they can be accessing besides their academic work.

From the instruction standpoint, teachers indicated that if the network goes down your lesson goes down with it. Although there have been major improvements since the initial implementation, technology can always be a tricky issue. “If you have something that relied on digital formats to work, and you lose power or the network then you are pretty much trapped”, says Life Science teacher of the 8th grade class. Some teachers indicated they will even keep

spare paper copies of lessons just in case they have any kind of technology issue, they will not lose the entire lesson. The issue arises when there is a specific APP that you want students to use, and they have batteries that are not charged or they do not have their iPad with them. Or worst case, the Wi-Fi goes down and none of the students can access the APP. This is when technology is at its worst.

Discussion

Desire for Increased Technological Resources

After concluding this study, it can be said that overall the students at this particular school district have a positive attitude in regards to the use of iPads for daily instruction. Students overall indicated a positive response to the majority of survey questions including that they felt using the iPads had the following positive impact: made note-taking easier, made school life easier, felt the importance of learning to use technology, and that they needed to know how to use technology to be ready for the future. These positive attitudes show similar results to research conducted by Li et al. (2015). Their study also indicated that students excited at the opportunity to use technology for academic purposes. This same theme was found in survey results when students expressed positive attitudes in using iPads during school, and that the use of iPads in this fashion made their lives easier.

Students indicated through the survey that the iPads made taking in class notes easier, and made their school day easier according to survey findings. The open-response questions also confirmed these positive attitudes that were found in the Likert Scale questions. Students specifically indicated that taking notes is quicker, easier, and the ease of carrying one device with them all day makes their lives easier on a typical school day. Similar to the views of the students, teachers also felt that the iPads made their life easier “And I like the fact when I grade I don’t take a pile of papers home; I just take one iPad” (Teacher 2). This particular finding seemed to be true for both students and teachers.

In addition to the ease of access and note-taking that students found, students also expressed that they felt comfortable using the technology as well. Students felt that they were

comfortable using the technology and that there are rarely issues during the day. These findings are similar to the findings of Lee and Spires (2009). The findings in this research indicated that students are easily able to adapt to technology because of how native the technology is to them. The same perceptions can be confirmed from the teachers' view point through various interviews. Teachers indicated that because students are so tech savvy, they were able to even provide help to teachers while they were still learning how to use the devices.

The only negative finding from students is that they found it to be harder to read on the iPad. Specifically, students indicated that using e-Books and reading articles online was strenuous on the eyes and difficult to follow along. This is different than the findings of Boyce et al. (2014) and Milman et al. (2014) who found that the personalization of text using the iPad was a benefit for their students. One of the reasons this study found different results may be because of the way that the iPad was implemented as well as the age level. The findings of Milman et al. (2014) was a 1:1 implementation, but dealt with elementary school students and not middle school students. As for Boyce et al. (2014), these findings used the iPads as interventions to stimulate engagement, and did not have a 1:1 implementation process.

iPad Activity

The iPad implementation in this district is at a 1:1 level, similar to the way iPads were implemented in the findings of Bebell et al. (2014). The activities associated with the iPad are mainly paperless note-taking. This is done through the use of the iTunes U and Notability APPS. Each observation of teacher classrooms included the use of iTunes U and Notability to begin each lesson. Teachers had students take notes, and complete independent work using Notability as well.

Another big feature that was used in each observed class through Notability was the ability to change colors and use highlighting. In ELA the students used different colors to organize different parts of the essay they were outlining. In math, highlighting was done in various colors to show the different parts of shapes, and substitute the lengths into appropriate formulas. In addition to note-taking, the AIS mathematics teacher also used IXL. This is an application that allows students to login on their iPads, select a skill that a teacher has chosen, and continuously work on building fluency at a particular skill. The skills in the APP are aligned with standards, and the special education teacher also mentioned in her interview that she uses this same application.

While observing the learning activities in 3 out of the 4 subject areas, I found that the use of iPads/technology was useful. Useful, meaning that other approaches would not have been as effective. Biology lab allowed students to zoom in and sketch their own drawings in parts of the flower, giving ease to students to change colors where appropriate to make their drawings life-like. Highlighting in math was an effective way for teachers to differentiate instruction and help keep their lower-ability level students on task and on the same page. The IXL APP is one of the greatest intervention methods available in AIS or special education classes. The application continuously gives students problems that are different, but relating to the same skill. This application is similar to the APP that is discussed in the research of Bryant et al. (2015). This would take teachers an enormous amount of time to come up with all of these problems on their own.

Student results found in *Figure 9* and *Figure 10* seem to be conflicting when asking students about comfortability with iPad use and frustration with iPad use. Students seemed to report feeling comfortable when using the iPad during the school day, yet there is a distinct

change in responses when asked about iPad frustration. Perhaps this change in percentage is because although the students feel comfortable with the technology itself, it is possible they feel frustrated with the learning content while using the iPad. This possibility would indicate frustration with course content rather than with the technology itself.

The Teacher's Point of View

Overall, the teacher participants were found to have a positive perception when it came to using iPads as instructional tools each day in their classes. Teachers in this district were using the combination of teacher instruction with the incorporation of different iPad applications. This type of instruction was found to be favored by students and aligned with the literature of Bryant et al. (2015). A common theme in the teacher interview was that the teachers felt this sense of fear and nervousness at the beginning of the implementation. However, each teacher that was interviewed expressed a change from their initial perspective after using the iPads. Teacher 1 even indicated that one of his initial fears was that the kids would know more about the technology and that it would hurt his instruction. In fact, he found that in the transition, the students' natural ability with technology helped to enhance his instruction.

Teachers also expressed that they felt the iPads helped to keep the students and themselves organized. Teachers liked that they didn't have to keep track of a multitude of papers, but instead because everything was done on the iPad they only needed to bring home one device. They also felt that this same benefit could help the students who struggled to become organized. The students did not need to worry about keeping track of notebooks and folders, but instead they only needed the one device to bring to all of their classes so that they could take their notes in Notability.

Teachers felt positive about this method of instruction because they did not need to worry about folders full of paper anymore, but simply all they needed to do was to upload one PDF to iTunes U. From here, the teachers said students would download the PDF to their iPad and transfer the PDF to another APP called Notability. This type of instruction is how the students indicated they prefer technology integration in the research of Bryant et al. (2015). These students indicated that their preferred method of instruction with iPads was the combination of teacher instruction with the use and incorporation of different applications on the iPad.

According to teacher interviews, the iTunes U and Notability APPS are what really keep the structure of the paperless classroom running. Students even noted these particular APPS as being one of the benefits to using the iPads during the day in the student survey. For teachers, the iTunes U APP is essentially a virtual binder, and is where all course files are uploaded. Anything that would have previously been copied for students can be found here. Once students download these files, they import to Notability. This APP is designed explicitly for note-taking and will allow for color, shapes, diagrams, graphs, and high lighters to be used at their ease.

This was the major APP being used to store the information, according to Teacher 2. Even in classes like math, Teacher 3 exclaims that the ease of graphing is much better in the Notability APP. Each teacher expressed a positive perception on the Notability APP that allowed color coding, diagraming, note taking, and graphing. These particular apps are not found in any of the reviewed literature, and that might be because none of the studies looked explicitly at an entirely paperless classroom.

The special education teacher that participated in the study noted that in addition to note-taking, there are different skill building APPS that even record student data over time. This method is similar to the uses of technology in the research of Arthanat et al. (2013), Bryant et al.

(2015), and Lowther et al. (2012). These researchers explained that there are different drill and practice techniques that can be done using technologies for mathematics interventions with special education students. In this study, the special education teacher said students can perform these same type of skill building activities, and that the APP will record and send her student data, which is extremely helpful in process of writing IEP goals for students.

Independent work was also another advantage to the iPad. This is cross-curricular and the work of Lowther et al. (2012) found that students enjoyed using the iPads for this independent work. The findings of this research give similar results, from both teachers and students. Students indicated through surveys and open-ended responses that they enjoyed using iPads for different modes of work, including independent work. Interviews with teachers also indicated the use of Showbie which can be used to digitally turn in these type of independent class or homework assignments.

Teacher 2 and teacher 3 also found Notability to be helpful in a lot of cases especially for color coding and using diagrams. This means that teachers no longer have to worry about distributing colored pencils and hearing students say they don't have specific colors. "Students are able highlight text as we go through notes and point out important information" (Teacher 2). During the observation of this teacher, I was able to see firsthand that during a Biology lab students were able to change the colors on the iPad with ease while drawing a flower sketch in lab. This also helps from the teacher end, as teacher 2 explained that when using the overhead about ten years ago, you were constantly erasing your master copy and re-doing it. Now you can just duplicate the same document and have multiple keys in addition to being able to email students a PDF from class and not create separate absent work for them.

Teachers found that the iPad was also able to offer students more interactive ways to be engaged during class. These findings in this study were mainly from the mathematics teacher, science teacher, and special education teacher. Similar to the findings of Melhuish and Falloon (2010) as well as Rossing et al. (2012), teachers loved the easy access students had to the multitude of applications. The science teacher expressed in her interview that students use a 4-D Anatomy APP during her classes. This gives an enormous advantage to students that are visual learners. The students are able to look at the different body systems and isolate the particular system that they are studying in their class.

Teachers found there were only two things they did not like about the implementation of the iPads. The first finding is that there are students who may be distracted by the iPad. Each teacher interviewed mentioned this as being one of the drawbacks. The special education teacher interviewed in the study mentioned that it depends on each individual student when determining if this is a good approach for them. During the observation of her class, there was an instance where one student had gotten off task by surfing the internet and attempting to play a game. This is the kind of distraction the teachers were talking about. Several studies also mentioned this kind of opportunity being an issue when using iPads (Arthanat et al., 2013; Perry & Steck, 2015; Rossing et al. 2012). During the study of Arthanat et al. (2013), four special education students were observed interacting with technology interventions. During this study, it was found that one out of the four special education students was motivated to learn using the iPads, but the other three were distracted by the type of intervention.

The other main concern of teachers was connectivity issues. Teacher 2 explained in her interview that “If the network goes down and you or your students can’t connect, you’re going to sink with the ship”. This concern was in alignment with the research of Maxwell and Banerjee

(2013), Minshew and Anderson (2015), and Rossing et al. (2012). The teachers indicated in interviews that a majority of the applications require a strong wireless network in order to work properly. This same need was mentioned in the study of Rossing et al. (2012) who explained the issues associated when there was an outage of wireless connectivity and how that could create issues. Teachers found that in their school district there were more initial issues with the network, but the technology department quickly fixed them and made appropriate updates such as increasing bandwidth, installing more routers, and providing other updates in a timely manner to keep things running smoothly.

Faults of Professional Development

Through the results of the teacher interview, the area that was lacking for the iPad implementation process was good teacher preparation. Each teacher expressed negativity when asked about the professional development that was given to them in preparation for the iPad implementation. There were professional development opportunities offered, according to teachers. However, teachers found that the professional development offered was ineffective mainly because the support staff offering the workshops were not teachers.

The presenters were experts and could tell you what you wanted to know about the different APPs that could be used, but in terms of putting that technology in a classroom teacher felt they were shorthanded. This finding of negativity was rather different from the findings of Christensen (2002) and Kim et al. (2013). These researchers found in conclusion to their studies that there were implications supporting this type of professional development, and that it would benefit teachers. Perhaps these researchers did not consider the issues of non-educators giving the presentations. This lack of experience could hinder the leaders of these professional

development sessions from explaining effective ways of fitting the technology into the context of a classroom.

Teachers expressed that the only way they were able to effectively learn to use the technology to their liking was through firsthand experience and collaboration with each other. Teachers would often communicate and collaborate sharing new ideas with each other as that initial year of implementation took off. Teachers felt that if they were given more time to experiment with the technology that it would have been more useful than sitting through some of the workshops that were given.

Implications

The study gave evidence that students enjoy the use of iPads during the day, and that overall they feel it is useful and beneficial for them. This student in this study expressed positive attitudes specifically toward the ease of note taking and organization. Teachers should make an effort to make sure the iPads are being used in these ways that students expressed they prefer. In addition, students in this study expressed negative attitudes for using the iPads to read. They said it was difficult and hard on their eyes. Teachers can use this information to provide students with printed reading materials, while still taking notes on the iPad. This could increase the positive attitudes of students who are using the iPads.

The teacher perspectives provide insight to other districts that might be considering moving to a 1:1 iPad implementation in their district. Teachers provided their experiences with the iPads that may influence districts that are nervous about such a change, since the teachers interviewed in this study were all nervous at first, but after using the iPads that view changed.

The teachers also provided insight as to what APPS were useful in the implementation of the iPads; specifically, the iTunes U and Notability combination for the paperless note-taking during instruction. These findings all would be beneficial as to giving direction to a district that has just begun researching the 1:1 iPad initiative. The final implication was in regards to the professional development. Teachers felt that the P.D given was not useful because it was not given by teachers that were using the APPs in the classroom.

Limitations

All questions that are to be administered by survey or interview have been reviewed by a university professor who possess a Ph.D. in the area of Culture, Literacy, and Language. The professor has published many works and has a thorough knowledge of the research process. The mentioned professor has confirmed that all survey questions, interview questions, and protocols should have valid results based on the proposed research questions.

The potential situation that minimal students participate in the study could skew the results of the data. This could be a result of not having interest, not obtaining parental consent, or an unwillingness to participate. A small population would not provide a true view of the student attitudes that the research seeks to discover. In addition, the researcher is also the teacher of the student participants. This could also potentially influence students to answer a certain way to make their teacher happy instead of answering truthfully.

One of the limitations that I found throughout the course of this study is that only one grade level was investigated. This was due to the limitation of time, and that the acquiring of data for all three grade levels in the middle school would have taken three times the amount of time, which the researcher simply could not do at this time. This would be interesting in the future to investigate the attitudes of students in the entire middle school. In addition, only one

school was investigated. Future research may want to investigate multiple districts with similar implementations to provide a deeper synthesis of findings from teachers and students in multiple districts, in an effort to find the most effective method for implementing the iPads.

After the distribution of student surveys, the researcher noticed that there was a large percentage of students who were not sure in a question regarding to engagement with the iPads. The results of *Figure 12* show 43% of students were not sure if they felt engaged when using the iPad during class. This could be a result of students not understanding what the question meant by the word engaged. The researcher should have used more appropriate language for eighth grade students to ensure they knew what was meant by engagement.

Suggestion for Future Research

Perhaps futures research could investigate how this type of professional development can be made better. The teachers in this study indicated that one of the flaws in technology professional development is that the instruction is not coming from other teachers. The teachers who participated in the study indicated that it would be more beneficial to hear how other teachers are using the technology in an actual classroom. Although the instructors for the P.D could tell you anything about the device they were presenting on, they could not give meaning to using the device in a classroom for instructional purposes.

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*Appendix A***HSR Approval**

23 January 2017

Zachary Forys
c/o Sovicheth Boun, Ph.D.
Language, Learning and Leadership
College of Education
The State University of New York at Fredonia

Re: Zachary Forys—Teacher Perceptions and Student Attitudes of iPad
Integration in Schools

Your research project using human subjects has been determined Category 1, Exempt, under the United States Department of Health and Human Services Code of Federal Regulations Title 45 Public Welfare, Part 46 Protection of Human Subjects, 46.101, Subpart A (b) (1) and/or (2). This document is your approval and your study titled "Teacher Perceptions and Student Attitudes of iPad Integration in Schools" may proceed as described. **Your approval is valid from January 25, 2017 through April 1, 2017**

Thank you for keeping the high standards relating to research and the protection of human subjects under the auspices of the State University of New York at Fredonia.

Sincerely,

A handwritten signature in blue ink that reads "Judith M. Horowitz".

Judith M. Horowitz, Ph.D.
Associate Provost, Graduate Studies, Sponsored Programs
and Faculty Development
Human Subjects Administrator

Appendix B

Consent Form for Student Participants

Dear Student,

Technology is an essential role in today’s field of education. Each day in school you are given the opportunity to use an iPad to enhance your educational experience. Throughout the course of a school day, the iPad is used for many different activities in almost every subject. Since our school district provides so many opportunities to use technology, I would enjoy hearing what you think and include my findings in a research study.

I am conducting a small research study in order to determine the attitudes of my students when it comes to using the iPad during the school day. The use of technology in schools is a growing trend in school, and your feedback would provide opportunity to improve how technology is used in schools in the future. If you choose to participate, you will be asked to complete a survey consisting of 20 questions. The survey will contain questions that ask about how you feel when using the iPad during the course of the school day. After I have collected the survey, I will analyze the results and report my findings in the form of a Master’s Thesis for SUNY Fredonia. While reporting the results of the survey, your identity will remain confidential. There is no penalty of any kind if you choose not to participate. In addition, you can choose to leave the study at any time. The study is expected to begin at the end of January 2017 and end at the beginning of April 2017.

Please sign below to acknowledge that you will be a participant in this study to determine the attitudes of students who use iPads on a daily basis during the school day.

Please contact me with any further questions,

Zachary R. Forys

Mr. Forys
 MS Mathematics Teacher
 Silver Creek Middle School
 716-934-2603 ext. 2313

_____ Yes, I will allow Mr. Forys to collect an observation and survey to contribute to the study.

_____ No, I will not allow Mr. Forys to collect an observation and survey to contribute to the study.

Name of Student: _____

Date: _____

Signature of Student: _____

Date: _____

Appendix C

Consent Form for Parent/Guardian

Dear Parents and Guardians,

Technology is an essential role in today’s field of education. Each day in school your student is given the opportunity to use an iPad to enhance their educational experience. Throughout the course of a school day, the iPad is used for many different activities over a variety of content areas. Being a school district that provides its students many opportunities to use technology each day, I would value your student’s feedback.

I am conducting a small research study in order to determine the attitudes of students when it comes to using the iPad during the school day. The implementation of technology in schools is a growing trend in today’s schools, and your student’s feedback would provide an opportunity to improve technology implementation in the future. Participating students will be asked to complete a survey consisting of 20 questions. The survey will contain questions that ask about how the student views using the iPad during the course of the school day. After I have collected the survey, I will analyze the results and report my findings to fulfill my Master’s Thesis requirement at the State University of New York at Fredonia. While reporting the results of the survey, the identity of all students who participate will remain confidential.

Please sign below to acknowledge that you will allow your student to be a participant in this study to determine the attitudes of students who use iPads daily during the school day. If you choose not to let your student participate, your student will not be given nor take the mentioned survey.

Please contact me with any further questions,

Zachary R. Forys

Mr. Forys
 MS Mathematics Teacher
 Silver Creek Middle School
 716-934-2603 ext. 2313

 _____ Yes, I will allow Mr. Forys to collect an observation and survey from my child to contribute to the study.

_____ No, I will not allow Mr. Forys to collect an observation and survey from my child to contribute to the study.

Name of Student: _____ Date: _____

Signature of Student: _____ Date: _____

*Appendix D***Consent Form for Teacher Participants**

Dear Potential Participant,

Technology is an essential role in today's field of education. Today's teachers are given the opportunity to use an iPad to enhance the educational experience of their students. Throughout the course of a school day, the iPad is used for many different activities over a variety of content areas not only by students, but teachers as well. Being a school district that provides both teachers and students many opportunities to use technology each day, I would value your feedback.

I am conducting a small research study in order to determine the perceptions of teachers when it comes to using the iPad during the school day. The implementation of technology in schools is a growing trend in the field of education, and your feedback would provide opportunity to improve this implementation in the future. If you choose to participate, you will be asked to complete an interview that will last approximately 30 minutes. In addition, I would request to conduct two classroom observations to witness the technology that you use. After I have collected the data, I will analyze the results and report my findings in the form of a Master's Thesis for SUNY Fredonia. While reporting the results of the survey, your identity will remain confidential.

Please sign below to acknowledge that you will be a participant in this study to determine the perceptions of teachers who use iPads for classroom instruction. You may choose not to participate or withdrawal from the study at any time.

Please contact me with any further questions,

Zachary R. Forys
MS Mathematics Teacher
Silver Creek Middle School
716-934-2603 ext. 2313

_____ Yes, I will allow Zachary Forys to collect an observation and interview to contribute to the study.

_____ No, I will not allow Zachary Forys to collect an observation and interview to contribute to the study.

Name of Participant: _____ Date: _____

Signature of Participant: _____ Date: _____

*Appendix E***Interview Protocol**

Guiding Teacher Interview Questions

1. What content area do you teach?
2. How long have you been teaching?
3. How are iPads implemented in your district?
4. When you first found out you were going to be using iPads in your district, what were your initial thoughts about using them in your class?
5. Has your view on using iPads in your class changed from what you initially thought?
6. How are iPads used as learning tools in your class?
7. What types of iPad training were you given before you began using the iPads?
8. What was the most beneficial thing about the training?
9. Is there continuous PD given to teachers for the iPad?
10. Is there any PD given to new teachers that were not here for the start of the iPad implementation?
11. What are the different uses of the iPads in your [content area] class?
12. Are there any specific APPS you use frequently?
13. Do you think the use of iPads as a learning tool benefits or hinders education and learning?
14. Do you think that iPads bridge the gap between learning and the 21st century?
15. What are the benefits to using an iPad in class versus paper and pencil?
16. Are there any negatives associated to using the iPads in class?

Appendix F

Observation Protocol

Observation Protocol adapted from ISTE Classroom Observation Tool

Setting

Date: _____

Grade Level: _____

Course: _____

Teacher: _____

Number of Students: _____

Observation Start Time: _____

Observation End Time: _____

Room Description and Student Characteristics

Student Groupings (Check all observed during the period)

_____ Individual

_____ Student Pairs

_____ Small Group

_____ Whole Group

_____ Other (Please Specify):

Teacher Roles (Check all observed during this period)

Lecturing

Interactive Direction

Discussion

Facilitating

Modeling

Other (Please Specify):

Learning Activities (Check all observed during the period)

Creating Presentations

Research

Information Analysis

Writing

Test Taking

Drill and Practice

Simulations

Hands-on Skill Training

Other (Please Specify):

How essential was technology to the teaching and learning activities?

- Not needed; other approaches would be better.
- Somewhat useful; other approaches would be as effective
- Useful; other approaches would not be as effective
- Essential; the lesson could not be done without it

Comments:

Technologies used by the teacher

- Apple TV**
- Desktop Computer**
- E-mail**
- iPad**
- Laptop**
- Library Database**
- Overhead Projector**
- SMART Board**
- TV**
- Video Camera**
- Web Browser**
- Word Processor**
- Other (Please Specify):**

Technologies used by the students

_____ **Apple TV**

_____ **Desktop Computer**

_____ **E-mail**

_____ **iPad**

_____ **Laptop**

_____ **Library Database**

_____ **Overhead Projector**

_____ **SMART Board**

_____ **TV**

_____ **Video Camera**

_____ **Web Browser**

_____ **Word Processor**

_____ **Other (Please Specify):**

Activities Observed Using Technology and Approximate Length:

*Appendix G***Student Survey**

Student Survey

The current research study is looking to find out what students who use iPads in schools everyday think about them. The questions will begin by asking you a few questions about yourself, and then will ask about how often and familiar you are with the iPads. The questions will also ask for you to rate on a scale of 1-5 how much you agree or disagree with the questions, in order to hopefully discover how you feel about using the iPads in school.

Directions: Please circle one choice for questions 1-5.

1. What is your gender?
 - a. Male
 - b. Female

2. What is your age?
 - a. 5-7 years old
 - b. 8-10 years old
 - c. 11-13 years old
 - d. 14-16 years old

3. What is your race/ethnicity?
 - a. African American/Black
 - b. Asian/Pacific Islander
 - c. Hispanic/Latino
 - d. Multiracial
 - e. Native American/American Indian
 - f. White
 - g. Not Listed (please specify)
 - h. Prefer not to respond

4. On Average how many hours a day do you use technology in school?
 - a. 0-2 hours
 - b. 2-4 hours
 - c. 4-6 hours
 - d. 6-8 hours

5. On Average how many hours a day do you use technology outside of school?
 - a. 0-2 hours
 - b. 2-4 hours
 - c. 4-6 hours
 - d. 6-8 hours

Please respond to the following statements by circle one choice ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

6. Using iPads will help prepare me for the future

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

7. I would like to learn more about how to use iPads at school

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

8. I want to have a job that uses iPads

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

9. Using iPads at school makes life easier

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

10. Knowing how to use technology, or an iPad is important in life

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

11. Using iPads during the school day makes school more interesting

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

12. I feel comfortable using the iPad during school

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

13. I do NOT feel frustrated when using the iPad during school

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

14. I am interested in using iPads instead of other technology that is available (ex. Laptops)

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

15. I feel more engaged during class when using the iPad.

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

16. Using the iPads at school makes taking notes easier

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

17. Reading is much easier on the iPad instead of on paper

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

18. I find myself off task less often during class when using the iPad

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

19. I rarely experience technology issues when using the iPad during the school day

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

Questions 20-21 are open response questions. You may leave any comments that will help the researcher know how you feel about the question that is asked.

20. What activities do you find the iPad is most beneficial for during the school day?

21. What activities do you find are most difficult when using the iPad during the school day?