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The implementation of a one-to-one iPAD program in an urban high school

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THE IMPLEMENTATION OF A ONE-TO-ONE iPAD PROGRAM IN AN URBAN HIGH SCHOOL

by

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DEDICATION

I would like to dedicate this work to my patient and loving wife Alissa and my wonderful children: Sarah, Hannah, and Ariella.

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I am incredibly thankful for the assistance and encouragement of the many people who helped me to complete this dissertation. First, I would like to thank my committee. They offered much support and advice throughout the process. My committee chair, Dr. Bruce Fraser, has been a remarkable friend and has taken me under his wing after the Educational Media and Technology division of the school closed down. I would also like to thank my committee members, Dr. Swapna Kumar and Dr. Phil Tate. I had the great fortune of being a student in their graduate classes and learning from them in the dissertation advisement phases of the program.

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IN AN URBAN HIGH SCHOOL

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ABSTRACT

The purpose of this qualitative study was to apply the lessons learned from the Apple Classrooms of Tomorrow studies, the SAMR model, and Diffusion of Innovations theory to explore stakeholder perceptions of iPad integration at an urban high school in Massachusetts. The implementation was viewed through the lenses of the Apple Classrooms of Tomorrow (ACOT) studies (Baker, Gearhart, & Herman, 1990; Dwyer, Ringstaff, & Haymore Sandholtz, 1990a; Dwyer, Ringstaff, & Haymore Sandholtz, 1990b), Rogers' (2003) Diffusion of Innovation (DOI) Model, and Puentedura's (2012) Substitution, Augmentation, Modification, and Redefinition (SAMR) Model. The researcher used qualitative analysis to code the data. Through data analysis, five themes emerged: communication, control, division, distraction, and workflow. The iPads changed how and when students and teachers communicated. Teachers sought more control over the iPads in the classroom. Control over learning shifted toward the students with the introduction of the iPads. Divisions became apparent with iPad use: new teachers versus veteran teachers and upperclassman versus underclassman. Distractions were rampant. The iPads influenced the workflow of how teachers taught and how students accessed the curriculum.

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GLOSSARY

21st Century Learning- A term used to describe core technological competencies including collaboration, critical thinking, problem solving, and digital literacy, while promoting on-demand learning through the use of technology (Jones, 2014).

Bring Your Own Technology (BYOT) or Bring Your Own Device (BYOD) - An initiative that allows students to bring their own personal mobile devices such as laptops, iPads, and smartphones to school (Cardoza, 2013).

Flipped Learning - A pedagogical approach in which students learn at home and practice in the classroom, a 'flip' from previous ways of learning (Sams & Bergmann, 2012).

Learning Management Systems (LMS) - An application or platform used to store and manage course content. Some capabilities include accessing reading materials, lecture materials, submitting assessments, viewing grades, collaborating with fellow students, and communicating with the teacher (Murphy, 2011).

Mobile Devices - Technology devices that are easily portable, such as a laptop, smartphone, or tablet (Jones, 2014).

One-to-One or 1:1 - An educational program wherein the district provides a computing device for each student to use. Some schools allow students to take the devices home at night and others just have them available during the school day (Bundy, 2013).

Wi-Fi Network - A wireless technological infrastructure in which devices such as computers, laptops, tablets, and smartphones with Wi-Fi capabilities can connect to the Internet within a specific range (Jones, 2014).

CHAPTER ONE: INTRODUCTION

Background and Rationale

The rapid expansion of technology has drastically changed all facets of our lives and education is no exception. The race to keep up and improve learning is a critical issue in modern education. Every year, schools and districts purchase technology in an effort to improve learning (Bebell & Kay, 2010; Johnson, 2012). Grimes and Warschauer (2008) reported that in 1983, the student/computer ratio in the U.S. was 168:1. By 2005, the ratio had decreased to approximately 4:1. The U.S. Department of Education reported their estimate in 2008 that 100% of public schools were using computers for instructional purposes. That same year, 52% of schools were using laptop computers housed on mobile carts that could be moved from classroom to classroom (U.S. Department of Education, 2008). Technologies were making their way into the classroom.

Educational Technologies

Educational technologies are being incorporated into schools in the United States and across the globe. Internationally, tablets have made their way into school in countries including South Korea, India, Kazakhstan, Turkey, France, Japan, Singapore, and Australia (Clarke & Svanaes, 2012). Domestically, entire states have implemented initiatives to provide laptops or other educational technologies to every student, known as a one-to-one initiative (Bundy, 2013). Large districts, like as Henrico Country in Virginia and Cobb County in Georgia have provided laptops to middle and high school students (Penuel, 2006). However, there is too little research-based evidence to determine whether such programs are effective (Penuel, 2006) or whether specific technologies such as

iPads improve learning (Clarke & Svanaes, 2012).

In 2010, Apple released the iPad and with it began a new wave of technology: portable, easy-to-use, and relatively inexpensive tablet computers (Dhir, Gahwaji, & Nyman, 2013). Tablets are handheld computers, similar to a laptop with touchscreen capability (Enriquez, 2010). The use of iPads as educational devices spread rapidly across the United States (An & Alon, 2013). As Clarke and Svanaes (2012) noted, most U.S. schools have piloted tablet devices. For instance, the Los Angeles Unified School District (LAUSD), the second largest district in the United States, approved a $1 billion one-to-one iPad initiative (Blume, 2015). While iPads are integrated into schools (Clark & Svanaes, 2012), there is a scarcity of research on iPad implementation due to the newness of one-to-one initiatives using iPads.

Among the few extant studies, there seem to be both advantages and disadvantages of one-to-one programs. Among the advantages, Clarke and Syanaes (2012) found schools that incorporated tablets reported an increase in pupil-led learning. In particular, they found students participated in more collaboration, partly due to the tablets' ability to increase communication. Students also had opportunities to work independently with the tablets, which was also viewed as positive. The pair cited disadvantages to using tablets, including older students treating them more like entertainment devices than learning devices and tablets were also described as a distraction to students and a disruption to the class.

Jameson High School Initiative

In 2012, Jameson High School (JHS), a pseudonym for the study site, began a one-to-one iPad program. Jameson High School is an urban high school in Massachusetts. Urban schools are in or close to a major city that is more likely to have higher concentrations of students from low-income families (Lippman, Burns, & McArthur 1996). The Massachusetts Department of Elementary and Secondary Education (2014) defined 'low income' as the percent of enrollment who meet any one of the following criteria: eligibility for free or reduced lunch, eligibility for food stamps, or beneficiary of Transitional Aid to Families. This is true of JHS; it is racially diverse and has a large low-income population. During the 2013–2014 school year, the population of JHS was 1,559 with 39.2% of the population identified as white, 47.1% Hispanic, 6% Asian, 4.4% African American, 3% multi-race non-Hispanic. The majority of the students, 75.1%, were considered low income.

Jameson High School's goal is to prepare students for the 21st century. One way it has attempted to do this is by incorporating iPads into the classroom. Administrators described the implementation of the iPads at JHS as part of an overall vision to create a more student-centered learning environment to prepare all kids for college and careers in the 21st century.

The Jameson High School iPad initiative started with the school information technology manager who envisioned iPads at the school. This has had rippling effects throughout the entire school. Figure 1 illustrates the timeline of implementation.

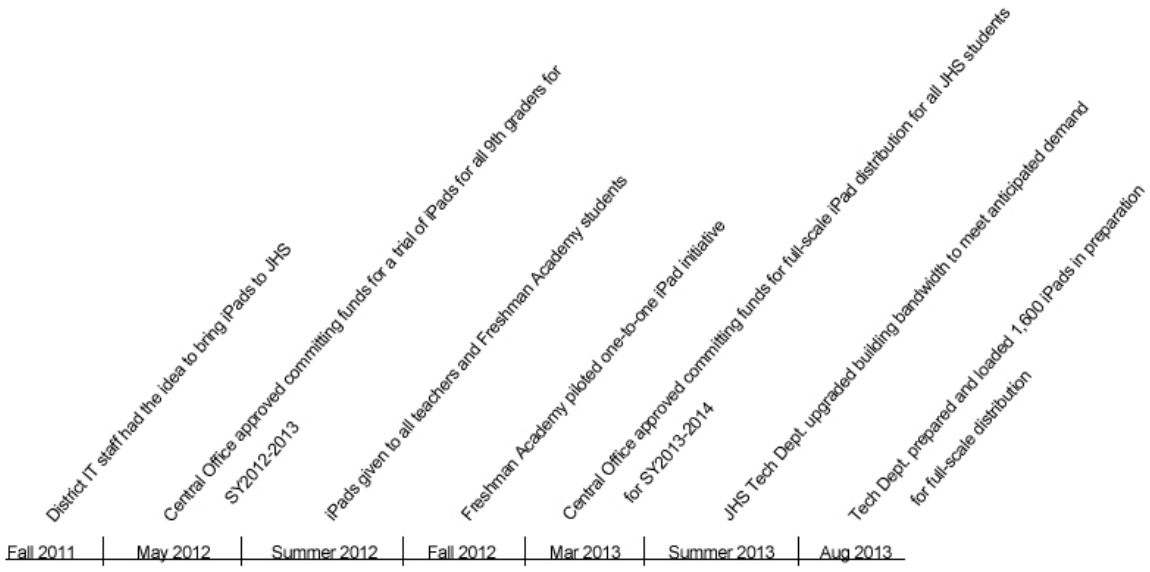

Figure 1**.** Timeline of the iPad initiative.

In the 2012–2013 school year, JHS loaned all 9th grade students, known as Freshman Academy, and all teachers in the school iPads for classroom use as an attempt to stay cutting edge with technology and provide students with the opportunity for more student-centered learning (J. Michaels, personal communication, September 30, 2013). Student-centered learning involves students as the originators of their own knowledge through reading, exploring, thinking, assimilating data, and creating new knowledge (King, 1993). Teachers looked for the best way to use iPads in the classroom. After a few months, teachers decided to pursue flipped learning as a way to best utilize this technology. The creators of the term "flipped learning" defined it simply as, "That which is traditionally done in class is now done at home, and that which is traditionally done as homework is now completed in class" (Bergmann & Sams, 2012, p. 13). By having students do preparatory work in advance, 'flipped classrooms' provide more

opportunities for student-centered and classroom-based activities to facilitate better learning." The school was open to the possibility and flipped learning became a school initiative.

After the first year, the school technology team, comprised of volunteer teachers, administered a Likert-style survey to teachers, freshman students, and parents of the Freshman Academy. The survey gathered data about the iPad initiative to determine if the program should go forward for the whole school. The results indicated that teachers felt the school as a whole was using less paper, that the wireless infrastructure needed improvement, that they perceived iPads were improving learning, and that students were slightly more organized. Students indicated feeling slightly more organized, that they used the iPads more in core subjects than electives, not being distracted much, and not losing or breaking their iPad. Parents indicated improvements in their child's performance and attitude about going to school since the previous year. Parents reported students doing homework both on and off the iPad, improved communication between their child and the teacher, that their child was more organized and engaged, and children working in groups.

With these positive results, coupled with improved attendance, the Superintendent decided to expand the iPad initiative to the whole school (P. Daniels, personal communication, June 20, 2014). At the beginning of the 2013–2014 year, the remainder of the students received iPads. This study builds from the previous research conducted by the technology team at the research site.

The purpose of this qualitative study was to apply the lessons learned from the Apple Classrooms of Tomorrow studies, the SAMR model, and Diffusion of Innovations theory to explore stakeholder perceptions of iPad integration at an urban high school in Massachusetts. This study was placed in the context of other research, because without proper historical context and research, each technology that we introduce into the classroom will continue to "leave our educational landscape pretty much the same as it was before they came" (Saettler, 1990, p. 386).

This study was informed by prior research on technology implementations and their impact on learning. The Apple Classrooms of Tomorrow (ACOT), a collaboration between public schools, universities, research agencies, and Apple Computers that began in 1985 described the phases of technology implementation as Entry, Adoption, Adaptation, Appropriation, and Invention (Baker, Gearhart, & Herman, 1990). The Substitution, Augmentation, Modification, and Redefinition (SAMR) model that succeeded ACOT examines how a technology does or does not enhance teaching and learning (Puentedura, 2012), describing Substitution, Augmentation, Modification, and Redefinition as phases in technology integration. Roger's (2003) Diffusion of Innovation (DOI) theory suggested there are four spheres of influence affecting the spread of a new idea: the innovation itself, communication channels, time, and a social system. Rogers (2003) further categorized adopters of the innovation as innovators, early adopters, early majority, late majority, and laggards. These terms and concepts are central to the discussion of the problem and the findings of this study.

Statement of the Problem

With intense interest in applying technology in education, administrators, teachers and parents need to better understand how technology may improve their students' learning experience. The iPad, which came out in 2010, is still being integrated into new schools and improved upon as a pedagogical tool in others (Clarke & Svanaes, 2012). The problem is that while the iPad is being used in more schools, there is limited research about the use of one-to-one tablet initiatives and even less in urban school settings. Urban schools face different challenges than middle-class and affluent schools (Cuban, 2004), including differences in the safety of the environment, the amount of resources available, and access to support, both at home and at school. It follows that urban schools might have different experiences incorporating technologies such as iPads. With the popularity of technology programs, a stronger collection of best practices in diverse settings is needed to guide both theory and practice.

Significance of the Study

Given the increased use of tablets in schools, the results of this research helped identify aspects of an iPad implementation program that should be incorporated or avoided in a successful rollout and adoption. This research was conducted at an urban high school and added to the literature on one-to-one programs.

Scholarly Significance

As a scholar, it is clear that a serious gap in the literature exists. Comprehensive searches of the literature, including Google Scholar, ProQuest Dissertations and Thesis,

and EBSCO H.W. Wilson Full Text did not reveal extant studies exploring the perspectives of students and one-to-one iPads in urban high schools. Keywords for the searches included terms like urban, one-to-one, 1:1, iPads, tablets, education, high school, secondary education, and/or k12. Only Gerger's (2014) study exploring one-to-one iPad programs within an urban high school was comparable, though it did not examine the perspective of the students. Gerger studied administrator and teacher's perceptions of the change processes through adoption using Fullan's (2007) Innovation Model and Capacity Building Model. Accordingly, this research fills this critical gap in the literature by providing knowledge on iPad use in an urban school.

Practitioner Significance

As a practitioner, this research builds from previous data collected at the research site. This study delved deeper into teacher, administrator, and student perceptions of iPad use through qualitative interviews, focus groups, and observations in an urban high school in Massachusetts. This research is valuable to Jameson High School (JHS) personnel and other schools looking for a model of implementation. Bringing the iPads to Jameson High School was an expensive endeavor for the district. Between the tablets and the infrastructure, the iPad program cost the district close to one million dollars and required time and resources from the faculty and staff (P. Daniels, personal communication, June 20, 2014). It was important to assess how the iPads were used in order to ascertain the program's success and worth for future investments.

The study collected data about the strengths and weaknesses of iPad use in an urban setting, perceptions of professional development, how the iPads were used for

teaching and learning, and perceptions of flipped learning. The findings provide a snapshot of how iPads were implemented at this school. Understanding the implementation process at JHS might allow other practitioners and stakeholders – students, teachers, administrators, parents, and the larger community – insights into their own implementation processes. Teachers could learn how to utilize the technology and contemplate their own pedagogical approaches. Administrators can gain insights into different approaches and policies. Students could see how others adopted the technology. Parents could learn how their children used iPads in school.

Research Questions

The purpose of this qualitative study was to apply the lessons learned from the Apple Classrooms of Tomorrow studies, the SAMR model, and Diffusion of Innovations theory to explore stakeholder perceptions of iPad integration at an urban high school in Massachusetts. One-on-one interviews with the teachers and administrators, focus groups with the teachers and students, and classroom observations provided the data. The research questions were:

1) How are iPads being used for teaching in an urban instructional setting?

2) How are iPads being used for learning in an urban instructional setting?

3) What are teachers' perceptions of the iPad implementation?

4) What are students' perceptions of the iPad implementation?

5) How do students perceive the flipped learning initiative?

6) How do teachers perceive the flipped learning initiative?

Summary

Technology implementations have taken place in schools internationally, nationally, and locally. This study focused on a one-to-one iPad initiative at an urban high school in Massachusetts. The data was studied in the context of the Apple Classrooms of Tomorrow (ACOT) studies, the Substitution, Augmentation, Modification, and Redefinition (SAMR) model, and the Diffusion of Innovation (DOI) theory. These studies, model, and theory helped to provide a framework to better understand iPad implementation. The results of this study provide value for both scholars and practitioners interested in technology implementation in urban high school settings. Chapter 2 reviews the literature about technology in urban schools, the theoretical frameworks consulted for this research, one-to-one initiatives, including 'bring your own device,' laptops in education, and iPads in education.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews research on technology in an urban district. Next, it summarizes the Apple Classrooms of Tomorrow (ACOT) studies related to technology incorporation in the classroom, explains the Substitution, Augmentation, Modification, and Redefinition (SAMR) model and Diffusion of Innovation (DOI) theory. It also introduces one-to-one initiatives, explains research involving bring your own devices (BYOD), and summarizes research on laptops and tablets in education. Laptops and tablets are compared and contrasted. The chapter also presents research on iPads in education.

The Urban School

Jameson High School (JHS) is an urban high school in Massachusetts. As previously defined, an urban school is in or nearby to a major city and is more likely to have a higher concentration of students from low-income families (Lippman, Burns, & McArthur, 1996). Urban schools typically also have a large population. As urban areas are densely populated, it follows that class size and school enrollment size are much larger in urban schools (McCracken & Barcinas, 1991). This section reviews research comparing and contrasting urban education with rural or suburban education, particularly in communication, technology access, and learning with technology.

Ainsworth (2002) evaluated data from a longitudinal study in the 1980s and 1990s. Ainsworth found that neighborhood characteristics predict educational outcomes. In general, students in urban cities did not spend a lot of time doing homework. Also,

educational achievement (based on students' math and reading test scores) were lower in urban settings. Ainsworth provided two reasons for these results: social collectivization, where students learn that academics is not a priority, and lack of resources to effectively complete tasks.

Barnyak and McNelly (2009) examined the practices and beliefs of administrators and teachers about parental involvement in an urban school district in Pennsylvania. Specifically, the purpose of the study was to provide insights into the lack of family involvement at the middle and high school levels in an urban district. The pair's quantitative study surveyed 92 teachers of grades K–12 and 7 administrators. The study found a lack of utilization of technology for communication between home and school. Teachers informed parents about what went on in the classroom through the school handbook, parent orientation, and an assignment notebook and/or special information sheet. The majority of teachers never used a newsletter, homework calendar, homework hotline, teacher contract, teacher web page, or email to parent(s). It appeared that there was a gap between school life and home life in this urban district.

Becker (2000) analyzed national survey data describing children's access to computers in school and at home and reasons why children's computer experiences vary. Using the Teaching, Learning and Computing: 1998, U.S. Census Bureau's Current Population Survey of U.S. Households (CPS), and 1997 and 1998 supplements, 4,000 teachers and parents of more than 23,000 children were surveyed. Students in schools with mostly wealthy families used computers differently than students from poorer families. While teachers in low socio-economic status (SES) schools reported more

computer-use than teachers of higher SES schools, low SES schools often involved traditional practices and beliefs about student learning. Higher SES schools incorporated more constructivist and innovative teaching strategies. Becker (2000) described how teachers in low SES schools used computers for "remediation of skills" and "mastering skills just taught" (p. 55) and allowed students to work independently. Teachers in high SES schools were more likely to use computers to "teach skills such as written expression, making presentations to an audience, and analyzing information" (p. 55).

Project Tomorrow (2013) used data from the annual Speak Up National Research Project. The goals of the project were to stimulate new discussions around technology in education and inform policy. The Project's online survey was available for a month in 2012 and was open to any school in the United States. Over half of the schools that participated were Title I eligible, an indicator of a low-income status. The data from 39,713 parents, and 102,070 educators from 8,000 schools presented an overview of trends in digital learning.

Project Tomorrow (2013) data from urban schools showed that the concerns of 72% of the urban teachers closely echoed those of teachers in suburban and rural communities – namely that the device were a distraction. For a bring-your-own-device environment, two-thirds of urban teachers noted the concern over some students possibly not having devices. Also, 23% of teachers were concerned about their own lack of knowledge about what features to use on the devices. Other areas of concern for teachers were related to not having specific curriculum to support use of the device and not knowing how to effectively utilize the devices in the classroom. The data showed that

urban teachers and administrators were increasingly converting their classrooms to accommodate mobile devices.

Mouza's (2008) mixed methods approach studied differences between 100 students using laptops versus not using laptops in 3rd grade and 4th grade urban classrooms. Data were collected through classroom observations, teacher interviews, student questionnaires, and student focus groups. Mouza (2008) found that through the guidance of teachers, laptops "enabled disadvantaged students to engage in powerful learning experiences" (p. 447). Laptop-use correlated with enhanced motivation and engagement with schoolwork, increased interactions among students and teachers. Students were empowered as they were able to teach the teacher about laptops.

Such behaviors were not evident among comparison students. The control group had two computers in the room. These computers were used for tasks such as word processing and Internet research. The computers were "sometimes used as a reward for students finishing their work" (p. 458). In contrast, students who used laptops produced academic gains in writing and mathematics.

The literature reviewed in this section on urban education showed that there were some differences between urban education and rural or suburban areas. Urban students were more likely to be living in poverty than were suburban students. Also, urban schools have larger enrollments and less parental involvement. Additionally, urban schools tend to use technology in traditional ways, whereas rural and suburban schools use technology in more constructivist ways. Urban, rural, and suburban schools all have concerns about students being distracted by their electronic devices. In general, teachers from all three

types of schools lacked confidence in their ability to best incorporate technology into the curriculum. Technologies, specifically laptops, were shown to be engaging, motivating, and empowering for urban students.

Theoretical Framework

Theoretical perspectives and seminal research anchored this study and assisted in the interpretation of the results. Those that best provided structure for studying an iPad implementation were the Apple Classrooms of Tomorrow (ACOT) studies, the Substitution Augmentation Modification Redefinition (SAMR) model, and the Diffusion of Innovations (DOI) theory. Each is described in detail in this section.

Apple Classrooms of Tomorrow

Apple Classrooms of Tomorrow (ACOT), while not a framework, is a series of studies that offer insights into how technology is integrated into classrooms. ACOT was a collaboration among public schools, universities, research agencies and Apple Computers that began in 1985 (Baker, Gearhart, & Herman, 1990). Technology has changed quite a bit from the ACOT study, but many of the findings are still relevant. ACOT provided 32 teachers and 650 students in 5 public school sites (4 elementary and a high school) with different technologies for use at home and at school. The technologies were computers, printers, scanners, laserdisc and videotape players, modems, CD-ROM drives, and software titles. Research was conducted in the four years following implementation of these technologies. There were 22 reports written based on data from the ACOT project. Three of the reports—7, 8, and 9—were directly pertinent to this study.

Report 7 (Baker, Gearhart, & Herman, 1990) evaluated and explained findings from the first and second years of ACOT. Students' academic scores stayed the same and they had sustained positive attitudes about schooling. Writing quality improved as students created rewrites. Teachers developed higher expectations for their students. An area of concern for teachers was being able to cover the standard curriculum and most teachers reported being stressed through the experience.

Report 8 (Dwyer, Ringstaff, & Haymore Sandholtz, 1990a) researched teacher beliefs and practices regarding patterns of change. They described a continuum to capture the phases of technological integration in a K–12 classroom. These phases of the ACOT continuum are Entry, Adoption, Adaptation, Appropriation, and Invention (Dwyer, Ringstaff, & Haymore Sandholtz, 1990a).

Entry phase. According to Dwyer, Ringstaff, and Haymore Sandholtz (1990s), the Entry phase involves some changes in the physical environment; wires need to be run, blackboards replaced with whiteboards, desks moved around, etc. Instruction, however, does not look too different from a control classroom. Rowe (2014) studied teacher's pedagogical transformation, which was informed by the ACOT studies, and therefore the researcher had some insights into how ACOT studies are still relevant 30 years later. The emphasis is still on traditional, lecture-style in which the student was a "passive receiver" (Rowe, 2014, p. 15). Technology is used minimally as a resource to support lecture-based instruction and for basic student presentations. Dwyer, Ringstaff, and Haymore Sandholtz (1990a) discovered that veteran teachers faced first-year-teacher problems such as "discipline, resource management, and personal frustration" (p. 5).

Adoption phase. In the Adoption phase, teachers continue to deliver traditional instruction and used paper-pencil tests, physical textbooks, and chalkboards. In Dwyer, Ringstaff, and Haymore Sandholtz's (1990a) study, teachers used the new technology to support text-based drill and practice instruction. Rowe (2014) found teachers felt more comfortable permitting students to use computers for writing, and provided opportunities to remediate learning through software. Teachers tended to use Internet searches for acquisition of new resources to supplement a lesson. Dwyer, Ringstaff, and Haymore Sandholtz (1990a) wrote that student attendance increased at this phase and discipline problems ranged from zero to a few.

Adaption phase. Productivity is a major theme of the Adaption phase (Dwyer, Ringstaff, and Haymore Sandholtz, 1990a). "Students produced more faster" (p. 6). When students and teachers had more time, students engaged in higher-order objectives. Rowe (2014) explained this was when both teachers and students realized technology's ability to provide differentiation, letting students advance at their own pace. Students and teachers increased confidence using the technology with the increased opportunities to do so. Teachers at this stage began to create blogs, threaded discussions, and other dynamic experiences (Rowe, 2014).

Appropriation phase. According to Dwyer, Ringstaff, and Haymore Sandholtz (1990a), the Appropriation phase is "the point at which an individual comes to understand technology and use it effortlessly as a tool to accomplish real work" (p. 6). Some indications of this phase include team teaching, interdisciplinary project-based instruction, and differentiation (Dwyer, Ringstaff, and Haymore Sandholtz, 1990a).

Additionally, the researchers found that teachers allowed students to teach each other. Teachers also became facilitators rather than lecturers. Furthermore, teachers tended to reflect on teaching strategies and to question old ways of doing things.

Innovation phase. Dwyer, Ringstaff, and Haymore Sandholtz referred to the Innovation phase as a placeholder for further development. Entry, Adoption, Adaptation, and Appropriation were the phases that led up to Invention and led to purposeful change (Dwyer, Ringstaff, & Haymore Sandholtz, 1990a). Rowe (2014) explained that at this stage, teachers rarely used direct methods of instruction. Instead, they adopted a constructivist approach where teachers to act as a guide who coached students to construct their own meaning, informed by previous knowledge and experience.

Report 9 (Dwyer, Ringstaff, & Haymore Sandholtz, 1990b) was an extension of Report 8 and focused on how teachers coped with going through the phases detailed in Report 8. Specifically, Report 9 researched teacher beliefs and practices and their support for change. Two teachers' journeys with the ACOT experience and the five stages were chronicled. One teacher taught elementary school and the other, high school. One teacher involved had to learn to "undo my thinking" (p. 2) in order to utilize new technology. The study found that changes that took place were towards student-centered, collaborative, and active learning.

The teachers had similar experiences with using the technologies in the classroom, but ended up in very different places (Dwyer, Ringstaff, & Haymore Sandholtz, 1990b). The elementary teacher found employing innovations was anxiety inducing and caused her to retreat to her former ways of teaching. She felt that

colleagues, administration, and family were critical of her efforts. Exhausted by the process, she left ACOT after her first year. The high school teacher also experienced cycles of innovation that caused anxiety and retreated to her former ways of teaching. She was exhausted. This teacher, however, did not quit the program and came back year after year with more "pedagogical strength and certainty about her direction" (p. 7).

The researchers attributed teachers' reactions to the working environment (Dwyer, Ringstaff, & Haymore Sandholtz, 1990b). The elementary teacher worked in a self-contained classroom and had little or no opportunity to discuss her experiences. The high school teacher joined the project in the second year and the first year staff incorporated joint planning, team teaching, and interdisciplinary instruction. There was ample opportunity to watch others and discuss. Support for the program was shown through praise by the principal and district technology coordinator routinely.

Substitution, Augmentation, Modification, and Redefinition

Puentedura (2012) expanded upon the work of the ACOT project and created the SAMR model. SAMR is an acronym for substitution, augmentation, modification, and redefinition. This reflects four levels of technology integration. The model is illustrated in Figure 2.

Substitution is the lowest level of technology integration (Puentedura, 2012). In this model, the Substitution level is when technology acts as a direct substitute for a previous measure, but there is no functional change. Rowe (2014) used the example of a teacher making a reading accessible on student iPads rather than handing out a paper copy. The students complete the same task (reading) using a different medium (the iPad).

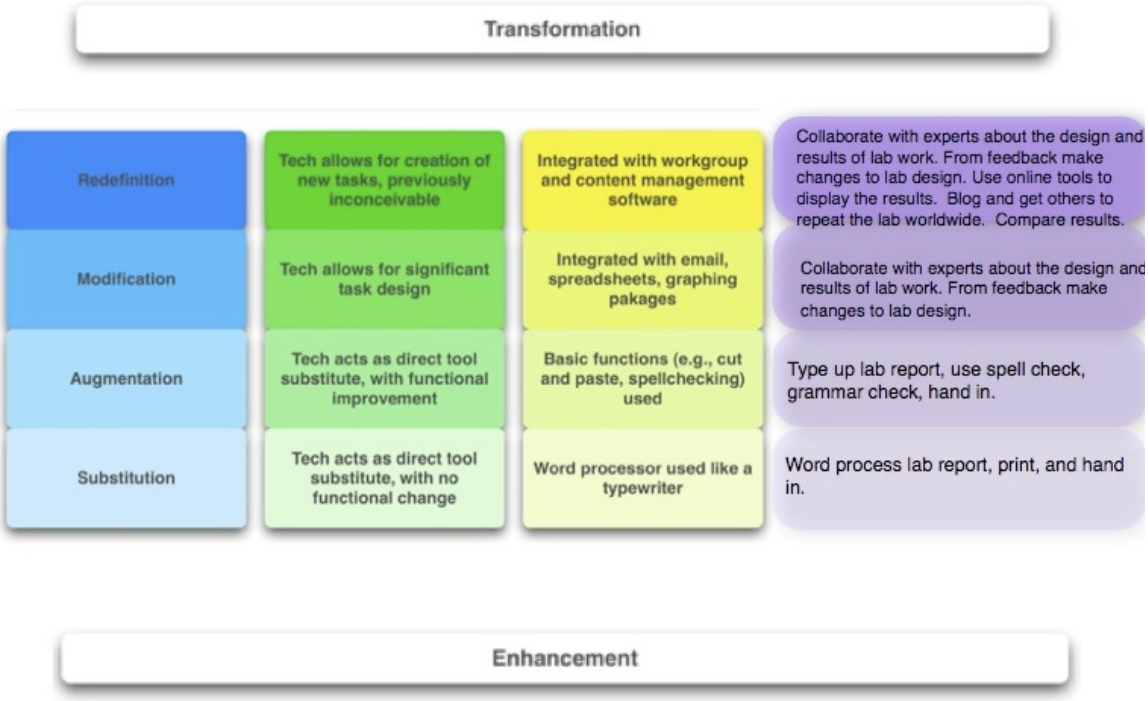

Figure 2. The SAMR Integration Model (Rowe, 2014).

At the Augmentation level, technology is used as a direct tool substitute, but with a functional change (Puentedura, 2012). The researcher used the example of a teacher who had students read an article on the iPad while also utilizing the built-in dictionary when they encountered an unfamiliar word. Alternately, they could use the iPad's ability to read the passage to them.

The Modification level incorporates technology in a way that allows for task redesign (Puentedura, 2012). Rowe's (2014) illustration of this level was a student instructed to use Google Docs to write a response to a reading and then share the Doc with collaborators for feedback. The task is altered to incorporate the technology.

The Redefinition level requires technology to allow for the creation of new tasks that were previously not possible without technology (Puentedura, 2012). Rowe (2014)

gave the example of students taking a virtual field trip using web conferencing technology. Students are able to converse with experts and share findings using student created media to demonstrate their understanding. Redefinition is considered the highest level of the SAMR model.

Diffusion of Innovations Theory

Diffusions of Innovations (DOI) theory (Rogers, 2003) explains how a technology is integrated through a culture over time.

Rate of adoption. Rogers (2003) determined that innovation is accepted or not by the participants in a social system and coined the term "Rate of Adoption" to describe the speed with which an innovation is accepted. There are many factors that affect the rate of adoption: the perceived attributes of innovation, the type of innovation-decision, communication channels, the nature of the social system, and the extent of change agents' promotion efforts.

***Perceived attributes of an innovation*.** The perceived attributes of an innovation include the relative advantage, compatibility, complexity, trialability, and observability. Rogers (2003) described the relative advantage as "the degree to which an innovation is perceived as being better than the idea it supersedes" (p. 229). In the case of iPads, this could be phrased as whether teachers perceived them to be a more efficient way to teach or as an all-in-one repository for students to use for learning. Rogers defined compatibility as "the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential adopters" (p. 240). For the purposes of this study, individuals could ask whether iPads seem to be a logical

connector between teachers' educational philosophies and what they hope to do. Complexity is defined as "the degree to which an innovation is perceived as relatively difficult to understand and use" (p. 257). For example, are the iPads easy enough for the end user to want to use them? Trialability is the degree to which an innovation may be experimented with on a limited basis" (p. 258). Asking whether teachers felt that they were given enough time to try out the iPads before using them is an example of this category. Observability is "the degree to which the results of an innovation are visible to others" (p. 258). Did teachers see other teachers using their iPads? What did teachers hear from students about their iPad use in other classes?

***Innovation-Decisions*.** There are different types of "Innovation-Decisions", a term coined by Rogers (2003, p. 13). The innovation-decision involves the progression of an entity "from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and to confirmation of this decision" (Rogers, 2003, p. 475). Rogers (2003) classified innovation-decisions as optional, when people can choose to engage with the innovation; collective, when individuals decide to take on the innovation and it is then mandatory; and authority, when decision makers such as a principal require the innovation's implementation. The more people involved in making the innovation-decision, the slower the rate of adoption (Rogers, 2003).

***Communication channels*.** Communication channels are the means through which the innovation is known to people. Two of the more popular means of disseminating information is through mass media or through interpersonal means such as

a private email. Rogers (2003) wrote that mass media is a more effective way of speeding up adoption.

Social system. The nature of the social system, including its norms and how close the participants feel, can also affect the rate of adoption. If there is a culture of trying new things and sharing ideas, it would follow that trying an innovation and finding ways to make it work would be adopted quickly.

Promotion efforts. A change agent is one "who influences clients' innovation-decisions in a direction deemed desirable by a change agency" (Rogers, 2003, p. 473). The extent of their promotion efforts also affects the rate of adoption (Rogers, 2003). The effort exerted by change agents does not directly correlate to innovation adoption. Instead, the greatest change took place when opinion leaders adopted the innovation, usually somewhere between 3 and 16 percent in Roger's (2003) research. Once critical mass is reached, the innovation continues to spread without action from the change agent.

Rogers (2003) categorized different groups of innovation adopters: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. This classification is "the most widely used in diffusion research today" (Rogers, 2003, p. 282). In this classification system, innovators come up with the idea and bring the idea to the group.

Early Adopters are the members with the highest degree of opinion leadership (Rogers, 2003). Opinion leadership is the "degree to which an individual is able to influence other individuals' attitudes or overt behavior informally in a desired way with relative frequency" (p. 475). Innovators have been described as "cosmopolites" (p. 283), while early adopters can be described as "localites" (p. 283). That is, the early adopters

are the foot soldiers who help push the initiative rather than just coming up with the idea. The early adopter shares opinions about the innovation to peers.

People who are a part of the Early Majority strive to not be the first to try something, nor the last. They deliberate a little before completely adopting the innovation. In contrast, the Late Majority are people who adopt an innovation after the Early Majority. Their decision to adopt may be derived from peer pressure. Rogers (2003) described this group as skeptical, explaining that they need to remove most of the uncertainty about a new idea before they are willing to adopt it.

Rogers (2003) described Laggards as traditional; they look to the past to inform their decisions. They can be "isolates" (Rogers, 2003, p. 59), those who are not connected to a group, in their system and will often have a social network of like-minded people. Laggards justify their resistance to the innovation and they must be confident that the new idea will not fail before adopting. The term laggard may have a negative connotation, but no disrespect is intended (Rogers, 2003).

Rogers (2003) explained that one problem with this model is it requires 100% adoption. Even laggards, who are late to adopt, have adopted the innovation in this description. The model does not account for, or have a term for, non-adopters.

One-to-One Initiatives

This study examined the implementation of a one-to-one iPad initiative, where every teacher and student received a device. Findings were interpreted through the frameworks of the ACOT studies, the SAMR model, and DOI theory as guides. In order

to better understand the initiative at JHS, it was imperative to understand the research on one-to-one initiatives.

In the 1980s, Apple Classrooms of Tomorrow (ACOT) project spearheaded the '1:1,' or one-to-one computer access movement (Donovan, Hartley, & Strudler, 2007). Bebell and O'Dwyer (2010) predicted that "Some form of 1:1 computing will be the norm for the majority of American classrooms at some point in the future" (p. 5). For the sake of consistency, this research refers to an environment where every person has a device as one-to-one.

There are multiple discussions about one-to-one programs in the literature. Teachers described more value from devices when all students had a device to use in a one-to-one setting compared to when only a few students had them (Vu, McIntyre, & Cepero, 2014). Norris and Soloway (2008) agreed that one-to-one environments where every student had a device was ideal, comparing lower ratios to a teacher providing only three pencils for the whole class to use for a writing assignment. "For a technology to be truly useful, each child must have his or her own" (Norris & Soloway, 2008, p. 2). Vu, McIntyre, and Cepero (2014) found that the more iPads there are in a classroom, the more time kids spend with them. While this may seem like an obvious statement, Cuban (2001) found that the amount of technology in a school did not necessarily translate to technology use in the classroom.

Availability and financial considerations for technology adoption have changed greatly in a short period of time. In 2001, one-to-one computers to student ratios were financially unfeasible for an institution (Vu, 2013). Handheld computers, such as laptops

and tablets, made a one-to-one solution feasible with their lower price point.

A one-to-one initiative can take on different forms. For instance, Richardson et al. (2013) described programs that allow students to take the device home, in essence "owning" the device for the school year. Penuel (2006) explained that with 24/7 access, students can access an array of resources, communicate with other students and teachers, and gain experience using technology. Other programs consider themselves to be one-to-one programs if students have access to the device or set of devices daily in the classroom. Another variant is known as 'bring your own device' (BYOD), when students provide the technology to be used in school. Although schools may supplement lower-income families in this case, some educators do not consider this scenario to be a true one-to-one program (Richardson et al., 2013).

One-to-one classrooms are just the first step in creating what Norris and Soloway (2004) call 'the handheld-centric classroom.' In a handheld-centric classroom, each student has his or her own handheld computer, but there are also other devices available to them in the classroom, such as networked PCs, probeware, and digital cameras. The authors believed this better-supported project-based learning. Norris and Soloway claimed one-to-one classroom merits included artifact creation and revision, collaboration, learning in-context, managing and coordinating the use of multiple resources, ongoing assessment, teacher feedback, and communication with the home, community, and administration.

Richardson et al. (2013) compiled a database of one-to-one initiatives across the globe. Inclusion required certain criteria be met and literature and web searches were

utilized to find schools with initiatives. Students had to be able to take the device home with them, eliminating 'bring your own device' programs in which students supplied their own device. Programs had to span a region and not be limited to just a school or a district. The database included the type of device, total number of units deployed, sponsoring program, start date, grades served, and amount of funding allocated. Devices used included the Intel Classmate PC, XO Laptop, Lenovo Laptop, Linux (NComputing), Apple iPad, Apple MacBook, and Asus EeePC. Richardson et al. (2013) found that what was promised at the onset of a large scale one-to-one project was often not what was delivered. The researchers concluded that initial news reports or press releases may not accurately depict the results. For instance, they found a discrepancy between the rate of deployment of the devices publicized and what was in classrooms.

For the purposes of this research study, at JHS (the research site), one-to-one is defined as when every student, teacher, and administrator is issued an iPad for the duration of the school year. Once issued, the iPad were not collected from students until the end of the school year. Administration and teachers do not turn in their iPads at the end of the year.

Bring Your Own Device Initiatives

One-to-one technology initiatives are not always financially feasible for a school district, therefore initiatives where students are told to bring their own device (BYOD) (also known as bring your own technology (BYOT)) can be an alternate strategy (Gaines & Martin, 2014). Ullman (2011) clarified the BYOD environment as a type of one-to-

one computing classroom that is fueled by students' personal devices and saves the school from buying the devices. Arnold (2015) explained in BYOD programs, students' mobile devices can help to achieve a nearly one-to-one computing environment at little or no cost to the school.

Highlighted in the work of Gaines and Martin (2014), the Mankato Area Public School District in Minnesota considered a one-to-one laptop initiative. With 7,500 students enrolled, that would have cost the district over $1 million to implement. Instead, they spent $50,000 to upgrade the wireless network allowing adequate bandwidth to have their students bring in their own devices. Norris and Soloway (2011) argued that the ubiquitous nature of phones and other devices naturally led to students bringing their own devices.

Beyond the financial savings of a BYOD program, there are other advantages. O'Sullivan-Donnell (2013) wrote that some students preferred their own technology because it was more convenient. For example, the school's technology might not work or connect to the Internet. Personal technology preferences also included familiarity with navigating their own devices and that websites were often blocked on the school's technology. Cardoza (2013) found that while students could bring any mobile device, the majority of students brought laptops. O'Sullivan-Donnell (2013) discovered that some students preferred to use the school's technology, primarily if their own device could not connect to the school network.

BYOD is not ideal for every classroom. Gaines and Martin (2014) pointed out that BYOD programs inhibit equity. There are inherently students who can afford the

newest technologies with the latest features while others cannot. Teachers in the Gaines and Martin (2014) study felt that BYOD initiatives may increase the digital divide between students. It was also difficult for teachers to control different devices. As a result, different students had different devices, resulting in classroom management issues that outweighed the benefits of the program (Jones, 2014).

Teachers' Use of Bring Your Own Device

Cardoza (2013) discovered that prior to a BYOD implementation, teachers desired more information about the implementation of the innovation, including the time requirements for preparation, timelines for implementations, and their supervisor's expectations. For successful implementation and planning, school district leaders and professional development designers need to understand the factors that influence a teacher's decision to revise pedagogies and incorporate technologies (Jones, 2014). Additionally, drivers of technology innovation should understand the classroom challenges involved with implementing a bring your own device (BYOD) program, such as student distractions and classroom management issues (O'Sullivan-Donnell, 2013).

The literature suggests that professional development opportunities for BYOD programs should be relevant to specific content areas and customized to meet the teachers' needs. Otherwise teachers' professional development offerings may have little influence on the classroom integration of the technology (Jones, 2014; Ross, 2013). Beyond the content alignment, Ross (2013) found that teachers gave time as a reason for not participating in voluntary professional development.

Cardoza's (2013) study found that teachers utilized the devices in the classroom;

however, they did so in their own ways and not with consideration to the campus' vision or expectations. Ross (2013) agreed, indicating that teachers made instructional decisions based on their comfort level with technology. Ross also found that personal experience with technology and lesson planning for student-centered learning is a greater indicator of successful BYOD implementation than teachers' age or teaching experience.

Jones (2014), however, found that a teacher's willingness to integrate BYOD might not be related to the teacher's confidence, personal technology use, or experience in personal technology. In the study, teachers with low confidence in their technological skills were willing to teach with the technology if they felt the students would follow the classroom rules. The teachers with strong technology skills, however, believed the students would go off-task and were therefore less inclined to teach with technology.

Students' Use of Bring Your Own Device

O'Sullivan-Donnell's (2013) work revealed that bring your own device (BYOD) programs encouraged project-based learning, promoted collaboration, contributed to higher student engagement and motivation, and allowed for differentiation of instruction. O'Sullivan-Donnell stressed that differentiation was achieved through a blend of students' personal technologies and traditional classroom methods.

Stavert (2013) argued that BYOD programs affect the classroom lessons as the teacher may have to take into account the lowest common denominator of students' device capabilities when developing the lessons. Gaines and Martin (2014) wrote that different devices also affected testing. The pair claimed that for testing, including standardized testing, it was best when students had the same or similar devices.

The literature is clear that there are advantages to BYOD programs. They can promote collaboration and allow for differentiated instruction. However, there are disadvantages. These drawbacks include distraction and accentuating the digital divide. Also, teachers' and students' perceptions of the technology impact how it is used.

Laptops in Education

Background and Statistics

Another iteration of one-to-one programs involves laptops. Laptop initiatives started more than a decade ago as parents and school boards predicted they would lead the way into the 21st century classroom (Hu, 2007). Hu studied programs that took place in New York City where a $45-million, three-year program gave 6,000 students laptops in 2005. Other states that bought thousands of laptops for students were Maine, Michigan, Pennsylvania, and South Dakota.

In 2007, 25% of U.S. school districts initiated a one-to-one laptop program (Stanfield, 2013). By 2008, found that 52% of schools were using laptop carts in the classroom (Gray, Thomas, & Lewis, 2010). Around that same time, Grimes and Warschauer (2008) claimed that laptop programs offered "the greatest potential of educational technologies to date" (p. 306) with the ability of wireless communication and collaboration. Some benefits of laptop programs included motivated students, higher attendance rates, and lower dropout rates (Hu, 2007).

Support

When adding one-to-one devices to the classroom, administrators felt their goal

was to “redefine learning to inspire learners through individualized and innovative learning” (Cox, 2014, p. 213). However, Whicker (2012) found that about forty-five percent of teachers reported that they were not aware of their district's goals for a laptop program. There is a mismatch. Ongoing administrative support is necessary to sustain laptop projects (Alberta Education, 2010). In their study, Broussard, Hebert, Welch, and VanMetre (2014) found that teachers were concerned about technology initiatives when they felt there was a lack of ongoing instructional support.

In Cox’s (2014) study, administrators claimed that the success of their laptop program was due to the planning and professional development of the teachers. Bebel and O’Dwyer (2010) similarly found that professional development was a key component to ensuring success in any change initiative. Dunleavy, Dexter, and Heinecke (2007) noted that the high financial cost of laptops underscored the need to provide teachers with high-quality professional development. Other researchers highlighted the timing of professional development, ideally prior to when students received their devices (Greaves et al., 2010; Hanson, 2014), that it should be specific to a teacher’s content area (Marable, 2011), and acknowledged that finding the time to fit professional development into the busy school day was a problem for teachers and administrators (Jenkins, 2012; Marable, 2011). Mini-sessions taught at the school was one suggestion to address these concerns (Marable, 2011).

In Whicker’s (2012) research into laptop implementation, fifty percent of teachers felt that the professional development they received met their needs. Other initiatives were found to be lacking in professional development (Broussard, Hebert, Welch, &

VanMetre, 2014; Lowther, Ross, & Morrison, 2003). In some instances (Strother, 2013), despite professional development, teachers lacked the knowledge and experience to use the laptops effectively. Strother concluded that further research was needed to address differentiated professional development for teachers.

The Teacher's Role

Dunleavy, Dexter, and Heinecke (2007) noted that the mere presence of one-to-one laptops did not automatically add value to the classroom. Gorder (2008) wrote that the teacher was the most important factor for successful technology integration. Further, Whicker (2012) found that a teacher's personal- and professional-uses were related to the frequency of a teacher's classroom-use. Whicker also found that there was no correlation between a teacher's age and proficiency with technology. That is to say, a young, new teacher might not be very proficient and a veteran teacher might be exemplary in his or her use of technology. In fact, Marable's (2011) work revealed that a portion of teachers were comfortable using technology for their classrooms while others were fine refraining from its use.

Students and Laptops

Throughout the literature, student-use of laptops was seen as advantageous as it prepared students for life (Broussard, Hebert, Welch, & VanMetre, 2014; Lei & Zhao, 2008; Niles, 2006), helped students stay organized (Broussard, Hebert, Welch, & VanMetre, 2014; Cox, 2014; Garthwait & Weller, 2005; Grimes & Warschauer, 2008; Strother, 2013; Zucker, 2009), assisted students with learning (Alberta Education, 2010; Branch, 2014; Cox, 2014; Dunleavy, Dexter, & Heinecke, 2007; Garthwait & Weller,

2005; Grimes & Warschauer, 2008; Hanson, 2014; Lei & Zhao, 2008; Lowther, Ross, & Morrison, 2003; Marable, 2011), and aided students with communication (Broussard, Hebert, Welch, & VanMetre, 2014; Cox, 2014; Dunleavy, Dexter, & Heinecke, 2007; Garthwait & Weller, 2005; Hanson, 2014; Lei & Zhao, 2008; Lowther, Ross, & Morrison, 2003; Niles, 2006; Standley, 2012; Strother, 2013). Student-use of laptops was seen as disadvantageous at times when students were distracted with the laptops (Broussard, Hebert, Welch, & VanMetre, 2014; Dunleavy, Dexter, & Heinecke, 2007; Hu, 2007 ; Lowther, Ross, & Morrison, 2003; Niles, 2006; Tagsold, 2012) or when users faced other issues, such as technical and logistic issues (Alberta Education, 2010; Broussard, Hebert, Welch, & VanMetre, 2014; Dunleavy, Dexter, & Heinecke, 2007; Garthwait & Weller, 2005; Lowther, Ross, & Morrison, 2003).

Preparation for life. Both teachers and students in Niles's (2006) study believed that immersion in a technology-rich classroom was beneficial for students' success after high school. Broussard, Hebert, Welch, and VanMetre (2014) described advantages for students, including the chance to learn responsible computer-use, as well as enhanced college preparedness as students gained familiarity with Microsoft Office, email, a Learning Management System (LMS) (an application or platform that is used to store and manage course content (Murphy, 2011)), and Internet databases. Lei and Zhao (2008) described how using laptops in the classroom allowed students to gain technology proficiency. However, they did note that teachers feared students were developing over-dependency on the devices. Tagsold (2012) also found that teachers were concerned about the potentially harmful effect of technology on the mind and society in general.

Organization. Teachers described how laptops helped with organization and efficiency (Broussard, Hebert, Welch, & VanMetre, 2014; Garthwait & Weller, 2005). Applications such as OneNote and Moodle (an online LMS that allows teachers to easily put curriculum online (Zucker, 2009)) improved organization (Broussard, Hebert, Welch, & VanMetre, 2014). Zucker found that teachers incorporated Moodle in their classroom when they had laptops at their disposal. This is consistent with Grimes and Warschauer's (2008) findings that one of the greatest affordances of the laptop was its ability to assist with content delivery. Further, Cox (2014) wrote about the advantages of the Google Applications platform to provide a collaborative environment where students could construct their own learning and how Google Applications can be accessed from their laptops. Strother (2013) concurred that laptops kept students more accountable using online access to timelines and deadlines.

Learning. Some studies found a strong correlation with laptops and learning. Lei and Zhao (2008) found that students used their laptops for various tasks related to learning: homework, searching, emailing, taking notes, searching information on the Internet, learning subject content with specific software, and learning through online discussions. Alberta Education (2010) found by using laptops, students engaged in deep inquiry, problem solving, and authentic learning. Also, when using laptops, students were motivated to learn and engaged in class (Branch, 2014; Garthwait & Weller, 2005; Grimes & Warschauer, 2008). In Lowther, Ross, and Morrison's (2003) study, students and teachers believed laptops increased interest in learning and encouraged more meaningful classroom activities. Parents felt that their children were more interested in

school as a result of the laptops. Cox's (2014) findings also supported the parental view that learning was enhanced.

Laptops and learning were not always positively correlated. Standley (2012) reported a lack of a strong association between learning and students' laptop use. Part of the problem could be, as Broussard, Hebert, Welch, and VanMetre (2014) found, classes that utilized laptops were less challenging than traditional courses without technology. Standley (2013) reasoned that students' initial perception of learning with a laptop was not at the foremost of their thoughts; however, learning could be taking place.

Hu's (2007) study of Matoaca High School in Virginia found no academic gains after five years of a laptop program. The school discontinued the program. Cox (2014) stressed that the device was not what motivated the student, but rather other influences such as the student's intrinsic desire to learn were more important. Cox found that laptops enhanced learning by providing more resources and collaboration within and between students and teachers. Further, Cox found that student engagement did not change with the use of a Chromebook (a specific laptop). Students who routinely completed their work before the Chromebooks were introduced continued to complete it once they were. Students who did not complete their work before the Chromebook did not improve with the technological intervention.

Within the literature, it seems as though when using laptops for learning, not all core subjects used laptops equally. Grimes and Warschauer (2008) compared California state tests of students who used laptops in their classes to those who were not. They found that there was no significant difference for English scores. There was a significant

difference for math scores. However, Grimes and Warschauer (2008) determined that this could not be associated with the one-to-one laptop program because the laptops were not used in math classes as frequently as in the English classes. Laptops were used daily in the language arts, science, and social studies classrooms, and were used less frequently in the mathematics classroom. Branch (2014) found that math and science teachers, with the exception of one in their study, had not altered their instructional activities significantly from the pre-implementation period. Branch's participants explained that they felt having laptops impacted their classrooms very little. They believed student-centered instruction, combined with direct instruction was present in their classes both before and after the laptop program.

Barriers to laptop use in learning environments varied. A loss of class time from one period to the next because student access restrictions were not lifted from the prior class was one issue Broussard, Hebert, Welch, and VanMetre (2014) identified. Another barrier was the ease with which students could cheat. Broussard, Hebert, Welch, and VanMetre stated that students could email answers to other students. The researchers suggested that students had a reticence toward technology and preferred traditional pen-and-paper approaches.

Traditionally, classrooms have been teacher-centered, where the teacher is at the front of the room and all information flows through the teacher. An alternative to this approach is student-centered learning, when students have more authority and generate their own learning. King (1993) summed up the role of teachers in a student-centered classroom as a 'guide on the side' rather than 'a sage on the stage.'

Researchers believe with the introduction of laptops into the classroom, there was a shift to more student-centered activities (Alberta Education, 2010; Branch, 2014; Cox, 2014; Hanson, 2014; Lowther, Ross, & Morrison, 2003; Niles, 2006). Lowther, Ross, and Morrison (2003) found that students were more eager to engage in project-based activities with laptops. Garthwait and Weller (2005) reported that students improved learning by using the laptops for group interactions and discussions. Additionally, Branch (2014) found that there were more groups of students coming together for learning as opposed to sitting in straight rows of desks.

In laptop accessible classrooms, Cox (2014) found that teachers used online collaboration to help students construct, or discover for themselves, their own learning. This required instructional changes on the part of the teachers to "adapt to digitally enhanced constructivism" (Cox, 2014, p. 212). The researcher concluded that the learning experience did not depend on a specific device, but rather on a learning environment based on digital constructivism.

Building on this student-centered learning approach, Cox (2014) determined that students conducted more research when they had laptops. Teachers noted that the laptops made information more accessible for students (Broussard, Hebert, Welch, & VanMetre, 2014; Garthwait & Weller, 2005; Lei & Zhao, 2008; Marable, 2011; Strother, 2013). With laptops, learning became anytime, anywhere (Branch, 2014). Students were better able to "find current information quicker" (Lowther, Ross, & Morrison, 2003, p. 40). This has opportunities for additional skill building, as Lei and Zhao (2008) wrote that teachers are concerned about student efficiency in online research and the ability to

evaluate sources. While students have the tool to search, they may not have the skills to search effectively.

Laptops allowed for another shift: differentiated learning. Alberta Education (2010) and Hanson (2014) found that teachers used laptops to differentiate learning for students. Broussard, Hebert, Welch, and VanMetre (2014) found that laptops were helpful in meeting needs of visual and verbal/auditory learners. Through customization, students with laptops could use computers more often, extensively, and independently (Lowther, Ross, & Morrison, 2003). Strother (2013) and Hanson (2014) wrote that in addition to differentiating classwork, teachers found that laptops allowed for the customization of assessments as well, including project-based assessments and computerized assessments that offered questions based on the student's previous answer. For example, if the student got the question right, a harder question would appear next.

Students used their laptops for various tasks related to expression via creating websites, burning CDs, and using Photoshop (Lei & Zhao, 2008). Cox (2014) wrote that laptops afforded more flexibility with types of assignments. Cox cautioned, though, that students needed to see the laptop as a learning tool rather than a means of entertainment.

Alberta Education (2010) found that it is not until the second and third years of an initiative that the focus is shifted to using the technology for learning and engagement. The researchers concluded that the transformation to 21st century learning happens incrementally. Grimes and Warschauer (2008) suggested that laptop-use promoted 21st century literacies, including increased autonomy, productivity, and collaboration. Overall, the use of the one-to-one laptops appeared to allow the classroom to be "more

learner-, assessment-, community- and knowledge-centred [sic]" (Dunleavy, Dexter, & Heinecke 2007, p. 444).

Communication. Niles (2006) found that laptops changed the way students communicated with teachers and with each other. Dunleavy, Dexter, and Heinecke (2007) wrote a one-to-one ratio "allowed the teacher and students to create virtual communities that communicated synchronously and asynchronously to share ideas, solicit writing feedback, or ask relevant questions about the learning task" (p. 450). There were many advantages for students and they included greater communication with teachers and peers, specifically in cases of absences or need for reinforcement and clarification (Broussard, Hebert, Welch, & VanMetre, 2014). Through the technology, teachers were able to give instant feedback for work submitted (Broussard, Hebert, Welch, & VanMetre, 2014; Cox, 2014). Garthwait and Weller (2005) explained that another benefit to using laptops in the classroom was how it allowed the teachers to be more mobile in the classroom. Technology afforded more face-to-face time between students and the teacher.

Students used laptops for communicating through using social media, email, messaging, and Skype (Lei & Zhao, 2008; Standley, 2012). Broussard, Hebert, Welch, and VanMetre (2014) noted that the digital communication only works when students read messages and many students were not checking email or the class website for updates and information. Lowther, Ross, and Morrison (2003) had conflicting results stating that students worked more cooperatively due to email. Cox (2014) found that as a result of using laptops, student collaboration increased. Alberta Education (2010)

reported more collaboration and creativity among teachers.

Student communication and social skills were impacted by the laptop (Strother, 2013) and some teachers felt for the better and others for the worse. Lowther, Ross, and Morrison (2003) found that students were considered better writers because they "are not afraid to write— they can delete and redo a paper much easier (p. 40)." The researchers noted a reliance on grammar and spell check tools. Niles (2006) also stated that teachers expressed the challenge of grammar issues that arose from laptop-use. Lei and Zhao (2008) wrote about teachers' concerns on digital literacy and originality: "Some teachers worried that students might just copy and paste content from the Internet and take everything online as factual without careful scrutiny" (p. 16).

Distraction. One challenge for students when using laptops was going off-task and being distracted (Broussard, Hebert, Welch, & VanMetre, 2014; Lowther, Ross, & Morrison, 2003; Niles, 2006). Hu (2007) reported that being off-task was enough of a reason for a school to discontinue using laptops. The Liverpool school district in New York, which had adopted a one-to-one laptop program, has decided to phase out its laptops. This decision was made after students cheated, downloaded pornography, and hacked into local businesses. The school had found the program to be "educationally empty" (Hu, 2007, p. 1). The School Board President, Mark Lawson, found there to be no evidence that the laptops had an impact on student achievement and they were more of a "distraction to the educational process" (p. 1).

Tagsold (2012) suggested ways to overcome distraction when using laptops. The researcher found that some upper level English students managed distractions by using

self-regulatory techniques, such as keeping goals in mind, to complete work. They also allowed themselves to listen to music while working and took mental and physical breaks (Tagsold, 2012). The English teachers helped students with distraction management by enforcing strict deadlines. The teachers assigned challenging assignments, created lessons that capitalized on students' social need to connect with peers, utilized new technologies in class, used an online course management system, advocated for filtering on student laptops during the school day, and emphasized that the laptop was a tool which may take care of lower-level thinking tasks to free up time for higher-level thinking tasks.

Broussard, Hebert, Welch, and VanMetre (2014) claimed that students were not self-disciplined enough to stay on track while using laptops without monitoring. Dunleavy, Dexter, and Heinecke (2007) noted that distraction brings with it the added challenge of needing additional classroom management techniques. Lowther, Ross, and Morrison (2003) specifically wrote that it was student Internet-use that required monitoring on laptops. Across the literature, teachers felt that classroom management was harder now that they had to monitor laptops (Branch, 2014; Broussard, Hebert, Welch, & VanMetre, 2014; Lei & Zhao, 2008; Strother, 2013).

Aside from distraction, there are other factors that need to be taken into account with implementing laptops into the classroom. Alberta Education (2010) reported that the first year involved many technical and logistical issues as wireless hardware was installed in the schools, policies were established, and professional development seminars occurred. There were also many challenges that interrupted class time and students' abilities to work, including the lack of durability of the laptops and styli, the short battery

life, computers updating, restarting, and crashing without warning, and Internet connectivity often slow or interrupted (Broussard, Hebert, Welch, & VanMetre, 2014; Dunleavy, Dexter, & Heinecke, 2007; Garthwait & Weller, 2005; Lowther, Ross, & Morrison, 2003). Broussard, Hebert, Welch, and VanMetre (2014) added that there was a lack of diligence on the part of students when it came to charging the laptops. The researchers also found a lack of consequences for damaged laptops.

Tablets in Education

Tablet computers, sometimes known as tablet PCs or TPCs, are a competing technology to laptops in the classroom. Enriquez (2010) described tablets as essentially laptop computers that have the added functionality of touch screen capability. Of the tablets, the iPad is a popular choice. Burden, Hopkins, Male, Martin, and Trala (2012) wrote that 94% of students preferred to use an iPad to a traditional computer or laptop and 92% felt that they learned more when they used an iPad in lessons.

The current lead seller in tablet technology is the iPad; however, there are other technologies including the Samsung Galaxy Tab, Motorola Xoom, Blackberry Playbook, Dell Streak, Asus EEE Pad, HP Slate, Lenovo LePad, Cisco Cius, and Microsoft Surface (Burden et al., 2012; Churchill, Fox, & King, 2012; Vu, 2013). For families with young children, there has been an increase in ownership of tablet devices such as iPads, from 8% of all families in 2011 to 40% in 2013. There has been an increase from 52% to 75% of children with some type of "smart" mobile device at home (e.g., smartphone or tablet) in just two years (Common Sense Media, 2013). Although tablets are popular, Jennings,

Anderson, Dorset, and Mitchell (2010) and Waters (2010) determined that tablets are not a replacement for computers or laptops, but an enhancement.

Tablets Versus Laptops

There are advantages and disadvantages to both laptops and tablets. Waters (2010) wrote that a tablet is great for portability, research, and small projects while laptops are better for larger projects, such as movie creation. Richardson et al. (2013) explained that some educators criticized tablets suitability for one-to-one programs as laptops have more powerful hardware and more robust software options. Also, laptops have a superior file management system, allowing files to be located easily and transferred easily (Mang & Wardley, 2012).

Burden et al. (2012) identified two frustrations with using tablets: typing on the "keyboard," which is an electronic interface on the bottom of the screen, and writing with the fingertip. The researchers note that physical keyboard accessories and styluses have resolved these issues. Also, Garcia (2011) wrote that wireless Internet is one of the largest limitations to incorporating tablets into the classroom. Timmermann (2010) explained that when the wireless Internet is available, the tablet allows students to access and manipulate their work from school and home, enabling a bridge between the two.

Other differences between the tablet and laptop deal with multi-tasking, which is being able to work on more than one undertaking at a time, and distraction. While tablets allow multiple applications to be open, as of this writing, they do not allow them to be on the screen at the same time. However, this seeming shortcoming has been found to keep students on-task. Mang and Wardley (2012) stated that students who use tablets versus

laptops were less likely to go off-task when using their device. Off-task activities included online chatting, using social networks, and watching videos. The researchers estimated one reason for this was the privacy afforded by the laptops cover. Mang and Wardley further stated that tablets allowed for both typed and handwritten input, but traditionally laptops only allow for typed input, though some newer models of laptops also offer handwritten input.

Interestingly, Chou, Block, and Jesness (2012) found that a disadvantage of using iPads for education was student distraction by irrelevant apps and websites. Johnson (2013) furthered this idea by stating iPad distraction is the biggest concern for teachers and students. Students noted that it took effort to be self-disciplined and exhibit appropriate use with an iPad.

Cost is a consideration for both laptops and tablets. Laptops, like all technology, have an initial expense and a quick depreciation – typically three years (Carter, 2001). Generally, there is no built-in mechanism for dealing with the machines after they become obsolete (Carter, 2001). Hu (2007) reported that Northfield Mount Hermon School, a private boarding school in Massachusetts, stopped their five-year-old laptop program in 2002 because they were spending more on repairing the laptops than on teacher training. Furthermore, teachers were not always using laptops in their classrooms because technical glitches used up too much class time.

Starting in 2005, the expense issue of laptops was addressed. Richardson et al. (2013) wrote that Nicholas Negroponte, founder and chair of the MIT Media Lab, introduced the world to the possibility of a $100 laptop computer. As of 2013, 2.5 million

of these laptops, known as XO[tm], the $100 Laptop, or One Laptop per Child (OLPC), have been used across the globe to give children a means for education. Richardson et al. stated that other organizations have also joined the cause of providing low cost devices for educational purposes. Intel[tm] has circulated over 7 million of its Classmate PCs[tm] to youth on every continent. While these laptops are less expensive, they are also less powerful.

Cost is a consideration for iPad use in education (Benton, 2012; Alberta Education, 2012). Along with the cost of the hardware is the cost of the wireless networking infrastructure (Valstad, 2011) and the bulk purchasing of apps that enhance the functionality of the devices (Benton, 2012). Benton further found that mobile devices offered a lower cost ratio per student than personal computers. Apple has offered bulk-discounting for apps when purchased for a class set of iPads (Kaciupski, 2013). Apple has sold over 8 million iPads for education (Etherington, 2013).

iPads in Education

Implementations of iPads in schools. Lei and Zhao (2008) described one-to-one computing as one of the fastest growing phenomena in K–12 classrooms. Implementation differs across districts, within districts, and even within a school (Jones & Strudler, 2012). Each school district has to determine how the technology is to be implemented and how the technology will meet the objectives (Lee & Winzenried, 2009).

Burden, Hopkins, Male, Martin, and Tralia (2012) described three access models. First were schools that deployed class sets for use during the school day. Another model was when schools lent devices to the students for the school day that were not tied to a

specific class. A third tactic was for schools to give devices to students for use at school and home for the duration of the pilot program. Beyond access, there are other considerations within a technology implementation program. For example, Gaines and Martin (2014) recommended having an Acceptable Use Policy (AUP), upgrading the network infrastructure, piloting the program, and incorporating professional development.

Successful implementation involves students utilizing their time, funds being allocated wisely, and students having access to the devices, apps, and Wi-Fi (An & Alon, 2013). Additionally, the researchers recommended that schools account for security of the devices and protocols such as registration and sign-out. Mang and Wardley (2012) made six recommendations for any instructor looking to implement iPads into the classroom: 1) Know everything about the tablet ahead of time, 2) Decide early on how the tablet will be used in class, 3) Work with the Information Technology department, 4) Make the tablet an integral part of the class, 5) Describe the features and benefits on the first day, and 6) Consider how to distribute the tablets.

Schmidt and Ho (2013) identified some common challenges when it came to implementing iPads in a school that are related to time: installation, configuration, deployment of apps, making backups, and overall care and maintenance of the devices. Hixon and Buckenmeyer (2009) wrote that other reasons for poor implementation included teachers' lack of time, training, equipment, and support.

Hall (2010) warned that technology innovations come with an additional difficulty compared to other school initiatives, in part because they keep evolving.

Technology innovations evolve by changing to a new device, i.e., using PC computers and switching to Macs. Another form of evolution is upgrades or changes to the computer software.

***Goals*.** Successful implementation in schools requires "careful and long-term planning before, during, and after the implementation process" (Montrieux, Vanderlinde, Courtois, Schellens, & De Marez, 2014, p. 482). Requirements include infrastructure, stakeholder preparation and engagement, and oversight and evaluation (Burden, Hopkins, Male, Martin, & Tralia, 2012; Heinrich, 2012). Furthermore, Pettit (2014) reported that the culture of the school as pioneers and the shared vision of the participants, along with the nature of their training, were the factors that contributed to the success of this iPad implementation.

To create unified goals, Johnson (2013) discovered that a team approach, such as student engagement and parental input, was instrumental in the development and implementation of the one-to-one iPad program. Teachers in Vu's (2013) study claimed their iPad-use was related to whether the principal's expectations were known to them. The implication was that school administration should communicate a clear message to teachers about their expectations. "The principal should be more involved in a school district's technology integration initiative so teachers know what they are expected to do with new technologies" (Vu, 2013, p. 67). Gerger (2014) disagreed and found that too much planning could be counterproductive, writing "implementation is really about lessons learned along the way and the ability to make adjustments on the spot" (p. 143).

Professional development. Valstad (2011) warned that a consideration when implementing iPads is that they require extensive training to transform educational practices. Thorough and timely professional development was a key in Johnson's (2013) work to get teachers to utilize the technology in their classrooms. Not surprisingly, Valstad (2011) and Chou, Block, and Jesness (2012) wrote that teachers felt they needed more professional development and time to prepare for classes. Clarke and Svanaes (2012) found that 72% of the teachers wanted more training in how to use tablets in their teaching. Gerger (2014) reported that effective strategies learned in professional development minimized the initial classroom management challenges.

Transformation. Hamilton (2014) found that teachers enacted one of three different types of change with the iPad: 'Adding On,' 'Combining,' or 'Remaking.' An example of Adding On is converting a hardcopy worksheets and handouts to electronic versions. Puentedura (2012) would classify this as Substitution. An example of Combining is adjusting a previous assignment to include multimedia elements on the iPad. Combining is equivalent to Puentedura's (2012) description of Augmentation. An example of Remaking is using the Internet capability of the iPads to expand the students' audience and offer new ways to demonstrate knowledge and understanding. Remaking would be equivalent to Puentedura's (2012) Modification or Redefinition. In Hamilton's study, psychology (AP) and chemistry teachers had to prepare students for an end of the year test and therefore did not employ the iPads much as they might have in other settings, which may limit examples that correspond to Puentedura's work.

In contrast, it is important to note that not all schools need to implement

technology to develop higher order thinking or student-centered or constructivist learning. Pettit (2014) discussed a high school that did not change as a result of iPad adoption. Pettit reasoned that the school already had a constructivist learning environment (project-based work) and therefore the school did not change to take on a more constructivist pedagogy.

Just using an iPad does not necessarily improve pedagogy. Richard Brecht of the National Foreign Language Center warned that technology should not be seen as a "magic bullet" (Maxwell, 1998, p. 22). That is, technology should not be thought of as a solution for all problems in the classroom. Nor should it be implemented without planning by administration or teachers. Lightner, Bober, and Willi (2007) explained that technology can be used in a very clerical manner; it can be used solely for information access and distribution, which does not mandate that information needs to be internalized or incorporated into new, creative ideas. For example, an iPad can be used to search for information and write documents that would not lead to a deep understanding for a student (Black, 2009; Ranker, 2008). Also, iPads can be used in the same way as reading a book if students are simply asked to complete exercises after viewing/reading or simply recall what they viewed (Rowe, 2014). Saettler (1990) emphasized how "technologies do not mediate learning, but that knowledge is mediated by the cognitive process produced by technologies" (p. 453).

Design features. The iPad is a portable device that allows users with permission to have access to classroom resources (Alberta Education, 2012; Goodwin, 2012; Valstad, 2011). Goodwin (2013) wrote that iPads have an intuitive design, simple

interface, touch screen functionality and multimedia capabilities. Alberta Education (2012) agreed, stating that iPads have a very short learning curve. Churchill, Fox, and King (2012) wrote that the iPad improved organization through apps that allow for access to class websites such as Schoology and Moodle. There were also apps that could help with storage such as Dropbox and Google Drive. Furthermore, the Churchill, Fox and King (2012) described apps that can help with information access such as iBooks, YouTube, iTunesU, and Kindle. Pettit (2014) found that having the videos available online for students also made teachers' jobs easier and made teachers feel more effective.

Alberta Education (2012) identified a propriety limitation with the iPads. Apple limits how customers interact with their software, so participants in the study found that purchasing and sharing apps was difficult. Also, iPads do not allow for distinct users (Alberta Education, 2012). That is, Apple expects every user that interacts with the iPad to have the same experience. Participants noted difficulties integrating their iPad into the management system or a managed network paradigm in the schools. iPads were designed to be standalone devices and do not adapt well to these environments as "iPads work best in a one-to-one setting" (p. 14). Kaciupski (2013) found that the Dropbox app allows students to store their files in unique accounts, which helps resolve the issue of a shared account.

Teachers felt a limitation with iPad-use was device management in the Alberta Education (2012) study. Teachers preferred more control over what students could access. Johnson (2013) wrote that parents had a similar concern. They felt the device was being used more for entertainment than for learning. One recommendation was that the

device be left at school so parents did not have to patrol the device. Valstad (2011) found that there were too many restrictions with the iPad in schools, i.e., websites being blocked. The teachers felt this was a huge detriment to utilizing the iPads for class.

Use of iPads in the classroom. iPads have affected learning in the classroom. Changes include differentiated instruction, as well as motivation and engagement of students. Furthermore, the iPads have influenced the teachers' role in the classroom.

Learning with iPads. Larry Cuban, professor emeritus at Stanford University warned, "iPads are a marvelous tool to engage kids, but then the novelty wears off and you get into hard-core issues of teaching and learning" (Clark & Luckin, 2013, p. 5). Yet, the literature seems to support specific advantages of the iPad for student learning. One advantage of iPad integration is active engagement on student-centered activities (Chou, Block, & Jesness, 2012; Clarke & Svanaes, 2012; Goodwin, 2012). Johnson (2013) wrote that the iPad improved organization, including multi-tasking, planning, and note-taking. Furthermore, Johnson found that with the iPad came higher grades, enhanced learning, and the acquisition of more technology skills. Overall, parents, teachers, and students believed that the iPad program improved student learning (Edgar, 2013; Johnson, 2013). Students perceived that the iPad program has allowed for more creative and more hands-on project-based learning (Chou, Block, & Jesness, 2012; Johnson, 2013).

Students used the iPads to research up-to-date information (Chou, Block, & Jesness, 2012; Goodwin, 2013). Vu, McIntyre, and Cepero (2014) described how after students accessed information online, teachers asked students to use the gathered information in order to write a report or to present the findings in front of the class. This

allowed students to demonstrate their research and application skills.

The iPad encompasses many tools that work well for the classroom (Churchill, Fox, & King, 2012). There are apps that can help with productivity such as word-processing, NotesAnytime, Mail, and iMovie. The researchers described apps that can help with communication such as Facebook, Skype, and FaceTime. Clarke and Svanaes (2012) found that iPads facilitated faster student feedback and communication with their teacher. Goodwin (2012) found that iPads improved face-to-face and online collaboration among students. Goodwin (2012) suggested that one-way learning was improved through the use of apps to help scaffold information.

Contrasting digital and traditional students, Garcia (2011) researched students who used iPads with the Explore 9/11 app, an application about the 9/11 terrorist attacks that uses first person interviews. The non-iPad group read transcripts from the audio accounts on the app. Both groups filled out a graphic organizer and took a pre-and post-tests. The students in the treatment groups scored higher than their respective control group. The iPads seems to foster more collaboration and cooperation than was present in the control groups. The focus on a single application limited the study and it is not generalizable to other apps, but the findings were interesting despite these limitations.

A complaint Valstad (2011) raised was the lack of educational content for the iPad. Chou, Block, and Jesness (2012) agreed that there was a lack of apps for specific content areas and Goodwin (2012) described a lack of educational apps to leverage the unique attributes the iPad provides, such as a gyroscope and accelerometer. Despite these concerns, Clarke and Svanaes (2012) found that, overall, teachers were in favor of

adopting tablets in schools as they believed they improved learning.

Differentiation. Teachers' ability to easily differentiate instruction on iPads allows for personalized learning (Goodwin, 2012). There are multiple ways for students to access the curriculum and they can access information on their own and at a faster pace (Chou, Block, & Jesness, 2012). Additionally, students can demonstrate their understanding through different multimodal forms (Alberta Education, 2012; Goodwin, 2012). iPads can beneficial for dyslexic pupils who could "increase the font size for texts to de-clutter their vision" (Alberta Education, 2012, p. 8). Visual learners benefit from apps such as StoryKit, StoryPatch, and Proloquo2go that help students write. English language learners (ELLs) are able to take advantage of the audio features of the iPad.

Tablets support a range of enhanced assessments as well (Alberta Education, 2012; Valstad, 2011). iPads allow individualized assessments to take place through the use of Google forms, e-Clicker, and Edmodo (Alberta Education, 2012). Performance-based assessments using e-portfolios on the iPad give teachers a means to support summative assessments. The iPad is also catalyst for more creative endeavors through the use of its video and still cameras and voice recording abilities (Goodwin, 2012), providing new opportunities for students to demonstrate their learning in conjunction with a range of multimedia.

Engagement and motivation. iPads were found to improve motivation and engagement (Alberta Education, 2012; Gerger, 2014; Goodwin, 2012). Vu's (2013) study found that one-hundred percent of teachers agreed that the iPad was motivating for students. Pettit (2014) wrote that students wanted to use the iPads more often and for

more authentic uses. Valstad (2011) found that motivation among many of the students moderately increased and surmised this was mostly because of the use of mind maps, "iPad's playfulness and tactile feedback" (p. 120), and opportunities to access required reading more easily. However, Edgar (2013) found no significant effect on iPad integration on satisfaction of students.

The teacher's role. As has been discussed, the role of the teacher is central to any classroom initiative. Goodwin (2013) cautioned that the affordances of the iPad "were actualized because of the ways in which the teachers deployed the devices and embedded them in authentic and rich learning experiences" (p. 6). In general, teachers stressed the use of iPads as a digital resource and not as the only resource in a larger system of support for teachers and students (Alberta Education, 2012).

Vu, McIntyre, and Cepero (2014) found that some teachers did not like using iPads in the classroom, predominantly those who did not use the one-to-one model. All of the participants in Vu, McIntyre, and Cepero's (2014) study did recommend that a colleague try out the iPad for himself or herself.

Math and science teachers were more likely to use instructional technology than members of all other departments combined in Rowe's (2014) work. Possible explanations included the department head's status as a former technology coach and therefore pushing the initiative. Rowe also found that status as a willing participant may play a role in how successfully a person implements new technology. There was no significant relationship between a teacher's education level and the frequency with which they use technology for instructional purposes in Rowe's work.

Summary

Chapter two outlined the relevant literature for this study. As Jameson High School is an urban school, it was important to understand the uniqueness of that environment for the study. First an explanation of an urban school was given along with research on technology-use in an urban setting. Next there was a review of one-to-one initiatives, specifically bring your own device (BYOD), laptops, and iPads. All of these implementations have advantages and disadvantages and are still being employed today. Chapter three will explain the methods and procedures needed to conduct this one-to-one study of iPads in an urban school.

CHAPTER THREE: DESIGN METHODS AND PROCEDURES

The purpose of this qualitative study was to apply the lessons learned from the Apple Classrooms of Tomorrow studies, the SAMR model, and Diffusion of Innovations theory to explore stakeholder perceptions of iPad integration at an urban high school in Massachusetts. In particular, this study examined teaching and learning approaches, teacher and student perception of the iPad program implementation, as well as perceptions of flipped learning. The study site, Jameson High School (JHS), implemented a one-to-one iPad initiative. A one-to-one initiative is concerned with providing one technology device with Internet access to every administrator, teacher, and student (Bundy, 2013). This study was conducted after all the students at JHS had used a school-provided iPad for at least one school year to understand how the iPad was being used for teaching and learning.

The research questions that guided the study included:

1) How are iPads being used for teaching in an urban instructional setting?

2) How are iPads being used for learning in an urban instructional setting?

3) What are teachers' perceptions of the iPad implementation?

4) What are students' perceptions of the iPad implementation?

5) How do students perceive the flipped learning initiative?

6) How do teachers perceive the flipped learning initiative?

To answer these questions about perceptions of the program, a qualitative approach was used. Specifically, data was gathered through interviews. The purpose of interviewing "is to allow us to enter into the other person's perspective" (Patton, 2002, p. 341). Through

qualitative interviewing, one interviews to "find out what is in and on someone else's mind, to gather their stories" (p. 341).

Teachers and students were interviewed and observed; administrators were interviewed. Individual interviews and group interviews (focus groups) were conducted to learn the students', teachers', and administrators' perspectives on the program. The majority of the research questions dealt with teacher and student perspectives on the issues of iPad use, iPad implementation, and flipped learning. Administrators were asked to share their experiences and reflections as a way to verify accounts of the teachers and students and to add additional insights into how students and teachers were using the devices. Additionally, observations took place to see how classes were being conducted now that iPads are a part of the pedagogy and also helped triangulate the data.

Population and Sample

This study explored the perceptions of the administrators, teachers, and students. All full-time faculty at Jameson High School, including teachers, substitutes, and administrators, were invited to participate in this study. All junior and senior students whose advisory teachers chose to be involved were eligible to participate. Upperclassmen were chosen as they had experienced high school with the iPad and without it and could therefore speak about both experiences.

Data Collection

Data was collected through interviews, focus groups, and observations.

Teacher and Administrator Interview

The Assistant Principal forwarded an invitation (see Appendix I) to all teachers via email looking for participants. A follow-up email was sent by the Assistant Principal to try to entice more to join. The follow-up email was a reforwarding of the initial email (see Appendix I). Forty-eight full-time faculty including teachers, substitutes, and administrators at Jameson High School volunteered to be interviewed. A consent letter was read and agreed upon as per the requirement of the IRB prior to the start of the interviews (see Appendix E: Administrators; Appendix G: Teachers). The researcher followed a one-on-one interview/focus group guide (See Appendix B: Teachers; Appendix C: Administrators). The interviews and focus groups lasted between 20–40 minutes. All of the conversations were recorded with a digital audio recorder, transcribed, and coded into themes. There was a gift certificate raffle for teachers who participated.

Teacher Focus Groups Interviews

Teachers were invited to participate in focus groups through the Letter to PLG (see Appendix H). PLG stands for Professional Learning Group and is a meeting of subject teachers. Teacher focus groups consisted of nine groupings of teachers. Freshman teachers met by themselves according to subject area. The rest of the school met by subject area. The focus groups met one time per department (Departments include: mathematics, English, science, social studies, foreign language, English as a second language, special education, technology, freshman mathematics, freshman English, freshman science, and freshman history). The focus groups took place during department meetings and lasted up to 30 minutes each. The researcher followed a one-on-one

interview/focus group guide (See Appendix B). During this meeting, the researcher reminded teachers about the possibility for classroom observations and meetings with junior and senior advisories. At the start of the meeting, the researcher read a consent letter and asked those who wanted to participate to agree as per the requirement of the IRB (see Appendix G). The researcher recorded the focus groups with a digital audio recorder, transcribed conversations, and coded the data into themes. Bagels were provided for all who were present.

Student Focus Groups Interviews

Advisory teachers were asked to have their advisory students participate. Advisory time is the first period of the day in which students meet in groups with their advisory teacher and discuss topics on a variety of subjects including, college applications, financial literacy, students' grades, current events, and happenings in the students' lives. Twenty groupings of students (6 seniors, 8 juniors, and 6 mix). These groups consisted of about 12–15 students each. Students were asked to verbally assent/consent (see Appendixes D and F). The Institutional Review Board approved a Waiver of Documentation of Consent that allowed for the verbal consent from all subjects, including children. These groups met one time during my prep period or during advisory for 20–30 minutes. The researcher followed a one-on-one interview/focus group guide (See Appendix A). The conversations were recorded with a digital audio recorder, transcribed, and coded into themes. Candies were provided for all who were present.

Classroom Observations

Teachers were invited to have their classrooms observed through the Letter to

Staff (see Appendix I). Nine teachers accepted. The observations took place during an entire class period (1 hour and 20 minutes). The researcher took detailed notes of the lesson, and information related to iPad usage. The teachers were selected based on whether they taught a class when the researcher was available. A $5 Dunkin' Donuts Gift card was provided for the teachers who participated.

Instrument

Patton (2002) wrote that in order to maintain consistency with questioning, an interview guide should be used. An interview guide was designed to answer the research questions that focused on the implementation of the iPad at the high school for students (see Appendix A), teachers (see Appendix B), and administrators (see Appendix C). The questions were appropriated from other research related to technology use in the classroom, as detailed below. As Patton explained, the interview guide provides questions from which the interviewer is free to branch out from to delve further into an issue or ask clarifying questions as needed. Technology used and how it was described was then compared to the ACOT findings and classified based on the SAMR model and the Diffusion of Innovation theory.

The interview guides were compiled and tested with a pilot group of students, teachers, and administrators. Changes were made based upon feedback from pilot interviews and scholars in the topical area. Below are the student, teacher, and administrator questions in the context of the research questions they aimed to answer and the research from which they were derived.

Student Questions

RQ1) How are iPads being used for teaching in an urban instructional setting?

- How do your teachers use the iPad in class (Goodwin, 2012; Vu, 2013)?
- Thinking back to before the iPads, what, if anything, has changed in the school culture since the introduction of iPads (Clarke & Svanaes, 2012; Cox, 2014; Hamilton, 2014; Niles, 2006; Travis, 2013)?

RQ2) How are iPads being used for learning in an urban instructional setting?

- Are iPads being used to their full potential in the classroom? Please explain (Strother, 2013).
- Thinking back to before the iPads, what, if anything, has changed in the school culture since the introduction of iPads (Clarke & Svanaes, 2012; Cox, 2014; Hamilton, 2014; Niles, 2006; Travis, 2013)?
- Are iPads being used to their full potential in the classroom? Please explain (Strother, 2013).
- How do you use your iPad in class? Does this differ from how you used to do classwork (Strother, 2013)?
- How do you use your iPad for homework? Does this differ from how you used to do homework (Strother, 2013)?

RQ4) What are students' perceptions of the iPad implementation?

- Are iPads being used to their full potential in the classroom? Please explain (Strother, 2013).

- Do you feel that your behavior in the classroom has changed as a result of the iPad program (Goodwin, 2012; Jones, 2014)?
- Do you have any concerns with iPad use in the classroom (Branch, 2014; Broussard et al., 2014; Valstad, 2011, Strother, 2013; Whicker, 2012)?
- If you were to be given the authority over the iPad program, what would you do to improve it (Strother, 2013)?

RQ5) How do students perceive the flipped learning initiative?

- What do you think about the flipped classroom (Branch, 2014; Snowden, 2012)?
- How do you use your iPad for homework? Does this differ from how you used to do homework (Goodwin, 2012)?

Students over 18 years old were given a consent letter (see Appendix F) and students under 18 were given an assent letter (see Appendix D) via an email to the advisory teacher who distributed the letters prior to meeting. Physical copies were also presented at the interview. Students under 18 were also given a Parental Informed Consent form (see Appendix J). Additionally, the researcher read through the Student Assent Form (see Appendix D) at the start of the interview session. All students were asked to verbally agree to be in the study. Students who did not wish to participate in the study were invited to listen to the discussion.

Teacher Questions

Questions for Background Information

- What class(es) do you teach (Strother, 2013)?

- How many years have you been teaching? At Jameson High School (Strother, 2013)?

RQ1) How are iPads being used for teaching in an urban instructional setting?

- How do you choose apps for your class (Goodwin, 2012; Vu, 2013)?
- Thinking back to before the iPads, what, if anything, has changed in the school culture since the introduction of iPads (Clarke & Svanaes, 2012; Cox, 2014; Hamilton, 2014; Niles, 2006; Travis, 2013)?
- What were your initial goals when implementing the iPad in the classroom? Were you successful in achieving these goals (Clarke & Svanaes, 2012)?

RQ2) How are iPads being used for learning in an urban instructional setting?

- Thinking back to before the iPads, what, if anything, has changed in the school culture since the introduction of iPads (Clarke & Svanaes, 2012; Cox, 2014; Hamilton, 2014; Niles, 2006; Travis, 2013)?
- How, if at all, do iPads aid in the learning process (Branch, 2014; Broussard et al., 2014; Strother, 2013; Whicker, 2012)?
- How do your students use their iPads in the classroom? Outside of the classroom (Strother, 2013)?

RQ3) What are teachers' perceptions of the iPad implementation?

- What were your initial goals when implementing the iPad in the classroom? Were you successful in achieving these goals (Clarke & Svanaes, 2012)?
- What are some of your concerns with iPad use in the classroom (Branch, 2014; Broussard et al., 2014; Valstad, 2011, Strother, 2013; Whicker, 2012)?

- How has student behavior been affected by the iPad program (Goodwin, 2012; Jones, 2014)?
- How did you feel about the professional development around the iPads? What other ongoing professional learning opportunities are needed, e.g. access to a blog or regular workshops (Branch, 2014; Goodwin, 2012; Jones, 2014; Valstad, 2011; Vu, 2013)?
- What technical problems/pitfalls have you encountered with the iPad in the classroom? How have you dealt with these (Strother, 2013)?
- Have you found administration to be supportive/forthcoming with respect to the iPad initiative and what is expected? Please elaborate (Jones, 2014; Vu, 2013).
- If you were to be given the authority over the iPad program, what would you do to improve it (Strother, 2013)?

RQ6) How do teachers perceive the flipped learning initiative?

- How do students use their iPads outside your classroom (Goodwin, 2012)?
- How has flipping the classroom affected the culture of teaching and learning (Branch, 2014; Snowden, 2012)?

Administrator Questions

Questions for Background Information

- How many years have you been an administrator? Teacher? At Jameson High School (Strother, 2013)?

RQ1) How are iPads being used for teaching in an urban instructional setting?

- How do you choose apps for your class (Goodwin, 2012; Vu, 2013)?

- Thinking back to before the iPads, what, if anything, has changed in the school culture since the introduction of iPads (Clarke & Svanaes, 2012; Cox, 2014; Hamilton, 2014; Niles, 2006; Travis, 2013)?
- What were your initial goals when implementing the iPad in the classroom? Were you successful in achieving these goals (Clarke & Svanaes, 2012)?

RQ2) How are iPads being used for learning in an urban instructional setting?

- Thinking back to before the iPads, what, if anything, has changed in the school culture since the introduction of iPads (Clarke & Svanaes, 2012; Cox, 2014; Hamilton, 2014; Niles, 2006; Travis, 2013)?
- How, if at all, do iPads aid in the learning process (Branch, 2014; Broussard et al., 2014; Strother, 2013; Whicker, 2012)?
- How do students use their iPads in the classroom? Outside of the classroom (Strother, 2013)?
- What are some of your concerns with iPad use in the classroom (Branch, 2014; Broussard et al., 2014; Valstad, 2011, Strother, 2013; Whicker, 2012)?
- How has student behavior been affected by the iPad program (Goodwin, 2012; Jones, 2014)?

RQ3) What are teachers' perceptions of the iPad implementation?

- How did you feel about the professional development around the iPads? What other ongoing professional learning opportunities are needed, e.g. access to a blog or regular workshops (Branch, 2014; Goodwin, 2012; Jones, 2014; Valstad, 2011; Vu, 2013)?

- If you were to be given the authority over the iPad program, what would you do to improve it (Strother, 2013)?

RQ6) How do teachers perceive the flipped learning initiative?

- How are students using their iPads in the classroom? Outside of the classroom (Goodwin, 2012)?
- How has flipping the classroom affected the culture of teaching and learning (Branch, 2014; Snowden, 2012)?

Recorded interviews were stored in a digital file on a password-protected computer. The desk drawer where the audio recorder was stored required a key. The backups of these interviews were stored on Google Drive accessible only by the researcher. The transcription of the interviews was also stored on a password-protected computer. The names of the interviewed and observed were coded and the master file was stored on a password-protected computer. If a classroom subject was identifiable, for instance, only one teacher had an AP physics class, then that classroom was described as a science classroom to increase anonymity.

Trustworthiness

A study is deemed trustworthy if it has credibility, transferability, dependability, and confirmability (Lincoln & Guba (1985). They defined the following terms: Credibility involves having confidence in the 'truth' of the findings. Transferability involves showing that the findings can be used by others. Dependability involves showing that the study could be repeated. Confirmability is the extent to which researcher

bias has been removed and the findings are therefore accurate.

Credibility

Two of the ways this study gained credibility was through triangulation and member checking. Data was triangulated by studying different subsets of participants — administrators, teachers, and students — in an attempt to gain a greater insight to iPad-use in the classroom. Interviews were used to verify participants' accounts of how they used the iPad. Member checking was used by having all of the teachers and administrators who were interviewed and/or participated in the focus groups review transcripts of the conversations to verify its accuracy. Students were not asked to verify their respective transcripts, as many of the interviews were not transcribed until after students had graduated.

Receiving approval from the Boston University Institutional Research Board prior to collecting data also increased this study's credibility. By outlining the research and demonstrating compliance with University policies, the board granted approval. Additionally, the researcher met with the Principal of Jameson High School and the Assistant Superintendent to ensure this research could be conducted. As requested by the IRB, the Principal and Assistant Superintendent submitted letters of support.

Transferability

Cohen and Crabtree (2006) wrote that thick description is a way to help with the transferability of a study, improving its use by others. Thick description is a detailed account of the setting (Cohen & Crabtree, 2006). Chapter four's thick description of the demographics of JHS as well as a timeline of events of the iPad initiative aid in a reader's

determination about the transferable to other schools and settings.

Dependability

Dependability can be determined based on an external audit (Cohen & Crabtree, 2006), which involves having a knowledgeable source review the process of the research study. For this study, a dissertation committee composed of three professors reviewed the methods of the study. Also, the interview questions were approved by the dissertation committee and reviewed by graduate students in a School of Education graduate research course.

Confirmability

Confirmability of a study is increased by the creation of an audit trail. Cohen and Crabtree (2006) wrote that method of developing an audit trail, or evidence of the steps taken, is to save the data. Original audiotaped interviews were saved for review if necessary, along with the codebook for interview classification. Transcribed interviews were shared with the participants to verify. The final write-up of the study will be given to administration, teachers, and students who request it. Names were not included to protect anonymity.

Data Analysis

The interviews and focus groups were transcribed and entered into a qualitative analysis software program called nVivo. This software aided in coding, annotating, and analyzing the data for any trends. The data were analyzed for common themes, which formed major categories and the minor categories that followed. This process involved

classifying bigger ideas and recurring themes, consolidating these topics, creating overarching themes, and revisiting the data to reclassify themes. A codebook (see Appendix K) of themes was created as they emerged. After all of the interviews had been read and the data had been classified into groups, the researcher returned to the literature review to gain further insights into the findings.

The observations were used to verify what the teachers and students said matched what was happening in the classrooms. The researcher observed classes and took notes on the setting, i.e. how the room was arranged, what was written on the walls, how the iPads were being used by teachers and students, and the duration of each activity. Contradictions between what was said and what transpired in the classroom were noted. Teachers or students were asked to clarify their statements or actions when necessary.

Once the themes had been identified, the researcher returned to the ACOT, SAMR, and DOI research to anchor the findings within previous theory and research.

Timeline of Activities

Data collection took place between May 20 and June 30, 2014. Some of the activities of this study overlapped. For instance, weeks of interviews, focus groups, and observations overlapped. In total, this study including development of this document took 18 months. The timeline is presented in Table 1.

Table 1

Timeline of Activities

Task	Duration
Achieve entry into the school for this study through a discussion and a letter of support signed by the Principal and Superintendent.	1 day
Have the Assistant Principal send out an email to encourage teachers to join the study.	1 day
One-on-one interviews with full-time faculty including teachers, substitutes, and administrators at Jameson High School.	6 weeks
Have the Assistant Principal send out a reminder email to encourage more teachers to join the study.	1 day
Interviews with the teachers who did not respond at first, but do respond due to the Assistant Principal's second request to participate. Same protocol will be followed as those who responded to the initial interview request.	3 weeks
Focus groups with students	2 weeks
Focus groups with teachers	4 weeks
Interviews with the administration	3 weeks
Classroom observations	5 weeks
Coding, Analysis, and writing	90 weeks

Researcher Perspective and Bias

The researcher works at Jameson High School as a full-time computer teacher, but was not involved in bringing iPads to the school. Teaching classes where students use the iPads and seeing the students use iPads in class was part of the impetus for this research. After being given an iPad to use in the classroom, the researcher formed opinions on the usefulness of this device. Because the researcher's classroom is a computer lab with a one-to-one desktop computer (connected to the Internet) ratio, at first

the researcher did not find iPads to be very useful. Usually, if a student was using his or her own iPad, they were off-task. The researcher found behavior management difficult with the iPads. The researcher's instinct was to take them away, though students could potentially use them for school, i.e. look up a project rubric on the iPad while working on the desktop computer.

However, the researcher preferred to not take the devices away for two reasons: 1) Students would need them for a future class and 2) The researcher would be collecting iPads on a daily basis. The researcher began this study from the position that teachers can utilize iPads for learning, but was unsure of how they were being used by other teachers throughout the school. This curiosity led the researcher to decide to study iPads at Jameson High School.

During the latter half of last school year, while the researcher was collecting data and devising the study, the researcher implemented the iPads more into the classroom and has found them to be helpful for disseminating information and having students submit work from school and home. Communication with students is easier; the researcher can send an email or an update through the class Learning Management System (LMS) known as Schoology.

In order to combat potential bias due to the researcher's position at the school and initial impressions of iPad use, knowledgeable scholars reviewed the interview protocol to ensure questions were open-ended and not leading. The researcher encouraged the participants to express their views without my influence on their answers.

Being an insider at Jameson High School had some advantages. Chavez (2008)

wrote about easier access to participants and expediency of rapport building while interviewing. Also, Chavez wrote about detection of participants' actual behavior versus their performed selves. The researcher found that in those respects, working in the district was helpful.

The researcher's doctoral studies at Boston University in the Educational Media and Technology program have shaped the researcher's world view. A focus of the program is to study educational technology in a historical context with an emphasis on technologies' role in education through a researched perspective. To distill the program into a single statement, it is not the technology that matters, but rather the teacher. The researcher was primed to know the iPad will not be a magic bullet for education, but instead was curious if and how the teachers utilized it. This framed the research in a way that minimalized the role of the technology in this one-to-one initiative and focuses more on the people involved.

Limitations

One constraint of this study is the potential researcher bias because the researcher worked within the district where the research occurred (Fitzpatrick, Sanders, & Worthen, 2004). The potential to influence the study by picking certain teachers with whom the researcher had relationships was possible. To combat this bias, all administrators and full-time teachers in the high school were invited to participate. This study was framed as a chance for teachers to have their voices heard on the subject of iPads and school culture. Based on informal conversations with teachers, this was a welcome project and the topic

itself enticed participation. Also, to try to minimize other bias related to my working within the district, the researcher met with advisor, Professor Bruce Fraser, to gain an outsider's perspective.

There was no funding associated with this research as the district already had iPads and therefore there was no concern of specific results viewing the initiative favorably or unfavorably. Gift certificate honorariums were funded by the researcher independently."

Delimitations

This study was open to all administrators, teachers, and junior and senior students at the high school. Parents were excluded from this study as the iPad users' perspectives were sough and parents were outside observers. Freshmen and sophomore students were excluded from the interviews and focus groups as they were not in the high school before the use of iPads and therefore could not speak from experience about the time before the implementation.

Summary

Chapter three presented the design of the study—qualitative research using an interview guide at an urban high school with students, teachers, and administrators. The study was open to all full-time faculty—teachers, substitutes, and administrators—and junior and senior students. Interviews, focus groups, and observations were used. The interview guide used open-ended questions related to the research questions. The research

questions dealt with how the iPads were being used, perceived benefits and challenges of using the iPads from the teachers' and students' perspectives, teachers' perceptions of the iPad implementation, and teachers' and students' perceptions of the flipped learning initiative. The results were coded into major categories and the minor categories that followed. The results were interpreted through the lens of the ACOT studies, SAMR model, and DOI theory to gain insight into an iPad implementation.

CHAPTER 4: FINDINGS

Context

The iPad implementation took place amid many changes at Jameson High School (JHS) initiated in preparation for school accreditation from the New England Association of Schools and Colleges (NEASC). NEASC requirements included school-wide rubrics and a student advisory period. Other changes—block scheduling and Professional Learning Groups (PLGs)—were implemented to help facilitate these two major changes. The implementation of iPads was not required by NEASC, but took place within the larger timeline.

During the accreditation process, the Freshman Academy was started. Freshman Academy was a section of the high school that was dedicated to only freshman classes. The administration separated freshman in an attempt to create a culture of pride and support. The iPads were piloted in the Freshman Academy for a year before being deployed to the rest of the school. In order to place this research in the context of these measures, a timeline of these activities is presented below, followed by an explanation of the events, and then the findings of the research.

Timeline of the JHS iPad Initiative

SY2011–2012

Fall 2011	Freshman Academy started
May 2012	Central Office approved committing funds for a trial of iPads for all 9th graders for SY2012–2013
Summer 2012	iPads given to all teachers and Freshman Academy students.

SY2012–2013

Fall 2012	Freshman Academy piloted one-to-one iPad initiative.
SY 2012–13	Freshman Academy teachers explored and experimented with pedagogy and applications for creating Student-Centered learning environments in their classrooms.
Winter 2012	A technology team was assembled to discuss support needs for faculty for teaching with iPads.
Jan 2013	A survey was administered to all 9th grade students, their parents, and all Freshman Academy teachers.
Feb 2013	A Freshman Academy teacher presented on iPads to the Superintendent.
Mar 2013	Central Office approved committing funds for a full-scale iPad distribution for SY2013–2014.
Apr 2013	JHS awarded Nellie Mae 20-month planning grant to explore Flipped Learning approaches
Apr 2013	The technology team explored the feasibility of JHS students in a bring your own device (BYOD) environment and concluded one-to-one (iPads) device were more equitable and manageable.
May 2013	A second survey was administered to all 9th grade students and Freshman Academy teachers.
June 2013	A team of JHS teachers travelled to Minnesota for “FlipCon” conference to learn about the flipped classroom pedagogy.

June 2013 A team of Freshman Academy teachers planned and facilitated a 2-day professional development for all JHS teachers.

Summer 2013 The JHS Technology Department upgraded the building bandwidth to meet anticipated demand.

Aug 2013 The Technology Department prepared and loaded 1,600 iPads in preparation for the full-scale distribution.

SY 2013 – 2014

Fall 2013 Pearson Professional Development provided trainings for JHS teachers.

Spring 2013 Interviews and focus groups were conducted with teachers, administration, and upperclassmen.

(J. Michaels, personal communication, September 30, 2013).

The administration at Jameson High School (JHS) uses professional development to help the teachers be successful during times of change. Workshops were used to support the change initiatives at the high school preceding this study. Some freshmen teachers, researched flipped learning and brought the idea to JHS. Once the model was approved, the administration hired Pearson, an education resource company, to provide professional development on flipped classrooms. All teachers attended a two-day professional development training. Additionally, administration selected some teachers to attend FlipCon, a professional development conference in Minnesota. Those teachers were willing to offer best practices during future school professional development. At the end of the 2013 school year, when the Freshman Academy had finished piloting the iPads, the Freshmen teachers provided a school-wide professional development where they shared

their experiences, taught specific apps, shared best practices, and answered questions.

Freshman Academy teachers, students, and parents were surveyed and the results were presented to the Superintendent by a Freshman Academy teacher. Based on the results of the survey, the Superintendent deemed the iPad pilot a success and moved forward with purchasing iPads for the remainder of the student body. At the end of one school year once everyone had iPads, this study began using interviews, focus groups, and observations.

Through qualitative data analysis, this study sought to answer the following questions: 1) How are iPads being used for teaching in an urban instructional setting?, 2) How are iPads being used for learning in an urban instructional setting?, 3) What are teachers' perceptions of the iPad implementation?, 4) What are students' perceptions of the iPad implementation?, 5) How do students perceive the flipped learning initiative?, and 6) How do teachers perceive the flipped learning initiative?

After data were collected and analyzed, five themes emerged from the data. These themes are communication, control, distraction, division, and workflow. Each were placed into the context of the question(s) it purported to address and are listed below.

Question 1: How are iPads Being Used for Teaching in an Urban Instructional Setting?

This study collected evidence of how iPads are being used for teaching in an urban instructional setting in order to address the first research question. Through interviews, observations, and focus groups, a number of themes emerged from the data.

These included communication and instruction workflow.

Communication for Teaching

Data collected suggests that a great deal of communication happened between teachers and students with the iPads. Communication was coded as the way or the amount that people exchange ideas either verbally or digitally. The iPads have made teachers and students more accessible to each other. As a student explained, “We email the teacher a lot more. You’re in contact more. It’s more connected.” An English teacher said, “I am in constant contact with my students.” A Freshman Academy English teacher added, “They’ll communicate with me even during class. So we could be discussing something, but I could have the iPad on for quick emails back and forth.”

A history teacher found that the iPads enabled him to meet with the students more face-to-face:

> As I started to track it, there were many days that I talked to every kid, every day. And most days, it was most kids. That sort of surprised me. I think having them work with the tech tools that they have in class more project-based, more group activities like that has allowed me to get down and consult more with them and talk to them one-on-one.

Teachers and students communicated during the school day about events that take place afterschool. A teacher who runs an afterschool club found the access to his students to be very helpful: “Yesterday, we had an event that was last minute in Boston, so I was able to send messages to them during the day and get that organized and figure out who was going to go. So that was convenient.”

A vice principal commented that with the iPad, teachers and students "communicate beyond the bounds of the classroom." There are a few different ways for teachers and students to get in touch with each other including email and the Learning Management System (LMS), Schoology. An art teacher explained, "Instead of having to email them, you can just post on Schoology."

Teachers generally described an increase in the ease of contact and more open lines of communication. Teachers even communicated with students when the teachers were absent. A vice principal thought that teachers were proactive with respect to setting up assignments for students to do on Schoology, the school sponsored website that teachers can customize for their classes, regardless of whether there was a substitute. "I've heard the teacher say, 'I'm going to be absent tomorrow so make sure you log onto Schoology, there is something on Vietnam that you need to complete.'"

A social worker kept in touch with students through the iPad as well. "Kids will email on the weekends and can email me during the day. So it is no more of the coming to my door and waiting and being late for class. It streamlines the communication." The social worker explained students have an open line of dialogue to school personnel, adding another adult to help them with personal issues. The iPad provided a line of communication. "It's nice when a kid feels like they can send me an email and have hope that tomorrow at 8 o'clock I have my social worker so I'm going to be fine."

Instruction Workflow

Instruction underwent some changes with the introduction of the iPads. Instruction was coded as the way or the frequency that teachers provided curriculum

access and differentiate instruction. These included subthemes of content access, differentiated instruction, immediate feedback, organization, teacher's role, and support tool.

Content access. Teachers changed how they provided access to the curriculum with the iPads. The teachers were proactive in setting up Schoology websites used for content delivery. A mathematics teacher explained, "Schoology is our hub, so I use that as my way of giving assignments, collecting assignments, going over any mistakes that they may have." On their websites, teachers added links, readings, PowerPoints, videos, documents, quizzes, calendars, discussions, and reminders, all for the purpose of enhancing education. Even textbooks were easier to access. A vice principal found iPads to be superior to textbooks in their ability to have up-to-date information: "It's very powerful when you have something like this in front of you that is up-to-date, accurate, and you can go anywhere with it."

Differentiated instruction. The iPad opened up opportunities for differentiated instruction. The students did not all receive the same materials so that teachers could better meet individual needs. For example, a video might help differentiate instruction, according to a teacher: "They [students] might need a different amount of time to get it done. So if I sent home direct instruction, they can stop the video, make notes, go back, and that's differentiated."

Another teacher explained: "What I do with that is some kids make a PowerPoint, some kids do an EduCreation, some kids make a movie, and they can use their iPad to create the presentation." A special education teacher added that students can personalize

the assignments with certain apps:

> Using some of the apps like Educreations and movie making, my kids are able to have their own voice and present some of their personal interests in class when normally they wouldn't have been.... Where their communication is low anyway we try to use different apps that the teachers are using and show the students how to use them.

Similarly, a history teacher praised the iPad for its ability to differentiate:

> I was able to push out readings, 10 different sets of readings to pairs of kids, so that they could take on different characters in the scenario. One person was Kerry in one pair. Another pair was the Russian Foreign Minister, Lavrov. Another one was Assad. Another was the leader of the rebels. And all these different groups, and it was something that was so easy to do using the technology that made me excited about using it as the year went on and it went well. And it couldn't be more timely. The kids did a good job at it. It was just easy to differentiate. It was easy to send out a variety of different assignments at the same time.

"Kids figure out what they need," explained a Freshman Academy biology teacher. "They design their assignments to reflect their needs and then they produce products that are more personalized." The teacher went on to explain that he can ascertain what the students have done. For example, "You three did not watch the videos, so you are not doing dissections today. See ya, you are in the corner on your iPad."

A teacher explained that in the past, teachers differentiated lessons by devising

"different versions of it [a lesson] to address different learners in the classroom." The teacher went on to say that is still done, but that now students can use different apps that relate to the learners' style. To fulfill the expectation of the assignments, students can also choose what they want the teacher to assess. "I think students feel, or they have the capacity to at least feel respected and trusted a little bit more when they have the choice to choose the thing that they are going to be graded on."

The iPad granted teachers the ability to check for students' understanding and then allow the teacher to then differentiate the lesson accordingly. A special education teacher shared that she has her students watch a video and based on the results of questions about the video, the teacher can determine what the students need – remedial work or more challenging work. "In inclusion, where you have a lot of different levels, it's definitely helpful."

An English language learner (ELL) teacher described how, in an ELL classroom, having a resource that students can go to for their individual needs can be invaluable:

> So instead of, miss can you help with this, miss can you help with that, and I'm being pulled in different directions, I can just tell the kids, if you need help, there's a video on Schoology, just go to whatever station you are on. And there they get that explanation and it helps them focus on what they need to do and they can play back, they can listen again.

Differentiation also helps with students who are ready to excel in class beyond the current curriculum requirements. A special education teacher explained that teachers can now create a video before class for students who are ready to "learn it on their own and

move forward with the curriculum," freeing the teacher to help other students.

Immediate feedback. The iPad initiative seems to have increased the speed of feedback between teachers and students. An English teacher described the iPad as "a good communication system." The teacher went on to explain that the iPad is "a much faster way of communicating because for editing, my students email me at home and I can quickly edit it and send it back or give them a quick comment. So it's a good interactive dialogue."

Teachers described how the iPad was ideal for formative assessments, facilitating quick turnaround time with grading. An English teacher described how he would conduct a quick check for understanding with his students. This teacher would ask students to take screenshots of their annotations and send them to the teacher. This would let the teacher know who understood the material and who did not. "In that way, it made reading in class and at home a lot more personal and intimate 'cause we had more access to what that process actually looked like."

An administrator described teachers using the quiz capability of the iPad for a "ticket-to-leave-esque activity." A Freshman Academy science teacher found the quizzes allowed him to collect data quickly and this data could be used by either the teacher or the students to modify instruction and learning. An English teacher cautioned that as a result of the fast-paced culture, "the students' desire for instant gratification [with grades, with getting answers, with being entertained] has definitely increased."

Organization. The iPads seemed to aid in organizing the curriculum. A history teacher found Schoology to be a place to post content and plan lessons. This teacher

appreciated organizing all of his materials in one place. In the past, he used computer files and a filing cabinet for articles. An upperclassman shared that some teachers prefer all of the work uploaded to Schoology in order to keep themselves organized. This added an extra step for some students as they needed to digitize some of their work in order to upload it. The student shared, "So I would write down the notes, or write down the homework on a hard copy and I'd have to take a picture of it on NoteAnytime and send through Schoology." One teacher did not find a learning management system to be the ideal place for student work submissions. "For whatever reason, I'm not good at grading on Schoology — too easy to ignore, unlike the giant stack of papers on my desk." Further, a special education teacher had a hard time staying organized with the iPad:

> I was just curious what I had on there over the summer and I had found I had archived lots of stuff that's good. I didn't even remember that I had it. One of the problems that I have is it is so expansive—the new technology is so expansive that it is hard to keep track of what you are doing anymore. The organizational skills that I have don't seem to help. I'm not sure what to do about that yet.

Teacher's role. Data suggest that the iPads made teachers think about their pedagogy. An administrator said, "I think the iPad has teachers thinking. I think it has them wondering whether this tool can defuse into their everyday repertoire to a degree that makes them academically stronger." Teachers spoke about the teacher's role changing with iPads in the classroom and with the concept of 'flipping the classroom.' A teacher shared how "[teachers] act more as a facilitator because students can go straight to the iPads and find out what they should be doing on their own. They can work with

their groups." A history teacher described the teachers' role as "much more of a consultant" as students do more research than in the past.

Teachers believed the iPads in the classroom allowed for more one-on-one time to work with students. One teacher explained that by having student learn the content at home, teachers were free to delve deeper into the content or clarify the content from the videos in class. As teachers are met with more with students, a teacher confided, "It requires teachers to have more social skills and discussion skills themselves." This, a teacher said,

> … has made it more of a collegial environment. I think they [students] kind of look at the teacher as more of a team member rather than like the teacher; someone to bounce ideas off of, but they still recognize that they have to have a measure of distance from them too, in a way.

Having more discussions, a vice principal shared, allowed the teachers to know the students better:

> Teachers are able to help kids more than they ever could before. Give them the one-on-one attention that they normally wouldn't have gotten. When I go into a classroom, teachers know every kid, their ability, their strengths, their challenges. And they know the ways in which the student learns best. Because the kids are now able to show them. The change has just been so different.... It is great for the kids that need that one-on-one attention that usually they would just muddle through and sink or swim. But now they have that one-on-one attention that they need.

When the vice principal would enter the classroom, teachers were often working with students. In fact, sometimes the vice principal would have to ask, “Where is the teacher?” because the teacher was mixed in with the students.

According to an administrator, the teacher is needed for the iPad program to be a success. “[The iPad is] simply just a tool that is going to aid them. And with good teaching, the program will be successful.” An upperclassman agreed, “We would probably need a teacher catalyst in order to find out how we can use these iPads more effectively.” The student went on to add that the program is not where it should be, though. “Right now, I don't think we are using them [iPads] to their full potential.”

A teacher stressed that the content was the most important factor and the teacher’s role was to see how the iPad could help facilitate students reaching their learning goals. An upperclassman did not think that teachers were doing this. The student stated that as a result of the iPads, teachers did not have to do anything. “There is less things for them to do. If they give you an assignment, they can just sit back.”

A substitute teacher dreaded what would happen if people thought teachers were obsolete. The substitute feared class sizes could increase to 100 students and the school would have less teachers. The substitute hypothesized this would create the mentality that the students are a product when in reality, “There is that human quality that has to be developed.”

Some teachers struggled with what their role is now. One teacher reported:

> They were asking us for a change of the heart. We are going to change the way we teach. So, you are now going to become a student. And the students are going

> to become their own teachers in some ways.... I've been really questioning my role in the classroom.

A Physical Education teacher also recognized that two changes were taking place at the same time: "So you've changed two major things, how you teach and what you use to teach. And that was very difficult for some people. I know it was for me. It still is."

Direct instruction. An administrator observed that teachers lectured less since the iPad adoption. A vice principal explained:

> I was so used to a teacher at the front of the room lecturing and students taking notes and being bored, and heads down or just sleeping or trying to get out and leave. I would sit in an 80-minute observation and see students, "Can I go to the bathroom? Can I go to the bathroom? Can I go to the bathroom?"

But lectures have not disappeared with the advent of iPads on campus. A history teacher shared how his identity as a teacher was based on lecturing, "Lecture. I need a good lecture to feel like I am who I am." A Freshman Academy teacher said, "With the kids who don't bother watching the flipped videos on their own time, they need the direct instruction." Another reason that lecturing is still important is to ensure that students have "the real information, the terminology, etc. before you let them loose on the iPad." An English teacher said that a lecture, as opposed to a video, can lead into a discussion, "So it becomes a conversation even though it started out as a lecture, it lends itself to conversation. If I put it all on the video, there is no chance for that."

A substitute teacher highlighted the continued need for a teacher-centered approach in education, saying, "I think there is a place for flipped learning in certain

subjects, in certain areas. But I still think that you need the teacher to be teacher-centered." One teacher thought iPads could enhance a teacher-centered classroom, sharing "I think they are a good tool that can be used with traditional methods."

Student-centered learning. An administrator said, "The ultimate goal is more student-centered learning in class where students have opportunities to engage with higher-level work and engage with their teacher, and engage with their peers." A mathematics teacher concurred stating, "I wanted to see how to best leverage that technology to make the students more the owner of their education."

According to a teacher, a culture of trust and patience needs to be cultivated from the start of the course:

> Once they see that the teacher is buying into this philosophy and is really trying to hand the responsibility over, I think consistency is key, iPad or no iPad, the technology is almost beside the point. They are more willing to take those chances because they know that they have a teacher that will trust them or be patient with them. I think that is really important.... I think it's consistency and trust from day one.

Another teacher felt this approach was working, "They are actually getting it [the content] rather than me just spoon feeding them." A special education teacher noted, "There have been days where I completely just facilitated and not given any instruction and I think it's really cool on those days to see how the students are really learning on their own."

One teacher stated that the setup, or layout, of the room can help with achieving a

student-centered approach. In this teacher's classroom, the desks were set up in a horseshoe formation and as a result, the teacher said, "I'm more of a student in the room with them. It's a group of us."

> A history teacher did not support a strictly student-centered pedagogy, saying: My lectures aren't lectures. My lectures are Socratic. My getting questions from the kids. I use humor. I use a lot of sarcasm. That took years to build up. When my kids are here, they are listening, they are paying attention, they are asking questions, they are learning. To all of a sudden say, that is wrong. Now make everything coming from the students back.

Further, an administrator described how iPads combined with flipped learning "really focus[ed] on teaching kids how to actually teach themselves, which is a very important skill that sometimes we neglect, especially in a teacher-centered philosophy or structure."

A Freshman Academy teacher commented that the switch to a more student-centered approach was not welcomed by all students: "Some of them that were good at playing school their whole life are missing the fact that the teacher just provides everything up there and they can just do their worksheet on their own as formulaic."

A Freshman Academy science teacher explained that student-centered learning was already happening prior to the iPad initiative and that science teachers do not lecture for 80 minutes. With science classes, students have opportunities to explore and do hands-on activities. A social worker described her group meetings as already "very student-centered":

> If someone had a bad weekend with a parent, or if somebody had it out with a

> teacher, or is failing, or a boyfriend, or an unhealthy relationship, or substance abuse, or whatever, that's what the agenda of the day was.

Therefore, the technology did not necessarily bring pedagogical change across the school, though it appears to have changed how some teachers taught.

Blended instruction. Data suggest that many teachers approached their classrooms from a blended approach, incorporating different pedagogies, including those that were teacher-centered and student-centered. A Freshman Academy mathematics teacher asked her honors students to reflect on the year. Eighty percent of the students found the iPad and flipped learning helpful. However, some students wished the teacher would still lecture and dictate notes.

An administrator warned that regardless of the method of instruction used, what was best for the student should be foremost in the teacher's mind:

> There might be times where that video is a good efficient way for kids to learn something, but there might be other times where the best way for kids to learn something might be that 10- 15-minute lecture or direct instruction that is really good from us. And if that is the best way for a certain class to learn a certain topic, we want to make sure that is how we're teaching them that topic.

A director also felt that a blended approach was the best, sharing:

> We shouldn't be moving away from everything that we've done before, that obviously as teachers, we have a lot of good strategies and we have a lot of good lessons and a lot of good units developed. It's not that the move to iPad and flipped learning is throwing away everything we've ever done before. It's just

trying to leverage the technology to make some things better.

Teachers seemed open to the new ideas that the iPad program afforded, but were not willing to relinquish the successful pedagogy of the past. A teacher said:

> My initial goals as a teacher was to bring the most benefits to the students while still maintaining the structure that I found worked for me as a teacher with twelve years of experience. So it was a balance of adding this fabulous new tool, but then keeping going with what I've found effective in the past.

A Freshman Academy teacher believed that some lessons just required a lecture from the teacher, but tried to find the balance:

> There's certain topics where we're like 'there is no way they could learn this from a 3-minute video or a 5-minute video.... This is one of those lessons where we are going to have to stand here and lecture you.' But then the next day we try to switch it up...

One teacher adopted a blended approach to teaching and believes that is the correct way to teach:

> As long as it is blended learning. It has got to be a little of everything. If they are expecting in my class 100% flipped student-based learning 100% of the time, then they won't find that.... I don't think all kids learn that way. Haven't we just got jammed down our throat for ten years about differentiated instruction because kids learn differently?

This teacher believed that flipped learning worked, but not as the sole pedagogy.

Support tool. The iPads were thought of as supportive tools and as an administrator shared, they were "Not the only tool, but just one of the tools." One teacher said, "So they [students] are using it, but it's not the only thing that we do. It's not at the core of what we do day-to-day... iPad is just one means to an end." Another teacher put content on the iPad for students who want to use it as a supplement, but claimed she is not "dependent in the moment on the iPad." Yet another teacher described the iPad as "A tool in a toolkit.... I think they are just putting way, way too much emphasis on it.... It's given me another tool to reach my kids."

A technology teacher did not find that the iPads were a major resource in the classroom as the computer lab already had a computer for every student. The software on the computers was robust and would not run on the iPads. The iPads did serve a purpose, though, "The iPads allow students to have an example and grading requirements in front of them at all times while working with other materials. This saves time from having to flip back and forth on the computers."

An art teacher did not find the iPad to be very helpful in supplementing her class. "Finding things that would be realistic that could be used for helping in the classroom as a supplement to whatever lessons I was teaching, which has been more difficult than I thought it would be." Therefore it seems as though implementation varied across departments.

Question 2: How are iPads Being Used for Learning in an Urban Instructional Setting?

To answer the question of how iPads were used for learning in an urban instructional setting, the themes of communication, control, and learning workflow were prominent. Control in this context referred to how the iPads kept the students accountable for their own learning. Teachers and students collaborated. Learning with the iPad involved student-centered learning, research, higher-level thinking, differentiated learning, organization, and documented work. The way that students submitted their work has changed as a result of having iPads. Also, the iPads provided a flexible environment where learning could take place anywhere.

Communication for Learning

Communication was a common theme as students discussed their iPad use. Students could be in constant contact with each other. The school provided a Google email address to every student. This email address was also used for the student's Schoology account. Students were now able to communicate for learning through a few means. As one student said, "I remember last year, you could only talk to the people in your classroom. It would be like, 'shh, shh, we're doing work.' Now you actually can talk to the entire class…school."

While the communication could be for academic purposes, it was not necessarily always the case. A Freshman Academy teacher reported that students used social media and texting. The students use the iPads as their primary mode of communication. The teacher said, "They are constantly in touch with each other through the iPad."

Their constant contact allowed students to claim, “We know about everything.” A vice principal confirmed this: “People seem to know information at lightning speed, faster than ever before.” As students reported things to each other, other students would tell them, “Yeah, I already know.” An upperclassman answered that having a topic to rally around, brought students together: “Things would happen around the school, like pride, or anything like that we would go on the social network and we would Tweet about it. And everyone would start talking to each other.” A special education teacher also found the iPads to be a catalyst for bringing students together:

> They are showing their videos and images in things they are interested in and they are finding they are interested in a lot of the same things. So we saw more camaraderie within my classroom. They are engaging a little more.

The iPad also seemed to be a jumping off place for conversations. As one student stated, “What we talk about is whatever we’ve seen on the iPad. It gives us more conversation starters.” Unfortunately, the communication is not always school-centric. A vice principal reported that some of the communication takes students off-task and even off campus. The gave the example of “Meeting up at a certain location. Like, ‘Let's skip class now and go meet here. Let's leave school and go get high.’”

The iPad offered the ability for students to communicate afterschool as well. A special education teacher reported, “I think they enjoy having the opportunity to be able to message each other and talk to each other when they are at home.” An upperclassman said that the communication can be pervasive: “Group chats are the worst. I’ll wake up to 300 messages.”

Collaboration. Collaboration took many forms in the data collected.

***Student collaboration*.** Some teachers appropriated student-to-student communication and the online discussion ability of the iPad for academic purposes. A Freshman Academy biology teacher explained, "I have one class where they are using Schoology like Facebook. It's amazing. They have these long protracted conversations on my Schoology page with each other and they all chime in. So that is good." The online conversation does not always stay on topic, however, as the teacher went on to explain, "Well, at least it starts there, and then, who knows?" One teacher did not have the same experience. "I had hoped that the discussion feature [on Schoology] would open up discussion, it did not. They didn't input into the discussions."

An English teacher said that as a result of the iPad implementation, "They [students] seek out help from each other; it seems more often than before." An upperclassman felt differently. This student believed that prior to the iPad initiative, students actively sought out others to collaborate and now they just turned to their iPad. Another student also found that students preferred to work independently. "They have Google, so why do they need someone to ask if they have everything in front of them?"

An upperclassman found iPads to discourage interactions even in groups:

Before, when you got put in a group, they put you in groups with people you don't really talk to and you, kind of like, get to know them if you had to talk to them.

With the iPads, kids have a reason not to talk to people they don't know, according to the study data. Another upperclassman confirmed this stating, "I did groupwork and when

you try to make conversation, they just kind of look at you, so I was like 'Okay, just go back on your iPad.'"

Teacher collaboration. The data collected suggests collaboration among teachers regarding how to use the iPads for class. When it came to learning how to utilize the iPads for class, a history teacher said, "Part of that you had to figure out yourself and part of that was working with colleagues. So I think informally and subversively, covertly we all began to work together and figure it out." A history teacher furthered that this has always been the case, "And some of my best ideas then and now, I've gotten from colleagues."

A director shared that iPads were a great point of collaboration among teachers. The director believed this because he felt people, who were not as good using technology, would not have a problem admitting it and asking for help. "It is an easier place to ask or help than other areas of teaching." A formal place for teachers to share ideas and work was the Professional Learning Groups (PLG) that met by department twice a week for about 45 minutes. Teachers noted that in PLG "a lot of sharing of ideas with the iPad" took place.

The Freshman Academy teachers worked with the iPads first in the classroom because they were a part of the pilot program. An administrator explained, "It was interesting to watch [freshman] teachers tackle that and work with each other. It's a real collaborative group in the Academy." Even with the observed collaboration, one teacher said there should be more. "I've seen a lot of teachers that have done some pretty impressive stuff, but not everybody knows about it.... [There needs to be] some sort of

area that teachers could go during their own time and find that information." A director added, "Hopefully, next year with the flipped learning coaches, that would be a good resource for people to take advantage of."

Accountability

With the iPads, students were given more control over their learning and were also held more accountable for their work. A Freshman Academy teacher has found that with the iPads, "A lot more onus is on the kids." That teacher mentioned that turning over control is "one of the scary things. Because I'm doing a lot less hand-holding." In general, teachers felt the "excuses have declined." A teacher said, "The students know that they have to be more accountable for the work because with Schoology they can't say, 'I forget.'" The work is posted online and submitted work is timestamped. An upperclassman said, "I can't use the, 'I don't have Internet' excuse anymore.... Some teachers don't really take that anymore because you could stay after school or something. I used to say that." Students also could not claim to not know how to do something anymore. "So there isn't an excuse to say, 'Oh well, I forgot what you said.' 'Did you rewatch the video?' 'Did you look it up online?'"

Students were accountable for the work even when they were absent and the deadline for the work was not necessarily extended. As a teacher explained, "[iPads] make it easier for when kids are absent because of field trips or whatever reason and holding them accountable, you were absent, the homework is still due on such and such a day."

A teacher felt that the iPads allowed for some accountability, but also gave

students more excuses not to do work:

> It sort of presented a lot of new issues for us in terms of behaviors and accountability.... And the level of accountability while it has provided us and students many more ways to assess their work and show and demonstrate knowledge, it has also provided many more ways to not submit work. My Wi-Fi was down, I lost my iPad, my battery ran out, I couldn't find my charger, blah blah blah. So we are seeing students who might have struggled already with more old-fashioned assignments, have more reasons that they are not doing their work.

Yet, one teacher observed that students "seem more proactive about getting missed work and checking for homework. They also seek out help from each other, it seems more often than before." A vice principal reported how students became proactive to make sure student records were accurate: "The kids are checking their grades on PowerSchool. We are starting to see some of that proactive where if they are marked absent for a class by accident, they are finding us immediately."

> Students spoke about how Schoology could verify that work was submitted: And whenever I submitted something, then my teacher would tell me I didn't submit it and I could go back and check. And the Schoology app would tell me I did submit it. It would be helpful and it would work in my favor.

An English teacher found the iPad to be a good "archival tool" as it often automatically saves students' work. The teacher found it took time to navigate the achieves to find the work, but it was a means to accessing students' knowledge.

An upperclassman mentioned that in college, students are expected to be more independent. The student went on to say that students are expected to use their technology properly and if they do not do the work, they will fail. Another student agreed that students were accountable for their own learning: “I feel like it's on you, if you want to learn, don't touch the iPad.”

A teacher was unsure if students were as responsible with the iPads as they should be. “I don't know if it's been all that successful if they've stepped up to their level of responsibility.” A guidance counselor believed it was the school’s job to teach students how to use the iPad responsibly. “I think it is our job as a school to teach them the balance. To say, it is time to put that away. It's time to do your work and some kids do that better than others, always.”

A teacher believed the iPads allowed students to gain ownership of their education and learn some self-discipline at the same time: “It has forced some students to take ownership over their own education, making it that much more meaningful to them.... Teaching them self-discipline in addition to the curriculum.”

Teachers were concerned that there would not be enough time to teach kids responsible-use of technology and all the curriculum. One said, “I understand that we are trying to teach them responsibility, but it is hard to do that with the amount of curriculum we need to get done in the short amount of time we have with the students.”

Some teachers felt that students needed to be treated as adults. As a teacher shared, “Some are joining the army, some are going into Iraq. They are not kids anymore. A lot of teachers treat them like kids and they are not kids.” Other teachers thought that

some students could not handle the temptation to go off-task with the iPad. The teachers did not think the students were mature enough to stay off of social media. “That will hopefully come with time. But, for some of them, they're not there yet,” one said.

A special education teacher believed that with iPads students owned their own learning. The teacher did not think all students were ready for the responsibility required to maximize the potential of the iPads, saying, “In inclusion at least, it's too early for them to get that. So we have to resort to giving it on paper and saying, ‘No iPad.’”

A science teacher wanted the focus to be on teaching the students responsibility instead of developing and policing rules. A teacher thought a better approach would be to let students know that when they are off-task, they are only hurting themselves. “I think that's something we kind of fail them on with our rules.” An administrator retold a conversation he had with a student. The administrator tried to impress upon the student the trouble with too many distractions. “’Wait a minute, you've sent out 532 Tweets today during school hours? What's this suggest to you?’” High school is a safer place for students to learn appropriate use of technology than college, an administrator explained. “I'd rather have them try to figure that stuff out in a safe and supportive environment than in college when there is no safety net.”

This extends to responsibility in other areas. A social worker shared, “We try to teach them healthy ways of coping and interpersonal skills and relating with each other and doing the right thing. That has always been the goal. So, advocacy, and taking ownership for choices that they make.”

An administrator also talked about a term recently used by a local mayor—

"digital tattoo"—and how he felt students did not understand the implications of what they put online. "I don't think the students understand right now how long this stuff sticks with them or the impression that they are making over social network or social media." He wanted the school to make a deliberate effort to teach students how to use their iPad responsibly. "I think, kids walk in and teachers assume that they know how to do that. And I think we need to deliberately teach them, thoughtfully teach them how do you become a responsible technology user."

An administrator believed that students needed to take more accountability for their behavior with the iPad. The administrator did not think the district has created "a culture of caring" for the well-being of the device:

> Our breakage loss is probably going to be just under 40%, in the mid-30s. That is something that we feel is much higher than what our prediction would be. So we haven't done a good job with that.

Teachers also feel that there needs to be some accountability on the part of students with regards to respecting the hardware: "If it falls, it breaks, whatever, big deal, you know, it's a freebee. So it's not coming out of my pocket, so something has to change with that." Part way into the school year, the administration noticed a lot of iPad breaks and issued every student an iPad cover.

Good choices. Successful students using the iPads are in control of their own decisions and make good choices. A teacher stated that appropriate iPad-use should emphasize responsible-use rather than limiting the use of the iPads. The teacher believed this better prepared students for college, a place where no one will check to see if they are

on task.

An English teacher explained that students were already using similar technologies on their own, but now could be shown the proper ways to use them:

> I think having them in the school, having them issued by a school in a controlled situation, I think forces us to teach them how to use them responsibly on multiple levels. From checking their email every day and being communicative to having a sound online identity. At all these levels, as an English teacher, these things are kind of a part of my curriculum — communication, listening, things like that. It kind of lent itself to my instruction in terms of having students be responsible-users.

However, one teacher did not think that most high school students were able to make responsible choices with the iPad:

> Idealistically…if we can teach them how to departmentalize that thinking, then we are going to teach them something bigger than school.... That's too tough.... They don't have the discipline and I don't think that most kids that age will ever develop the discipline to only be on what we want to be on.

A Freshman Academy teacher deemed the iPads a success for only the small number of students "who were able to make good choices for themselves, which was a depressingly small percentage." An upperclassman explained that even for students with strong wills, using the iPad for social media can be tempting as that is what "everyone else might be doing."

A mathematics teacher found that one method for addressing students' off-task

behavior was “just really sternly telling the kid, “It's all about choices.... You are here for a reason.” An administrator reasoned, “Eliminating the iPad is not going to help him make better choices. It's just simply going to have him make different choices. We need to work on how to help him make better choices.”

Learning Workflow

iPads seemed to have impacted the way that students were learning and giving them more responsibility for their own learning. Data collected suggests that students researched more within the classroom. Students had opportunities for higher-level thinking and differentiated instruction. Students rewatched lessons through videos as they needed. Furthermore, students found the iPad to be an organizational tool that allowed students submit work, write documents, store notes, and annotate and showcase their learning.

Student-centered. An administrator applauded student-centered learning, saying:

> I think it has been good because the students are not just passive vessels of knowledge, with the teacher getting smarter by doing all the talking in class. The kids actually have to do stuff now. They have to talk more, they have to interact more, create more. Some classes…I've always seen that.... Some other teachers didn't have that kind of focus before. At some point they have to let the kids run with that knowledge and start to create and not hold their hand as much.

Similarly, an upperclassman described the way that she learns as being “a lot more independent now.” She went on to explain:

> I have all this information at my fingertips and I can look up things. I don't have

> to ask the teacher if I don't understand something. I can just go online and help myself understand it. I feel that I am more self-taught now. I'm still using the teacher as a tool, but I'm teaching myself basically.

An English teacher explained that much of the learning was derived from and cultivated by the students. “We use Google Drive a lot to write, collaborate on writing, peer edit, and share.”

A special education teacher pointed out that the school is expecting students to be student-centered, but has not helped students know how to be self-driven learners: “I think one of the major frustrations is because the students have all the information accessible to them.... So we are expecting them to be self-driven learners. They have had zero education in just being self-driven.”

Research. The iPads have Internet capability and they are often used by the students to do research and quick searches. An upperclassman said, “We have the Internet, which is very good. It's something we didn't have in class before.” Another upperclassman added, “The most useful thing is having the Internet right there, so at any time you can just look up information.” A history teacher found the students collaborate on research, “They could all be looking at different things, trying to get different stuff. Comparing what they are finding. I think it makes good research a lot better.” This teacher cautioned that proper research needs to be taught to students. The teacher said that the students “are from a generation of, ‘It's online, it's true.’” The teacher thought that the school should offer professional development on teaching students how to research effectively:

> We haven't had any PD on that. No one has even mentioned that at an official meeting.... These kids are exposed to so many million more things than I ever was. We have to teach them how to choose what's good, what's not good, what might be harmful, what might not be harmful. We don't do that. That's got to be part of it.

Digital literacy may be an area for the school to pursue as a result.

According to an upperclassman, having the ability to instantly research has facilitated more discussion: “Especially when you are doing debates, you have all that information at your fingertips and you can just pull it up very quickly and it enhances your arguments.” In fact, an English teacher shared that teachers no longer need to schedule time in the computer labs for students. “I was excited for the students to be able to conduct more research without having to schedule time in the computer labs.” An administrator claimed that “kids can dig up information instantly now. They don't need a library. A library is their iPad.”

A special education teacher said there is now an order to students finding out the answers. “We tell them to research it themselves first, talk it over with the members of their group second, and then ask the instructor third. Not just assume the instructor is going to answer all questions.” But, a special education teacher did not feel that students were used to using the iPads to research independently:

> You would think this technology would make the students more self-reliant, more independent. But if a word comes up that they don't understand, instead of looking it up because they have this $500 piece of equipment, they are like, so

> what does this mean? And you find yourself saying, why don't you look it up? So that whole sort of independent piece is not quite there yet. It is not ingrained in their thinking in how they respond to challenges.

Higher-level thinking. The iPads allowed higher-level thinking, learning that delves into applying, evaluating, analyzing, and creating. A vice principal has found the iPads to be used for higher-level activities. Prior to the iPad initiative, the administrator observed "typical bottom of Bloom's Taxonomy happening." Since the initiative, the administrator saw students "creating, analyzing, really debating. I walk into a classroom now and instead of let's memorize this, or let's do that, it's more critical thinking, thoughtful discussion."

An administrator explained that sending lower-demand work home allowed class time to be used for higher cognitive-demand work. The administrator felt that these activities required more support from their peers and teacher and, therefore, belonged in the classroom. A special education teacher noted that assigning students to learn key vocabulary for homework and expecting students to know it before coming into the classroom has been instrumental.

A humanities teacher feared that students would miss some key points if they were left to their own learning and did not get a lecture from the teacher. Therefore, the teacher needed to ensure the lessons included ways to have students think critically. "You just don't know if they are getting quite as much that way. It puts the onus on us to try to design the lessons that will get at that higher-level thinking."

An English teacher did not feel that giving students access to the Internet for

information gathering was a good idea. This teacher said that part of the process is being lost and there is meaning in that process:

> Much of what we do is built on the idea of inquiry and research. Being curious and then pursuing that curiosity to the n^{th} degree. In some ways, having so much information at the tips of their fingers, makes the students, and this is anecdotal, just sort of what I see on a day-to-day basis, makes them feel, "The information is there, so I'll get to it"… To be sure, searching things up does take some mental work and problem solving, but I'm afraid of dependency on the web. Before, I would have been happy that they take the initiative to look things up, but now that's all they do.

A substitute teacher said that it is crucial for the student to do the thinking, "An iPad is a tool. You still have to think and cultivate the brain and develop the brain and all that." An upperclassman said, "I feel like when you take the time to learn something, it sinks in and you actually remember it."

Yet not everyone believed the iPads were and effective learning tool. "I question whether or not they [iPads] actually do anything," a teacher said. "They are not engaged by it and it does nothing for my class.... It doesn't really help them internalize the material.... That is such a passive thing to just watch this video." An upperclassman said the iPads did not help her learn, "I got good grades, but I just feel that I didn't learn anything."

An upperclassman admitted that for homework, finding answers online was easier than reading a text:

> When we had to go home and look at a textbook, teachers would know what is in the textbook and then they'd give us questions where we'd have to think of an answer ourselves. But now when they give us any question, there is all this information on the Internet and we can take someone else's answer a lot easier…. "Oh this guy has this answer, sounds smart," and then use that instead of developing our own.

A student who did this shared, "I might get a good grade on the test, but I'm leaving thinking I learned something."

Some students did not find that they were reaching higher-levels of thinking. "I feel like the work got easier," one said. An English teacher said students relied too much on the iPads. "So, it has almost become like a crutch that they think every answer to every problem is somewhere to be found on the iPad." An upperclassman shared that having electronic material decreased learning because a student could press "Control-F" to find the answer and then copy and paste it into his or her own homework without having to read or write.

An English teacher worked to find assignments that students could not use the iPad to easily find the answers. In essence, the teacher had to outsmart the iPad:

> I have to really work now on making lessons that the iPads will not help them with, so that they don't get tempted to use it. So that I can flat out tell them, this will not be found on the iPad.... You [students] have to use your brain.

Differentiated learning. With an iPad, students can learn content through different mediums. A vice principal explained:

> The student has a choice. If I walk into a classroom, there will be a range of students on different activities, different modalities, different apps. Some will use paper, some will use NoteAnytime, some will use a Notepad, some will have a book, but it is a really cool thing to see students working in a way that best suites them because they are not all the same and they don't all learn the same. And they don't all have the same interests. And some work alone. And some work with other students.

Students also have different ways to showcase what they have learned with the help of an iPad. An English teacher explained that iPads opened up more multimodal assessments. The teacher also found that teachers could include more projects that involved the school-wide rubric tasks of speaking, listening, and using technology and students had "more ways to express those things.... We weren't just limited to the writing process anymore. So we were creating short films, trailers, documentary-like work, photo essays." As an administrator said, the projects were very impressive:

> In history classes especially, I've seen kids creating documentaries that even four years ago would have been really strong projects for the History Fair at the regional level. We would have sent them easily to that. Kids are using iMovie, Explain Everything. Things like that to make videos.

Some teachers did not think that the iPads were as good for creating. "[iPads are] very clunky for the input and the creation of materials. It's good for processing, but creating stuff on the iPad is a pain most of the time.... An iPad is mostly designed for consumption rather than production."

Rewatch. Videos provided the opportunity for students to watch the lesson again as needed. A Freshman Academy teacher said, "I like that they [students] have access to everything. So you can say, 'We did the triangle inequality last month, if you don't remember it, go back, watch the video that I posted, go back, Google another video.'" An English teacher said that rewatching videos was great for remediation. The teacher created grammar and punctuation videos that students "can use over and over until they master [the concepts]." The teacher thought these videos worked especially well with English language learner students in the class. "I just say go back and watch the video and there are plenty of opportunities to practice." A special education teacher also found the repetition great for her students, saying, "For us it is repetition and reinforcement that help us versus here's a new activity that we are just going to throw at you."

A director commented that having a video to rewatch would be beneficial for shy students, "Lots of kids would be too shy or too hesitant to raise their hand in class and say, 'I didn't quite understand that part. Can you go back and do that again?'" A student shared how videos can help students get back on track. The student has found that if he was not paying attention in class, he could not do any work associated with the lesson, but if he not paying attention while using the iPad, he could "just rewind it and get right to the work."

Another student said videos can sometimes teach him better than a classroom teacher because of the ability to control the video: "You are not just, 'I got what the teacher said in the 30 second speech.' You can pause, rewind, and do whatever you want to do." A special education teacher shared that her students gained the most when she

was in the videos: “My students still struggle with watching videos that aren't created by me. I think that they are really used to my teaching style and my voice. And hearing somebody else talk about it is very confusing to them.”

On demand. Storing content on Schoology allowed students access to the curriculum from anywhere, freeing students from having to take notes. iPads also gave access to the content regardless of whether someone was absent or had the physical paper handout or not. An upperclassman said, “if someone wants to learn, they have all the material in front of them because of the iPad.” As a Genius Bar student said, “Now you can just go to Schoology and go to your class folder, and look up the PowerPoint, whereas before, if you didn't write it down, you didn't have it.” An English teacher shared that one of her goals with the iPad was to make the work content accessible from anywhere. This allowed students to gain access to worksheets if the teacher did not have enough copies. It also allowed students access to the materials as they needed. For example, “’Oh, I didn't learn this yesterday.’ ‘Oh, it's on the iPad.’ So, if there is a video or something you missed, it's on the iPad.”

The content placed on Schoology remained there for the semester so that students referred to it as needed. A teacher said, “The iPad is great that way because it becomes an archive. The kids don't have to depend on their notebook. This assignment is dated, you can go in and get it, you can see what it was.” An art teacher agreed that students have all of the resources and lessons on Schoology: “Whenever they need something.... I can just say, go onto Schoology, look under this file, it's there.” An upperclassman summarized, “A lot of things are on the iPad, so it's only one click away.” A math teacher reported, “I

actually find kids, when they are stuck on problems in class, go to the video right then and there, with headphones, and I'm fine with that." A teacher recalled that sometimes students find their own videos to learn from. "They won't even use the videos that our teachers use. Sometimes they do, but they'll just find some video that explains a process. So I think for math, it's great."

Organization. Many teachers spoke of how the iPad aided in keeping their classes organized with content, calendars, and agendas. A Freshman Academy biology teacher was a big fan of Schoology: "I think that's probably the best part. Looking at another school in the area that has implemented iPads, they haven't implemented a district-wide learning management system, and I think that's one of the best things about having them." A teacher said, "I chose to do just about everything on it.... They [students] said it was better to have everything in one place rather than have half the stuff on paper and half the stuff on the iPad." Another teacher explained that iPads have gathered all of the "pieces of paper" in one place for easy access. "They have got their review sheets, they've got access to them and they haven't got pieces of paper floating around."

Some teachers placed a calendar of class assignments online for planning purposes:

> I like to give them a couple of weeks in advance so that they can make it work with their schedules. I know that not everybody works that way where they can drop everything on the spot and just do assignments. These kids have jobs, family commitments, sports commitments.

One teacher did not find the iPad ideal for planning long term as events cannot be shifted easily:

> … [Schoology] didn't allow me the flexibility in the calendar scheduling to move stuff. So then I deleted everything I built for the whole school year and then just did it for the week out. And what I found is students don't look long term. So every Sunday, I put what we are doing for the week, so they know.

A teacher said that just having an iPad did not make students more organized or make them better students; if the student was organized before, he or she continued to be organized. If the student was not organized, the iPad did not make him or her organized. A special education teacher said the iPads did not help all students stay organized, saying, "Some students just have a hard time seeing the iPad and organizing and orienting themselves on the iPad, that some students just have all their work on paper. And that's easier for them and they are more successful." A special education teacher felt that teachers were needed to show students how to stay organized:

> We have to embed teaching kids how to stay organized in everything, whether it is in your normal classrooms or now on the iPads, whether you are using an iPad or not, it is something that as teachers we all have to get better at is teaching those what we would think implicit tasks.

Some students did not think the iPads aided in organization. One said, "I think it's just a lot easier when work and books are tangible. Because you can feel like you are actually accomplishing. I'm getting all these papers done. I'm finishing them and I can put that away." Another student said:

> It's way easier for an assignment to slide through on Schoology and not see it because you don't have a hard copy of it. You can't just look through your bag and be like, alright, this is all my work.

Another student preferred the ordering of notes in a binder to the Notes app. The student did not find that the notes were organized like regular binder notes, sharing "It's technology where you can barely find things. Everything is going to get lost." Some students found the folder system of organization on the iPads to be overwhelming. One said:

> I feel like I lose stuff on the iPad.... On the iPad, I put it in one folder and there is a ton of stuff in that folder. I feel like I forget to do work on the iPad. I look at my bag and I don't have any paper in it.... It's not like a physical thing, so I forget a lot.

An upperclassman expressed that iPads would help students stay organized if either all of the teachers either used them or did not. They said, "It's hard when some of my teachers want to use it and some of them don't because then I think that some of my notes are on the iPad but then they are on paper."

Document work. Students wrote notes, journaled, and annotated with their iPads. Journaling was something that could be done online and easily shared with the teacher in real-time. The way students took notes has changed. Some students did not just copy the notes digitally; students took pictures of the notes.

Document annotation. Students annotated their digital worksheets. Some students did this for note taking. A chemistry teacher shared that students submitted their notes:

> And what kids were submitting back to me were their notes. So they might watch a video and they might do a reading, and then they would submit their notes. So I think one really useful thing for me as a teacher, I never got to see what their notes looked like before because I never had them turn it in. It was just something that I checked off. It was really interesting to see what kids think notes are. And I did it from my CP [College Prep] to the honors [classes] to the AP [Advanced Placement]. It was just interesting. One thing I've appreciated from it, it sort of threw in my face the literacy aspect.

A director said that with the iPad, students can "Do some of the old-school paper and pencil stuff, but it is electronic now where they pull up the pdf, write the answers on it, and send it back." Students annotated their homework as well. A student explained, "In English, we'll just get a worksheet and we'll just fill it out at home or something."

Pictures of notes. Students used their iPads to take pictures of notes on the board rather than write out the notes by hand. A student shared, "My teacher calls us photographers because when posts the notes on the board, we just take a picture of the notes." A mathematics teacher reiterated this:

> A lot of kids have also taken advantage of the iPads by just taking literal pictures of the notes. So instead of writing out, let's say we're doing a graph exercise. Instead of writing out the graph by hand, they'll just literally hold the iPads, snap

> a photo of it. And they could either write on top of it, if they need to write additional notes or just leave it as is.

Not all teachers were proponents of students taking pictures of notes. One said, "They think that taking a picture of something and just having it is more efficient than taking notes. It's hard to explain why it is better to take notes as opposed to just taking a picture of it." A mathematics teacher was a proponent of students writing in notebooks, taking a picture of the work, and submitting the picture: "That way, you have the digital copy, but you also have the comfort of also doing it on paper. Especially with the math because it is hard to do it on the iPad."

The camera on the iPad was also used to document progress on assignments. In art class, the students were expected to take pictures of the stages of a piece. As a student said, "For the art classes, I use it the most. It's easier for us to document it as we go because we take pictures of it and upload it to Schoology." This allowed students to be more accountable for the learning and freed the teacher from performing this task for every student. A technology teacher warned that with the cameras on the iPads, students can take pictures for devious purposes. Students were "able to take pictures of finals or quizzes and send them along."

Word processing. An English teacher was a proponent of the iPads' document sharing capability via Google Drive, "I can actually own the documents and share them with them. So I can literally see them typing as they do it. It's real time."

A Freshman Academy teacher shared, "The kids can't really do word processing on the iPad. I feel like, what is the number one literacy skill that an incoming freshman in

college should be able to interact with Microsoft Word." A teacher agreed, adding, "Microsoft Office apps would be really good because I think them being able to create documents that aren't NoteAnytime and be able to do something with them afterwards would be cool." Further, a teacher suggested that the workarounds for getting content from an iPad to Word was not ideal:

> The other thing I think is not having a concrete go to, reliable word processing app. A lot of times, kids have to write things, write papers, but they are going from NoteAnytime to having to email it to themselves, to putting it in Microsoft Word and that screws up the formatting. So as a result, they have this paper and it's already got flaws in it, but the flaws are amplified by the fact that now they have these formatting issues because they are transferring it from one program to another.

Content submission. While teachers put content on Schoology for students to access, students worked with the content, and then submitted work through Schoology. Schoology provided all students with a similar portal for submitting work to the teacher. An English teacher stated that "All homework for me is a Schoology assignment and returned back to Schoology." An upperclassman confirmed, "That's how we usually turn in our work. For most classes, like my history classes mostly, you turn it all in on Schoology." A technology teacher added that even Do Now activities are electronic and submitted through Schoology.

Another upperclassman said that teachers may have students work on paper, but then submit the work through Schoology. "For physics we use it to upload all of our

classwork to Schoology, but we do all of our work on paper, there is a scanner where we can scan it and upload it. It's an app that can scan the paper. And you can just upload it digitally."

Flexible environment. The iPads provided students with a portable learning environment. A student shared, "And for essays, it's way easier. You don't have to wait until you get home, you can do it whenever. You can type it on your Notes and then email it to yourself." Students found they could use the iPad during the "in between moments" to complete work: "I think it's easier to do work at lunch with the iPad. If you have something to finish up on the iPad, it's really easy to just sit down and do it real quick." Also, iPads allowed students to work together without being in the same room. A student said, "Like for example, the math classes sometimes… instead of going to people's houses sometime and working on them when you are stuck, you can go on an app and FaceTime instead."

Question 3: What are Teachers' Perceptions of the iPad Implementation?

Teachers perceived that iPads changed communication. They thought that iPads blurred the personal lines between teachers and students, therefore, limits needed to be put into place. Teachers also felt that with the increased communication came more chances for conflict. Furthermore, the fast-paced communication and overuse of the iPad had changed the communication skills of students.

Teachers spoke about whether, and if so how, iPads should be controlled. Topics of control revolved around classroom management and techniques such as blocking apps, collecting iPads, and monitoring iPad-use.

Distraction was a major concern with the iPads. In every interview, whether it was with students, teachers, substitutes, or administration, the word “distraction” was used. Students and teachers were distracted by the iPads. People spoke about iPad-use as an addiction and for entertainment. The topics of disruption, how to avoid rushing to judgment, and getting students back on track were also discussed.

Teachers perceived divisions throughout the school as a result of the iPad implementation. Teachers believed there were divisions between young teachers and veteran teachers, those who adopted the initiative versus those who did not, upperclassmen and lowerclassmen and their comfort with the devices, and an achievement gap. Discussion about the individual nature of teacher-use and buy-in and the difficulty in classification also took place.

Communication

Evidenced by the data presented for Question 1, teachers and students communicated quite a bit with the iPad. As a result of increased communication, teachers expressed concern about blurred lines between roles and respect towards teachers.

Blurred lines. An administrator stated:

> There is this shift that I've seen with respect towards adults and they think they are much more familiar with their teachers. They are more their friend and they don't see them as an authority figure or someone to be respected. So this kind of takes away that face-to-face communication that a student would never say to a teacher.

Some teachers preferred a separation between students and teachers for the part of the

day that does not involve school. One teacher said:

> I don't use Twitter because ... I think that's their world and I have no business in it. Nor do I want to. I think there should be a separation. To me it would be like in the 70s, a teacher coming to a nightclub and saying, don't forget you have homework. Something is weird here. Don't forget, I teach psychology so I know a lot about the brain, and there needs to be those separations. There needs to be the downtime, there needs to be different lives. So they don't really need to be that connected to me 24/7. And I cringe when teachers think that is important.

Another teacher agreed, expanding on the importance of separation. The teacher thought there could be legal ramifications of extended content sharing:

> If you are teacher and a student connected digitally, say on Twitter, and I happen to just pick out your Twitter, and I click it and I look at your timeline really quick for giggles, and I see stuff about you that I'm not supposed to know, do I act? Do I call your parent? Do I not? Do I let it go? Do I tell the coach? Do I tell the teacher? Do I tell the principal? Do I tell the parent? And if I don't and something happens, am I responsible? That's opening up a can of worms that I'm not sure we want to go down.

Some students seemed to still be learning that their online presence was available for everyone to see, blurring the lines between private and public content. A social worker gave a common example:

> So it's almost teaching them to, you put it out publicly, it becomes public because they always say, “It's none of their business.” I'm like, “Yeah, but you put it on a

> public network, you have got to remember, you put it out there publicly, it becomes everyone else's business."

Limit. With the accessibility that iPads afforded, teachers felt that limitations needed to be put in place on the times they were expected to communicate with students outside of school. A Freshman Academy teacher explained that prior to iPads, when the teacher left school for the day, interactions with students stopped. Maybe the teacher would write to let students know if she was going to be absent. Now students continue the class discussions outside of class time. One shared that students would write, "I'm struggling with this problem, I need help, can you help me?"

Another teacher said, "Yeah, I could talk to them my whole day off, if I take a personal day. Once I was on jury duty. I was communicating through Schoology the whole time when they needed help on a worksheet." Teachers shared that students expected the teachers to be available. "I found that difficult. I'm like, if I have the chance, I will respond, but I'm not responding at midnight." A Freshman Academy teacher shared:

> Last night I opened my iPad at 9:30–9:45 and I got an email sent at 8:45 saying, "Miss, I didn't understand the homework." I didn't even respond. I was like it's quarter to 10 at night, I'm not…. That could be an hour-long conversation, and I'm tired.

A substitute teacher recounted how students communicate with the absent teacher:

> Especially if they don't understand the assignment. So you could be out sick and you are going to get an email and they expect an answer. Again, I think there has

to be more respect for the teacher who is not there.

A Freshman Academy teacher implemented a cutoff time. “I told the kids that I won't be responding after 7 unless it's a rare occurrence and I get to check it. Otherwise, if it's after 7, you can post it on Schoology for your classmates to respond.” Teachers remembered an email sent out by administration suggesting limitations: “I think there was an email that was sent out about teachers sending home homework at 10 o'clock on a Sunday night. So it's got to be within reason.”

A teacher shared how an email can lead to a teachable moment: “You see the timestamp [of 11pm or midnight] and you talk to them about it. ‘Why are you up this late? Why are you waiting until the last minute?’ And it brings out that discussion on not procrastinating.” One teacher had a different perspective, “Now in my AP class, I'll see that they are sending me things at 10, 11, 12 at night and that's great because they are seniors and that's going to be their lives at college.”

Communication skills. Students communicated faster. Changes took place to manage the speed of these conversations. A teacher described students as quieter. “Most of them [students] have started to quiet down because they are just constantly [typing] all day long with everyone.... Nobody has to talk to each other. You can just look at that and you don’t have to speak.” This was observed in the classroom and at lunch.

Yet, these changes are not always positive. A teacher reported, “There is a more open line of communication between teachers and students, which is nice, but I think a lot of the interpersonal relationships are being lost because of the iPads.” A special education teacher explained how detrimental the iPad can be for peer interaction. “Our

population deals with communication issues a lot, too. We really need to promote more communication with peers amongst kids whether substantially separate or even the small learning group kids. This does not assist with peer communication and interaction."

One teacher described how there is "No communication. They don't know how to speak. They live and die by this [mobile device], whether it is the phone or the iPad." Students were also said to be "using the iPads as a crutch to not have to interact with other kids." A substitute teacher recounted that students have trouble with or little interest in continuing conversations:

> I'd get an answer, but then I'd get back to the iPad. Even this morning, two kids in an advisory class, both from different countries. So, "Hi, how are? What's new? Blah blah blah." They answered my questions, but then they were back on the iPad. I see less communication skills, interaction, conversation.

An English teacher said, "It is very difficult to have a conversation about things.... It doesn't help build relationships between us."

A social worker feared that students do not have the basic social skills, including eye contact, which are necessary in life. "I feel like their verbal communication skills/ conversational skills are kind of lacking now." This was reiterated by an English teacher:

> I'm concerned because when they have to present themselves in a job interview or in some kind of situation in some kind of a meeting, high tech meeting, whatever, I don't know if they are going to have the communication skills. And that concerns me. To me it is very important. As an English teacher, my class depended on discussion. And my class depended on supporting feelings and so

on. And I wonder if they are going to be able to do that. I really do."

Further, a Freshman Academy teacher also wondered, "The ability of just going up and having a conversation. How many of them don't know how to just go up and introduce themselves besides stupid messages online?"

The syntax and vocabulary of online communication seemed to migrate into the vernacular of offline communication. A substitute teacher explained, "Students are losing the ability to communicate verbally and write correctly as more and more are using incomplete sentences and abbreviations." A Freshman Academy teacher called the writing "Text message writing" and said students thought it was "okay to use single letters instead of actual words." Another freshman teacher found the positive in this by stating that the texting language "does create some sort of creativity." A special education teacher found that the iPad helped with linguistic skills. "They have to speak to the thing, the iPad has to recognize their voice, so they have to speak louder and clearer, so there are some positives there."

An administrator felt that students were reading on the iPad more now even if they were reading other people's comments or social media posts: "The mere fact that they have an iPad, I think that they are reading more. Whenever you are looking at that screen, you are reading." However, a director warned about an issue that may occur with reading comprehension as a result of learning online. This director said that students are used to "bouncing around" when reading online and would therefore have a harder time making meaning in a linear text.

Communicating through a mobile device seemed to be the new normal. A

> Freshman Academy teacher thought this was just the way of the world in general. "There is so much you lose that you [should] learn in high school. How to be social and that's a big part of growing up. Are they going to lose a lot of that? Or is that just the way the world is changing?" As a guidance counselor said, "I think it is very ingrained in our culture now that this is how they communicate."

Conflict. The iPads seemed to cultivate a culture of immediacy with instant access to everyone and everything. A social worker offered her thoughts:

> There's no delayed gratification for students. Everything is impulsive, everything is instantaneous. The thought comes to your head, it's on Twitter. So those are just life skills that I think are important. And I'm concerned when they move into adulthood; I think they may possibly be lacking some of those really important day-to-day personal skills.

As students were all wirelessly connected to each other, there was the potential for conflict. An administrator thought that the devices were a medium for bullying as everyone had one and students did not always think of the ramifications of their actions:

> And then you start throwing in how easy it is to hide behind the anonymity on social media and kids can really find themselves getting into trouble quickly when things kind of blow out of proportion.

A teacher added, "Everything is so instantaneous now in terms of rumors and fights and all these Twitter wars." A social worker described how kids are impulsive and as a result, "They are always so quick to put things out there. And then are shocked when they get a reaction."

"They don't delete anything," a Vice Principal shared. "They have all their conversations, they have all their pictures, and they think that it is okay to Tweet things that they normally wouldn't say to a person." An administrator found that the iPads captured moments that would otherwise have been forgotten:

> Things that they would say in the hallways as kind of a joke are now in print…. It is online and we can find it. And it is still there. And that goes with the pictures that they take of themselves and each other too. It will astound people if they saw what people are putting out there.

Despite the ability of iPads to promote conflict, vice principals did not think the bullying had increased as a result of the iPads: "I don't think we saw an increase in any type of bullying. It seems to be the same conflicts that we have had with or without the iPads."

Distraction

The iPads were described as a huge distraction for students. Teachers cited them as a "culture of distraction." Another teacher said, "If I want my kids giving me their explicit attention, I say, 'Put the distractors away.'" A Freshman Academy teacher felt that distraction was the biggest problem. "Yeah, that's like the biggest problem.... Some students don't get their work done because of the iPad."

Teachers believed that when students were not constantly engaged, they used their iPads for off-task behavior. "At any given moment," a teacher said, "when [students] are not actively engaged and on task, immediately the iPad is out as a distraction." A teacher shared that distractions made their jobs much harder. "Probably the ability to be

distracted has been increased. I've talked to a lot of teachers who are against the iPads simply because it has made their job more difficult to keep kids on task."

Another teacher said, "I have to tell the kids, get off iMessage, get off Twitter. I have a kid in my AP class, who I tell him daily, daily." Teachers hoped that as students become more familiar with iPads, the distractions would slow down:

> I had juniors this year and it is their first year with the iPads. Hopefully as they come through, that [distraction] won't be an issue so they can focus on the collaboration and use it as a tool instead of a distraction.

Vice principals acknowledged the distractions, but one believed that iPads were used more for learning:

> They are definitely using Twitter and Instagram. But again, going through the classrooms, there is definitely more on-task behavior than off-task behavior. Or at least from what we observe quickly in there. Certainly, I have seen lessons, I have seen students accessing videos using Schoology getting assignments, going over the notes, annotating their reading.

An administrator agreed that students were authentically working and on task. Though, he admitted that it was possible that students closed apps and went back to their work due to his presence. A teacher said, "And even when they're technically doing work, the abundance of stuff flying over the top of the screen constantly drags them off-task."

Some teachers thought students were always distracted and this was just another medium for that distraction. Prior to iPad implementation, students were distracted by their phones. "I'm thinking back to my first year when I started teaching," a teacher

shared, “and I was teaching a business elective and I couldn't get kids off their phones ever.” Prior to the phones, students passed notes or doodled:

> The only difference is you plug in this distraction [as opposed to notes]. Distractions are distractions and kids are going to be distracted.... In some ways, it's changed because it's easier for them to access distractions, but I don't know that it's any different than it's always been in a school. I think when you are disengaged and looking for something else, you'll find it.

Teachers thought students were better able to hide their off-task behavior. “I think they are able to hide the fact that they are not paying attention better,” said one. A common excuse teachers received when reminding students to stop using their devices in class was that students were just “checking the time.”

A Freshman Academy teacher said group chats were very time consuming because there was always somebody available to talk with:

> So maybe Ann can't answer right now, but Melissa can, and…. I'm catching up on what eight people said.... I had a kid's phone one day and he must get all of his iMessages on his iPad and his phone on my desk. And it literally did not stop for the entire day until it died. It was just flash, flash, vibrate, vibrate, flash, flash, flash. It just kept flashing. I was like ‘and this is why you are not doing well in class because your phone,’ and he just looked at me and he laughed.

Other teachers agreed that group chats were detrimental to learning. “I don't care what you are doing, [a group chat is] so much more interesting than anything we are doing in the classroom. Even if they like the topic, it just is. They're adolescents.” Teachers said

students blamed their lower grades on distractions with the iPad: “Even though they [honors history students] are good students, they are taken in by the temptation to use them for social ways.”

As a result of using iPads, students seemed to be in a haze during their time at the high school:

> There were still a few kids who were zoned out on those iPads.... There were a lot of kids who left here and felt like it was just one big anesthesia. They got them in September, they put their heads down, and all of a sudden they were in a cap and gown is the way one kid put it to me.

Students seemed to prefer using their devices than helping the teacher. The teacher had difficulty enlisting students to make a bulletin board or deliver something because they would rather play a game on the iPad. “Normally kids would be dying to have other things to do and now they are on iPads,” the teacher said.

An English teacher believed iPads impacted the level of respect afforded from one student to another. This became noticeable during a class discussion. “Now it’s like, nobody cares that this kid is talking because they’d rather just talk to their friends on text or whatever.”

A mathematics teacher said that she thought the calculators, while expensive, were a worthwhile investment for class because they did not have the Internet on them. “Texas Instrument has an app that is $30. It's one of the most expensive apps that functions just like the graphing calculator, which is $150, but if the kid's on [Instagram or Twitter]... yeah, so shut it down.”

Students were not the only ones facing distractions. Teachers reported that the iPads distracted them as well. “And we all sit in the faculty meetings and on our iPads, doing the same things that the kids are doing,” one said.

Addiction. The iPads became a point of addiction according to some teachers. A social worker said, “It's kind of a natural instinct to grab for the iPad or their phone.” Teachers said things like, “It is becoming a bit of an addiction problem,” “They can't be without it,” and “I find my kids are extremely compelled to use their iPads all the time.”

A teacher told of an encounter with a student asking to check a device during a test:

> “Can I check that? I just heard it buzz?” Really!? In the middle of a test? They can't detach themselves from it. It almost seems like a magnetic force. They don't even realize they are doing it. They reach into a desk. It's like, “Move away.”

Another teacher shared:

> If they [iPads] are in front of them, even closed, there would be a ding. They would know it was a text message or an Instagram and they wouldn't be able to wait. If my phone rang now I would turn it off. “Sorry about that, I forgot to turn..” If their phone or iPad rang, it would be, “Oh I gotta check this.”

“It's on steroids,” a teacher said. “It's almost like a drug.” Others said, “In class, the iPads were a horror and a distraction and the kids were helpless in front of them” and “I've had a few seniors say, it's their lifeline and they're lost that it's being taken from them today.”

Teachers found that the games on the iPads were addictive for students. “And

they are addicted to these stupid little games and every two or three months, it seems to be a new one." Using the iPads became a habit, one teacher shared. "It seems like if there is any downtime, whether that downtime is scheduled or not, the kids will immediately, it's almost by habit, they'll just go to their iPad and surf or go on Instagram or whatever."

A teacher found that some students needed help in refraining from the device: "The interesting thing is the students say that it is more distracting. The other day I took a phone away from a girl and she said, 'Thank you because I can't.' They are like addicts."

Back on track. Off-track behavior was pervasive. "I don't have behavior management issues either, but there is not one kid that hasn't been off task this year in my class. They all have. No question."

Redirecting students who were off task was a challenge teachers described. "I see that students have a hard time getting off of it when they are asked to, when it is not for a lesson. It's just getting them off of it." A teacher said, "Perseverating is the best way [to describe the behavior]. They just lock in on it and they want nothing else.... In the hallway, in the bathroom."

Some teachers were not concerned, stating that multi-tasking was the way of the world. "You're able to fully participate in this, and send a Tweet, but then come back fully participating, but not get sucked into, let me check and see what Kim Kardashian did over the weekend." However, not all students could multi-task successfully. A teacher said:

> You've got to figure out when is appropriate and when is not appropriate. Some kids can do it, and I would say half can't. And in that half that can't, there is also the 10% who can't even get back with the re-direction. But they are the kids who would have been off-task before; they are the off-task kids.

A Freshman Academy teacher came up with a solution for repeat off-task offenders: "we print out a paper copy of what we are doing for kids who are off-task and it's just like, if you're going to act that way, we give them paper."

Entertainment device. Many teachers referred to the iPad as an entertainment device. To explain, one teacher said that you would not open a textbook and find a copy of Mad magazine, but "They can do that with the iPad. They can open up schoolwork and they can go into silly newsfeeds and stuff like that." Another teacher found that students used technology for "non-academic, non-assigned tasks," such as social media, listening to music, games, watching videos, and selfies "constantly."

Games students played were not intellectually challenging. A teacher said, "They are playing games that aren't that interesting like Flappy Bird or pool, something that doesn't require much thought." Students were described as "mentally lazy because they are sitting there and just mindlessly playing games."

Because of these distractions and entertainment applications, teachers questioned whether the iPad was the right choice for a tablet. One said, "The iPad, to me, always seemed like a social/entertainment device and not primarily an educational device. So my question is: Was the iPad the best choice?"

Babysitter. A few teachers even went so far as to call the iPad a babysitter. One said "I just think that we have to be careful that we don't just fall back on technology per se with the iPads, etc., and use it as a babysitter for our kids." As the students were occupied all the time, the devices also became known as "a pacifier." A substitute teacher found the iPads to be a substitute for the substitute. "As a sub, I love the iPads. It keeps them busy…. Now, not a problem at all because they all have their iPads and they are all very busy. But as I said, I don't know how productive." One substitute teacher claimed that the majority of the students in the auditorium were watching Netflix and using Twitter. "They are not doing the work that is due at the end of the class because the teacher's not there. How are you supposed to do something when the teacher is not there?"

Toys. Some teachers referred to the iPad as toys. "I do feel like the school gave these kids the best toy in the world and told them not to use them, except when we tell them to.... It's an extremely compelling toy." A Physical Education teacher described the iPad as a toy with no boundaries. "I think the main thing is you gave 1,600 students a toy and we had no guidelines to follow before we gave them this toy."

Students also saw the iPad as a toy, and turned to it when they needed an escape: "When they get to a point where they are stuck on something or they are frustrated, it is easier for them to say, 'Oh, time to play with the toy,' and not get the kind of help they need." A teacher made an analogy between a Barbie doll and the iPad showing that the school had appropriated a toy and tried to make it only for education:

> It's almost like if you took somebody's Barbie doll and suddenly said, "No, now you are using this for biology and you are gonna show us anatomy and physiology of the human body and the systems using the Barbie doll. And you can't play with it anymore. It's not a toy." And basically how would you feel if someone took away your toy and said, "No, you have to use it for school now." You take all the fun out of it. And so it was basically we sucked out the fun.

Disruption. Sometimes when students went off task, it disrupted the education of not just the iPad users, but also others. A teacher said:

> They are Tweeting that often, that means how often are other people are reading them. So if you have a kid who is Tweeting 20 times a day times 100 kids. Tweets you are constantly flipping through, and every time you go to help a kid, constantly, the thing is popping down, popping down. And that's just from one app.

Other students' reactions to what they saw online were distractions. A student said, "Sometimes in history, I'll be doing my work and I'll hear somebody behind me laughing. And I'm like, 'What are you laughing about?' And I'll see them on their iPad." Another student found the classroom to be quiet except for the occasional commotion around something on the iPad: "Kids will be laughing out because they will be sharing photos and stuff. That's really the only sound you hear. Is when kids are making noise because they are talking about a photo."

Students could access all of the other students in the school and were communicating even when they should have been learning. A teacher shared:

> Something could be happening in my classroom and they could be laughing about something that is happening in a history classroom because it is nearly impossible to keep them off and where you want them to be. So someone might send them a picture or someone might send them a text and I'm sure it goes the other direction too. Or an Instant Message about something and they'll just start laughing. I'll be at the board talking about triangle theorems and someone will be cracking up in the back of the room. "Hmmm, what [app] are you on right now?"

A student found that when the teacher disciplined other students it created another form of distraction: "People are on their iPads and it distracts me when I'm doing work and I hear the teacher yelling, 'Stop using the iPad when you are supposed to be doing work!'"

A student also spoke about how the iPad led to fewer disruptions in class: "It has been a good sedative for a lot of kids.... I think what it has done is it's kinda given kids this way of self-distracting without distracting as many other people." One teacher claimed, "Students overall are less disruptive, because they are more distracted… Students are less disruptive, however they are less attentive." A vice principal agreed, stating: "The discipline referrals are down."

Rush to judgment. A couple of teachers have noted that it was important not to rush to judgment with students. Learning can look different. It may look like a student is distracted or off task, but in reality, they may be doing exactly what they are supposed to be doing. A teacher said:

> I know in my class, especially in my AP class, if I'm in the middle of a discussion, if a kid has his iPad propped up, he could be doing a myriad of things. And I'll be

> honest with you, how many times have I gotten caught this year with, “What are you doing on your iPad right now?” “Oh, I'm fact checking what someone said.” “Oh, turn around and show me.”

Another teacher noticed this phenomenon in the hallways as well. Teachers no longer assumed that students in the hallways were off task:

> I think there was always this assumption, if you saw two or more kids together in the hallway before, that they were not where they belong and now you kind of think, I wonder if they are working on a movie or if they are doing something else.... And even with my students, if I am not sure if a kid is on task or not, instead of asking what they are doing on the iPad, I might just kind of creep around and look because a lot of times I will look over with certain kids because I know their work habits are not great and I'll just check and sometimes I'll look and see, "Oh, they are actually looking at a ceramics video.”

Control

iPads have brought the issue of control to the forefront of teachers’ minds. A Freshman Academy teacher said, “So yet again, it comes back to that concept of how much control teachers have over how the kids interact with the device. To me, that is the clincher issue.”

Classroom management. Classroom management was one way to deal with any issues that arose with iPad use. Teachers found that the iPads had to be managed. A social worker found them to be more work for the teachers, sharing, “I think the iPads, it's another thing to be disciplining kids around. It just adds a whole other thing.”

Teachers found themselves constantly reminding students to put the iPads away when they were not needed, which caused power struggles. A teacher said, "I've got two or three [students], as I'll call them 'hitters'. Most of them are a quick reminder, 'I asked you to put your iPad away. Under the desk I don't consider away. Backpacks.'" A teacher described this as a "culture of negativity," and said "I'm always disciplining, 'Put away your iPad, Don't touch your iPad.' It's been a noticeable classroom climate change this year."

Teachers found this battle to be going on throughout the entire school year: "What is it June 16th? And still as soon as I walk in, 'No iPhones, no iPads' every single day. Not once, not twice, but…" Another teacher found that reprimanding students at the start of the class of the iPads set a negative tone. "The minute we start, I have to say, 'Put away your iPad,' and immediately that sets up some resistance."

One teacher suggested that management skills can help keep students on task: "If the teacher knows who to keep apart from each other or who needs to be reminded to stay on task every five minutes, it can be handled." Alternately, some teachers thought they should be able to see the student's screens and be able to lock students out of certain apps:

> And there is no one stopping him from looking at that and getting lost in the pages of the Tweets. I feel that if we don't put some sort of limit or big brother on this thing, we are never going to win that battle…What 16-year old kid would pick the quadratic equation over what his girlfriend is saying about him on Twitter?

Other teachers did not think the iPads should be monitored or limited. One said, "I'm not

comfortable with blocking. Having your information monitored and used for purposes you are not familiar with. I'm just not comfortable with saying, 'Here's an iPad, but you can only use it for this purpose.'"

Teachers found that if one student went off task, "then everybody seems to think that you've been given license to do that." Teachers were unsure of how to differentiate, letting some students go off-task and not letting others. A teacher explained some students can multitask really well, earning excellent grades while texting, but others cannot.

Some teachers did not believe students' off-task behavior was a behavior management issue, but rather a systemic problem that needed to be addressed. One shared:

> I'm tired of people saying it is a behavior management thing because you could ask any administrator in the building and I don't have behavior management issues. But I can't compete with all the stuff that is on the Internet and the games. So even with my advanced kids…It's a joke. And it's not enhancing learning, it's detrimental actually.

Other teachers stopped disciplining around the iPads. One teacher said, "I tried a number of different things and the iPad always won out. It's tough to fight." One teacher decided to stop yelling at the students to stop using their devices and set ground rules for use in the classroom: "I just said, if an administrator comes in, have the knowledge not to text. And while I'm teaching, please be respectful and don't text. So that has worked for me."

A teacher shared that a key piece to utilizing the iPads correctly is getting the

students to want to learn:

> I feel like we've moved backwards this year in getting kids to want to do it because they are taking those side tracks and distractions. So they are like, “Why do we have to do this?” and go back to iMessaging. So for us, it's an engagement piece. It's like, how do we get them engaged to where they don't want to be messaging their friends, which, maybe they'll never get to that point.

Access blocking. One solution proposed by teachers to make the iPad a more productive was to block apps. One teacher felt the school has to prepare students for the real world where they cannot be on their cell phone at work. If left unchecked, the teacher did not think the students had the self-control to regulate themselves. Another teacher believed that teachers have a responsibility to protect students and therefore block apps. They said:

> I just think it is our responsibility. If you are a parent, you won't let your kid watch certain shows, why wouldn't you let your kid watch a show and say, "Let him figure out what's good or not good. That's how he'll grow." No, that's not what we do. There is some sort of governing that we do with our kids because we don't think they are ready for certain things.

A vice principal disagreed, saying students need to learn responsibility. “They need a safe place to make mistakes. We are here around them. We need to have the supports with them. They need to learn responsibility. The answer is not blocking it.” Another administrator was also a proponent of an open campus, saying, “I'm one for unleashing the power within the law.” A teacher agreed. “I’d actually rather not block,”

they said. “Only because blocking iMessage, blocking Instagram, blocking Facebook—its blocking communication, and I don't think it's a good idea.”

As a teacher relayed, the administration decided to not block apps, with the exception of Facebook. Some teachers described the campus as encouraging anarchy. “It's a free-for-all,” they said. Many teachers were confused about why the only social media application that was blocked was Facebook. “Well, Facebook is blocked. That's the only thing that is blocked… I know, they don't use it anyhow and it's the only thing that is blocked.” The rationale was if one app was blocked, then students would just use another similar, unblocked app, creating a fruitless ‘whack-a-mole’ approach to block. Others say more merit: “Block it, block it, block it. And then block the next thing they come up with.”

Teachers wanted the ability to control which apps were blocked and which were allowed in their classes:

> It would be nice if somehow this could work for teachers to be able to sort of have that control. To flick a switch and say, today we don't need this, so we are not going to be able to access it. But then to allow it when it's relevant. I don't know if that is even possible, but having that kind of control would be nice.

One solution was to only allow what teachers approve. A member of the IT department said that they can block a specific app, but it was not ideal:

> We just had a parent call in who wants her daughter blocked from texting apps. So what you have to do is delete the app and then you have to disable the app store so they can't download any apps. So there is no good way.

The IT department can block apps at the firewall while keeping the app store open, so any web-based apps such as Facebook, Twitter, Instagram can all be blocked while the students are at school on their iPads. If it is a game, however, blocking at the firewall will not work. There were apps to help manage other apps, but one considered by JHS, Casper Focus, was not deemed effective. Those who piloted it at the school found it to be buggy—"We quickly found that it froze a bunch of kids' iPads"—and the idea was dropped.

A similar solution to blocking apps was to only allow apps that were educational. There was talk of an educational-only iPad. One teacher said, "I think if there was a way to create an education-only user type of iPad, I think that would be better suited for school."

A Freshman Academy teacher wished that teachers had more of a say in the implementation of the iPad. The teacher wished there had been a vote "instead of 'No, these people want to keep it so the whole school is going to do it.' I think people would feel better if they knew that at least there was a vote."

Teachers felt limited in the choices they had to control the iPads. One said, "I don't feel like I have any control over what the kid is doing on these devices…and those are the two...no management, all of the management, there is no gradient and scaffolding I can use." This teacher thought that a different tablet device could be more suited for education.

Lock students in. Aside from blocking apps, another proposal was to allow the teacher to lock students into certain apps. A teacher explained, "Guided Access is a

program by Apple that allows teachers to lock students into one particular app." The teacher went on to explain that Guided Access was not ideal for a classroom for a few reasons. "It does have a bug in that if the student just turns off the iPad and turns the iPad back on, it is no longer locked."

Classroom set. Some teachers suggested maximizing the iPad-use for educational purposes by having a classroom set stored in a locked cart: "I don't think it would be financially feasible, but I think it would make it more beneficial in the classroom."

A teacher believed that students should not have access to iPads 24/7, but rather use them at the teacher's request. This teacher felt the iPad was too much of a temptation for students to have in front of them at all times:

> What I see with the iPads is kids who normally would have been more on task…it's [the iPad] there. And kids that don't want to be off task, but it's hard. It's like if you give a kid a lollipop and put it on the desk and say, don't eat that for an hour. And it's sitting there and they are looking at it. At some point, they are going to say "Screw it, I'm gonna lick the lollipop." I just think that the fact that they [iPads] are there at times when they don't need to be there is too much of a temptation.

Some teachers liked the idea of a classroom set, but they realized that then students would not have access to the iPads at home, which would lose a great deal of the benefit of an iPad.

iPad collection. In order to prevent off-task behavior, some teachers did not allow iPads in their classrooms: "This year, I actually banned the iPads and went hard

copy.” Some teachers, who did not want to deal with the iPads, just collected them. One explained:

> Certain days, with certain kids, I have had to actually take the iPad and a few minutes later, the phone is out, and I've had to take the phone and I'll end up with a stack of 20 gadgets on my chair by the end.

A Freshman Academy teacher said, “I have so many kids where it's like, either they are on Twitter or I take their iPad from them.” A technology teacher said, “I know in my classes, I take at least 1 iPad away each class.”

Teachers gave reminders to students before collecting iPads, but the students continued to use them. One explained:

> I find the iPads very frustrating most of the time because I constantly have to say, “Excuse me, I said put the iPads away. I said away! I mean under.” I go through this every day. “iPads away. In your bag. Oh never mind, now I'll collect them.”

Once the collection starts, teachers often find themselves collecting more devices from the same students, amassing stacks of devices. One said, “And my chair will literally have a stack about 20 inches high of just iPads and phones.”

Teachers said it was not always feasible to take away the iPads. One teacher used the iPad as a textbook and therefore could not take it away. Another teacher explained, “The trouble is when you take away someone's iPad, and then the next teacher who is organized to have the iPad can't… You'd then have to email the other teacher. Please, if you need it, you can have it.”

iPad days. Although it would require more planning, some teachers recommended allotting certain days to using iPads. One said, “I would say we only use iPads two days a week instead of them being a pervasive piece of every day. So the students could see that it is a tool, but it is not their life.” Another teacher said, “I think maybe there would be iPad days and there wouldn't be iPad days or iPad blocks…I think that would help. So that they haven't got access to them all the time.”

Tech breaks. Some teachers dealt with the distractions by giving the students tech breaks. A tech break was an allotted time when students were allowed to use their iPads for any purpose they wanted – games social media, surfing. One teacher built in tech breaks, finding it helpful for the freshman to learn when it was appropriate and when it was not. Teachers gave tech breaks as a reward to students for doing their work. A special education teacher noticed that “the kids that were into it and abiding by it, they got on the cases of the kids who were goofing off. Because they knew if they didn't, then everybody was going to have a consequence.”

Wi-Fi management. A teacher recommended students use airplane mode, which disabled the Wi-Fi. In theory, without the Internet, the need to communicate with others would be squelched. They said, “I just have them turn the Wi-Fi off…because you can see it. And if the icon is on, then they have a session.” A session was a punishment involving students staying after school. One teacher struggled with this, saying, “you can put it on airplane mode, but as soon as you walk away, it is off.” Another teacher found the process to be too cumbersome: “But even with airplane mode, you are like, ‘Go to Schoology,’ and they are like, ‘I'm on airplane mode.’ ‘Go off airplane mode, go to

Schoology, open the document, go back on airplane mode.'"

iPad monitoring. Teachers found they had to monitor students more. A teacher shared, "… so much of my job ends up being monitoring what they are doing and that is very difficult when I can't see the screens." A teacher described part of their task as "Speak to students prior to entering class. Walk around constantly. Stand next to them."

One teacher summarized the struggle with iPads as about control and visibility of the iPad. "If students do have their iPads out, I'd like to be able to check to see what they are doing without going and peering over their shoulder." There did not seem to be a single solution to the monitoring problem.

Division

There were many divisions within the school as iPads were incorporated into the culture. Divisions, or perceived differences, were prominent between new and veteran teachers, if and how individuals used the technology, how students bought into the process, how individuals were accustomed to working, and those on each side of the achievement gap.

New versus veteran teachers. There was a divide between teachers and how they categorized and thought of themselves. This was particularly true between those who viewed themselves as young or veterans. Young teachers were described as utilizing the iPads to the fullest. Veteran teachers were described as using the iPads sparingly or "having a difficult time figuring out how it can be best used in their classroom." A director explained that the iPad initiative had been "invigorating [for] younger teachers who are more tech savvy and take on more of a leadership role. So I think in terms of

school culture, you really kind of see this uprising of young leaders within the building."

A teacher believed this grouping was discriminatory, saying:

> I think there has been a little bit of discrimination — young teachers versus old teachers — not thinking that the older teachers can catch on to things.... It's been a bit insulting in some ways.... And I think sometimes the teachers who have been around awhile are looked at as being passé or things that they do as being passé.

Another teacher shared, "If you are not adopting this all the way, it's because you are a dinosaur or something." One teacher felt undervalued:

> I've seen a schism created by administration pitting veteran teachers against new, young digital natives so to speak, with the kind of idea that if you are past a certain age, you can't learn technology.... I feel completely undervalued. No one asks me to do anything. I didn't get on any trips to go anywhere or do anything as an older teacher.

An English teacher found herself in-between the two groups. They said, "I think some people perceive there is a fractious piece between the younger teachers who are more tech savvy and older. I haven't felt that. I'm 45 so I'm kind of straddling both age groups."

A teacher noticed that two camps formed as a result of the way the iPads were implemented, sharing:

> I do think there is a lot of innovation going on and people are open to new ideas and sharing ideas and that's good, but I also think there is some resentment from maybe the way it was implemented as sort of a mandatory move to technology and a lot of people weren't ready for that and were resistant to it.

A vice principal thought two camps did not completely capture the full picture. “I think that, as a general statement, that is probably true, but there are people in both camps. There are some veteran teachers who are really embracing it and some of the younger teachers that are not.”

One vice principal explained that Freshman Academy teachers helped start the initiative and were therefore took ownership:

> I think the initiative seems to have been fueled by the younger teachers.... I think some veterans get jaded. They think they haven't necessarily stepped up to the plate. I think we have some very passionate teachers who have gotten involved. I think I've witnessed that… I think defensive is probably a better way to put it [as opposed to jaded]. Being told that you aren't doing it right or this is a better way.

The vice principal went on to explain why this was hurtful to veteran teachers. “Teaching is a vocation to them, it's not just a job. So it's very personal for people.”

Use of iPad. There was a division in the use of the iPad. Distinctions could be made about the degree of buy-in for the iPad:

> Some sort of division between those who love the iPads and those who are ambivalent towards the iPads, and those who despise the iPads in the classroom setting… That has kind of shown itself a few times in PLG where there are these people who rely on the iPads to do everything.

A teacher spoke about different camps made for tense situations in meetings:

> At some meetings, it almost felt like a standoff. The flipped people and the non-flipped people. Sometimes I'm like, “I'm a flipped learning coach, don't hate me.

Don't think bad. It's caused some tension."

Some teachers were stronger proponents of the iPads and flipped learning than others. An administrator said that individual mindsets determined buy-in to an initiative, explaining, "It is really the people and their mindset that are going to make the difference. It always has been."

Some reluctance toward buy-in could have been related to fear that the device could go away. This fear was brought to the forefront after a faculty meeting where an administrator warned that due to the number of iPad breaks and the financial burden of the program, the program could end. This was challenging because:

> There's a level of commitment to it. If we are going to flip everything and we are married to this device, or a similar type of device, that it is here for the long-term and not something that is going to be taken away.

A teacher admitted that even prior to the meeting, he thought about this possibility, noting "I think we all had that in the back of our minds."

A guidance counselor noted that flipping with an iPad seemed to be celebrated more than flipping without one. They said:

> My concern is that those teachers [who flip without an iPad] feel like bad teacher. They feel as though they aren't really part of the technology movement in the building.... I know that there are many of them who are excellent teachers and I would just fear that those teachers are feeling that they are becoming obsolete because we value teachers who use the iPads effectively more.

One teacher said, "It just seems that there is an attitude that if you don't do all these

things and stand on your head and create these really entertaining videos, then you are not doing it right."

The iPad was too great a change for one teacher who said:

> What you've done is you've taken veteran teachers and said, I want you to teach completely different and I want you to use a different tool for teaching. Those are two huge changes to ask. And I can see why some people would be resistant. It's hard for me, and I'm trying to change.

There had not been a consensus on the value of the iPad, a teacher explained. "I haven't yet heard an agreement in any faculty group I've been in about the iPad." This teacher has heard that "during the first year, the first few years of implementation student performance actually decreases because it is a learning curve."

An administrator said that teachers were using the iPads more effectively from the start compared to previous technologies. Teachers had students create multimedia productions within the first couple of years. One administrator said:

> Because a lot of times with technology, like when the Smartboard came out, a lot of teachers weren't using its full functionality, they were just basically using it as a glorified chalkboard. Instead of just writing with chalk, they are just projecting words that they had written up in a Word document or something. It's not really using the full power of it. But I see a lot now with kids creating stuff in only year two of the initiative. So I was pretty pleased with what I saw, a lot of teacher initiative going on there.

Administration seemed to be happy with how the iPads were being used for academics.

Some teachers did not use the iPad to its capacity. One teacher said, “I joke that I use it to kill small rodents and insects. Not a lot. I'm very technologically unattached. I do my grades. I do my emails. It almost ends there.” Some teachers used it more at the beginning of the year: “I've found as the year has gone by, I use the iPad less.”

One of the IT technicians noticed a bell curve. They said, “You have teachers who fully embraced it and took off flying with it. And then teachers who incorporated it, but maybe aren't using it to the fullest extent and then some who have a hard time integrating it.” The IT technician found that this bell curve was normal when any initiative is embraced.

There were some teachers who were not completely sold on the iPad. “I’m not sure the benefits of the iPads outweigh the problems they’ve caused,” one said. A Freshman Academy teacher said, “I see good and bad. I'm not sure if I like them yet.” Despite their personal preferences, a Freshman Academy teacher observed, “Some of the kids really run with it, which sort of keep me on the fence about it.” Some teachers wanted to do away with the iPad altogether, saying, “Eliminate it, fully, totally, and completely.” An administrator said, “The trouble is, there is never a one-size-fits-all. Some of the people who went to it, are like, ‘Oh come on, this is so easy,’ but then other people who went there, they felt overwhelmed.”

Student buy-in. Teachers described student’s acceptance of the flipped classroom initiatives as “a work in progress.” One teacher found it to be “more of a struggle than implementing the iPad itself.” Student responses were varied. A Freshman Academy teacher said, “The buy-in from the kids is really low. They think it is optional for them to

look at a website or watch a video." Another Freshman Academy teacher stressed that one cannot generalize about student buy-in of the devices. They cautioned, "There are a lot of levels of ...you can't generalize; a wide range of adoption."

A teacher found that his students were invested in making the iPads work. He said:

> I think really from the get-go we were working with a group of kids who were willing to go to the places we wanted to try to go with it and do the sort of things we wanted to do with it. In terms of creative assessments, in terms of them creating actual products that reflected what they did in the classroom.

Student comfort level. The juniors and seniors, who had learned without the iPad for all of their schooling, roughly eleven to twelve years, seemed as though they were not comfortable changing the way they did things. A history teacher believed students preferred a lecture, especially because that was what they were used to. They said:

> I didn't give a lecture that entire quarter. We went to the 2nd quarter. Everything was kids, they were working in groups, they were doing the research, they were presenting to the class. Everything was the kids. It was getting towards the end, I was out a few days sick. I said I really need to get you this information and I lectured. When I ended, 19 kids in the class, they all stood up and clapped. "We've been waiting two months for that." They want it too. And maybe it's the comfortableness. Maybe when the 2nd and 3rd graders are up here, they'll be used to it, but these kids have been taught a certain way for 10, 9, 8 years and it's new to them too. And, I think, frightening to them.

A teacher summed it up as: “We pulled the rug out from them and slapped them in the face with an iPad.”

One teacher noticed a difference as to who watched the assigned videos. The teacher found that the freshman watched the videos more often than the juniors. The teacher hypothesized why this was the case, “I don't know if that's because they had had a different expectation the first two years and it was confusing for them. The freshmen, I didn't have much problem with them watching it.” Similarly, another teacher did not have much success with upperclassmen watching videos. They said, “And maybe since I taught seniors and juniors, they weren't as invested, but when I would make a video and I have a class of 28 kids, probably 2 of them watched it.”

Achievement gap. There is an economic gap between students, which seems to be common in urban schools. Giving all of the students an iPad allowed the students to have access to the classroom content. While some students did not have access to the Internet at home, and the iPads work best with an Internet connection, a cable company offered a discounted rate to our students. Students used their iPads at the school and at any local establishment that offered free Wi-Fi, such as the public library.

One teacher found that giving everyone iPads empowered some students. “And for the lower, the kids who are less privileged socially, they are as good as anybody suddenly.” Another teacher noted two ways the iPad closed the achievement gap. First, all students can participate in “online discussions and collaborate with other students outside of the classroom more easily than relying on students having their own devices.” Second, teachers can require assignments that can take advantage of the power of the

iPad, as all students have them.

A technology teacher expressed how iPads helped to make school seem more relevant and therefore more engaging for students:

> I think it has benefited them because up until now I think that we were kind of limited. We weren't really speaking the same language that they were speaking. They were used to...as soon as they got out of school, the majority of their day is in front of their screen. And here we were trying to conduct a class without some of the things they were used to. I mean, how can you compete with television? How can you compete with video games? And now we have these iPads so that what we are providing is up there in interest level.

However, a teacher noticed that the iPads did not fully close the achievement gap. "Like anything else, for the kids that do the work, it was very successful for them and the kids that don't do the work, it was a major distraction." The teacher did not necessarily think the iPad was the issue, though. "I think kids that want to learn, learn. And kids that don't want to learn, don't learn."

Academic level seemed to influence how students were able to use the iPad for class. A teacher explained this point of view:

> Overall, I have pretty much flipped my class almost entirely. What I've found is that the honors students do it really well and they come in really well prepared the next day and kind of jump right in, but with the college prep students, I've had to kind of build in some additional scaffolds at the beginning of class to kind of review for the students who may have done it, but still provide enough of that

> basic knowledge foundational information that if a student didn't do it, they are not completely left behind.

Similarly, a Freshman Academy teacher noticed a widening of the achievement gap:

> So there are very huge extremes. So I guess that's a cultural shift. The extremes, the division between the kids who are successful and not in my classes, that gap has widened. I imagine it is more pronounced for freshmen than it is for upperclassmen, but it is definitely very apparent. A bunch of my F's right now, probably 15 of them are below 50%. In the 40s and 30s. Very little to no work is getting done.

A history teacher did not believe academic level made the difference, but instead it was socio-economic background. “So I think that is the difference,” they said. “I don't think it is college to honors necessarily. I think it is more their socio-economic background.”

Question 4: What are Students’ Perceptions of the iPad Implementation?

Students perceived changes in communication because of the iPads. Students were quieter in classes. Like the teachers, students thought iPads brought a different type of social conflict. Also like the teachers, students believed there needed to be limits to iPad communication between teachers and students.

Communication

The perception was that students were always using their iPads. A big part of what the students did on the iPad was communicate with other students. Students used a plethora of apps to communicate such as email, iMessage, and social media. As a result

of all of the online communication, students described the school as being quieter, having more conflict, and needing limits put in place for online communication.

Quieter. Students described their classes as being silent with less face-to-face interactions. An upperclassman agreed, stating, “It's harder to have a class discussion because everyone is so immersed in their technology on their own.” An English teacher concurred, “If I give my students 10 minutes at the end of class to take a break, it’s silent and they are all on iPads instead of talking to each other.” An upperclassman noted in the past, students talked to each other, now “let’s say I had to tell somebody something, I would iMessage them or I’d Tweet them.” Another upperclassman said it was “Like being in a clingy relationship. If you are always with your partner, when you are alone together, you aren’t going to have anything to talk about.”

Students described the immersion of the technology as pervasive. One upperclassman said “They [students] just have their face in their iPad.” Another student described how the problem continued into the hallways. “People don’t even know how to walk in the hallway. They carry this giant thing in front of them.” Yet another upperclassman said, “Everyone is looking down. You bump into like three people.” Students explained that some students watched Netflix with their headphones in as they walked down the halls.

An upperclassman said the freshmen were on Twitter constantly, “and then their iPads got taken away and it was just like now they were forced to socialize and they were just there staring at each other. They don't know what to do.”

An upperclassman spoke of a difference in the way that students make friends at

school as a result of iPads. Previously, one would have to “find something in common [in person] rather than picking something out of social networks.”

Conflict. Students described the content of students’ online conversations as “Hostile. It's bullying. It's talking bad about people. It's mostly what everyone is doing online.... It's every day, all day.” A student summed up the experience as “I feel like everybody is in everybody's business. There is no escaping.”

A student felt like the drama affected his learning. “You're coming here to learn, if you don't want to learn, let the other kids learn. And kids are just over here starting drama over social media. We can't even go out of the classroom without hearing about it.”

An upperclassman explained how the iPad can be used for nefarious purposes. “A lot of people, even I do it, Tweet about someone else even if you don't say their name. When the other person is on their free time and they see it, now both people are starting to fight.” Another upperclassman described the iPad as a weapon. “I really have a weapon in my hand, I feel like. It really is. Think about it.”

While some students mentioned that they thought the administration monitored their conversations online, a vice principal clarified:

> I don't [actively monitor students’ accounts]. I don't go looking for trouble, but what the kids don't seem to understand is if they put something out there, it's public and it is fair game. It's like standing up in the cafeteria and screaming. But if we have a fight or we have students that are using or students tell us, you know what, so and so is doing drugs or is cutting, going to commit suicide needs help,

> we have to look because that is where they put everything. And it's not private, it's public. And the other thing that students forget is these are the property of this high school. And they signed paperwork saying that we can search them at any time for any reason. It is not theirs. It is on loan to them from the school.

Limits. One complaint students had was the unpredictability of when assignments appear online. A student said, "I'm supposed to check my iPad every hour at night to see if you posted some work for me. No, I'm not going to do that, sorry." One student said, "We don't really go on Schoology unless we are in class and the teacher tells us to go on Schoology." Another student explained that some teachers uploaded assignments without telling students. The students were expected to know the assignment was there. Yet another student said, "I've had teachers who assigned homework halfway through break and expected it done."

A student mentioned that sometimes with the volume of communication on the iPad, some notifications can be overlooked. Schoology notifies students when a teacher makes a change to the site. "Sometimes it's 7–8 links that get sent out as a different thing in Schoology and there are so many categories within categories that once in a while, some just slip through the cracks," a student explained.

Some students described how they could not do assignments without Wi-Fi at home and not everyone had Wi-Fi. These students wanted some kind of limitation put in place on the amount of Internet required homework.

The Schoology platform, by default, sets homework to be due by midnight. Students explained that prior to the iPads, they could work all night on homework. One

student explained that the midnight deadline helped him to get the work done. He said, "We have to submit by 12 midnight. So I think it's a good idea for schools. The deadline helps me get it done on time."

Distraction

A student described the iPad as a "double-edged sword." The student went on to say, "It opens up a lot of windows that the teacher can use for the classroom, but it also brings a lot of distractions; a lot of things that aren't really needed in the classroom." One student believed the iPad to be a distraction to everybody:

> When you have an iPad in front of you, no matter how mature you are, no matter if you are the teacher, a student, the principal, it doesn't matter, in my opinion, you cannot deny the fact that it is a distraction tool.

A guidance counselor heard students admit that the iPad is a distraction:

> I think it's a major issue, though. I do. I'm a member of the school improvement team and the past three meetings we have had, the kids have brought it up.... They have brought it up and said, if we are being honest here, it is a distraction to us.

Distractions limit participation in class: "[Teachers] ask a question and maybe there will be maybe one person that raises their hand. Because the people that are on their iPad, keep focusing on that and don't even listen." A student explained how the iPad was another excuse not to do work. The student described that previously he would either pay attention or sleep, but now "I have that third option of 'Oh this problem is too tough I'm getting bored,' and then I would just sit back and check my iPad for Twitter and stuff. It just adds another distraction element."

A student shared that the iPads may have played a role in the student's "most distracted year yet," confiding:

> Even though the iPad is super-useful, especially the aspects where you get to use the Internet, …it left a lot of room for me to be able to do what I want and the teacher not knowing, so I was really distracted in all my classes and at home.

A student stated that after being distracted in class, the student could not participate in the lesson:

> It wasn't because I wasn't doing the work; it was just struggling in class because I missed the whole lesson. She did care, but I don't think she realized it was because the iPad, she just thought I was slacking off.

In addition to being distracted in class, students shared that they are distracted in the hallways too. "And when you walk through the hallway, you always bump into someone that's like this [holding iPad up in front of their face]."

A student discovered that an old-fashioned book can be a better way to learn sometimes. "I feel like you can teach yourself with a book; the book doesn't have Twitter on it. When I'm reading my college book at home, there's not going to be an iPad in my face."

Addiction. A student found that iPad-use was an addiction. They said:

> I know it's a lot about self-control, but technology is like an addiction. You take someone's phone away from them and they go crazy. If they lose it for 2 seconds, they are like, "Oh my God, where is my phone?" And then it becomes like that with the iPads too and Social Media and texting. There's a psychology behind it

> where it does become an addiction…. And my sister was introduced to it as a freshman and I haven't seen her like leave the room. She is on it all the time. And it's not for schoolwork. She's not studying. Honestly, she is failing most of her classes. Legitimately failing. And she is sitting there and all she does is stay on the iPad. I'm afraid what's going to happen to her when they finally take it away, hopefully she'll see the sunlight.

As with any addiction, students felt a compulsion with the iPads. Students expressed the need to check a new notification on their devices. "Because when I get an email," they said, "and I see the little red thing come up, I have to click it." Another student added, "Yeah, I want to get rid of it [the little red notification icon] so bad."

An upperclassman recounted what happened when the school collected the iPads at the end of the year: "When they just took our iPads away, every senior right now is like, 'What the hell do I do all day?' Because we are so used to having them, being on them, and looking things up."

Entertainment device. Students said that the iPad was an entertainment device: "Kids will start playing games and they'll start doing other things on the iPad instead of doing what they should be doing like using Schoology and taking notes and stuff." As an entertainment device, students said there was always something to do. "You can't be bored anymore, I think that's what it is. There is always something to kind of do on your iPad, whether it be a game or on social media."

Students claimed that with the iPad, they improved on certain entertainment skills. "I definitely got really good at the app, 8 Ball Pool." Another student said, "I got

good at not looking at the screen when I'm playing." Students also credited the iPad with making for a more enjoyable entertainment experience. "Netflix has become a dream on this." With regards to social media, another student said, "I've gotten like 100 followers."

A student stated that the iPad offers more distractions than classroom tools: "For one school-based thing, there are seven social media things within the iPad. So we can do one school thing, but there is also all our other social medias that distract us completely."

Students did not use that many apps on the iPad: "We have, like, the power to do anything from those iPads. Like the app store is so broad, yet we live on 6 apps…Twitter, Instagram, Tumblr, Facebook, Vine, Games, YouTube, Pool." Other students mentioned using Snapchat, Candy Crush, Netflix, Pandora, and iMessage. Students also used their iPad for playing music and doing online shopping.

Back on track. A student claimed that it was harder to get back on track with the iPad than previous means of distraction. The student said that when being distracted previously, he could rejoin the class at times because he was limited in his distractions. Now the student has more options as to ways to be distracted and will "keep being lost in the iPad." When asked how students get themselves back on track when getting distracted with the iPad, students responded with, "It's like 12 o'clock in the morning," and "You sleep."

Homework. Some students claimed distractions were the reason they did not do their homework. An upperclassman blamed iPad-use at home as the reason for not doing homework. They said, "Especially when you are home, that's when more distractions will come. Because you are not in school and you are not violating anything." Another student

confirmed, “I'd be saying at night, ‘I'm going to do my homework’, but honestly, I go on a website, somewhere I'm not supposed to be on. I forget.”

An upperclassman said that the iPad allowed students to procrastinate doing their homework. The student believed he could use the Internet to find answers really quickly, therefore did not feel the urgency to do the homework right away. The student claimed that due to the simple nature of the homework assignments, he did not learn anything.

Personal device. As students were given the iPad for the year and they had permission to download what they wanted, they took advantage of that. “You get a little comfortable with it and think, I'm probably going to have this for a while and download this, this, this, this, and this. I guess you get a little too attached to it.”

Students used the iPads for many personal reasons. A student shared, “They give you your iPad in August and you put your whole life—your social media accounts and pictures—and it comes due and you have to just give it back.” Another student thought of the iPad as his own. “With the iPad, I end up using it for my eBay accounts. I use it for a bunch of stuff other than school-related. I do treat it like it's my own because for the time being, it is.”

An upperclassman believed that use of the iPad should be personal and not the business of the school, especially when not on school grounds. They said:

> They really invade your personal space on there. I don't like how even if you are out of school, you Tweet something and you are not in the school, you are out of it, but they can look at it and you can get in trouble for it. But you weren't on school grounds, you weren't at school, I don't think you should be held liable for

> what you did out of school. They are going on your personal thing and looking at it.

Hiding. Students found that it was easy to hide what they were doing on the iPad. Teachers tell students to stay on task, "but it's harder for them to notice, because we are supposed to be on the iPads." An upperclassman added that they can get away with anything:

> You can hide it perfectly. It's there. So let's say you are in class and everyone is supposed to be working on their iPads, you could just be playing a game or messaging someone, listening to music and the teacher wouldn't know any better.

Even when the teacher walked around the room, students shared that they can "swipe the screen" to hide what they were doing.

Classroom Management

One student felt it was the teacher's responsibility to utilize the iPad in such a way that students would not go off task. "I feel if they were to put their mind to it, they could possibly do the entire lesson on the iPad. If the entire time you have to use the iPad for the lesson, people wouldn't be on another app." Students also recognized that teachers deal with classroom management differently. One said, "It depends on what teacher because some teachers when you walk in right away, they'll be like, 'Put your iPads away,' and other teachers just don't acknowledge it at all."

Students were not allowed to use iPads in all classes. A student said, "In my math class, people would actually get in trouble for taking their iPads out in the middle of lessons." Another student shared, "Every day, in every class, you'll hear a teacher say,

‘Put the iPads away or something like that.’”

Student perceived that teachers had many different approaches to limit or manage the iPad. For example, blocking, using it for strictly educational purposed, locking students into an app, having classroom sets, iPad collection iPad days, and monitoring.

Content blocking. Students offered many solutions to managing the iPads including getting rid of social media apps, having a timeframe from which the iPads could be used, and blocking everything that is non-educational. A student felt that there were only a few apps that were really needed. “As long as there was Schoology, NoteAnytime, and Google to search things, there wouldn't be the distraction level because you can't play games.”

Students were open to more restrictions. A student noted, “I think they should have more restrictions. They shouldn't just do Facebook, they should do all of them.” One student said, “If it's possible to block certain apps like social media and games and stuff, I feel like it would be a lot more helpful. That's usually what everybody is on and that's why they can't pay attention in class.” A student noted that it would be for the best. “I wouldn't like it, but I know it would make everything better.” Another student did not want the apps blocked for himself, but knew it would be for the best, conceding, “They should block some apps after we leave.” One student did not feel that blocking apps would be ideal for their learning style. “Honestly, I'd be aggravated. I can't be too focused on a class, I need at least a two-minute distraction. A little check on Instagram and let me get back to class.”

Lock students in. A student thought giving teachers the ability to lock students into an app would be beneficial, saying, “Maybe they could give the teachers the access to block every iPad within the classroom so they [students] won't turn it on or they'll stay in one app if they are taking notes.”

Home set. A student suggested that students only have the iPads at home. “That eliminates the distractions in the classroom and it still allows us to have all the opportunities at home, to watch videos and submit assignments online and look up answers on the Internet, or do research, or write papers.”

iPad collection. Students thought that a classroom collection of iPads would be ideal when the iPads were not being utilized for class. “I would time it. Use of iPad should be timed.” Another student agreed, hoping that would cut down on off-task behavior: “They should enforce certain times when we can use it because I know ever since we got the iPads, I'm constantly on it playing games or going on Twitter… I never had that problem before.”

A student elaborated that collecting iPads when they should not be used would work. “Because it [the iPad] is just kind of there. It's either pay attention to the teacher or play again. And more often than not, you are going to pick the game.” Another student suggested a cubby system for collection. “Have a cubby for kids. Okay, 20 minutes, go put it back in the cubby.”

iPad monitoring. A student suggested allowing teachers to monitor students’ iPads through a program: “I think they need a program so that they can see what each student is doing on the iPad.” Some students would not mind having their iPads

monitored, saying, “Yeah, for the sake of education.... I'm having fun with the iPad for all the wrong reasons.”

Division

Students discussed being divided as a result of the iPad. Students perceived the divisions around how accustomed they were to the iPad and how they used the iPads.

Student comfort level. There seemed to be a division between those who were accustomed to learning a certain way and those who were more open to a new approach to education. An upperclassman thought that if they had been given the iPads as freshman, they might have been more accustomed to them and gotten over the novelty of all the off-task possibilities. One said, “This is like our last year. I think if we had it for four years, we could have gotten over the fact that we have a bunch of games that we can play all day long.” Students also said that they were already set in their ways of doing things. “That's the only way I'll learn: by writing, listening… My sister, she's a 7th grader, and they are going to get used to it quicker than what we did in a year. They'll be with it for four years.”

Another student described trying to use apps and being unsuccessful:

> For some of my classes, I tried doing the apps and NoteAnytime and stuff and I can't process it as well. I feel like I'm reading, but I'm not really getting it because I'm just going from one thing to another. And if I have to write it out, like handwritten, I'm re-reading it and getting the concept.

Students believed that the younger students, especially the sophomores who had the iPad for a year already were better with them. “They [underclassmen] are so used to it already

since they've had it; especially the sophomores."

Use of iPad. Whether an iPad was expected to be used for a class was attributed to the teacher's choice. Students used the iPad for everything in the classroom including 'Do Now' activities, classwork, following along with a PowerPoint, taking notes and conducting research. A student stated, "It runs 80% of the class." Other students did not use it at all. One said, "It's gotten to the point that I don't even charge it. It's dead right now. I don't use it in school." One student believed that veteran teachers continued to teach with their former methods and therefore the iPads were not utilized.

Another observation was that teachers' use of the iPads fell on the extremes. "Some of my teachers, they are either all for it, or totally against it. I had physics last semester and everything was flipped learning… And I have a teacher this term, and he's like iPads away; it's work time."

Students noted that some teachers who used the iPads initially stopped using them as the year went on. "At the beginning, we used them a lot…like for quizzes. But now teachers just give us paper and we use it for notes. It kind of faded out." Another student said, "I haven't used my iPad in like 3 months."

Some students did not view the iPads as revolutionary and therefore were unclear as to why they were needed. "When you really think about it, why do we really need it in class when we have paper and a teacher up there? And a computer?" Another student added, "Whenever we actually need the Internet, just go down to the computer lab every once in a while. We don't all need the iPads 24/7." Some students believed that their teachers were using the iPad "just for the sake of using it…because it makes it feel like

it's not a waste."

Some students were bothered that they were forced to have the iPads. "We didn't even get a vote to see if we wanted it. It was just dumped on us with no choice. I didn't want the iPads and I still think it's pointless." Another student preferred using books to iPads and said, "I personally wouldn't have liked the iPads, I liked having the book in front of me. I don't like reading stuff electronically."

Achievement gap. Some students talked about how their grades went down with the iPads. "Umm…honestly, I feel like they [grades] would have been better without the iPad." Another student said, "My grades suffered this year because of them. I was a straight A student last year. This year, I have trouble focusing in class and I would miss whole lessons." Some students spoke about how their grades went up. They suggested the work got easier and the students could work on assignments ahead of time and submit them.

Question 5: How do Teachers Perceive the Flipped Learning Initiative?

Teachers had some misconceptions about the flipped learning initiative. Many equated it to videos, but others equated it to student-centered learning. Teachers expressed opinions about how much flipped learning should take place. Teachers also perceived that the iPads created a more flexible learning environment and that the students were not watching the videos at home.

Misconceptions

A vice principal thought there was a great deal of misconception of what flipped learning means:

> Some people think it is about making videos. That's one aspect of it. So once you start to work with people and say, listen, it is more of student-centered learning practices, “Oh, I like this. I didn't realize what this was.” People who are resistant some by, oh this is all gonna change in another year. I think we are uncomfortable being the guide on the side as opposed to the sage on the stage. All information must come through me rather than being facilitator. Once people start to see it and figure it out, they are comfortable with it.

Just invoking the term flipped learning raised a question among staff: “Depends what you mean by flipping the classroom. Are you talking about videos or are you talking about student-centered learning?” A teacher shared that most students thought flipped classrooms involved videos. Another teacher added, “I think that's a reflection of how teachers viewed it at first.”

A vice principal stated that the faculty needed more professional development on flipped learning: “We have a very rudimentary understanding of what it is.” Some teachers partook in professional development on flipped learning and shared their knowledge:

> And one of the things I took from [their site] was that the teachers who flipped were the ones who wanted to flip. Some teachers feel like they have to flip. And the administration isn't being like, I'm coming in, I'm making sure you're flipping. But there is this sense of, I should be flipping. And if you don't necessarily believe in what the flipped classroom is, I don't believe that you should be doing it.

Already Flipping

Many teachers felt that they had already had a flipped classroom, so this was nothing new. A flipped classroom was equated with student-centered learning by teachers. “I think that's one of the major goals of flipped learning is to make the students own their education.” A teacher found that flipping the classroom allowed for more student-centered and higher-level thinking activities: “It has enabled me to do more deep analysis and activity in class, whereas before I would try to do it all at once and it was too much.”

Another teacher equated flipped learning to student-centered learning:

> So the flipping the classroom seems to me an acknowledgement that the emphasis that we've seen on content over a couple decades has its limitations. And I'm not saying it's not new; it's new. Talking about flipping and the technology is new, but to me, it goes back to making it student-centered… If it's not going through the student's brain, they aren't learning anything. They might as well not do it.

Teachers acknowledged that flipped learning was not revolutionary. Flipping the classroom did not have to involve sending videos home for students to watch:

> In some ways, using a textbook is flipped learning, right? The source of information is at home. The kids interact with the source of information, they come into class hopefully having processed some of that information and you facilitate the furthering of their understanding.

One teacher reiterated that the iPad was not necessary for flipping a classroom: “Can’t stress enough how confusing or entangling the iPad with flipped classrooms is

detrimental. The iPad is a good tool for flipping a classroom, but is totally not necessary." A chemistry teacher found that she flipped her classroom without using the iPad. "Yes, I flip because all of those constructivist learning experiences. I'm an expert at them… And then people say even if I'm not using the iPad, I'm flipping because I'm running a constructivist classroom. You betcha I am."

Many teachers felt they were already flipping their classrooms. English teachers had previously assigned students to read at home so that they could work with the material in class. "The idea of working with something at home and coming back with it in the classroom wasn't new or unusual, but the medium certainly changed."

Art teachers also claimed to be flipping their classrooms, at least in terms of student-centered activities. A teacher described their classrooms as flipped in the sense of 80% student-centered and 20% teacher-centered. "It hasn't changed it at all in the art rooms really because we have always done…We basically show them, this is how you do whatever and then you turn them loose to do it."

A history teacher was surprised when flipped learning was sold as a new idea. They said:

> In terms of student-centered, I've always done that. It's just my preferred style, which is part of why many of us feel this nothing new. The whole flipping is nothing really new to us.... It's like somebody saying, now we are going to wear shoes. What are you talking about, I've been doing this all along? And those people are the experts on shoes. And we are going to go to other parts of the country and look at shoes. So for some of us, it's like I've been doing this. It's part

of my routine.

One teacher stated that flipped learning can look different in different classrooms and that makes for a complex situation. “We are all used to this cookie-cutter approach and we all have different cookie cutters. That's going to confuse the kids. That's going to confuse us. That's going to confuse the administrators.”

Advantages to incorporating flipped learning were described by teachers. A teacher stated that the videos gave the students multiple chances to experience the content. This was a means of improving retention of material. They said, “What I always struggled with was [student] retention in all of my classes. That they would forget something because I only taught them once.”

An English teacher gave the following example of flipped classrooms:

> If I were introducing Hamlet, I would give background information on Shakespeare. I would give background information on the Elizabethan period. I would give background on drama. I could do that, make the video kind of deal, and they could refer to that any time. And then I could get into the play. So to me, that is a very good thing.

A director expressed that while the students still might need the teacher to elaborate on some points, less class time was needed. “If that low demand work was going to be 20 minutes of class time one day, maybe now it has to be 5 minutes of class time or 10 minutes of class time.”

As teachers facilitated discussions and activities, there were more opportunities for teachers and students to build relationships. An administrator noted: “There is more

human interaction, more of that relationship 'R' happening that draws them into the culture. I see that emerging. I see the relationship piece emerging through the use of the iPad."

While not everyone met either definition of a flipped classroom, an administrator believed the initiative would gain momentum: "I have seen pockets… The other people are usually the early adopters of new technology and new approaches… I think everybody is going to start doing it. Or at least almost everybody is going to start doing it, the flipped approach."

A teacher explained that flipped learning was such a change for some and therefore it was a work in progress. "It's been a slow process. I think a lot of the success that I am seeing with the flipped model in conjunction with the technology, it is definitely coming in the latter half of the year."

Not all teachers were fans of flipped learning and the role that it created for teachers:

> I didn't go to college and spend my life in this profession to be a coach or a moderator. I'm a teacher…. Can you be a teacher and a coach and a moderator and...? Sure you can. But never forget that teacher is up at number one. In my mind, flipped, teachers are pushed off to the side. You might be wearing all these other hats, but to me, that role of teacher isn't there and I think that is important.

A Freshman Academy teacher shared that the switch to the flipped approach was not an easy one. "Getting away from the mindset of, 'You're not teaching me?' Because it is just a different way to go about it, but it is so different from what they are used to that

it's a big struggle."

An administrator stated that a mix of pedagogies created a richer educational environment:

> I wouldn't want to see the whole high school flipped. I think you need an eclectic mix of methods….I have witnessed and watched some great flipped lessons that to me, if I was a kid on that topic, I envision how that topic was presented to me and how it is getting presented to them, and I would much rather be a learner in their world, even coming from the generation that emerged with computers in their original form.

One administrator hoped that teachers would see the value in the iPad even if they were not used for flipping. "The tool still could provide a resource in classrooms in debate instantly calling up information. You are not necessarily flipping. You are using it as a tool in a different way."

A teacher did not think that the flipped model was a "one size fits all". The teacher believed that flipped was just the latest fad and another tool that teachers can utilize:

> It's going to be a series of things that fix education.... To just kind of say, that was all wrong and this is the way to lead us to the promised land, to me I think is a slap to the people that were here and the work that we've done.

Flexible Environment

iPads offered a flexibility learning environment. Teachers found that the iPad alleviated the need to go to a computer lab:

> Just logistically it's hard to get down to the computer lab or we had the laptops on wheels, just such a time issue. And those didn't work half the time. So I did feel like it helped in that regard a lot.

Teachers noted that iPads provided mobility to students. “With the portable platform, they are not stuck to a desk. They can get up and move around the room.” Teachers found that the iPads extended the walls of the classroom. One said, “The iPad allowed me to get the students working on things when they weren't in my classroom.”

Homework

One change that came with the flipped classroom was what homework looked like. Teachers often created or linked to videos that students could access. A Freshman Academy teacher found the hardest part of the flipped classroom was getting the students into the mindset that they had to do the homework to be ready to work in class with their new knowledge. This teacher has often found that students said, “I don't know what is going on. I need help with question one.”

Many teachers found that most of the students did not do the homework. One teacher said, “They just don't watch. It's an elaborate exercise in futility. In this environment, I mean. I imagine in some environments it would be [worthwhile].” Another teacher said:

> I taught seniors and juniors; they weren't as invested. When I would make a video, and I have a class of 28 kids, probably 2 of them watched it. And I would tie it into an assessment and they still wouldn't watch it. It was really frustrating.

When students did not watch the videos, some teachers had students watch the videos in class. Others taught the material despite the lack of preparation. “I have a pretty low rate of students watching things at home, so I just end up repeating it in class, which isn't necessarily flipped.”

A Freshman Academy teacher found flipped learning to be pointless if students were not watching the videos:

> Because I mean, if you make a great video and nobody watches it, who cares. And the hours that it takes to make a video for one lessons, it's ridiculous. It takes away from personalization. We only have so much time. I want to talk to my students. And then they were advocating watching a video using your own face there. I mean, just what they [students] want to see. Talk about something as a joke. Five to ten minutes of that. That's not novel at all. You want something that's fun and engaging and different. That's really in a lot of ways, regressive thinking for a progressive kind of an idea.

One teacher said, “We have to go the next route and fess up to [the fact that] urban kids don't do homework.” A Freshman Academy teacher had the same sentiment: “The bottom line is: In this population, they don't watch the videos.” One teacher suggested that homework is not something that everyone can do equally at this school. “I'm not sure how many kids are actually able to do homework. It seems like homework disadvantages a lot of kids. They don't have the resources at home, the space, the time, the environment to do work.”

Another teacher noticed a slight improvement with homework as the year went

on. They claimed students did “A little more than they have in the past… Not a great improvement, but…homework is always a struggle.”

Some teachers found that students were not watching the videos, but just Googling the answers. One teacher shared that when he assigned questions, theorems or formulas, students conducted a Google search rather than watch a video that the teacher provided. The teacher claimed it would be easier to find the answer if students watched the video, but “they don't want to commit to watching the video.”

Teachers found that when students did not do homework in a flipped learning environment, it was more detrimental than in the past:

> Even when it was traditional lecture, probably a similar percentage didn't do the homework, but now you are relying on the fact that they are going to do it in order for the next day to be successful. So it is just a little different in that way.

For students that did not do the homework, teachers had to come up with strategies to get everyone caught up:

> If the lesson is dependent on their having done something previously, then I'll have them in heterogeneous groups so other students can pick up the slack or I'll talk to them individually about it or sometimes I'll schedule in a little time at the beginning of the period if you didn't do this, go take a look real quick while these other kids are starting to do something else and then jump on it.

One teacher had to watch the videos with the students in class. They said, “I put it up on Schoology, I put up links for videos and stuff for them to look at home and then I look at them with them in class.” Another teacher’s solution was to give students multiple

days to view a video. “I give them two or three days. I tell them, you can go to the library afterschool, you can do some in here if you like before you leave school.”

Implement flipped learning when students did not do the homework assignments created social stratification. A teacher noticed that students who did not do the homework were placed in different groups from others. They said, “Then it became known…In my class there was a comment, ‘Smart kids are in that group.’ And that comes out and that's definitely a struggle because we try to mask that as much as we can.”

A Freshman Academy teacher found that students were more successful with flipped videos when they were introduced later in a unit:

> “Here's a video, go home, and try to learn from this,” I found didn't work. Because they are too immature to sit there. They'll just watch it once passively and be like, I don't get it and put it away… I would teach it the old way and use it more mid-unit to kind of enforce what I'm teaching. So once they have a basis of what they are learning about, then they use it once they have stuff to follow along with, I found it works much better that way.

A teacher found that students need to engage with an activity while watching the video. “I think what is essential with the videos that go home is what you are having students do as they are watching the video.” A Freshman Academy teacher shared that there are websites that can track how much of a video students have watched and embed questions within the video.

One teacher mentioned having success with assigning videos and giving a paper worksheet to be completed. “That seems to work for me, that's working better. I know

other staff, they have great success with sending home work [completely on the iPad], but it hasn't worked for me." Having a tangible piece of paper seems to be a motivating factor for students. As a student said, "When I have a piece of paper that someone gives me for homework, I see it and want to get it done. On the iPad, I don't really care, I just decide not to do it."

Teachers found that having an incentive such as a lab or activity can motivate some students:

> They [students who do not watch the video for homework] have to watch it during class and have to play catch-up with the other kids. So if there is anything going on in the class, like an activity, they have to miss out on that and they have to go to the back of the room just to get caught up.

Another teacher found the flipped initiative to be at odds with the previous initiative of increasing literacy:

> I've spent two years working on the literacy team breaking our backs trying to get the rubric and all this other stuff out, and in my mind, well, if we are doing all of this to get the kids to read and write, to send them home to watch a video, to me kind of defeats what we have been spending all day trying to do. So I send my kids home to read.

Question 6: How do Students Perceive the Flipped Learning Initiative?

Similar to teachers, students were unclear of what flipped learning meant. Some claimed to not experience it at all. Students verified the teacher's perceptions that they were not doing the homework.

Role of Flipped Learning

Some students were unclear on what flipped was. They used statements like: "define flipped," "Is that like when you have to watch the videos?," and "I think the teachers themselves were kind of hazy on it. So therefore, we were hazy on it."

Other students said that it was not happening in their classes. Comments included "It's a myth," "I don't do that. We'll just learn the material in class like before," "I think it's only like freshman," and "I don't even know if we do have flipped learning. It doesn't seem that obvious to me."

Students explained that certain classes were less likely to flip than others. "It's 'cause with AP classes, they always have, it's like a national curriculum, they are all doing the same thing everywhere. So not every school has iPads. So they are just doing what they have been doing every year."

A vice principal found that not all students were fans of flipped learning, at least at first:

> You take education in the way that kids know it and you break it. And they are no longer able to play school anymore. And they have learned to play school very well. And now you change the game on them. They have been doing this for 8 years or more if they've had kindergarten or preschool. And so you change it up

> on them and parents freak out and the kids freak out and they say, you know what, my teacher is not teaching me. They expect me to teach myself. So they don't understand it, and they don't really get it until they go through it for a bit. And then when you talk to them, they finally realize what it is and how much freedom they have, and you talk to them months later and they are like, "This is awesome."

Students seemed to prefer when the teacher taught the lesson. One said, "I had a class where they tried to use some videos. I didn't learn anything. You need a teacher actually explaining it." If students do have to learn from a video, they can be left with lots of questions. One said, "I'll ask about 100 questions the next day."

Some students were proponents of flipped learning. One said, "I kind of like it, though. It shows you things you are about to learn so it gives you an overview. So it's easier once you get to class, so once you see it, 'Oh yeah, I saw that.'" Another student said:

> For all my classes, we do flipped learning and I think it's very helpful. You have the notes and you have the videos to watch. And then you come into school and you take the quiz. If you have any questions, you ask in school. And the teacher doesn't mind answering them. I think compared to last year, my grades have gone up…a lot. I like it. I like the iPad a lot. I think it is a helpful source.

Students thought that flipped learning worked better in some classes than others. One said:

> I feel like with a hard curriculum like math or English maybe, you can't do it through a video because, you can't really do it through a… Looking at the video

> isn't really going to help you. ‘Cause if you have a question, you can't ask the video, “What do I do?”

Another student said, “I think in the STEM [science, technology, engineering, and mathematics] subjects, it doesn't work. In order to learn, you need instant feedback in class.”

An upperclassman had some insights into why flipped learning did not work for everybody:

> If you're [the teacher] coming into it saying, I'm going to teach everything in the video, I just wanted them to have a rough sketch of what I'm going to be teaching. well that's one way to do it. But to be dependent on them knowing the information and going in and having worksheets based on what they should already know, I just don't think you can do that…. As a teacher, you are supposed to teach everybody and... people who want to learn, will learn from flipped learning, but the people who you gotta try to motivate to learn, aren't going to try to learn through flipped learning. In high school, it's a pretty even split between people who want to learn and people who don't want to learn.

Homework

Some students believe the homework to be unnecessary. For example, one student said:

> Actually last week we were assigned a video to watch and she was like "Come into class and know what the video was talking about, it should only be like 30 minutes." And I just automatically blew it off because I knew that when we came

> back the next day in class, the beginning of the class was just gonna be going over that and I would just learn it there.

Another student elaborated on experiences in math class:

> What she would do was have us watch videos on a certain subject and then teach the same thing that we just watched the next day. It just goes by faster if we already watched the video because we sort of knew what it is, just we don't fully understand the entire subject so she just clears up any hazy spots. But if you don't watch the video, you can basically get an understanding of it.

One problem with requiring iPad use for homework was students who got distracted. “If I were to do my homework, I would get distracted and want to go on Netflix.” A student explained that doing homework on the iPad is tough because there was no oversight. They said, “Even though we can do what we want on the iPad in school, we still can be told, ‘Shut it off’ or ‘Put it away,’ but at home, obviously not at all.” Therefore, it took this student “way longer to do homework.”

Another problem with homework based on videos was students who found the video homework assignments to be busywork and not challenging:

> Sometimes the questions correlate exactly with the video, so I feel like it is just busy work, just to prove that you watched the video. Once again, I feel like it's not having me solve and come up with problems and gathering information to answer it. It's still being explicitly given to me. It's more like memorization than coming up with conclusions.

A student noticed that watching the videos can be more important in some classes than others:

> I'll say for my AP class, the teacher was very proactive with the flipped learning. She did give us the majority of videos to watch at home. And the videos would be hour-long videos, two-hour long videos on a particular chapter. And we'd have notes that would coincide with them. And we'd learn everything through those videos. Then once we came into the classroom, it would be hard for her to clarify because some of us would watch videos and some of us wouldn't. So it was very imbalanced. Some classes do it more effectively than others. In calculus, you can get away without watching the videos, whereas in chemistry, you would have to watch the videos.

One student said, “I don't really check my iPad when I go home, my iPad is not my iPad. I just use it for school. If anybody uses it, it's my little cousin, to play on it. I really don't.” A student explained that adding more tasks to the homework would not increase buy-in: “Some people don't even do their homework. What makes you think they are going to watch a video and learn so they can do it?”

This was consistent with what a teacher found regarding students’ use of iPads for homework:

> I have found that many students will tell you point blank that they don't use the iPad at home. They don't look at it on the weekend or after they leave school. They just use it at school. Many, many of them have turned off the notifications. So, here they have this tool that has endless possibilities, yet when you want to

notify them or give them an update, not necessarily afterschool, but during the school day, and you are applying an update or whatever, they don't know. Many of them do use it as an academic tool, but a large majority, I have found, don't.

Summary

Chapter four reported the findings from the interviews and focus groups. The answers to the six research questions were answered in themes. iPads were found to be used for teaching and learning through communication and instruction workflow. The iPads were used for learning for communication, accountability, and learning workflow. Teachers perceived the iPads as affecting communication, being a distraction, affecting classroom control, and bringing divisions. Student perceptions of the iPad implementation revolved around similar topics as teachers: affecting communication, being a distraction, affecting classroom control, and bringing divisions.

Teachers approached the flipped learning initiative with skepticism. Many teachers had misconceptions about it. Many teachers had already flipped their classrooms, and most teachers found that students were not doing the homework. Many teachers appreciated the flexible environment that the iPads afforded and teachers assigned work to be done outsides the confines of the classroom. Students also approached the flipped learning initiative with skepticism. Students, like teachers, were a little unsure of what a flipped classroom was. Many students claimed to not experience it. Students stated that flipping worked better in some subjects more than others. Also, students admitted to not doing their homework.

CHAPTER 5: FINDINGS AND INTERPRETATIONS

Introduction

The purpose of this qualitative study was to apply the lessons learned from the Apple Classrooms of Tomorrow studies, the SAMR model, and the Diffusion of Innovations theory to understand the implementation of an iPad program in an urban high school in the Northeast. Data was collected from interviews, focus groups, and observations. The researcher used qualitative analysis to code the data. Through data analysis, five themes emerged: communication, control, division, distraction, and workflow. These themes will be discussed in relation to the research question they purport to address.

Question 1: How are iPads Being Used for Teaching in an Urban Instructional Setting?

Communication

There is ample evidence that the iPads were used for communication within the school. Through this implementation, all students now had access to a device that was connected to the Internet. Teachers found Wi-Fi access in the school to be spotty in the beginning, but the IT department worked diligently to fix this. This seemed to be a problem that would have normally been fixed in the first year of an implementation, but it took into the second year at JHS. This was in part because iPads were not utilized throughout the building in the first year as mainly freshmen used them. Freshmen were generally sequestered on the second floor of the building. Teachers admitted that the

Internet connection was much better as the year progressed. Teachers and students were found to be using the iPads for communication about class work.

Instruction

Teachers used a Learning Management System, Schoology, to move their course content online. Schoology was a quick way to provide content to students. Teachers would post items like documents, PowerPoint presentations, links, and quizzes. Teachers differentiated the lessons by making different resources accessible on the iPad to address learners' needs. Teachers also allowed students to submit different types of assignments as the iPad aided in the process of creation. The iPad's capabilities allowed it to showcase the students' work in a number of ways. For example, students made videos, created songs, wrote papers, and annotated pictures. While teachers aimed to reach all of their students, iPads aided in the process.

Content access. At Jameson High School, teachers used Schoology, and were responsible for gathering resources for their classes as they no longer had textbooks. The school did not purchase apps for the classroom as, at the time, Apple did not have a way for the school to send apps to the students and collect them back for future students to use. Clarke and Svanaes (2012) also found that teachers were more likely to download free apps. Utilizing a content management system was consistent with the literature as Grimes and Warschauer (2008) found a learning management system to be one of the greatest affordances with laptops. Also, Kocak (2015) also found consistency in software programs to be important.

Freshman Academy teachers did not have consensus on which learning

management system to use during the pilot year. At the end of that school year, the teachers came together and decided to move forward with Schoology. Having the school use the same app was helpful for students and teachers because teachers could help each other learn how to utilize the same app, Schoology. Also, students would log into Schoology for one class and see updates for another class.

Immediate feedback. iPads allowed teachers to return work faster than to prior to the implementation as feedback was digital, portable, and sent graded work back to students at the push of a button. This was consistent with Goodwin (2012), who also found the iPads facilitated instant feedback and that instant feedback was important as "it enables students to identify and rectify mistakes in their thinking before they become misconceptions" (p. 61).

Organization. Most teachers found the iPads to be a great way to stay organized. This was consistent with research on one-to-one devices (Broussard, Hebert, Welch, & VanMetre, 2014; Cox, 2014; Garthwait & Weller, 2005; Grimes & Warschauer, 2008; King, 2012; Zucker, 2009). At JHS, some teachers preferred to have a stack of papers. This may be due to the way they were used to working and could change in the future.

Teacher's role. The iPads were introduced concurrent with the idea of flipped learning. As such, it was expected that teachers would change their pedagogy to implement more student-centered learning. More student-centered learning occurred throughout the school with these implementations. As teachers assigned more videos for students to use on their own and took advantage of the iPads for group projects, there was more student-centered learning going on. Goodwin (2012) also found the iPad to promote

student-centered learning opportunities. Goodwin noted that the iPad did this better than desktop and laptop computers as the apps were less expensive and easier to use.

Many teachers, especially in English, electives, and the sciences were already employing student-centered learning activities and did not feel that the iPads brought that change. This was consistent with Bergmann and Sams (2012), the founders of the modern flipped classroom, who wrote that flipping could be done with just a textbook. With a textbook, teachers could assign chapters for students to read for homework and then have students use what they learned in the classroom the following day (Bergmann & Samms, 2012). While technology was not necessary to flip a classroom, it could be instrumental in transforming a classroom from a teacher-centered environment closer to a student-centered environment (Chen, 2011; Norton & Hathaway, 2010).

The dichotomy of the teacher- and student- centered models were not the only competing pedagogies for the classroom. Kolb (1984) proposed a hybrid as a way to reach more learners. Tyack and Cuban (1995) also expound upon the futility of choosing a top-down approach or a bottom-up approach. These researchers noted that an evolutionary process to change a historic perspective of education served as a more accurate and lasting approach to educational reform.

According to Kolb's (1984) learning styles, students learned differently from each other. Some students learned through the use of concrete experience, which involved fieldwork. Others preferred to learn through reflective observation, which included journals, brainstorming, and discussion groups. Still other students learned best through abstract conceptualization, such as lectures. Finally, others learned best through active

experimentation, such as homework, simulations, and lab work. Therefore, there did not appear to be one method of learning that would appeal to all students within this initiative. Multiple approaches to gain information used in the classroom provided the most opportunities for learning when well managed.

At JHS, a blended approach to teaching seemed to be what most teachers were using. Many incorporated teacher-centered lectures and student-centered learning. This seemed to be congruous to what Gerger (2014) found. "It [iPads] should not be the be-all and end-all, and teachers are beginning to learn that not every piece of curriculum calls for the use of technology" (Gerger, 2014, p. 116).

Support tool. Many teachers described the iPad as a support tool. It was an auxiliary device that enhanced learning, but was not essential for learning to take place. This was consistent with previous studies (Alberta Education, 2012). At JHS, this seemed to be especially true in computer labs where every student already had a computer.

Question 2: How are iPads Being Used for Learning in an Urban Instructional Setting?

Communication

Students found that the iPads opened up their communication capability to the whole school. Students were no longer limited to speaking with people in their classroom. One factor that facilitated communication with students was the school providing a Google email address to every student. This email address was also used for the student's Schoology account. Broussand, Hebert, Welch, and VanMetre (2014) found

that students did not check their email or the class website for updates and information. At JHS, there were certainly students who did not check their school email regularly either, but because so many teachers used Schoology, students were on the website, or app, quite often and would see notifications from their teachers.

Collaboration. The students collaborated more with the iPads, consistent with Stanfield (2013) and Alberta Education (2012). Heinrich (2012) found that 65% of students believed they worked more collaboratively with the iPad than without it. Neutral students represented 26% of the total, while 9% disagreed. Among the reasons given by respondents did not believing iPads added to collaboration were technical issues and lessons where iPad collaboration was not the best methodology.

In this study, it was found that students expected to come together for group work more, but it did not always feel authentic. As a result, students were physically closer together, but their minds were elsewhere.

Teachers collaborated to help each other learn how to utilize the iPads. Dwyer, Ringstaff, and Haymore Sandholtz (1990a) reported that teacher support was a major factor in the success of an implementation. At JHS, teachers did this formally in their Professional Learning Groups (PLGs) and informally through a chat in the hallway, at lunch, or afterschool. Stanfield (2013) also found teachers collaborated about iPads during common planning time.

Vu (2013) found that all of the teachers in their study learned creative ways to integrate the iPad and about creative apps from their peers. Benton (2012) reported that teachers received limited professional development and therefore teachers had to rely on

their colleagues for support. Gerger (2014) found teacher collaboration was more cross-disciplinary than prior to the iPad implementation. This did not seem to be the case at JHS because there was already a cross-curricular PLG put in place for the year, where the students would meet once a month with different departments.

Accountability

The iPads seem to have made the students more accountable. Strother (2013) also found that laptops kept students more accountable with online access to timelines and deadlines. Some teachers pointed out that the iPad brought with it new excuses: not having access to the Internet, forgetting to bring the iPad to class, and not having any battery charge left. With laptops, students used similar excuses such as spotty Internet connection, short battery life, and not charging them (Broussard, Hebert, Welch, & VanMetre, 2014; Dunleavy, Dexter, & Heinecke, 2007; Garthwait & Weller, 2005; Lowther, Ross, & Morrison, 2003).

Students checked their grades, class websites, and absences all from their iPad. Broussard, Hebert, Welch, and VanMetre (2014) also found that students took accountability in cases of student absences and when the student needed reinforcement. At JHS, students were also accountable for staying on task. There was disagreement among the teachers as to whether students were ready for the responsibility of open access to all apps and websites. Some teachers thought the students needed to learn this now while others thought the students were not ready. All the administrators that were interviewed thought the students should learn accountability in high school and therefore they wanted an open-campus, where no apps were blocked.

Teachers assigned work on Schoology so students could access it remotely. Therefore, students were accountable for work when the teacher or student was absent. Roehl, Reddy, and Shannon (2013) also found that the class could move forward despite student and teacher absences as the content was online.

Teachers and administrators believed that in addition to taking responsibility for their own learning, students needed to take more responsibility with the hardware as too many iPads were breaking. Clarke and Svanaes (2012) also noted the "fragility of the tablet" (p. 19). Gerger (2014) found that breakages were caused for a few reasons: the amount that the iPads were travelling, a lack of a deductible on the device, and indifference on the part of students. These reasons were consistent with the findings at JHS.

Learning

The iPads were used for many aspects of learning such as student-centered learning, research, higher-level thinking, differentiated learning, organization, documenting work, submitting work, and providing a flexible environment. In order for students to utilize iPads to their full potential, students needed to have Internet on the devices. Most students found a way to have Internet access after school hours, whether at home, a friend's house, the school, or the local library. Roehl, Reddy, and Shannon (2013) emphasized that access to the Internet was crucial for the flipped model to work.

Student-centered. Teachers stated that students were more "independent learners and more resourceful" after the iPads were introduced. One teacher pointed out that students were expected to be more self-driven learners in a student-centered environment,

but that students were not given the knowledge as to how to do this. Some teachers wanted students to explicitly be taught how to be independent learners as the school made a shift to enable more classes to be student-centered.

Research. Students used their iPads for a great deal of research, which often consisted of quick searches. This was similar to the findings of Chou, Block, and Jesness (2012), Goodwin (2013), and Willocks and Redmond (2014). At JHS, teachers explained that the ability to research in real-time allowed for richer discussions. One teacher cautioned that students needed more education to conduct accurate and worthwhile searches. There was a fear among some teachers that students did not triangulating their findings and were just accepting the first results they encountered on a search engine as the answer. Lei and Zhao (2008) also described teachers' concerns about students' ability to search effectively and discern between correct and incorrect information.

Higher-level thinking. Some teachers feared that students had become too dependent on the web and this harmed their development as critical thinkers. Students confirmed that, with iPads, the work did get easier for them as some assignments were simplified. More rigorous assignments may correspond to higher comfort levels for the teachers using the technology.

Differentiated learning. iPads provided an environment where multimodal assignments were possible. Students created presentations, videos, documents, music, etc. all from their seat in the classroom. This was consistent with Alberta Education (2012) and Goodwin (2012). Goodwin also found that iPads made differentiated instruction easy for the same reasons as some teachers at Jameson High School. There were many apps

from which to choose, apps had varying degrees of difficulty, and students re-watched videos as needed. Roehl, Reddy, and Shannon (2013) also stated that students could replay the lectures via video, as needed.

Like teachers at JHS, teachers in Rowe's (2014) study also found the iPads to be good devices for creating projects as they did not have proper apps or a physical keyboard. Burden et al. (2012) also found students were frustrated without a keyboard. O'Sullivan-Donnell (2013) found that mobile devices allowed for differentiation of instruction, but stressed that differentiation was improved through the use of a blend of students' personal technologies and traditional classroom methods. It seems logical that having a blended approach can provide even more methods of reaching students.

A special education teacher stated that students preferred to see their teachers in the videos. There seemed to be a level of comfort or familiarity that the students had with their teacher: their face, voice and/or style.

Organization. The iPad provided a repository of everything needed for a class via Schoology. This was consistent with research on one-to-one devices (Broussard, Hebert, Welch, & VanMetre, 2014; Churchill, Fox, & King, 2012; Garthwait & Weller, 2005; Johnson, 2013; Zucker, 2009). Some students did not like the way the iPad structured files and did not think they could find files efficiently. This was consistent with Valstad (2011) who wrote, "There is no logic in it to me. It's stored inside the app and within some hidden structure" (p. 102).

Like some teachers, some students preferred to have papers so they could see and hold something tangible. They believed this would help them stay organized. This could

be because of the way the teacher and students were used to working. This may change in the future as working digitally becomes the more common way people learn from the start.

Document work. Students annotated their digital worksheets. Students used the camera on the iPad to take pictures of notes. Taking pictures replaced students writing the notes themselves. The advantages included giving students copies of the notes quicker and gave the students access to their notes whenever they had their device. Yet, some teachers were aware that something was lost. Mueller and Oppenheimer (2014) showed that handwriting had advantages over typing for learning material and it would seem taking pictures too, although there is no extant research on the topic.

Content submission. Students submitted their work through Schoology. Even work that was done on paper, was often uploaded to Schoology as a picture. The submitted work was graded and returned to students with a quicker turn-around time than traditional paper assignments according to both teachers and students. Gerger (2014) also found that iPads streamlined the process of collecting work, grading it, and then providing access to the grades for students and parents.

Flexible environment. Within the classroom, the iPad freed students to move around. Garthwait and Weller (2005) found this with the laptops as well. The researchers believe this afforded more face-to-face time between the teacher and students. At JHS, the iPads allowed students to work wherever they wanted with an Internet connection. Students also had the ability to work in groups remotely from home. An Internet service

provider offered discounted Internet access through a deal brokered through the district to allow more students to be connected.

Question 3: What are Teachers' Perceptions of the iPad Implementation?

Communication

Communication increased with the iPads but teachers thought this blurred the lines of respect afforded to them. As there was more communication, teachers wanted limits put in place so that students would not contact the at all hours of the night expecting a response. Students tended to adopt the texting vernacular of informal writing in their emails to teachers. In addition to students writing suffering from iPad use, teachers noticed that students were less apt to speak to others face-to-face. As a result, teachers stated that students' communication skills suffered. Teachers and administrators spoke about the increase of conflict due to students' online posts.

Blurred lines. As students and teachers communicated more, because it was not face-to-face, there was a less formal nature to the relationship. Clarke and Svanaes (2012) also found that students felt closer to their teachers during technology initiatives. While this could be a good thing, a repercussion teachers reported was feeling that this diminished the respect afforded to them in emails. Students wrote informally and were assertive in nature.

Limit. As teachers and students were able to communicate at all hours of the day, teachers felt there should be limits put in place. Students emailed teachers as late as midnight on school nights. Clarke and Svanaes (2012) also found that students and

teachers communicated far more frequently, even on the weekends. At JHS, some teachers felt that students needed to be taught boundaries, how to formally write to their teachers, and what is a reasonable response time.

Communication skills. Students often communicated through their devices and this affected how and what students read. An administrator believed that social media promoted "a habit of [reading a text and] bouncing around very quickly" as opposed to the linear nature of reading a traditional text. Therefore, students "are going to have a harder time making meaning." Yet, students may thrive as traditional texts are updated to utilize current mediums with interactions and links, such as an iPad.

Drama. As things became instantaneous and without as much forethought, there was the potential for drama online. The administration did not feel that there was more drama with the iPads, though they did say that there was a trail with online communication that made it easier to see the truth; what people posted and when they posted. The iPads captured moments that otherwise would have been forgotten. Now, posts are archived and scrutinized. Schools should help students understand the power of their online words, permanence of the posts, and repercussions of their actions.

Distraction

iPads were found to be distracting. This finding was consistent with Chou, Block, and Jesness (2012), Johnson (2013), Tagsold (2012), and Wishard (2015). The iPads were such a distraction that teachers, a social worker, and students described iPad-use as an addiction. The idea of electronic devices as an addiction has been shown in the literature (Wang, Lee, & Hua, 2015). The researchers described how rational human

beings end up participating in irrational behavior as a result of their electronic addiction. In order to counter the over-use of technology, the researchers recommend people take measures to improve self-control.

Kocak (2015) believed distractions were linked to the problem of program implementation. Specifically, Kocak wrote how the lack of monitoring software that would allow teachers to control students' tablets during lessons failed to minimize distractions.

At JHS, teachers were also found to be distracted with the technology. In faculty meetings, teachers used their devices for off-task behavior. Teachers had an even harder time reprimanding another teacher for being off-task.

Entertainment device. Teachers described the iPad as an "entertainment/social device" and therefore wondered if the iPads were the "best choice." Cox (2014) and Johnson (2013) found that students and parents viewed the laptop as an entertainment device. The researchers cautioned that students needed to see the laptop as a learning tool instead. At JHS, teachers described the iPad as a toy and how they tried to appropriate it for learning. iPads were similar to laptops in this regard.

Disruption. With iPads, students described their classes as quieter. Before, if students were disruptive, they would act out in class and distract others. Now, students used their iPads and did not feel the need to be disruptive as they were distracted. Instead of being disrupted by other students in the class, students were now being disrupted by their devices. Clarke and Svanaes (2012) also found that formerly disruptive students

were now distracted by the iPads and therefore the classroom environment was more amenable.

Control

Students were given more control of their learning in the student-centered environment. The idea that students had more control in the classroom was scary for some teachers. Fairbanks (2013) wrote of a retired teacher who taught for 30 years and described the change from teacher-centered to student-centered as breaking free from the model and mindset of teacher as content expert. “It’s how most teachers were brought up, that you don’t make a mistake in front of your class, that only one person can have control, and it’s the teacher who must have control” (Fairbanks, 2013, p. 5). Some teachers at JHS struggled to hand over control as they had either been teaching in a teacher-centered classroom or learned in one.

Classroom management. As the iPads were a distraction to students, the iPads required some classroom management techniques. The iPads were similar to laptops in this regard (Branch, 2014; Broussard, Hebert, Welch, & VanMetre, 2014; Lei & Zhao, 2008; Strother, 2013). Teachers had to constantly tell students to stop being off task with the iPads. Gerger (2014) found similar results. An administrator in that study believed that teachers were frustrated and were unaware of strategies for keeping students on task. Gerger (2014) recommended that the staff take part in professional development to address this issue. Jameson High School could benefit from professional development on this issue as well. Wishard (2015) recommended that teachers establish standards for acceptable use of iPads and that teachers adhere to vigilance in monitoring student use.

The researcher also noted that "in some cases it is necessary to restrict a student's ability to access non-academic applications" (p. 77).

At JHS, some teachers believed that dealing with the iPads was not a behavioral management issue, most likely because they had never had behavior management issues before. The teachers seemed to imply that the iPads were just too much for the students to handle appropriately. Dwyer, Ringstaff, and Haymore Sandholtz (1990a) also discovered that veteran teachers found themselves dealing with classroom management issues that they had not had to deal with since their first year of teaching with technology implementation.

Content blocking. There was a disagreement, or rather a divide, when it came to blocking apps. Some teachers were very much in favor of blocking non-educational apps in an attempt to limit distractions. Others wanted an open campus for all, which would require more responsibility and restraint by the students. Valstad (2011) also found that some teachers believed that having too many websites blocked was a detriment to education. At JHS, some teachers wished the school had a vote on the issue of blocking apps and the majority would decide. These teachers did not feel that their voices were being heard. Colley (1999) believed this was important as ineffective change strategies are those that are "done to people, not with them" (p. 14).

Clarke and Svanaes (2012) researched a high school where the students were given access to social media. The school tried to create a time and place for social media rather than blocking it. The principal of that school said the next steps were to "find a way to make it positive" (p. 20). That is: a way to have students post nicer things and

utilize social media for education. Many teachers at JHS had already appropriated Twitter for their classroom. Administrators also used Twitter in ways that improved communication between the school and the community. JHS even offered a professional development for teachers on Twitter basics. Even still, students were off task on a daily basis. As iPads were issued by the school, students felt they were given the green light to use them at all times.

Tech breaks. One management strategy to discourage off-task behavior that some teachers employed was to give the students tech breaks during the class. A tech break was an allotted time when students were allowed to use their iPads for any purpose they wanted – i.e., games social media, surfing. These breaks came at an assigned time after everyone completed his or her work. Students were incentivized to complete their work so that the whole class could use their technology for a break. Clarke and Svanaes (2012) conducted research at a high school with 100-minute periods. The class periods were a long time for students to be expected to retain concentration. A teacher thought a short period of time to play a game was a way to "recharge the brain" (Clarke & Svanaes, 2012, p. 34). Jameson High School also had long blocks of 80-minute periods where students could benefit from a tech break.

Wi-Fi management. Turning off the iPads' Wi-Fi was not seen as a feasible solution by some teachers as students easily turned it back on. Also, if students needed the Internet for classwork, extra steps were involved – students needed to exit their current app, go to settings, turn Wi-Fi back on, and open the app that they wanted. In this school where the class sizes can be quite large, about 20–30, managing all of the students

became even more challenging.

iPad monitoring. Teachers found that a huge part of their job now involved monitoring student behavior with the iPads. As teachers needed to monitor everyone, they found themselves increasingly more mobile in the classroom. Gerger (2014) found this was an unforeseen challenge with the iPad as well. A teacher claimed to be "walking 100% of the time" (p. 95). At JHS, some teachers piloted CasperFocus, software that allowed teachers to monitor students' iPads, but it was not a viable solution as it crashed often.

Division

Pogue (2010), wrote, "In 10 years of reviewing tech products for *The New York Times*, I've never seen a product as polarizing as Apple's iPad" (p. 1). The iPad was polarizing for education too. There were different divisions that occurred with the iPads. The divisions included factions of teachers, degrees of use of the iPads, and a division between upper and lowerclassmen. The division between the haves and the have-nots might have closed, but teachers did not believe that the achievement gap was closed.

New versus veteran teachers. Teachers, students, and administrators spoke about teachers in two different camps: new, generally defined as young, teachers and veteran teachers. Veteran teachers at JHS were thought of as teaching for 10 or more years. The veteran teachers expressed feeling discriminated against and feeling undervalued as a result of their lower tech-savvy. The divide may have started as early as when the Freshman Academy was created in the fall of 2011. Teachers were asked to volunteer to teach in the Academy. Out of the approximately 30 Freshman Academy teachers, 6 were

considered veteran teachers. Also, the iPad initiative was piloted in the Freshman Academy as it was a designated subset of the population. One vice principal explained that Freshman Academy teachers helped start the initiative and therefore took ownership.

Gerger (2014) also found a divide among teachers. Gerger did not classify teachers other than to write that some were excited about the innovation and others did not want it. They wrote, "Excitement in advocates and feelings of reservation among those challenged by the notion of any change" (p. 130).

Use of iPad. There was a divide in how people felt towards the iPad. Some teachers loved it, some hated it, and others were ambivalent towards it. The same was true for flipped learning. Willocks and Redmond (2014) also found "Some people are using the iPad extensively and some not at all" (p. 403).

At JHS, some reluctance and a lack of teacher buy-in may be related to fear that the device could go away. This fear was brought to the forefront after a faculty meeting where an administrator warned that due to the number of iPad breaks and the financial burden of the program, iPads may not be staying.

Administrators, teachers, and students acknowledged that a teacher as an individual was the determining factor in if (and how) the iPads were used, rather than the age of a teacher or the subject taught. Goodwin (2012) also found that teachers were the determining factor in the success or failure of an iPad deployment. As such, the teacher needed to know the best pedagogical practices to use, and how the technology could help in the classroom.

Student buy-in. A Freshman Academy teacher said, "The buy-in from the kids is really low. They think it is optional for them to look at a website or watch a video." It is hard to say exactly why this is the case, but some possibilities may be: 1) students already did not do homework and the iPad did not incentivize them enough to do it; 2) the iPad was too distracting; 3) they did not think of the iPad as a true academic tool, but rather more of an entertainment device; and 4) the students were too accustomed to the way they had previously learned to change.

Student comfort level. Upperclassmen were not comfortable changing the way they did things. Therefore, there was resistance to flipped learning. The upperclassmen generally did not watch the videos. Some teachers believed this might change over time as students who received the iPads as freshmen progressed through the grades and using the iPads became the norm. As a teacher explained, "I wonder if that culture of resisting the iPad will change at all once it's kind of second nature."

Clarke and Svanaes (2012) also found that the oldest students used the iPads the least for learning. The students became more reluctant to adapt to the iPad, the higher their grade level was when the program was adopted. Broussard, Hebert, Welch, and VanMetre (2014) also found that students in their study preferred traditional pen and paper. Although the students were underclassmen, the data from the study was collected from 2012–2013, when tablets were a newer technology and the students might not have been as accustomed to using the tablets yet. Chatham (2015) claimed consistency was paramount when helping students view technology as a tool for learning as opposed to focusing on the technology itself.

Achievement gap. The iPad equaled the playing field in terms of access to classroom content. It gave everyone a means to do work outside the classroom. There may be more to closing the achievement gap that needs to be considered, however. Many teachers believed there still was an achievement gap. Perhaps having more student buy-in could help close the achievement gap.

Question 4: What are Students' Perceptions of the iPad Implementation?

Communication

Students said that they were constantly on their iPads and often communicating with their friends. As a result of always talking online, students found they had less to talk about in person and therefore were quieter in general. A student spoke about how the way students make friends was different and how relationships could start online. With cellphones and tablets, students certainly communicated differently than in the past. They began to communicate through an intermediary mobile device. As students could not read each other's facial cues or voice, tones, and inflections, there was more opportunity for misconstrued messages.

Drama. The students' conversations on the iPads were not monitored in real time and students reported that a great deal of nefarious chatting. Gerger (2014) also found that bullying took place, but found this was also on phones and not just the students' tablets.

Distraction

The students' perceptions of their own distraction was consistent with the teachers' perceptions. There seemed to be less class participation because students were busy using their iPads for off-task behavior. This was consistent with Chatham (2015) where half the students thought of the iPad as an entertainment device.

Addiction. Students felt a compulsion to check their devices. Even though there was a divide among using the iPad for academic purposes, many students used the devices for off-task purposes. Gerger (2014) found that students were used to having a device and if the school tried to do away with the program, "there would be a riot" (p. 103). At JHS, students used the iPads so much, they were unsure how to act once the iPads were taken away as they were so used to solely interacting with the device.

Personal device. Students felt a personal attachment to the iPad as it was in their possession for the school year. They used it for personal reasons – pictures, social apps, texting, games, and buying things. As Heinrich (2012) pointed out, schools have to accept that when they lend students a device for the school year, "students will use them for personal activities" (p. 25). Heinrich believed it was the job of the school to get the students to use the devices for academic purposes whenever possible. Therefore, it was important that students used the devices for homework when they were not at school.

At JHS, students claimed to want to do their homework, but they just got too distracted. Gerger (2014) found that it was essential to have parents help students be successful at home. In Gerger's study, the school provided parenting classes and a newsletter to assist parents.

Classroom Management

For the most part, teachers thought that classroom management was needed to manage the iPads. Teachers were frustrated with how much time was wasted with trying to get the students back on track. Some teachers thought that if students were engaged in the lessons, then fewer classroom management practices would be needed. Mang and Wardley (2012) also believed the best way to ensure students did not get distracted by other apps was to constantly engage students in using the iPad for academic purposes.

Lock students in. A student suggested teachers should be able to lock students into one app. Teachers did not find an ideal way to do this. Hopefully tablet makers and software designers will create viable solutions to this.

Home set. A student thought that giving students iPads to keep at home would allow students to use the iPads for homework and not get distracted in the classroom. One downside to this solution could be teachers would not be able to periodically see the iPads to ensure they were still in working condition. Another downside would be the cost-benefit: students would only be able to use the iPad for half the day. They would essentially be homework machines and not a device to advance student learning throughout the day.

iPad collection. Students suggested that having teachers collect iPads when they were not being used would be ideal. Mang and Wardley (2012) warned against distributing and collecting iPads on a daily basis as it was time consuming and did not allow students to use the iPads outside of class time.

iPad monitoring. A student suggested that teachers should be able to see what is on the students' screens at all times. It seemed that many teachers liked this idea as well, but similar to locking students into one app, the technology is not yet available.

Division

Upperclassmen versus underclassmen. There was a division in how upperclassmen (juniors and seniors) and underclassmen (freshmen and sophomores) used the iPads. Part of the difference was because the underclassmen had been using the iPad for education since they entered high school and some had the opportunity to use them in carts in 8th grade. The upperclassmen had experienced learning at the high school both ways, one year with an iPad and at least ten years of learning without one. Students seemed to be more comfortable learning in the way they had been accustomed. Upperclassmen believed that they were too set in their ways and that the underclassmen would work better with the iPads as they became more used to them.

Question 5: How do Teachers Perceive the Flipped Learning Initiative?

Misconceptions

Administrators, teachers and students seemed to have misconceptions about what flipped learning meant. Part of the misconceptions might have had to do with how the initiative was rolled out. There might not have been enough planning and forethought put into the initiative as was necessary.

The flipped initiative was a grassroots movement that started in the Freshman Academy by teachers. It did not originate with the administration. Accordingly, it might

not have been presented with enough of a top-down approach to give a consistent message.

Already Flipping

Many teachers believed they already had a student-centered classroom and that this initiative was therefore nothing new. The idea of student-centered learning is not new to education. John Dewey brought it to the modern education field in 1902 with his work *The Child and the Curriculum*. It was not surprising that student-centered learning has returned to the forefront of education as a large part of flipped learning because the pendulum of educational pedagogy swings back around (P. Daniels, personal communication, October, 9, 2014). At JHS, some teachers also had already sent content home for students to learn or read and therefore did not think that flipped learning was new either.

Affordances

With flipped learning, class time was used for more activities. Springen (2013) wrote about the need to "flip" as a means of getting away from the "one-size-fits-all" (p. 23) model of the traditional classroom. With more classroom time freed, the teacher could differentiate activities for the students to complete. Morgan (2014) wrote that to differentiate activities and learning, a teacher must devise a lesson in a way that the learning takes into consideration the unique learning needs of the individual students.

At JHS, an administrator found that as a result of teachers facilitating discussions and activities, student and teachers were building stronger relationships. They said, "I see the relationship piece emerging through the use of the iPad." Roehl, Reddy, and Shannon

(2013) also found that the flipped classroom allowed more time for teacher and student interactions as now the teacher did not have the burden of delivering content.

Homework

Many teachers found that most of the students did not do the homework. Some teachers thought this was a product of being an urban district. Ainsworth (2002) found that students in an urban district completed less homework. Some of the reasons given were available resources and collective socialization.

Springen (2013) added a critique of video homework, suggesting that watching videos was too passive. Springen believed that the most effective way to learn was to do something, not watching someone else do something. At JHS, a teacher believed that students should have to engage with an activity while watching a flipped video.

Question 6: How do Students Perceive the Flipped Learning Initiative?

Homework

Some students felt it was unnecessary to watch the videos, as the teacher would explain the content the next day anyways for the students who did not watch the videos. This appears to be a catch-22. Students did not watch the videos because the teacher would explain the content. Yet, the teacher explained the content because the students did not watch the videos.

Some students preferred to have homework on a piece of paper. As this study gathered the perceptions of the upperclassmen, this finding about preferring paper may not be the same for students in the future as students would most likely start using more

devices in the primary grades and continue to do so throughout their education.

Many students at JHS did not do their homework. Guggisberg (2015) found that 70.7% of students either liked or were neutral to flipped learning. Flipped learning seemed to be more liked in a district where students were doing the homework.

Relationship to Theoretical Framework

Apple Classrooms of Tomorrow Research

As a part of the Apple Classrooms of Tomorrow (ACOT) studies, Dwyer, Ringstaff, and Haymore Sandholtz (1990a) recognized five locations on the technology implementation continuum. These were Entry, Adoption, Adaptation, Appropriation, and Invention. Entry was the first phase and looks similar to a control group. For the most part, students used technology in the same way as the books. In the Adoption phase, teachers used the technology as a support to text-based drill and practice. The Adaption phase incorporated higher-level thinking, differentiation, and threaded discussions. At the Appropriation phase, students and teachers used the technology seamlessly. Here, the teachers' role switched to being a facilitator rather than a lecturer. The final phase, Invention, students constructed their own meaning.

There were elements of all of these phases occurring at JHS with the iPads, but they did not appear to be in a linear progression. In many classrooms, teachers used iPads differently. Some teachers used the iPad in the more rudimentary phases of Entry and Adoption. In other classes, teachers were Adapting and Appropriating in their lessons. Further, data suggests teachers were facilitators and differentiating instruction at the same

time, part of the Adaption and Appropriation phases. Therefore, this study found uneven evidence for the phases, mostly dependent on the instructor's level of implementation.

SAMR Model

Puentedura's (2012) SAMR model was also focused on technology integration and classified technology-use into different levels. In the Substitution level, the lowest level according to Rowe (2013), technology acts as a direct substitute for a previous measure, but there is no functional change. Teachers at JHS had students annotate digital works and submit them. While an English teacher declared that this "is something that before was pretty cumbersome and difficult to do," it still qualified as a substitution – students could annotate on paper and pass in the paper to the teacher. A teacher placed digital copies of all the texts online. The teacher found this cut down on the excuse, "I don't have my book today."

A student noted, "For what I've used the iPad for in class, I feel like I don't need the iPad to do any of what I've been doing in class." Students used the iPads to look up the definition of words. Language classes used the iPads for language dictionaries. In the past, students could use paper dictionaries. An administrator saw math classes where the students use calculators on the iPads rather than a traditional calculator. Changes like this have led some teachers to make comments like, "I don't think it has changed anything very much." One teacher described the iPads as a "glorified way to lecture" and "a glorified way to pass out homework." An administrator found that "[Some] eliminated [using] a little bit of trees, but you still have that paper and pencil philosophy." A teacher explained that there are very few apps that she used that offered something new and

different. Most apps are “having a worksheet on paper and now it's a worksheet on Schoology. Instead of a test on paper, now it's a quiz on Schoology.”

A teacher decided not to use the iPads, as she believed there were many unnecessary steps. They said, “I just didn't see the difference between giving them a sheet of paper or having them hit 17 different buttons to do this, get into NoteAnytime, and then turn it back.” The teacher thought the iPads were not equal to paper in this regard, but actually worse as students could encounter problems during those steps, “I just wanted to skip all the footfalls.”

The Augmentation level is when technology is used as a direct tool substitute, but with a functional change. At JHS, many teachers placed videos online or linked to videos on the web such as Kahn Academy. Having a video resources library allowed students to pause and re-watch videos and also access the lectures from anywhere.

Students partook in class discussions via Schoology. While students could have discussions in class prior to the iPads, the iPads afforded an archive of the conversations, allowed students to “like” what others had to say, and provided the chance for all students to comment.

Teachers gave quizzes to students on the iPads. These quizzes, formerly on paper and now on Schoology, graded themselves and provided quicker feedback to the students and teachers. A teacher preferred the method of gathering feedback with the iPads over previous methods. They said, “It's possible to do with clickers and there are some old school ways of doing it with people raising hands or raising cards, but it seems to be a more authentic data gathering experience.” The iPad also provided the ability to take

notes digitally. Advantages to digital notes included allowing students to search quickly for a word, check for spelling, and easily look up the definition of words.

The Modification level incorporates technology in a way that allows for task redesign. One example at JHS was teachers had students share and collaborate on documents through Google Drive. Another example was students having online synchronous and asynchronous discussions.

The Redefinition level, considered by Rowe (2013) to be the highest level of the SAMR model, requires technology to allow for the creation of new tasks that were previously not possible without technology. At JHS, classes were able to take virtual field trips and create and edit videos. A director noticed that teacher use of the iPads "goes the full range from high leverage use of the technology to sort of just saving paper use of the technology.

Valstad, (2011) wrote that, in general, iPads were a replacement for ways of doing the same thing and not a transformation to education. This seemed true at JHS to some extent, but Norris and Soloway (2004) wrote that using technology is about "evolution, not revolution" (p.88). The authors wrote that in their first year of using handhelds, "teachers use them just like their paper and pencil cousins; but in their second year of use, teachers tell us that they 'just think handhelds' as they adapt their lessons to more effectively incorporate handhelds" (p. 289).

Strother (2013) concluded that most classrooms are at either the Substitution or Modification phase. It appears that at JHS, many classrooms were also at the Augmentation phase, with activities like research, spell check, and video resources.

Diffusion of Innovations Theory

The Diffusions of Innovations (DOI) theory was created by Rogers (2003) and explained how a technology is integrated through a culture over time. Part of this theory explained the Rate of Adoption, or speed with which an innovation is embraced. The Rate of Adoption is affected by many factors such as the perceived attributes of an innovation, the type of innovation-decision, communication channels, the nature of the social system, and the extent of change agents' promotion efforts.

Rogers (2003) explained that the perceived attributes of an innovation included the relative advantage, compatibility, complexity, trialability, and observability. The relative advantage is "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers, 2003, p. 229). In the case of iPads, teachers did not see the iPad as better, but rather as a supplemental way to learn. Teachers had students use the iPads for many reasons including research, annotation, content access, work documentation, and communication.

Rogers (2003) defined compatibility as "the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential adopters" (p. 240). The iPads at JHS were implemented along with flipped learning, which required a more student-centered classroom. Many teachers already practiced student-centered learning and therefore the iPads were already in line with the needs of the potential adopters, and their values and experiences.

Complexity was defined as "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers, 2003, p. 257). Teachers discussed the

pedagogical trials of learning to utilize the iPad for the classroom. They perceived the iPad implementation as two changes: "how you teach and what you use to teach. And that was very difficult for some people." Aside from stating that both changes at the same time were difficult, teachers did not mention that appropriating the iPad for teaching was cognitively difficult.

For usability, the iPads were described as relatively easy to use. One area that was described as frustrating was the steps that are necessary to get work done on an iPad. The steps were not complex, but they were time-consuming. An upperclassman said, "You have to open it [an assignment] in Schoology, send it to the app, write it in the app and then send it back. The process is just annoying sometimes." Another area of frustration was the passwords. Students often forgot their passwords for websites and apps. This would most likely be a problem for any device the students used, though, not just iPads.

Trialability was defined as "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 2003, p. 258). All of the teachers were given the iPads in the summer of 2012. The Freshman Academy teachers were under the impression that they would not implement the iPads with the students until December. When the Freshman Academy teachers returned to school in the fall of 2012, they were told that the students would be using the iPads right away. Therefore, freshman teachers did not have trialability time with the iPads. The other teachers in the school did have that first year to explore the iPads, but many did not use them for classwork as their students did not have them and they knew they had a whole year before they had to implement them.

Observability was defined as "the degree to which the results of an innovation are visible to others" (Rogers, 2003, p. 258). Teachers generally did not see other teachers using their iPads. However, there was professional development at the end of the pilot year and freshman teachers shared their best practices with the other teachers.

Another aspect of the Diffusion of Innovation Theory is the innovation-decision. The innovation-decision involved the process of "forming an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and to confirmation of this decision" (Rogers, 2003, p. 475). Rogers classified innovation-decisions as: 1) optional, where people can choose to engage with the innovation; 2) collective, where the people decide to take on the innovation and it is then mandatory; and 3) authority, where a decision-maker such as a principal would require the innovation be implemented.

Rogers explained that the more people involved in making the innovation-decision, the slower the rate of adoption. The decision to have iPads at Jameson High School and what should be blocked and what would not be were made by an authority, the district administration. Teachers felt a pressure to use the iPads, at least at first. As the district provided iPads, teachers believed they should use them when administrators stopped in to observe a class. As time went on, teachers seemed to feel less compelled to use the iPads.

Rogers (2003) wrote that communication channels are the means through which the innovation is known to people. Two of the more popular means of disseminating information was through mass media or through interpersonal means such as a private

email. At JHS, administration disseminated information about the iPad initiative through emails and meetings. Teachers expressed searching out fellow teachers, face-to-face, to help with more specific tasks on the iPad.

Rogers (2003) classified the people in an innovation based on their rate of adoption. These include Innovators, Early Adopters, Early Majority, Late Majority, or Laggards. The Innovators for the iPad implementation were the IT staff who decided to explore tablets for the high school. Other Innovators included the administration who approved of the project and the Freshman Academy teachers who researched flipped learning and brought it to JHS. The Freshman Academy teachers, as a whole, seemed to embrace the iPads, although the first year was not smooth as they figured out how to best implement the iPads.

A reason for their adoption of the iPads may have been due to the responsibility they were given as the pilot group for the school and the geographical closeness of their classrooms for support. The other teachers in the school figured somewhere on the spectrum of iPad users ranging from daily use to not using it at all. As Rogers (2003) pointed out, the term Laggards implies that people did not use the device at first, but eventually do. Roger's model may not accurately capture the full gamut of technology users as at JHS, there were some teachers that used the iPads at first, but did not plan to again.

Recommendations for Future Research

There are a number of recommendations for future research. Interviewing upperclassman who received the iPads as freshman to see how they perceive the iPads is one area for future research. It might also be interesting to interview teachers and administrators now that iPads have been in a school for a longer period of time to see if or how they have changed their views on the iPads and flipped learning. At JHS, there is talk of possibly switching from an iPad to a Chromebook, and if that it is the case, students and teachers could be interviewed to find out how they feel the differences in these devices have affected their learning. Another area for future research includes ways to reduce distractions on tablets. Additionally, a study tracking students' grades quantifiably after the introduction of a tablet device could be worthwhile.

Recommendations for Students

Based on the results of this study, there are a number of recommendations for students. Students need to develop self-control strategies to stay on task. Students also need to know that they are accountable for their grades. They should know that the iPad belongs to the school. Students need to ensure that the iPad that was lent to them does not get damaged. One way to do this is to place a protective cover on their iPad. Even with these recommendations in place, students at JHS were not utilizing their iPads. Therefore, some of the onus falls on the teachers and administrators.

Recommendations for Teachers

Some of the recommendations from participants, if implemented by teachers, could help students utilize the iPad better. Teachers should show students how to be independent learners and how to conduct online searches effectively. Also, teachers need to teach students the ramifications of their online posts. Furthermore, teachers should supply assignments where students can gain practice accessing files on their tablet.

Tech breaks during a long class period seemed to have positive results. All teachers in a school should use the same Learning Management System to help students become familiar with one interface and increase traffic to one spot so that students are more likely to see notifications from any of their teachers. Teachers should set limitations on communication. For instance, teachers should not post assignments after 4:00 p.m. and students cannot expect teachers to answer a post after 6:00 p.m. Teachers should make videos with themselves in the video whenever possible. Last, teachers should try flipped videos later in a unit once a student has a foundation in the subject.

Recommendations for Administrators

In order to allow teachers to have a voice in decision-making, teachers should be a part of a democratic process during implementation and to decide whether certain apps are allowed. Administrators should provide professional development for utilizing an iPad in content specific areas. Also, teachers need professional development to be successful in classroom management when incorporating tablets.

There should be a top-down approach to ensuring everyone knows what the initiative is and the expectations. Administrators should consider accountability for breakages. In order to increase student accountability for the device, finding the right deductible for the insurance may help. As was done at JHS, administrators should require cases for the tablets. The administration should ensure that the school assigns a standard email to everyone to facilitate communication. Lastly, administration needs to give the initiative time to evolve.

Summary

Chapter five reviewed the findings and tried to understand the findings through other research. iPad-use at Jameson High School echoed the Apple Classrooms of Tomorrow (ACOT) studies, specifically the Entry, Adoption, Adaptation, Appropriation, and Invention phases (Dwyer, Ringstaff, & Haymore Sandholtz, 1990a). At JHS, some of these phases occurred at the same time, and sometimes even within the same classroom. With respect to the Substitution, Augmentation, Modification, and Redefinition (SAMR) model (Puentedura, 2012), JHS teachers incorporated all four aspects. Based on the interviews, focus groups, and observations, most classes substituted work to the iPad and augmented lessons. Rogers' (2003) Diffusion of Innovation (DOI) theory helped structure this research. This was especially helpful when in the discussion of adopters of the innovation on a spectrum from early adopters to laggards.

APPENDIX A

Interview for Student Focus Groups

- How do your teachers use the iPad in class?
- Are iPads being used to their full potential in the classroom? Please explain.
- Thinking back to before the iPad program, what, if anything, has changed in the school culture since the introduction of iPads?
- What do you think about the flipped classroom?
- How do you use your iPad in class? Does this differ from how you used to do classwork?
- How do you use your iPad for homework? Does this differ from how you used to do homework?
- Do you feel that your behavior in the classroom has changed as a result of the iPad program?
- What learning opportunities would have been helpful on how to use the iPad before you got them?
- Do you have any concerns with iPad use in the classroom?
- If you were given the authority over the iPad program, what would you do to improve it?

Thank you for your time.

APPENDIX B

Interview/Focus Group for Full-time Teachers/Substitutes

- What class(es) do you teach?
- How many years have you been teaching? At Jameson High School?
- What were your initial goals when implementing the iPad in the classroom? Were you successful in achieving these goals?
- How do your students use their iPads in the classroom? Outside of the classroom?
- How do you choose apps for your class?
- Thinking back to before the iPads, what, if anything, has changed in the school culture since the introduction of iPads?
- What are some of your concerns with iPad use in the classroom?
- How, if at all, do iPads aid in the learning process?
- How has flipping the classroom affected the culture of teaching and learning?
- How has student behavior been affected by the iPad program?
- How did you feel about the professional development around the iPads? What other ongoing professional learning opportunities are needed? (e.g. access to a blog, regular workshops)
- Have you found administration to be supportive/forthcoming with respect to the iPad initiative and what is expected? Please elaborate.
- What technical problems/pitfalls have you encountered with the iPad in the classroom? How have you dealt with these?

- If you were to be given the authority over the iPad program, what would you do to improve it?

Thank you for your time.

APPENDIX C

Interview for Administrators

- How many years have you been an administrator? Teacher? At Jameson High School?
- How are students using their iPads in the classroom? Outside of the classroom?
- Thinking back to before the iPads, what, if anything, has changed in the school culture since the introduction of iPads?
- What are some of your concerns with iPad use in the classroom?
- How, if at all, do iPads aid in the learning process?
- How has flipping the classroom affected the culture of teaching and learning?
- How has student behavior been affected by the iPad program?
- How did you feel about the professional development around the iPads? What other ongoing professional learning opportunities are needed? (e.g. access to a blog, regular workshops)
- If you were to be given the authority over the iPad program, what would you do to improve it?

Thank you for your time.

APPENDIX D

Student Assent

Study Title: How has the Introduction of a One to One Table Program Influenced the Culture of Teaching and Learning in an Urban School: An Ethnography

IRB Protocol Number: 3521E

Consent Form Valid Date: May 21, 2014

Study Expiration Date: May 20, 2015

Student Informed Assent Form

With your permission, you will be participating in a study that involves understanding if and how iPads have affected teaching and learning at Jameson High School. The results will be used as a part of my dissertation for my graduate studies at Boston University. Names will be kept anonymous and confidential. This study will take place from May through June 2014. This form details the purpose of this study, a description of the involvement required, and your right to participate or not.

The purpose of this study is to determine if and how the introduction of a one-to-one tablet program influenced the culture of teaching and learning in an urban school.

You will be asked to participate in a focus group interview lasting 20–25 minutes. This focus group will take place during your advisory period. You classroom may also be observed by me.

There are no direct benefits from participating in this research study. However, teachers, substitutes, administrators, and students will have a chance to voice their opinions and share their understanding of how iPads have affected teaching and learning.

The interviews and focus groups will be recorded on a digital voice recorder to help me accurately capture your perceptions in your own words. The tapes will only be heard by me and my doctoral committee for the purpose of this study. The audiotapes will not be made public. The tapes will be erased after the research is published. Insights gathered from the conversations and observations will be published as a part of a Boston University dissertation. Though direct quotes from you may be used in the paper, unless you specify otherwise, your name and other identifying information will be kept anonymous. The final write-up will be available to any administrators, teachers, and students upon request.

Participation is completely voluntary, and you have the right to withdraw at any time from the research. In the event that you withdraw from the study, all information, including recorded conversations, will be destroyed and omitted from the research. You are encouraged to ask questions or raise concerns at any time about the nature of the study or the methods I am using. You are welcome to contact me at: davek612@gmail.com and 781-286-8226 (or ext. 51228) or my advisor Dr. Bruce Fraser at bfaser@bu.edu. Also, you may obtain further information about your rights as a research subject by calling the BU CRC IRB Office at 617-358-6115.

Please let me know if you are willing to be a part of this research.

Thank you,

Mr. David Kaufman

APPENDIX E

Administrator Informed Consent Form

With your permission, you will be participating in a research study that involves understanding if and how iPads have affected teaching and learning at Jameson High School. The results will be used as a part of my dissertation for my graduate studies at Boston University. Names will be kept anonymous and confidential. This study will take place from May through June 2014. This form details the purpose of this study, a description of the involvement required, and your right to participate or not.

The purpose of this study is to determine if and how the introduction of a one-to-one tablet program influenced the culture of teaching and learning in an urban school. You will be asked to participate in a one-on-one interview. Interviews will take 20–40 minutes. The interview will be audio recorded.

The methods of data collection for teachers will be:

- One-on-one interviews
- Focus groups
- Classroom observations

The methods of data collection for students will be:

- Focus groups
- Classroom observations

The audio recordings will only be heard by me and my doctoral committee for the purpose of this study. The audiotapes will not be made public. The tapes will be erased after the research is published. Insights gathered from the conversations and observations

will be published as a part of a Boston University dissertation. Though direct quotes from you may be used in the paper, unless you specify otherwise, your name and other identifying information will be kept anonymous. The final write-up will be available to any administrators, teachers, and students upon request. Study data will be stored on a password-protected computer. For the purposes of quality improvement and safety, the Institutional Review Board may review your study records.

There are no direct benefits from participating in this research. However, teachers, substitutes, administrators, and students will have a chance to voice their opinions and share their understanding of how iPads have affected teaching and learning.

The main risk of allowing us to use and store your information for research is a potential loss of privacy. I will protect your privacy by labeling your information with a code and keeping the key to the code in a password-protected computer. You may be uncomfortable with some of the questions and topics I will ask about. You do not have to answer any questions that make you feel uncomfortable. If you participate in the interviews, your answers may give some insight into who you are and what your position is, and therefore, I cannot guarantee that you will be able to remain anonymous. Participation is completely voluntary, and you have the right to withdraw at any time from the research. You may choose not to participate. In the event that you withdraw from the study, all information, including recorded conversations, will be destroyed and omitted from the research.

You are encouraged to ask questions or raise concerns at any time about the nature of the study or the methods I am using. You are welcome to contact me at:

davek612@gmail.com and 781-286-8226 (or ext. 51228) or my faculty advisor Dr. Bruce Fraser at bfaser@bu.edu. Also, you may obtain further information about your rights as a research subject by calling the BU CRC IRB Office at 617-358-6115.

Please let me know if you are willing to be a part of this research.

Thank you,

Mr. David Kaufman

APPENDIX F

Student Informed Consent Form

Study Title: How has the Introduction of a One to One Table Program Influenced the Culture of Teaching and Learning in an Urban School: An Ethnography

IRB Protocol Number: 3521E

Consent Form Valid Date: May 21, 2014

Study Expiration Date: May 20, 2015

Student Informed Consent Form

With your permission, you will be participating in a study that involves understanding if and how iPads have affected teaching and learning at Jameson High School. The results will be used as a part of my dissertation for my graduate studies at Boston University. Names will be kept anonymous and confidential. This study will take place from May through June 2014. This form details the purpose of this study, a description of the involvement required, and your right to participate or not.

The purpose of this study is to determine if and how the introduction of a one-to-one tablet program influenced the culture of teaching and learning in an urban school. You will be asked to participate in a focus group interview lasting 20–25 minutes. This focus group will take place during your advisory period. Your classroom may also be observed by me. Focus group interviews will be audio recorded.

There are no direct benefits from participating in this research study. However, teachers, substitutes, administrators, and students will have a chance to voice their opinions and share their understanding of how iPads have affected teaching and learning.

The interviews and focus groups will be recorded on a digital voice recorder to help me accurately capture your perceptions in your own words. The tapes will only be heard by me and my doctoral committee for the purpose of this study. The audiotapes will not be made public. The tapes will be erased after the research is published. Insights gathered from the conversations and observations will be published as a part of a Boston University dissertation. Though direct quotes from you may be used in the paper, unless you specify otherwise, your name and other identifying information will be kept anonymous. The final write-up will be available to any administrators, teachers, and students upon request. Study data will be stored on a password protected computer. For the purposes of quality improvement and safety, the Institutional Review Board may review your study records.

Participation is completely voluntary, and you have the right to withdraw at any time from the research. You may choose not to participate. In the event that you withdraw from the study, all information, including recorded conversations, will be destroyed and omitted from the research. You are encouraged to ask questions or raise concerns at any time about the nature of the study or the methods I am using. You are welcome to contact me at: davek612@gmail.com and 781-286-8226 (or ext. 51228) or my faculty advisor Dr. Bruce Fraser at bfaser@bu.edu. Also, you may obtain further information about your rights as a research subject by calling the BU CRC IRB Office at 617-358-6115. Please let me know if you are willing to be a part of this research.

Thank you,

Mr. David Kaufman

APPENDIX G

Teacher Informed Consent Form

Study Title: How has the Introduction of a One to One Table Program Influenced the Culture of Teaching and Learning in an Urban School: An Ethnography

IRB Protocol Number: 3521E

Consent Form Valid Date: May 21, 2014

Study Expiration Date: May 20, 2015

Teacher Informed Consent Form

With your permission, you will be participating in a research study that involves understanding if and how iPads have affected teaching and learning at Jameson High School. The results will be used as a part of my dissertation for my graduate studies at Boston University. Names will be kept anonymous and confidential. This study will take place from May through June 2014. This form details the purpose of this study, a description of the involvement required, and your right to participate or not.

The purpose of this study is to determine if and how the introduction of a one-to-one tablet program influenced the culture of teaching and learning in an urban school. You will be asked to participate in a one-on-one interview, focus group interviews, and will be observed during one classroom period. Interviews will take 20–40 minutes. Focus group interviews will take place during department meetings and will take 30 minutes. You may be asked to participate in two focus group interviews depending on what department you are in. Interviews and focus groups will be audio recorded.

The methods of data collection for administrators will be:

- One-on-one interviews

The methods of data collection for students will be:

- Focus groups
- Classroom observations

The interviews and focus groups will be recorded on a digital voice recorder to help me accurately capture your perceptions in your own words. The tapes will only be heard by me and my doctoral committee for the purpose of this study. The audiotapes will not be made public. The tapes will be erased after the research is published. Insights gathered from the conversations and observations will be published as a part of a Boston University dissertation. Though direct quotes from you may be used in the paper, unless you specify otherwise, your name and other identifying information will be kept anonymous. The final write-up will be available to any administrators, teachers, and students upon request. Study data will be stored on a password-protected computer. For the purposes of quality improvement and safety, the Institutional Review Board may review your study records.

Teachers who participate in the interview will be entered in a raffle for a chance to win a $5 Dunkin Donuts gift card. Teachers who participate in the classroom observation will receive a $5 gift card.

There are no direct benefits from participating in this research. However, teachers, substitutes, administrators, and students will have a chance to voice their opinions and share their understanding of how iPads have affected teaching and learning.

The main risk of allowing us to use and store your information for research is a potential loss of privacy. I will protect your privacy by labeling your information with a code and keeping the key to the code in a password-protected computer. You may be uncomfortable with some of the questions and topics I will ask about. You do not have to answer any questions that make you feel uncomfortable. If you participate in the focus group, I will ask you not to tell anyone outside the group what any particular person said in the group. However, I cannot guarantee that everyone will keep the discussions private.

Participation is completely voluntary, and you have the right to withdraw at any time from the research. You may choose not to participate. In the event that you withdraw from the study, all information, including recorded conversations, will be destroyed and omitted from the research.

You are encouraged to ask questions or raise concerns at any time about the nature of the study or the methods I am using. You are welcome to contact me at: davek612@gmail.com and 781-286-8226 (or ext. 51228) or my faculty advisor Dr. Bruce Fraser at bfaser@bu.edu. Also, you may obtain further information about your rights as a research subject by calling the BU CRC IRB Office at 617-358-6115.

Please let me know if you are willing to be a part of this research.

Thank you,

Mr. David Kaufman

APPENDIX H

Email to PLG

May 20, 2014

Dear PLG leaders,

As you may have read in Mr. Mitchell's previous email, I will be conducting research at Jameson High School on the influence of iPads on the culture of teaching and learning. I was hoping to meet with your PLG group as a whole to ask some interview questions. The session should last no more than one PLG period. The data gathered from the interviews will be used for a Boston University dissertation that I am working on. I can provide Dunkin Donuts bagels and coffee.

Is this something your group would be open to? If so, could you let me know a date that works for you?

Thank you,

Dave Kaufman

APPENDIX I

Email to Staff

May 20, 2014

The Jameson Technology Committee would like to continue to gather data around the iPad usage at the high school. Towards this end, the committee is looking for full-time teachers, substitutes, and administrators who would be willing to participate in one-on-one interviews during teacher prep periods or afterschool. The interviews will be conducted by David Kaufman and will last between 20–40 minutes. These interviews will also be used for a Boston University dissertation that David Kaufman is working on. The interviews will be looking for information regarding how the culture of teaching and learning has changed as a result of the introduction of our one-to-one iPad program. For your participation in the interviews, you will be entered in a raffle to win a $5 Dunkin Donuts gift card (30 chances to win). Also, if you would be willing to let David observe your class, for your participation, you will receive a $5 gift card to Dunkin Donuts. During these observations, notes will be taken, but the class will not be video recorded. Additionally, David will be looking to interview some junior and senior advisory students as a group. If you would allow David to come speak with your group, he will provide munchkins.

If you are willing to help on this project, please e-mail davek612@gmail.com. In your e-mail, please include: your preferred time for an interview (afterschool or your prep), which prep you have (if that is your choice), if you are willing to have David observe your class, and if you are willing to let him interview your junior and senior

students. Dr. Dakin and Dr. Garcia have approved this research. Your name or class title will not be included in the final research write-up to help ensure your anonymity.

Thank you,

Dave Kaufman

APPENDIX J

Parental Informed Consent

Study Title: How has the Introduction of a One to One Table Program Influenced the Culture of Teaching and Learning in an Urban School: An Ethnography

IRB Protocol Number: 3521E

Consent Form Valid Date: May 21, 2014

Study Expiration Date: May 20, 2015

Informed Consent Form

Dear parents/guardians,

Your child's advisory class will be participating in a research study that involves understanding if and how iPads have affected teaching and learning at Jameson High School. The results will be used as a part of my dissertation for my graduate studies at Boston University. The results may also be shown to administration and teachers. Names will be kept anonymous and confidential. This study will take place from May through June 2014. This form details the purpose of this study, a description of the involvement required by your child, and your right to have your child participate or not.

The purpose of this study is to determine if and how the introduction of a one-to-one tablet program influenced the culture of teaching and learning in an urban school. Your child will be asked to participate in a focus group interview during his or her advisory period and/or a class period where your child's class will be observed by the researcher to learn how iPads are being used in the classroom.

Focus group interviews will consist of 12–15 students. Interviews will take 25

minutes to complete. The focus groups will be recorded on a digital voice recorder to help me accurately capture the students' perceptions in their own words. The tapes will only be heard by me and my doctoral committee for the purpose of this study. The audiotapes will not be made public. The tapes will be erased after the research is published. Insights gathered from the conversations and observations will be published as a part of a Boston University dissertation. Though direct quotes from your child may be used in the paper, his or her name and other identifying information will be kept anonymous. The final write-up will be available to any administrators, teachers, and students upon request. Study data will be stored on a password-protected computer. For the purposes of quality improvement and safety, the Institutional Review Board may review your study records.

There are no direct benefits from participating in this research study. However, teachers, substitutes, administrators, and students will have a chance to voice their opinions and share their understanding of how iPads have affected teaching and learning. This research may gain insight into what works and what needs to be changed with regards to the iPad program.

The main risk of allowing us to use and store your child's information for research is a potential loss of privacy. I will protect your child's privacy by labeling their information with a code and keeping the key to the code in a password-protected computer. Your child may be uncomfortable with some of the questions and topics I will ask about. Your child does not have to answer any questions that make him/her feel uncomfortable. I will ask your child not to tell anyone outside the group what any

particular person said in the group. However, I cannot guarantee that everyone will keep the discussions private.

Participation is completely voluntary, and your child has the right to withdraw at any time from the research. In the event that your child withdraws from the study, all information, including recorded conversations, will be destroyed and omitted from the research.

You are encouraged to ask questions or raise concerns at any time about the nature of the study or the methods I am using. You are welcome to contact me at davek612@gmail.com and 781-286-8226 (or ext. 51228), or my faculty advisor, Dr. Bruce Fraser, at bfaser@bu.edu.

Also, you may obtain further information about your rights as a research subject by calling the BU CRC IRB Office at 617-358-6115.

You may choose to not have your child participate. If would not like your child to participate, please contact me by phone or email. Your child will be a part of this research unless you contact me to request otherwise.

Thank you,

Mr. David Kaufman

Jameson technology teacher

Jameson High School

APPENDIX K

Codebook Example

Code	Definition	Example	Text Example
Communication	The way or the amount that people exchange ideas either verbally or digitally	I find that I am talking less in class because I now have my iPad.	I feel like in classrooms, they don't talk as much with each other 'cause they can just focus on their iPads rather than talking to the person next to them. I had hoped that the discussion feature on Schoology, so I would post things, links and stuff like that on Schoology, and I had hoped that the discussion feature would open up discussion, it did not. Open communication has definitely improved – kids find it easy to get in touch with me and vice versa.
Control	The idea of taking charge of or being more relaxed with the iPads in the classroom The one who is in charge of learning and/or teaching	Limits need to be put in place so that I am not receiving an email at 10 o'clock at night. The iPads should be used for strictly educational purposes.	I really do feel that the iPads have given teachers another issue around managing behavior and disciplining. And there is no one stopping him from looking at that and getting lost in the pages of the Tweets. So I think that you have to have controls, you can't let keep the iPad on all the time.

Division	A clear distinction or separation between groups of staff members or between groups of students based on similar characteristics that did not exhibit itself before the introduction of the iPads	Administrators love the iPads and teachers find it to be more of a hindrance	For the kids that do the work, it works. for The kids that don't do the work, it was a lot less successful. So there is very huge extremes. So I guess that's a cultural shift. The extremes, the division between the kids who are successful and not in my classes, that gap has widened. I imagine it is more pronounced for freshmen than it is for upperclassmen, but it is definitely very apparent.
Distraction	Being off academic task	Students are always sending Tweets when they should be taking notes on the lecture.	*I'm looking at the kid's iPad for 2 seconds, and they have Snapchats and iMessages and all these things flashing across the screen. How can you focus on anything for any length of time with that happening?* *But most of the time, I feel the iPad was a distraction to them because of the fact that they are playing games, they're reading their emails from Facebook or whatever.* *In some ways, it's changed because it's easier for them to access distractions, but I don't know that it's any different than it's always been in a school, I think when you are disengaged and*

			looking for something else, you'll find it.
Workflow	The methods used to complete work.	I use the iPad to check my email as I move throughout the building.	Mostly I use it for a Spanish dictionary. For ceramics, she used it to just to post pictures because we had to do step-by-step pictures of what we've done. but that's about it so far that I've used it. In AP Gov class, we can use the iPad to pull up information and stuff

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WORK EXPERIENCE

TEACHER, *Jameson High School*, Jameson, MA 8/04–present

- Develop curriculum for 9th –12th grade technology courses
- Lead an after school computer club
- Conduct technology seminars for teachers and administration
- Maintain the district website

DIRECTOR, *GiantCampus*, Cambridge, MA Summer 09

- Hired staff
- Led pre-camp orientation
- Oversaw daily operations of computer summer camp

PROFESSOR, *North Shore Community College*, Three Campuses, MA 1/05–2/07

- Taught courses on web design, animation, computer fundamentals, and game design to adults and children
- Evaluated students in beginner, intermediate, and advanced classes

INSTRUCTOR, *Math Advantage,* Wellesley, MA 6/04–8/04

- Created summer computer courses for children ages 7–16
- Ran activities and snack for the campers in between classes

TEACHER, *Wellesley Community Children's Center*, Wellesley, MA 8/03–6/04

- Planned and ran after school activities for 1–4 graders
- Encouraged sharing, proper communication, good sportsmanship, and fun
- Transported k–5 graders to their appropriate after school site