EXAMINING COLLEGE STUDENTS’ PERCEPTIONS OF IPAD USAGE ON MOTIVATION, ORGANIZATION, AND COGNITIVE SKILLS

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ABSTRACT

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This qualitative study sought to explore the impacts of iPads on college students in a one-to-one deployment program. More specifically, the researcher wanted to determine how the iPad impacted students’ cognitive skills, motivation to learn, and organization. The research question asked: “What are college students’ perceptions of how iPads impact their cognitive skills, motivation, and organization?”

iPads were distributed to eight students in a Midwestern state college to use on a 24/7 basis within a one-to-one deployment program. These students were all enrolled in the same Introduction to Social Studies Education course taught by Dr. Benson. Students were allowed to use their iPads in other classes and at home as well. Data collection employed a triangulation format as proposed by Miles and Huberman (1984). The three types of data collection during the 10-week study included: 10 classroom observations, and journal responses and matrix fill-ins students had to complete on a biweekly basis. The data was analyzed according to Erickson’s model of coding (1985) and organized in regards to the three main themes from the research question.

The coded data made it clear that students saw a clear improvement in their organization and cognitive skills because of the iPad. Specifically they enjoyed being able to keep their class materials in one location and the positive impacts on their cognitive skills. Students reported an initial increase in their motivation, but those feelings did not remain constant through the entirety of the study. These results should serve as a starting point for discussion about the relevance and effectiveness of one-to-one iPad deployment programs in college environments.
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CHAPTER ONE: INTRODUCTION

Study Background

The advancement of technology has altered the way our schools operate, affecting most students on a daily basis. Whether it is checking grades or assignments online at will, using Smartboards in the classroom, or “skyping” with pen pals or other classrooms thousands of miles away, technology continues to change the overall environment and pedagogies found in classrooms. Educators need to know more about the effectiveness of such technology in the classroom, because the overall evaluation of such technology cannot be limited to the fact that these services were simply made available to students. New technology in the classroom should have positive impacts on students in order to justify its existence in the learning environment (Center for Digital Learning, 2004). A review of education technology for my study included the device’s ability to provide specific learning outcomes and enhance student motivation, organization, and cognitive skills. The increase in students’ perceptions of their motivation, organization, and cognitive skills were outcomes found in Li and Pow’s study (2011) about integrating tablets in one-to-one deployment programs in the classroom. Studies on educational technology such as Li and Pow’s should be conducted because of the recent increase of the introduction of mobile devices in the classroom (Apple, 2012; JAMF Software, 2012; Harrison, 2010).

With the release of the iPad tablet from Apple in April of 2010, some schools jumped at the opportunity to integrate technology on a one-to-one basis in the classroom (Apple, 2012; Goodwin, 2012). One-to-one deployment programs provide each student a device such as a tablet or laptop to use. Students may either take the devices home with them or use them exclusively during school hours. It usually comes down to the policies and resources of the
school districts (Center for Digital Education, 2004). Some school districts have been financially stable enough to provide expensive tablets such as iPads on a one-to-one deployment (Caolo, 2013), while others have enacted optional “Bring Your Own Device (BYOD)” policies which allow students to bring tablets, cell phones, iPods, or laptops to use in class (Ficker, 2012). These BYOD policies and deployment programs are by no means the normal practices in most schools; rather, they are found in schools that are willing to experiment with new technology and have the financial backing to do so (Ficker, 2012). With a growing number of devices in the classroom, it is important that research be conducted to determine how these devices are impacting students.

**Statement of Purpose**

Recent studies (Goodwin, 2012; Li & Pow, 2011; Hendricks, Wickersham, & Lumadue, 2012) have explored the impacts iPads are having on students. Research has also found relationships between organization, cognitive skills, and motivation levels in regards to tablet use in one-to-one deployment programs (Li & Pow, 2011; Goodwin, 2012). With all the different types of technology now available to students, teachers, and schools, I wanted to discover whether or not iPads are having specific impacts on students in higher education, and if they are, what are they. The research question for my study was “What are college students’ perceptions of how iPads impact their cognitive skills, motivation, and organization?” The purpose of this study was to add to the literature surrounding the impacts iPads are having on students in the classroom and also provide a starting point for discussion about the relevance and effectiveness of one-to-one deployment programs in college environments.

I chose to study the impacts of iPads because of their user-friendly characteristics, the access they provide to educational apps in the iTunes store, and their ubiquitous and mobile
natures according to research (Puentedura, 2011; Apple, 2012; Lai, Yang, Ho, & Chan, 2007; Li, 2010; Li, Pow, Wong, & Fung, 2010). Additionally, I had a unique opportunity, because the professor for whom I worked received an in-college award to pilot the use of iPads in the classroom. The results of my study will be beneficial to professors, deans, and technology coordinators at the college and high school levels, as one-to-one deployment programs are beginning to appear more frequently in schools (Rockman, 2004). I hoped to find that iPads, and therefore technology, are having a positive impact on student motivation, organization, and cognitive skills, and therefore are enhancing the education experience of as many students as possible. My findings add to the literature surrounding the increase of integrating one-to-one deployment plans in schools.

Limitations

There were a few limitations to my study. First, only nine students agreed to participate in the study. By the end of the study, only eight participants had consistently completed the journal responses and matrix fill-ins. Although eight participants are ample for a qualitative study, a larger sample would have been more representative of the population. For example, my study only had one female and seven males, while the demographics of the class were closer to evenly split between males and females. One change that could have increased participation in the study would have required collaboration with my professor. If she had agreed to make the journal responses and matrix fill-ins part of the assignments for the class, students would not have seen it as extra work on top of all their class work and may have been more willing to participate in the study. This change would have also drastically increased the amount of data for the study. Second, participants in the study did not complete all of their journal responses and matrix fill-ins. One participant was actually dropped from the study because he did not complete
any of the requirements. Had students completed all of their journal responses and matrix fill-ins, the data collected could have been more accurate of the sample. Third, I should have completed more classroom observations because these were the only times that I was able to observe the impacts that the iPads were having on students. The classroom observations were a time to confirm what the other data sources were telling me, and spending more time observing in the classroom would have only increased my confidence in accuracy of the data.

**Definition of Terms**

**App.** An abbreviation for an application. Applications are software that can be downloaded onto mobile devices such as iPods, iPhones, computers, or Android phones. Some are compatible with only iOS devices, only Android devices, or both. They can be bought and downloaded in the iTunes store or on the Android market.

**BYOD.** An acronym standing for “Bring Your Own Device,” a policy implemented in some schools where students are able to bring their own mobile devices, such as iPods, iPads, other tablets, or laptops to use during class.

**Cognitive skills.** The following list consists of tasks students were asked to evaluate themselves upon: attention skills such as sustained, selective, and divided attention; long-term and short-term memory; logic and reasoning; auditory processing; visual processing; and processing speed (Gibson, 2013).

**Google Docs/Drive.** “A free web-based office suite offered by Google within its Google Drive service. [Google Docs] has since been replaced by Google Drive, which allows users to create and edit documents online while collaborating in real-time with other users” (Wikipedia, 2013).
**Matrix fill-ins.** These were the spreadsheets created and used to collect data from participants every other week during the study. Participants filled in these spreadsheets accordingly on Google Docs/Drive. The spreadsheets stayed the same throughout the study to ensure consistency.

**Motivation (to learn).** For my study, I used Huitt’s combined definition of motivation and related it to learning. Huitt (2011) defines motivation as “an internal state or condition (sometimes described as a need, desire, or want) that serves to activate or energise behaviour and give it direction [towards learning class material]” (p.1). Huitt mentions that this definition has been gathered from a variety of sources over a number of years.

**One-to-one deployment program.** A set of policies allowing one mobile device to be assigned to one student, whether for take-home, in-class use, or both. For my study, students were allowed to use these devices on a 24/7 basis, meaning they were able to take them off campus and to other classes.

**Organization.** For my study, this term referred to the ability of the student to remain prepared for class; however it encompassed aspects outside the classroom as well. It referred to completing assignments, remembering important deadlines and/or due dates, keeping track of assignments, papers, and notes, and presenting an effective demeanor in the classroom.

**Tablet.** A tablet is a one-piece computer that combines desktop and monitor into a smaller, more mobile, and ubiquitous device. The screens are usually activated by touch with pointers and fingers being the most common activators. They are able to connect to Wi-Fi Internet and have a wide arrange of functions or apps.
Summary of Chapters

My first chapter provided an introduction to the project, the purpose of my study, an overview of the limitations, and statement of the research question. Also in Chapter One was a definition of terms section that defines vocabulary words used throughout this paper. Chapter Two was dedicated to the review of literature that specifically focused on three different areas. It was important to first establish an increase in mobile devices in schools both in terms of tablets and iPads. Then the literature review moved towards investigating the reasons as to why iPads are being integrated into the classroom, both in the reactions of teachers and students. Finally, it was crucial to make the connection between the reasons for integration and the impacts iPads have had on student learning outcomes, specifically in the areas of student organization, cognitive skills, and motivation to learn. Chapter Three contained all the information regarding the research methods I used to guide and organize my research. Chapter Three also had sections that highlight my framework, procedures, data collection, and data analysis. Chapter Four presented the results of my data collection. The results were ordered according the three central themes I was investigating: student organization, cognitive skills, and motivation to learn. Chapter Five summated this paper with a discussion section, and implications section for professors/teachers, technology coordinators, and future research.
CHAPTER TWO: REVIEW OF LITERATURE

Introduction

This review explored an increase in mobile devices, an increase of tablet use in the classroom, students’ and teachers’ reactions to the integration of iPads in the classroom, and some of the impacts that tablets are having on students in the classroom. Each section provides information or research relevant to this study’s research question: “What are college students’ perceptions of how iPads impact their cognitive skills, motivation, and organization?” More specifically, the review focused on the increased use of mobile devices in the classroom and the reasons for such recent developments. Subsections in this area discuss increased usage of specific mobile devices like iPads and other tablets. This is followed by an overview of both student and teacher reasons/reactions for/to iPad integration. The subsections in the teacher section presented recent findings from studies all over the world regarding iPad integration projects. The findings were aligned with student learning outcomes in the specific areas of cognitive skills, motivation to learn, and organization. The review of literature ends with a summary of the information presented.

Increase in Mobile Devices

Tablets are relatively new to the general public. Although Microsoft released tablets as early as 2001, they truly gained popularity with American society with the release of the iPad by Apple in April of 2010. Roughly 244 million touch devices were sold in 2009, but 630 million were sold just two years later (Barseghian, 2011b). One can deduce that the drastic increase in sales of touch devices can be directly related to the release of the iPad, whose sales have continued to increase, quadrupling from 2010 to 2011 (Barseghian, 2011b). Along with these
iPads are other mobile devices that are now being deployed in over 2,000 school districts across the United States (Lawrence, 2012).

Although exact usage varies by person, mobile devices (iPods, iPads, tablets) have been integrated into the daily lives of many citizens, including students (Pilgrim, Bledsoe, & Reily, 2012) and young children, who use them both in and outside the classroom (Corrin, Lockyer, & Bennet, 2010). These new forms of technology (especially tablets) that combine mobility with hands-on interacting have become a leading option for incorporating new learning experiences in the classroom (Lai et al., 2007; Li, 2010; Li et al., 2010). Shuler (2009a, 2009b) affirmed these findings, asserting that mobile devices have extreme potential to be an integral ally to support students in the classroom. Fitzgerald (2004) took it one step further when he predicted that tablets could be more promising in the classroom environment than in other settings.

Mobile devices are important education tools in the classroom, because they provide valuable access to social networks, tools for learning and productivity (browsing the web or using as an e-reader), and thousands of apps (Johnson, Adams, & Haywood, 2011). Tablets in the classroom have been effective in the following areas: improving lecture presentations (Rogers & Cox, 2008; Ellis-Behnke, Gilliland, Schneider, & Singer, 2003), in-class assessments (Rogers & Cox, 2008; Ellis-Behnke et al., 2003) increasing cognitive skills (Goodwin, 2012).

**Increased tablet usage in schools.** People are exposed to more tablets than ever before (Barseghian, 2011b). These people include children and adolescents who have grown up engrossed in and surrounded by technology. Schools have begun to realize that mobile devices such as tablets can be used for educational purposes in the classroom. In order for schools to implement tablets, whether on a one-to-one deployment program or otherwise, there is usually adequate funding and a digital initiative priority from educators in the building. Colleges have
been experimenting with tablet incorporation as early as 2006, when Virginia Tech formed an agreement with Fujitsu Computer Systems Corporation and Microsoft (Nystrom, 2006). Virginia Tech was able to provide tablets to engineering students and faculty members (Nystrom, 2006). Supporting the integration plan at Virginia Tech, Harrison (2010) reported that classrooms in higher education had begun to adopt iPads as a means for primary instruction and student learning.

Although some schools with adequate funding and digital initiative priorities have begun to incorporate tablets in schools, others have not quite embraced tablet technology. There is a variance of legitimate reasons that some schools are unable to take on such technology programs. According to Yelland, Cope, and Kalantzis (2008), some obstacles that schools must consider to enact a mobile device system include “the infrastructure required to operate mobile devices, teacher professional learning, [the] safety and privacy of student information, and [the] re-examination of current curricula which are firmly rooted in the industrial era” (p. 22). However, if possible to integrate, according to Enriquez (2010) “combined with wireless networking technology, tablet PCs have the potential to provide an ideal venue for applying previously proven collaborative teaching and learning techniques” (p. 77).

Bonds-Raacke and Raacke (2008) determined that students come to the first day of class with predisposed expectations regarding technology and how it will be integrated in the classroom. For some students, that means teachers will make a PowerPoint presentation and play it either through their computer or the overhead projector (Bonds-Raacke & Raacke, 2008). The tablet, however, allows teachers to fall out of this technology trap and provides teachers with other avenues to integrating technology in their classroom. In their tablet integration study, Bonds-Raacke and Raacke (2008) reported that not only did students respond positively to the
new technology, but that they benefited from using it in the classroom. Students self-reported their feelings through questionnaires from which mean ratings were computed. Based on a 100-point scale, students reported the following:

‘The classroom environment was interactive’ (94.54), ‘the class was engaging’ (93.30), ‘the use of technology enhanced the classroom experience’ (94.35), ‘I benefited from the use of technology’ (93.62), ‘the professor was knowledgeable in using Blackboard’ (94.71) and ‘the professor was knowledgeable in using PowerPoint presentations’ (95.83). (Bonds-Raacke & Raacke, 2008, p. 238)

Although no specific benefits examples were reported in their study, Bonds-Raacke and Raacke (2008) point out the importance that their results have on teachers, because it informs them that students are willing to utilize technology and “allows instructors to contemplate the potential benefits of the technology in relation to students’ attitudinal responses” (p. 238).

**Increased iPad usage in schools.** Even with the drastic increase of iPad sales since its inception a few years ago, relatively little research says much about classroom effects of the iPad, especially at the primary level (Goodwin, 2012). This lack of research could be due to the fact that tablets were made readily available to the public just over 10 years ago and iPads were only released two and a half years ago, making it difficult to conduct long-term/longitudinal studies on their effectiveness in the classroom. At present time, Apple (2012) estimates that there are over 1,000 one-to-one iPad deployment programs throughout U.S. schools. They also estimate that by 2012, there were already over 1.5 million iPads being used in general and one-to-one deployment programs in educational settings (Apple, 2012). Hu (2012) notes that school districts in New York City and Chicago have ordered iPads to integrate into the classroom. New York City Schools ordered more than 2,000 iPads for teachers and students, while “More than
200 Chicago public schools applied for 23 district-financed iPad grants” (Hu, 2012, p. A16). Regelski (2006) argues that schools are trying to meet the demands of an increasingly global atmosphere, thus they need to embrace technology to prepare students for life in the 21st century. One way that schools are trying to do so is through integrating the iPad into the classroom environment. Not only are iPads gaining momentum in educational settings in the United States, one-to-one deployment programs are gaining momentum in classrooms all across the world (Apple, 2012).

Recently, the Department of Education and Communities in the State of New South Wales concluded a massive iPad deployment program (and thus apps) with students in the primary grades (Goodwin, 2012). One of the main reasons they wanted to conduct the study was because “developers have not been able to back their claims of educational value for students [from apps]: hence the urgent need for research to examine the educational effectiveness of apps” (Goodwin, 2012, p. 24). Researchers wanted to discover if students were truly using the iPads to access educational apps and unearth best practices. Goodwin’s (2012) enormous study had several findings in regards to students. First, researchers saw an increase in student engagement and motivation. Second, they discovered students showed improved knowledge and skills. Third, there was “enhanced collaboration and communication between students” (Goodwin, 2012, p. 51). These are just a few of the appropriate findings related to my study.

As addressed in the definition of terms section, apps are the programs used on iPad tablets that range from solitaire to streaming music to the over 20,000 education apps available for download. It is through these apps that students hopefully unearth educational best practices and successful learning outcomes with the iPad. These apps are the backbone of the iPad experience because users are unable to use operate the iPad without utilizing apps. The
abundance of apps makes the iPad experience unique and customizable to the user and their learning styles.

**Studies and Outcomes of iPad Deployment**

There are several reasons that iPads are groundbreaking learning tools in the classroom, including their mobility and ubiquity. Schools must address the divide that students still face between technology at home and technology in school; unfortunately many students see much more technology at home than at school (Prensky, 2001a, 2001b). This also means that the technology incorporated in the classroom must be as innovative as possible. Bielec (2010) discovered that desktop machines are losing their importance because mobile devices are much easier to transport. Studies are also beginning to produce some of the earliest information on the iPad’s effectiveness in the classroom (Goodwin, 2012). Some studies are reporting overwhelming positive attitudes from students towards iPad integration (Bonds-Raacke & Raacke, 2008).

Goodwin (2012) just published her findings from her study regarding the impacts iPads are having on students and teachers in the classroom. Her study was conducted in three different schools with five different teachers, over 90 students, and 75 iPads (Goodwin, 2012). As you can see there were not enough iPads for a one-to-one deployment program, but students were able to use them on a daily basis for around 18 weeks. This qualitative study found several key findings for students and teachers. First, “the iPad placed additional demands on teachers’ planning and preparation time” (Goodwin, 2012, p. 7). Second, “both teachers and students believed the iPads supported and enhanced student learning” (Goodwin, 2012, p. 8). Third, the iPad increased student motivation and engagement. These findings provide argument for those in agreement of implementing iPads into the classroom.
One other study reports that students are learning the way they want to because of the highly adaptable and flexible nature of tablets (Ellis-Behnke et al., 2003). Although their study focused on tablets created before the iPad, the iPad is both adaptable and flexible for several reasons, thus making it similar for argument’s sake. Students can download numerous different note-taking apps and organizer apps to manage their information from class in a system that works for them, which is not always the case with other tablets. Ringle believes that the iPad is better than other tablets available saying, “The Kindle [Amazon product] did have some strong points, but it did not meet the needs of higher education in relation to serving as an alternative to paper” (McCrea, 2011, p. 1). iPads are able to do tasks that students find important in the classroom, including being able to read research articles or other necessary materials for class while also allowing users to take notes in different formats and highlight text (McCrea, 2011).

**Student and teacher reaction to iPads.** Students are integrating their mobile devices because they are comfortable using them and the devices are easy to transport. Children, and thus students, are increasingly surrounded by more technology at earlier ages, which may be one of the reasons they are comfortable using newer technology. Prensky (2001a) went so far as to classify children born from 1980 to 1994 as ‘digital natives,’ because they grew up surrounded by and immersed in technology. Even some kindergarteners come to school with prior technology experience (Downes, 2002; Downes, Arthur, & Beecher, 2001; Learning and Teaching Scotland, 2003). Not only are students being immersed with more technology at a younger age, children’s cognition have evolved. Prensky (2001a) theorizes that students intake and process more information at quicker paces than ever before and are also excelling at “parallel processing” and favor graphics when available, because they want to be active in their learning. Therefore, in response to new technology, students are changing the way they learn and
process information (Cuthrell, 2004; McLoughlin & Krakowski, 2001). Students want machines that they can truly access from just about anywhere (Bielec, 2010). Namahoe (2011) sums it up well writing, “The report showed that they do not simply want more technology—they want the right technology. Students want systems and applications that serve their needs, support learning, and work properly ‘without getting in the way’” (p. 1). To quote Andrews, “The iPad is predicted to work well in the classroom, the concept is perfect for education—a light weight computer, relatively inexpensive, capable of being used almost anywhere: in your hands, on a table, attached to a wall, built into a tabletop” (Harrison, 2010, p.1).

Several key findings about student use of tablets came out of a pilot study involving iPad integration in a freshmen course at Texas A&M University-Commerce (2012). Results indicated that students prefer using technology in the classroom than not using it, faculty should enhance the digital transformation, and “it is incumbent upon colleges and universities to provide students with tech gadgets to foster and challenge their learning” (Hendricks et al., 2012, p. 15). It appears that mobility and ubiquity remain positive factors for students in terms of integrating iPads in the classroom. According to Geist (2011):

Results indicated that students thought that the device was most beneficial as an e-reader and a way to have instant access to information while the instructor was lecturing. They also found it to be beneficial in their clinical work in elementary school classrooms.

(p. 758)

These results are just the tip of the iceberg in terms of what else the iPad can do and how it can address evolving cognition. According to the instructor, students in the same study reported benefits: “It was cheaper [to be able to download digital textbooks] and that really made them less angry at me [the instructor] for making them buy so many books” (Geist, 2011, p.
This increase in popularity of digital textbooks is related to mobile device integration plans. Weisberg (2011) discovered that students have generally accepted these new digital textbooks, because they are cutting down on costs (most digital textbooks are free to create and use), and students believe they are excellent and innovative learning tools. These digital textbooks are usually only accessible by mobile devices such as tablets, iPods, or iPads, and may have an impact on student organization, in that textbooks can be accessed on devices. This can cut out the need of trying to keep track of multiple textbooks at the same time. Geist (2011) also found that group work became more efficient and students were more willing to complete assignments because they were easy to access. She reports that, “They [college students] did not want to sit at a desk and use a desktop or laptop computer. The future…will be mobile and app based rather than web based” (p. 8).

As evidenced above, iPads have been incorporated into schools at an increasing rate, and we are beginning to see the actual results and impacts of their usage in schools (Goodwin, 2012). It is important to discover how the iPad can be used most effectively in the classroom. According to Goodwin (2012), “the iPad offers teachers (and students) rich opportunities for transforming learning and using technology to modify and redefine learning (p. 8). Teachers can “easily provide engaging learning experiences for students using the iPad” (Goodwin, 2012, p. 20). Echoing these thoughts are Chiong and Shuler (2010), who propose that mobile devices have the potential to increase student learning. To conclude, in their simplest form, iPads give students new opportunities for learning and expose them to different learning environments (Peng, Su, Chou, & Tsai, 2009).
iPad Impacts on Student Motivation, Cognitive Skills, and Organization

There are other specific opportunities that iPads bring to the classroom. In fact, Li and Pow (2011) came up with four specific benefits that their research pointed to: “increasing their [students] motivations, developing their cognitive skills, improving their learning strategies, and planning for their learning in their daily activities” (p. 325). Enriquez (2010) also found positive results at the end of his iPad integration project that also utilized interactive learning environments. His study saw “improvements in student performance compared with the traditional instructor-centered learning environment” (p. 83).

Some of the earliest one-to-one iPad deployment programs have begun to publish their results. Several studies in Australia have a “consensus in their findings that learners are more engaged and motivated” (Goodwin, 2012, p. 23). Supporting this finding are Engel, Gosney, & Monroe (2012) who discovered “iPads were found to increase student engagement by providing innovative and creating learning environments” (p.1). Over the course of the 2010-2011 school year, these three instructors at Indiana University studied the effectiveness of iPads on three different learning communities. Students were allowed to use the iPads in class, but not take them home. Students self-reported information, while the researchers conducted classroom observations as well. Other benefits reported included increased creativity and active learning (Engel et al., 2012).

Based on the research surrounding increased student motivation from the devices, it is apparent that students appreciate the versatility of mobile devices (Green & Hannon, 2006). These devices allow students to make connections to relevant topics via the Internet, a process they would not be afforded without the device. If students are more motivated in the classroom than they will be more open to learning and engaging in class activities.
General research in the field of technology and learning has identified a couple specific reasons why students are able to learn and cognitively develop using the iPad. First, iPads are ubiquitous in that they do not restrict the user to a specific environment or timeframe from which they can access the Internet or documents. They are easier than laptops to transport and pass to persons as well. Second, iPads provide users with a more compact and intimate working relationship than larger, bulkier laptops. Other research is beginning to suggest that it is important students and teachers view technology as ‘cognitive tools’ (Johnsen, Peck & Wilson, 1998; Weston & Bain, 2010). iPad trials in Australia (Catholic Education, 2011) also found that one-to-one deployment programs promoted higher order thinking skills like critical thinking, problem-solving, and decision making skills. In this study, 11 teachers were given iPads to use daily in their classrooms. Participants self-reported their data mostly through video, blogs, surveys, and interviews over the course of two school terms in 2010. The framework was based on a funnel approach in order to come to succinct observations and conclusions. Sticking with this theme, Roscorla (2011) conducted a study with two focus groups: one using iPads to read materials and the other using physical paper. Roscorla discovered that students using the iPads scored higher on the transfer learning than those using traditional texts. Roscorla (2011) determined that “it [the result] is a big deal because higher order thinking, the ability to work together and the ability to construct knowledge in different contexts, are important skills that transfer to the workplace” (p.1).

There has not been as much research completed on student organization impact from iPad usage in relation to cognitive skill development and student motivation. Li and How (2011) did report seeing an increase in student organization or “planning for learning” in their study (p. 325). Fadel and Lemke (2009) suggest, “personal devices can increase … motivational skills”
(p.32), while Ellis-Behnke et al., (2003) found that the use of tablets in class improved students’ ability to organize notes and class materials.

**Conclusion**

As shown by the review of literature, mobile devices have been integrated into the daily lives of people and into the classroom. Although there have been studies advocating for the use of iPads in the classroom (Goodwin, 2012; Harmon, 2010), more literature on the topic can only benefit teachers and schools in the future. It is my hope that by publishing student perceptions on the iPad it will only serve to further benefit schools in determining if one-to-one integration programs are in their future. To conclude, the U.S. Department of Education (2010) believes that using real-world tools, such as the iPad, in the classroom prepares students better to become active members in an internally competitive workforce. Banister (2010) recommends teachers be proactive and take the challenge head on of incorporating mobile devices in the classroom, while researchers determine the specific outcomes and effects of said devices. Therein lies a challenge that teachers be bearers of innovation and new pedagogies to the classroom, but only if these devices serve the best interests of the students. The results of all the aforementioned studies lead one to believe that iPads and tablets are here to stay. The persistent question of what students’ perceptions are of mobile devices’ impact on learning is a subject for further research and the focus of this study.
CHAPTER THREE: RESEARCH METHODS

Introduction

Tablets have been integrated across all levels of learning, especially in the secondary and higher education environments. It is important to determine the perceived effect(s) of iPads integrated on a one-to-one deployment program into daily activity within the college classroom. As previously noted, the effect of tablets, especially iPads, on bringing new learning opportunities in a college classroom deserves an adequate study to determine the perceived impacts they are having upon college students’ motivation to learn, organization, and cognitive skills. In this section I will explain the type of study I produced and the approach I took. Then I will present an overview of the settings, participants, and data collection procedures I employed in my study. The chapter ends with a data analysis section that is followed by a concluding statement.

The Study

Qualitative research methods. This study was a qualitative examination of college teacher education students’ perceptions of the impact of iPad integration on their organization, cognitive skills, and motivation to learn, designed around the following research question: “What are college students’ perceptions of how iPads impact their cognitive skills, motivation, and organization?” Qualitative studies depend on words to describe and answer social phenomena (Schensul, Schensul, & LeCompte, 1999). Students provided these words themselves in their journal responses and matrix fill-ins. Although my qualitative study was neither strictly a case study or ethnography, it did employ similar characteristics. A qualitative approach was most appropriate because I focused on a single unit, the outcomes of the study were unclear and unknown at the beginning, and I played the role of participant observation (Schensul et al.,
This study was qualitative, in that I used classroom observation and participant prompt responses to explore students’ perceptions on the effects of iPad usage on their motivation to learn, cognitive skills, and organization. Since the data was qualitative, a descriptive analysis was necessary because it was a great way to bring the data to life. Through descriptions, the reader can understand what truly occurred during the class activities and how participants were using their iPads and the impacts they were having. Participants were asked to report their perceived impacts of iPads upon their motivation, cognitive skills, and organization. They provided brief descriptions in their journal responses of specific examples where the iPad impacted them. The framework for my study emerged from the work of Li and Pow (2011), who through their case study, found that one-to-one tablet deployment improved students’ perceptions of motivation, organization, and cognitive skills. They conducted their study in a primary school where students were allowed to take their tablet-PC home with them. Researchers compared a group that received take-home tablet-PCs to a group that did not receive take-home tablet-PCs. There were no changes to the pedagogical or curricular approaches of the teachers for either of the classes. Students were required to keep daily log sheets and answer questions in response to the tablet-PC’s effect on their motivation, cognitive skills, and motivation. They used qualitative and quantitative methods in their study. Their findings are crucial to the framework of my study, as stated here:

The results of this study indicate that deep infusion of one-to-one technology provided the necessary affordance for enhancing both formal learning at school and informal or less-structured learning at home, and that students’ perceived impact of technology on (1) enhancing their learning motivation, (2) developing their cognitive skills, (3) improving
their learning strategies and (4) planning for their learning in their daily learning activities was significantly higher in the Tablet-PC classes. (Li & Pow, 2011, p. 325)

With this grounding, I made several key changes to my study to fit the context. While Li and Pow (2011) conducted a mixed methods study, I decided to make mine purely qualitative so as to capture the varying impacts that the devices were having and to make the classroom observations more vivid.

All studies require a sense of validity so that the results can be reported with confidence, accuracy, and as little bias as possible. One time-tested method for increasing validity in qualitative studies is to employ triangulation practices. As summarized by Miles & Huberman (1984), “…triangulation is supposed to support a finding by showing that independent measures of it agree with it or, at least, don’t contradict it” (p. 235). For my study, I was unable to use data or investigator triangulation because I was in a classroom setting and this was my study for my thesis project; however, I was able to utilize methodological triangulation, in that I collected three different types of qualitative data from participants: matrix fill-ins, journal responses, and classroom/student observations. I chose the three types of data sources because they allowed for students to present their feelings and opinions within a contextual environment that was relevant to the research question. The journal responses allowed students to directly answer questions surrounding the three central themes of the study. The matrix fill-ins enabled students to reinforce their journal prompts with specific examples of how they were using their iPads, and thus how they perceived it was affecting their motivation, cognitive skills, and organization. Finally, direct classroom observations provided data on how students integrated and interacted with their iPads. The triangulation of these three data sources increased the validity of the study
because it employed numerous types of data collection, which can reduce the chances of internal and construct validity being biased or invalid (Schensul et al., 1999).

My role in the study was a participant observer, because not only was I the researcher for the study—I also served as a graduate teaching assistant for the course. Merriam (1998) would refer to my role as an “observer as participant” where my “activities are known to the group; [however] participation in the group is definitely secondary to the role of information gatherer” (p. 101). As Gans (1982) writes, I was a “researcher participant—one ‘who participates in a social situation but is personally only partially involved, so that he can function as a researcher’” (p. 54). At the same time, I was responsible for other aspects of the course including grading, minor teaching, and keeping track of attendance. All grading and attendance was done via the Internet, thus it was outside of the classroom and required minimal contact with students. Integrating myself into the classroom environment also increased the fairness of the results as well. Lincoln and Guba (2000) addressed fairness, writing, “Fairness was thought to be a quality of balance; that is, all stakeholder views, perspectives, claims, concerns, and voices should be apparent in the text. Omission of stakeholder or participant voices reflects, we believe, a form of bias” (p. 180). By stakeholders, Lincoln and Guba (2000) were referring to those people in the study with differing views or opinions. Therefore, classroom observations allow the researcher to see what students may not have reported in their journal responses or matrix fill-ins. Observations helped confirm that students were truly using the iPads in ways consistent with their self-reports on the matrix fill-ins. In closing, triangulation of three data sources was most appropriate to the study and its context. This idea is supported by Glaser and Strauss (1967) who write, “An approach to a necessarily higher level of plausibility should be based, therefore, on
using the method or methods best suited to the socially structured necessities of the research situation” (p. 234).

The data I collected was qualitative, and therefore I needed a means of reporting that integrated quotes, stories, examples, and the other remaining data in a way that flowed well and effectively. The research narrative also had to align to the type of study that I conducted. I decided to set up the narrative as a general description (Erickson, 1985) that infused aspects of thick descriptions (Geertz, 1973) along with tables of descriptive statistics. Erickson (1985) writes, “The main function of reporting general descriptive data is to establish the generalizability of patterns that were illustrated in particular description through analytic narrative vignettes and direct quotes” (p. 151). Therefore, it was crucial that I provide specific evidence to confirm the findings that I presented in my results section. This evidence took the form of quotes from students and/or thick descriptions, also known as realist tales. Marshall and Rossman (1999) describe realist tales as “displaying a realist account of the culture under study and published in … a third-person voice with clear separation between the researcher and the researched” (p. 158). I used this strategy to report the data I collected from the classroom/student observations so that the audience was able to understand just how iPads were being used in a classroom. Finally, I reported the results from the five matrix fill-ins and journal responses in descriptive statistics tables that allowed my audience to easily follow. One type of table that I utilized to show patterns in the data was a three-way contingency table (Fienberg, 1977). These tables gave a visual to the data that I collected over the course of 10 weeks and made patterns within the data much easier to see.

**Context and participants.** Participants in the study all came from the same college course. The course I used for my sample was called Introduction to the Teaching of Social
Studies and is a required course for secondary social studies majors. Three sections of this sophomore-level course were offered during this particular semester, two of which were taught by Dr. Benson (social studies professor and lead teacher) and myself (graduate/teaching assistant). As the graduate assistant for the course, I was responsible for keeping track of attendance, some grading, and small amounts of instruction. A different instructor taught the third section and was therefore removed from the study to ensure consistency of pedagogy and lesson design. All participants in the study were assigned pseudonyms to keep their identities anonymous and confidential. The sections Dr. Benson taught met twice a week for a semester, totaling 16 weeks. Each class period lasted one hour and 15 minutes bringing the total in-class instruction time to roughly 40 hours for the semester. Section one, which began at 9:30 am and lasted until 10:45 am, contained 30 students, two of whom dropped the course early in the semester. Section two, which began at 2:30 pm and lasted until 3:45 pm, contained 28 students.

The institutional backing for the project came in November of 2012 from the dean’s office at the university, given the professor’s successful application to a call for “Big Ideas” for technology usage. Based on this proposal, the university purchased 30 iPads: 25 regular iPad 2s and five iPad Minis. These iPads were purchased with a one-to-one deployment program in mind, meaning that students would be able to use the iPads for the entire semester. Therefore, students were able to take the iPads home, use them in other classes, and download personal apps of their choosing. The professor proposed to create a green classroom for the class, meaning that no paper was to be used during class periods. All handouts, quizzes, assignments, and course documents were available to the students via an online portal. Students were able to access these documents through mobile devices like laptops, iPads, or other tablets.
Dr. Benson purposely did not change her pedagogies so as to allow the impacts of the iPad on students’ cognitive skills, motivation to learn, and organization to emerge from the student choice. Her classes were almost always student-centered and infused with elements of guided inquiry, small group work, hands-on activities, interactive lectures, jigsaws, peer teaching, and other student-centered strategies. Participants were encouraged to use their iPad or mobile device on a consistent basis in class to enhance the classroom experience.

As referenced above, the number of iPads supported by the award (30) did not equal the number of students in the two sections (56). Dr. Benson and I debated various options for deployment, deciding in the end to require that all students who were able would bring their own device. They designed a lottery system to distribute the iPads to whoever remained without a device. Dr. Benson asked students to bring their own devices as possible on the first day, and then collected a roster at that time of who brought their own device and who did not. Eighteen students did not have mobile devices to bring to class on a daily basis. These students were given the first opportunity to use the iPads. All but one of the 18 students decided to use an iPad from the award. Also, participation in the study was not a pre-requisite for being assigned an iPad. Students with personally owned iPads were allowed to participate in the study as well.

Once the professor and I had ensured all students were either assigned or committed to bringing their own mobile device, my focus moved towards recruiting students for the study. Due to timing and planning concerns, I emailed all students at the beginning of the 2nd week informing them of an upcoming opportunity to participate in a research study (See Appendix A). Students were formally introduced to the project at the end of the 4th class period. I gave students an overview of the study and an informed consent form. Those interested in participating were required to bring a signed copy of the informed consent to the next class period. Participation, or
a lack of, in the study had no effect on students’ grades in the education class as Dr. Benson had no access to the data until after turning in final grades. In the end, nine students decided to participate in the study. Seven of these students used iPads from the award, while two used personal iPads. Participants in the study were required to return the signed informed consent form before they were given an iPad from the award (See Appendix B). Over the course of the 10-week study one participant did not consistently participate in the matrix fill-ins or the journal responses. He was removed from the study, which brought the total number of participants to eight.

The eight participants in the study all fell within the 19-20 years old age range. They were either sophomores or juniors in college, and were required to take Dr. Benson’s class for their education program. There were seven males and one female in the study. More information on the participants can be found in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Race</th>
<th>Device Used</th>
<th>Data Completion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siegfried</td>
<td>19</td>
<td>Male</td>
<td>Caucasian</td>
<td>Award iPad</td>
<td>90%</td>
</tr>
<tr>
<td>James</td>
<td>20</td>
<td>Male</td>
<td>Caucasian</td>
<td>Award iPad</td>
<td>100%</td>
</tr>
<tr>
<td>Patrick</td>
<td>20</td>
<td>Male</td>
<td>Caucasian</td>
<td>Award iPad</td>
<td>100%</td>
</tr>
<tr>
<td>Maggie</td>
<td>19</td>
<td>Female</td>
<td>African American</td>
<td>Award iPad</td>
<td>80%</td>
</tr>
<tr>
<td>Richard</td>
<td>20</td>
<td>Male</td>
<td>Caucasian</td>
<td>Award iPad</td>
<td>90%</td>
</tr>
<tr>
<td>Francis</td>
<td>20</td>
<td>Male</td>
<td>Caucasian</td>
<td>Award iPad</td>
<td>90%</td>
</tr>
<tr>
<td>Dirks</td>
<td>19</td>
<td>Male</td>
<td>Caucasian</td>
<td>Award iPad</td>
<td>100%</td>
</tr>
<tr>
<td>Owen</td>
<td>20</td>
<td>Male</td>
<td>Caucasian</td>
<td>Personal iPad</td>
<td>80%</td>
</tr>
</tbody>
</table>

Dr. Benson and I worked together to identify the constellation of apps that would be imaged on all the iPads. We geared app selection toward specific course learning objectives. These apps, such as Complete Class Organizer, Keynote, Pages, and Adobe Reader, were
identified before the semester started as crucial apps for a green classroom to be successful. We also hoped that students would use a few of the apps as a review tool for an upcoming Praxis test, while the Complete Class Organizer had been brought to the attention of Dr. Benson by a former student who reported improved academic performance due to its use. Additional funding from the award allowed for free licenses for the same apps to be distributed to those using personal iPads as well. As previously mentioned, students were able to take their tablets home with them and use them accordingly in other classes on campus.

**Data collection.** It was crucial that most of the information came from the students themselves because the research question focused on their perceptions. Over the course of the 10-week study, I completed 10 classroom observations (five for the morning section and five for the afternoon section) using an observation protocol (See Appendix C). I decided to observe five times in each class because students only filled out five matrices and responded to five journal prompts. Therefore, all three sources of data had the same opportunity for data collection. During the classroom observations, I was only observing the actions of the nine students in the study and how they interacted with their iPads. Each observation lasted for one hour and 15 minutes. Unfortunately, only two of the 10 observations had full participation from the eight students due to student absences, users forgetting to bring the iPad to class, and/or the iPad not being fully charged.

The second type of data that I collected was matrix fill-ins. I chose matrix fill-ins because it allowed participants to report their own data and perceptions, and gave me detailed information on how participants were using their iPads. This process was completed through Google Drive/Docs. I decided to use this type of data gathering because it was centralized, organized, and students were able to see other students’ postings, thus maybe helping them
remember certain apps they used or ways they used their iPads. In order to access and annotate the Google Docs matrix, students needed to have a Gmail.com account. I also assigned all participants a username to help identify their responses to the researchers, yet keep their identity anonymous to their peers on the Google Docs/Drive website. Then, I emailed all participants in the study the link to the matrix during the first week. The matrix asked students five questions. Please see Figure 1 for the matrix fill-in setup and respective questions. I asked these questions because the answers would provide me with specific examples of apps students were using and some of the direct impacts on student organization, cognitive skills, and motivation. To maintain consistency, these questions remained the same for the five times that students completed the

<table>
<thead>
<tr>
<th>ID Number (I assigned this in the email I sent you)</th>
<th>List of Apps used this week:</th>
<th>What were your most used Apps the past two weeks and how much time did you spend on each?</th>
<th>What are some of your favorite apps? Why?</th>
<th>Did you delete any apps over the past two weeks? Why?</th>
<th>Have you downloaded any apps over the past two weeks? What were they and why?</th>
</tr>
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<tbody>
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</table>
matrix. This process repeated itself every other week (Weeks 1, 3, 5, 7, and 9) over the 10 weeks of the study. It alternated with the short journal responses that students completed.

The last type of data I collected was journal responses, which participants completed on Google Docs. I chose to employ this type of data collection because it allowed students to report in great details the impact(s) that the iPad was having on their cognitive skills, organization, and motivation. To do this, I emailed all participants in the study the link to the journal response during the second week. I asked participants to provide a short paragraph answer in response to Table 2.

Table 2

<table>
<thead>
<tr>
<th>Journal Prompt #1:</th>
<th>Based on the results from Week 1a Matrix, it appears that all of you are using an APP to take notes. What APP(s) are you primarily using? What are your likes and dislikes concerning its use? And finally, how has it impacted your organization, motivation, and cognitive skills? Please make sure to cite examples related to your motivation to learn, cognitive skills, and organization.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Prompt #2:</td>
<td>Have you noticed a change in your motivation towards completing assignments, studying, or doing class work (either decrease, increase, or has stayed the same) since you received your iPad? Do you think your iPad has had a direct effect on this change? How so or why not?</td>
</tr>
<tr>
<td>Journal Prompt #3:</td>
<td>Based on the past 5 weeks of iPad use, what impact has it had on your cognitive skills (check this website for an overview of cognitive skills - <a href="http://www.learningrx.com/what-are-cognitive-skills.htm">http://www.learningrx.com/what-are-cognitive-skills.htm</a>). Has it been positive, negative, or no difference? Could you give a specific example or two? Please justify your answers.</td>
</tr>
<tr>
<td>Journal Prompt #4:</td>
<td>Is having a device everyday in the classroom beneficial? Why or why not? Please relate to how it has impacted your motivation to learn, organization, and/or cognitive skills when applicable. Please use examples when possible.</td>
</tr>
</tbody>
</table>
| Journal Prompt #5: | a) What is your perception on how the iPad has affected your organization this semester? Please cite specific examples.  
   b) What is your perception on how the iPad has affected your motivation to learn this semester? Please cite specific examples.  
   c) What is your perception on how the iPad has affected your cognitive skills this semester? Please cite specific examples. |

The question. Each of the five journal questions asked students specifically how their iPad was impacting their motivation to learn, organization, and/or cognitive skills. Table 2 lists the journal prompts I presented to the participants. The journal prompts that I asked were very similar to
those asked by Li and Pow (2011) in their study; however students were not asked to rank their perceived impacts using a Likert Scale in my journal prompts as they were in Li and Pow’s study. Students were able to list or provide short responses for their answers. Students were asked to base their cognitive skills development on six specific areas from a website I provided to them during the first journal prompt. I decided to use the cognitive skills more focused on the brain, because I was interested in seeing how students interacted with and thought about their own personal iPads. Bloom’s cognitive skills are geared more towards performance, which may not be the easiest to demonstrate with an iPad. The cognitive skills studied were: attention skills, memory, logic and reasoning, auditory processing, visual processing, and processing speed. The journaling process repeated itself five times over the course of the study (Weeks 2, 4, 6, 8, and 10). These responses were crucial pieces of data, because students could provide specific examples of how the iPad affected their motivation to learn, cognitive skills, and organization. The other types of data collection did not allow for such personal reflection by the participants. Students completed these journal responses more consistently than the matrix fill-ins. Out of the 40 total journal responses that should have been completed, only one of them were not acceptable as evidence. In comparison, 33 of 40 matrix fill-ins were admitted as data for the study. Appendix D provides a breakdown of the matrix fill-ins and journal responses over the course of the study.

**Data analysis.** The following section highlights the process I took in order to effectively and accurately analyze the three types of data I collected. First, I conducted all classroom observations on my laptop using the observation protocol created. As to not be limited by the computer or charging cord and to ensure accurate observations, I made sure to move around the classroom to see how students were interacting with their iPads. After each observation, the
notes went into a folder on my laptop. When it came to extracting my other two types of data, I removed them from Google Docs/Drive. Instead of exporting the data after every week, I decided to wait until the end of the study. This allowed students to complete any last minute journal response and/or matrix fill-in that they may have put off or forgotten about. I ended the data collection after 10 weeks, because I needed to begin analyzing the data to meet end-of-semester deadlines. I was then able to remove the data from Google Docs/Drive. From there I simply created two collated word processing documents for all of the journal responses and one collated Excel sheet for the matrix fill-ins. I chose to create two documents for the journal response so that I could collate them according to question and user. This step was not necessary for the matrix, because the questions remained constant throughout the study. I collated the responses by the usernames that were assigned to them earlier in the project. Once these documents were completed, I printed them off to begin the process of coding.

I chose the data analysis process of coding because it appropriately fits a qualitative study and descriptive analysis. The process of coding allows the researcher to go through the data and find similarities in the data according to codes. The three types of data (observations, matrix fill-ins, and journal responses) all fit well into Erikson’s (1985) process of fieldwork and coding because they are qualitative. Erickson (1985) laid out nine elements of a report on fieldwork research. I did not explicitly carry out all nine steps during my data analysis, however some were utilized more than others. Erickson (1985) proposed the importance of these nine steps:

Together they [the nine steps] allow a reader to do three things. First, they allow the reader to experience vicariously the setting that is described, and to confront instances of key assertions and analytic constructs. Second, these elements allow the reader to survey
the full range of evidence…Third, they allow the reader to consider the theoretical and personal grounds of the author’s perspective… (p. 145)

My attention to these three purposes will help the reader trace the path of my personal beliefs, perspectives, and subjectivities throughout the course of study (Peshkin, 1988).

According to Erickson (1985), the first step in the coding process of data analysis is to develop empirical assertions “that vary in scope and in level of inference” (p. 146). Empirical assertions are statements of the big idea or key findings from the data. I analyzed these empirical assertions codes developed from the research of Li and Pow (2011), who found that “students’ perceived impact of technology on enhancing their learning motivation, developing their cognitive skills…and planning for their learning in their daily learning activities was significantly higher in the Tablet-PC classes” (p. 325). These conclusions from their study became not only the basis of my research question (What are college students’ perceptions of how iPads impact their cognitive skills, motivation, and organization?), but they also became the three main codes of my research. Specifically, I combed through the data to look for reported impacts of the iPad and/or apps on participant motivation, cognitive skills, and organization. I began by reading over all the collected data I had prepared. For me this meant going through my collated data tables and field notes. These empirical assertions must be backed by specific data in order to ensure their validity and empirical nature, which I did by establishing evidentiary warrants for the assertions presented.

Evidentiary warrants are the facts or truths in the data collected. These are the quotes, actions, or observations that affirm the empirical assertions. Erickson (1985) writes, “This [establishing evidentiary warrants] is done by reviewing the data corpus repeatedly to test the validity of the assertions that were generated, seeking disconfirming evidence as well as
confirming evidence” (p. 146). Erickson (1985) also recommends that the researcher continue to test the evidentiary warrants and be open to the fact that assertions might need to be changed as the data analysis continues. It is important to note the differences in the data as well as the similarities in relations to the empirical assertions. These are known as disconfirming and confirming evidence, respectfully. Disconfirming evidence is that which does not align with the assertions. Researchers Lincoln and Guba (2000) suggest that including both disconfirming and confirming evidence may help convince readers that the assertions presented are trustworthy and accurate. As I went through the entire data set, I made sure to follow Erickson’s (1985) protocol, constantly looking for disconfirming evidence to add credibility to my assertions.

Another key component to Erickson’s approach is the concept of key linkages. Key linkages are the quotes or findings that connect many of the assertions into a larger or broader view, in essence, patterns of generalization. Erickson (1985) said that such linkages are key in that “they are of central significance for the major assertions the researcher wants to make. The key linkage is linking in that it connects up many items of data as analogous instances of the same phenomenon” (p. 148). Key linkages are also important, because they allow the researcher to map out the data according to assertion, evidentiary warrants, and confirming/disconfirming evidence. It is key that assertions are confirmed with more than one type of data to ensure validity and authenticity; therefore, I was looking for the assertions across data sources to ensure that the assertions were warranted.

Throughout the data analysis process, I followed the protocol described above. The first step in the process was to read through the data several times. I did not make any notes or write anything down; rather, I looked for patterns or repeated themes or occurrences in all three of my data sources. To streamline the coding process I decided to categorize the data by the data
sources and the framework of my research question. The framework consisted of three areas: student organization, cognitive skills, and motivation to learn. Once I established these, I took three large pieces of paper and assigned a framework category to each sheet. These three categories thus became my codes for the fourth and fifth time of reading through the data. Next I used colored markers to highlight evidence per framework category across the data sources for the numerous key themes. After I completed the highlighting, I enlarged the data via a word processing program on the computer, then printed and affixed the data to the appropriate category pages. Below each section I listed the disconfirming evidence and allowed for the data to apply to more than one category. Lastly, using the data and key themes, I was able to identify a couple key linkages from the data. I printed these off separately and highlighted them in orange. The key linkages were linked to the central themes using yarn. This set up gave me a comprehensive visual of the data and coding outcomes.

**Conclusion**

I set up this study as a qualitative study that utilized triangulation of data to increase ethical and valid research. Li and Pow (2011), and researchers Erickson (1985), Peshkin (1988), Lincoln and Guba (2000), Schensul et al., (1999), and Glaser and Strauss (1967) influenced the framework of the study. The work of Li and Pow (2011) guided me in creating my research question, while the classic pieces from Peshkin (1988), Lincoln and Guba (2000), and Glaser and Strauss (1967) helped justify my research methods. I used three data sources in my study. They consisted of student/classroom observations, matrix fill-ins, and journal responses. Participants completed the matrix fill-ins and journal responses via Google Docs/Drive, while an observation protocol guided the classroom observations. This data was then exported to separate collated word documents and excel sheets. After this, I was able to code the information to look for key
themes under each category to support my findings. The coding process was modeled from the work of Erikson (1985), albeit with some modifications that allowed me to visualize and categorize the information most effectively to my learning styles (i.e., visual learning). The findings from the study are presented in the following chapter.
CHAPTER FOUR: RESULTS

Introduction

Through Erickson’s (1985) process of coding data information, numerous key themes arose from the data that fell under the framework of my research question. In terms of the framework of the research question, first participants reported a perceived increase in their overall organization. Second, participants reported a perceived increase in their cognitive skills. Third, participants reported mixed results in terms of a perceived increase in motivation to learn. As established, these three areas had numerous key themes that emerged in the data.

According to the data, students perceived a positive impact in their overall organization and cognitive skills, while experiencing mixed impacts on their motivation to learn over the course of the 10-week study. The overall impacts that the iPad had on the eight participants in my study can be seen in Table 3.

Table 3

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>iPad’s Impact on Organization (Week 3)</th>
<th>iPad’s Impact on Cognitive Skills (Week 10)</th>
<th>Motivation (Week 3)</th>
<th>Motivation (Week 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siegfried</td>
<td>Positive</td>
<td>Positive and Negative</td>
<td>Positive</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>James</td>
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<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>Patrick</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>Maggie</td>
<td>Positive</td>
<td>Positive and Negative</td>
<td>No Change</td>
<td>Positive and</td>
<td>Negative</td>
</tr>
<tr>
<td>Richard</td>
<td>Positive</td>
<td>Positive</td>
<td>No Change</td>
<td>No Change</td>
<td>No Change</td>
</tr>
<tr>
<td>Francis</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive and Negative</td>
<td>Positive and</td>
<td>Negative</td>
</tr>
<tr>
<td>Dirks</td>
<td>Positive</td>
<td>Positive</td>
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<td>No Change</td>
<td>No Change</td>
</tr>
<tr>
<td>Owen</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
<td>No Change</td>
</tr>
</tbody>
</table>
**Student Organization**

Participants reported several impacts that the iPad had on their class and personal organization. First, participants liked being able to take notes and keep all their course materials bundled in one place. Second, they enjoyed being able to easily access their class materials. Third, participants were able to transfer their class materials to other devices. Fourth, some participants utilized the alerts and reminder functions of the iPad to increase their organization and manage their time better. These key themes are examined further after an overview of the data supporting students’ overall increase in organization.

**Overall response.** There was unanimous agreement that students felt the iPad had a positive impact on their organization. Siegfried was perhaps the best exemplar of a participant who saw immense positive improvements in his overall organization due to the iPad. He reported a positive impact in his first journal response writing, “I love the fact that it keeps materials organized by each class session/day. It makes it easy for me to go back and reference just in case I need that information” (JR 1). His feelings throughout the study did not change and he summed up his experience with his iPad in his final journal response writing, “It [the iPad] has definitely done wonders for my organization this semester!” (JR 5). During my classroom observations, I noted Siegfried using an app called Complete Class Organizer quite extensively to take notes, organize his class materials, and create graphic organizers (CO 2/26/13; CO 3/12/13). These observations made sense because he reported that he spent more time using the Complete Class Organizer app than any other app, sometimes upwards of three hours a week (MF 1-5). Siegfried was not the only participant who used the Complete Class Organizer app. Francis too raved about the organizing capabilities of the app and reported in his matrix fill-in,
“Overall the [Complete] Class organizer app has saved me this semester because it has made me organized and on top of things” (MFI 3). Clearly these students felt that the Complete Class Organizer app impacted their organization in a positive manner.

There was only one report of a mixed impact on student organization. Dirks reported little impact saying, “I feel the iPad helped my organization to an extent. I am a fan of a paper trail rather than online items. However, I think the apps that were set up for students to track assignments and exams were the most helpful” (JR 5). Not all students felt the same as Dirks, many directly reported about the benefits of the iPad in regards to organization.

The classroom observations confirmed that participants were more organized with the iPad. In one of the early classroom observations, five participants easily followed along with the class lesson and used their iPads at the same time. During this class period, participants were constantly working, because there were so many classroom activities going on. To begin the class there was an icebreaker activity, followed by a short quiz, a jigsaw activity, an introduction to a Webquest, and a review of an upcoming assignment. These activities flowed seamlessly, because participants were organized using their iPads. They did not have to worry about bringing hard copies of class documents, folders, notes, or writing utensils to class; if they had their iPads (which they all did on this day) then they were all set. There was no wasted time handing out papers or allowing students to go make copies of notes or assignments. Participants took their quiz through their online course shell and took notes on their devices in apps of their choosing during the jigsaw activity. All the participants used their iPads to take notes. One participant used the Evernote app, one used the Notes app, and three used the Complete Class Organizer

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To cite the data sources, I used the following abbreviations: JR and # indicating a journal response and the number; MFI and # indicating a matrix fill-in and the number; and CO and MM/DD/YY for classroom observation and date.
app. To finish the lesson, participants were able to pull up the electronic version of the assignment and its respective rubric (CO 2/12/13). Overall, students used their iPads in effective and organizing ways, much like they themselves reported in their journal responses and matrix fill-ins.

**Bundling.** Clearly one factor in organization is being able to access information in one place. In my study, bundling refers to the process of categorizing class materials and notes according to specific characteristics. Participants reported that they enjoyed being able to bundle class materials/information according to days, major, and/or class. Not only that, but participants also felt more organized because they were able to take notes *and* have all of their class materials together in an app of their choosing. This process of “bundling” was confirmed in all three forms of data collection and had positive impacts on many of the participants.

First, participants used a variety of apps based on personal preference for taking notes in class and at home. Participants reported that the following apps were all used at some point during the 10-week study to take notes: Complete Class Organizer, Notes (app specific to the iPad), Evernote, Adobe Reader, and Keynote. Nearly all the participants reported using or at least trying more than one app at some point during the study for taking notes. The most popular app participants used to take notes was Complete Class Organizer. Participants also used other apps, such as Notes and Evernote, to take notes throughout the study. Furthermore, participants consistently used their iPads and the apps aforementioned to take notes during class (CO 2/12/13; CO 2/26/13; CO 3/26/13).

On several occasions, I observed students using a variety of apps to take notes, organize their class documents, and consolidate information (CO 2/26/13 & CO 3/26/13). For example, Francis loved using the Complete Class Organizer app in class. He took class notes on the device
and was able to organize them according to class period. He also downloaded PDFs and was able to annotate them in the document and save them in his notes. These observations help to confirm that students were using their iPads and specific apps to help them organize their class materials and take notes all in one location.

Participants enjoyed having everything they needed for their class or classes in one location, namely an app on their iPad. Siegfried was one of the participants that felt bundling had a positive impact on his organization. He really enjoyed using the Complete Class Organizer app because he “loved the fact that it keeps materials organized by each class session/day. It makes it easy for me to go back and reference just in case I need that information” (JR 1). Later in the study Siegfried felt similarly when he wrote, “Complete Class Organizer allows me to organize…and keep material such as readings, notes…in one place in an organized manner so that I can easily access it when studying or referencing” (JR 4). In his final response, Siegfried summed up his experience with the iPad over the course of the study writing, “It [the iPad] has provided me a resource for taking and archiving my notes, which has always been a problem for me in the past” (JR 5). Quite simply, for Siegfried, the iPad “[did] many wonders for [his] organization [during the study]” (JR 5). Siegfried was just one of several participants who reported positive impacts on their organization because of the bundling capabilities of the iPad.

The matrix fill-ins and classroom observations confirmed the data in the journal responses in regards to being able to take notes and keep all class materials in one app or place. Although students did not directly address the issue as much in their matrix fill-ins, comparing the journal responses and matrix fill-ins provided evidence that participants were using the apps that they wrote about in their journal responses. For example, Siegfried addressed enjoying keeping all the class materials in one place in three different journal responses (1, 4, & 5), yet
does not explicitly mention anything about it in his matrix fill-ins. However, Siegfried did write about the wonders of the Complete Class Organizer and his matrix fill-ins add credibility to his journal responses because he reported using that app more than any other app in every matrix fill-in (MFI 1-5). Siegfried was not the only participant who reported about the benefits of bundling. Francis agreed about the benefits of bundling writing, “My favorite app is [Complete] Class organizer because I can keep all my notes for all my classes in it. It is really nice to have everything in one place” (MFI 1). And Owen added, “My favorite app is iBooks because it can store textbooks, my personal books, and any PDF’s I need for class in one spot” (JR 1). Owen took it a step further than the other participants in that she stored textbooks and personal books in the app along with her notes for class. These three participants pointed out the positive impacts that apps with bundling capabilities had on student organization.

The classroom observations also provided meaningful examples of increasing student organization due to bundling. First, participants usually used their iPads to take notes. In one of the early observations, almost all of the participants were using only their iPad to take notes during class (CO 2/12/13). James forgot his iPad while Dirks preferred to take notes on paper that day (CO 2/12/13). This trend continued through the study. I observed all participants taking notes on just their iPad during a later observation (CO 2/26/13). The apps that they used to take notes included Complete Class Organizer, Notes, and Evernote (CO 2/26/13). In closing, towards the end of the study it appeared that some students relied solely on their iPad for taking notes in class instead of as a supplement to writing notes by hand as some did earlier in the study. During one of my final observations, I noticed four participants brought only their iPad to class (CO 3/26/13). They brought no books or paper, and did not even need a pencil. These final
observations provide evidence that students were utilizing their iPads for organizing benefits, some of which could be results of bundling class materials and information.

**Easy access to class materials.** Participants also reported that being able to easily access class materials had a positive impact on their overall organization. Between the matrix fill-ins and journal responses, the majority of participants noted at some point how easy it was to access materials on the iPad and/or an app. Patrick was one of the participants who found the iPad vry easy to use, and thus impacting upon his organization. He commented during the second week of the study, “I like that it [Notes app] is very simple to use and it keeps my notes in one location” (JR 1). Not only was the Notes app easy to use, it also had bundling features that helped organize Patrick more efficiently. He also reported that he was more likely to complete assignments because “it [the iPad] is a lot easier to bring with me and access my notes when they are all in one place” (JR 2). Patrick made it very clear that he enjoyed both the bundling and ease of use characteristics of the iPad. He summated his journal responses writing, “Everything that I needed for class was on it [the iPad] and it was real nice being able to access everything so easily” (JR 5). It is obvious from his journal responses that Patrick perceived a positive impact on his organization due to the easy access to class materials that the iPad provided.

The matrix fill-ins provided evidence to support the key theme of having easy access to class materials and thus having a positive impact on student organization. Patrick supported his journal response in the matrix fill-in writing, “My favorite app is iBooks…and it is easy to use” (MFI 1). iBooks also allowed him to “have books that are easier to access” (MFI 2) and “access course material easily without looking it up online” (MFI 3). He was not the only participant to report that the iPad made it easy to access class materials. Richard found the Complete Class Organizer app “really easy to use” because “all my notes were in one place” (MFI 4). Both
Richard and Patrick found the iPad and specific apps easy to use and access class materials. They also both reported a relationship between bundling information and easy access to class materials, both of which helped increase their organization over the course of the study.

**Transferability of class materials to other devices.** The third key theme that centered on student organization revolved around a few participants who enjoyed being able to transfer class materials to other mobile devices. The iPad came equipped with technology that allowed for easy syncing with and/or transporting class materials to other Apple devices. James briefly addressed it as the first item in his first journal response writing, “I am using the default Notes app because it is a good way to organize my notes through two different devices” (JR 1), but Owen provided a more thorough explanation of some of the impacts that the iPad’s transferability had on his organization. He said, “I also like the Notes app because whatever I write on my iPad is transferred to my phone and vice versa” (JR 1). Owen actually saw a direct link between increased organization and having the notes on two devices. He wrote, “My organization skills have improved with this app because the notes go to two different places making it easier for me to remember to do my tasks” (JR 1). Owen reported benefits in his matrix fill-ins as well. He wrote about how liked being able to have his notes for his classes and his meetings on his devices, implying they were transferable to separate devices (MFI 4).

Although the matrix fill-ins and journal responses provided the bulk of the data for this key theme, the classroom observations provided a great example as well. James was observed throughout the study as being an Apple products user. He had at least a Macbook laptop (JR 5) and an iPhone, in addition to the iPad from the study, that he brought to class on a consistent basis (CO 2/26/13 & CO 3/12/13). It was through these different Apple devices that James was able to take notes because of the iCloud technology that syncs notes, pictures, music, and any
other files with all of the Apple devices. In other words, James was able to access anything he needed on any one of the three Apple devices that he owned. Although I never observed him without his iPad in class, he usually supplemented his iPad in class with his iPhone and/or Macbook. Through the examples of Patrick and James, it is clear that some students saw an increase in their organization skills because they no longer had to worry about not having class materials when they needed to access them. In other words, they were not forced to rely on just one device any more to access any class materials they needed.

**Reminders and alerts.** Participants reported a positive impact on their organization skills because of the iPad’s ability to set alarms, reminders, and alerts for different assignments. Specifically, these functions impacted students’ ability to manage and organize their time because it kept them abreast of deadlines and due dates for homework assignments and upcoming assessments. One participant that reported organizational impacts because of the alerts and reminders was Francis. Francis enjoyed using the reminders feature stating, “I also liked how I can set reminders for when I have homework due and what tests are coming up” (JR 3). At the end of study, Francis still felt the same way writing, “It was nice to be able to set reminders on my iPad so that I would not forget about when something was due” (JR 5). He felt that, “the iPad has helped me [organizationally] tremendously over the study. It helped to give me reminders about upcoming tests and homework assignments I had due” (JR 5). These quotes from Francis highlight the effect that the iPad had on his organization skills. Dirks was another student who reported the benefits of the reminders in terms of his overall organization. He directly linked the alerts and reminders to helping him stay organized and on top of studying. He wrote, “The reminders and programs that remind me of homework, papers and exams are helpful
because it gives me a reminder a week or more in advance, which reminds me to start studying that far in advance” (JR 3).

Francis also directly reported in his matrix fill-ins about using the reminder functions writing, “I can load PDF’s and set reminders in it [Complete Class Organizer] of when I have homework and tests due” (MFI 3). The classroom observations captured a few related instances as well. During one of the classroom observations I observed Dirks and Francis placing reminders or alerts in their iCal apps of when future assignments were due (CO 2/12/13).

Through the journal responses, the matrix fill-ins, and the classroom observations, it was apparent that some participants really enjoyed using the alerts and reminders functions found in several apps on the iPad to stay organized and on top of assignments. In particular, participants enjoyed being reminded of upcoming due dates and organizing their time in order to meet their deadlines.

In closing, from the data in the journal responses and matrix fill-ins fortified by the classroom observations, participants explicitly mentioned and were observed enjoying the benefits of having all the class materials, especially readings and notes, in one spot. Participants also enjoyed being able to easily access their class materials in organizing apps, such as Complete Class Organizer and Notes. In turn the technology of the iPad made it very easy to transfer class materials to other devices, as well as sync them if need be. Finally, students reported a positive impact on their organization from the iPad because of its capability to set alarms and reminders for upcoming assignments and due dates. As shown, one of the key results from the data is the overall organizing effect that the iPad has on its users.
Cognitive Skills

The key themes in the cognitive skills section are organized according to the six brain-based cognitive skills to which participants were asked to relate to during the first journal prompt. These included: attention, memory, logic/reasoning, auditory processing, visual processing, and processing speed. I decided to combine the auditory and visual processing skills because of their similarity, which equated to five key themes for cognitive skills. Participants reported heavy positive impacts on logic/reasoning, and memory, while attention, auditory and visual processing, and processing speed received fewer but still positive reports. Once I explain the overall impact on cognitive skills, I will evaluate students’ perceived impacts of the iPad on the six specific cognitive skills.

Overall response. Participants almost unanimously reported that the iPad had positive impacts upon their cognitive skills. Students were asked explicitly about the iPad’s impact on their cognitive skills in the journal prompt from week five (JR 3) and the final journal prompt in week 10 (JR 5). None of the participants changed their views from journal response three to journal response five. As shown in Table 3, there was an abundance of positive impacts reported of the iPad on student cognitive skills. Francis was one of the students who provided a lot of data in his journal responses and matrix fill-ins regarding the positive impacts that the iPad had on his cognitive skills. He wrote, “The iPad has had a positive impact on my cognitive skills. I have found that it is easier for me to remember things when I write them on the iPad” (JR 3). In class I was able to observe Francis increasing his logic and reasoning skills by using the iPad as a supplement to in-class instruction. In other words, Francis used the iPad to increase his knowledge by looking up difficult tasks or topics on his iPad during a lecture or class activity (CO 2/12/13). In particular I observed Francis using the iPad specifically for its Internet
capability while the instructor was going over a short section regarding a famous quote from
President Roosevelt regarding democracy. I could tell that Francis did not understand a term and
thus was using the iPad as an additional reference in the classroom to improve his cognitive
skills. Francis’ perceived impacts and iPad use remained steadfast throughout the study and he
responded to the final journal prompt writing, “My cognitive skills have gotten much better with
the iPad. I loved having the Internet at my finger tips while listening to a lecture” (JR 5).
Through this short vignette of Francis, it is apparent that students perceived positive impacts of
the iPad on their cognitive skills.

One other classroom observation early in the study provided a plethora of information on
how the iPad impacted participants’ cognitive skills. Participants completed a wide array of
classroom activities during class including an icebreaker activity, a quiz, a jigsaw activity, an
introduction to a Webquest, and an overview of an assignment (CO 2/12/13). This specific
section had five participants from the study and all five had their iPads that day. The participants
were using the iPad to read and process the article on Webquests. They created cheat sheets and
graphic organizers via their various note taking apps in order to schematize and arrange their
thoughts during the jigsaw activity. They seemed to pay attention with a device in front of them
and not get off task. Participants accessed review sites, which impacted their memory, before
they took their quiz. They demonstrated enhanced processing speeds and were easily able to
move from one task to another using their iPads (CO 2/12/13). Finally, participants also
displayed levels of auditory processing when they were able to take notes on their iPad while
listening to the rest of their group during the jigsaw activity (CO 2/12/13). This classroom
observation was crucial in determining what effects iPads had on participants’ cognitive skills.
during the study. These examples show that participants exemplified positive impacts on their cognitive skills due to the iPad.

**Attention.** Some participants reported in their journal responses specific positive impacts on their attention skills due to the iPad, specifically in the area of attention or staying on task. Richard was one of the participants who perceived the iPad to have a positive impact on his cognitive skill of attention. He reported that the iPad “helped [with] sustained attention” (JR 3). He found it much “easier to work with the iPad than to use a textbook…it is easier to stay on task because the iPad is a lot ‘cooler’ to use” (JR 3). So not only did Richard find it easy to use, the overall appearance made it appear cool to use and had an impact on his attention skills at the same time. Owen felt similar to Richard and “believed that the iPad has improved my attention skills” (JR 3). He also reported that the iPad “allows me to stay focused rather than being distracted by the noises in my house” (JR 3). Owen similarly reported in his matrix that he used the Pandora app to “create playlists depending on what I am doing to help me focus” (MFI 4), which in turn helped him to focus. Although these participants reported strictly positive impacts on their cognitive skills from the iPad, there were others who saw negative impacts in addition to positive ones as well.

A few participants reported both positive impacts and negative impacts on their attention skills due to the iPad. Maggie was one of the participants who experienced negative impacts as well as positive ones. Maggie did not like how easily distracted she could become with the iPad at her disposal (JR 3). Interestingly, Maggie reported in the first week that, “Cognitively, I keep more focused in class” (JR 1). Just a few weeks later though her beliefs seemed to transition when she wrote, “Sometimes I pay attention really well and retain everything I was taught and recorded with the iPad. Other times when I find the information uninteresting I will easily open a
different app unrelated to the task at hand” (JR 3). Oddly enough, Maggie did not mention anything in her final journal response regarding the iPad’s overall impact on her attention skills. Maggie’s example of perceived impacts on cognitive skills and makes it evident that perceptions were not always concrete throughout the study.

The classroom observations confirmed what Maggie reported as I observed her during one observation specifically accessing her Facebook and Twitter accounts during transition, down, and instructional time (CO 2/12/13). In a broader sense, there were six classroom observations during which I noted students using the devices for purposes outside of the learning context (CO 2/12/13; CO 2/26/13; CO 3/12/13; CO 3/26/13). These actions including checking social media apps like Twitter and Facebook, buying sporting tickets, checking email, updating basketball scores during March Madness, or doing assignments for other classes. (See Appendix E for a complete list of recreational apps that participants used over the course of the study.) Students completed some of these actions during down time or transition time, while others did them during instructional time. From my classroom observations, the majority of these actions were completed during down and transition times with isolated instances during instructional time. These examples show that although some students reported positive impacts on their cognitive skills because of the iPad, others were distracted because of the ubiquitous nature of the iPad, which obviously negatively impacted their attention skills.

**Memory.** More than half of the participants directly reported a positive impact on their memory because of the iPad, especially when it came to remembering class information. James wrote in his first journal response, “my cognitive [skills] has improved because my mind remembers things when I type them” (JR 1). He felt similarly at the end of the study saying, “I remembered a lot better when it came to assignments and due dates” (JR 5) and enjoyed that “the
iPad could be switched on with a button and accessed to the Internet in a matter of seconds, it made it easier to remember things!” (JR 5). James found that he could remember items much more effectively through the iPad because of how he input information into the iPad and how those in turn affected his memory skills. He was not the only participant who discovered similar impacts. Patrick also discovered positive impacts on his memory stating, “I have an easier time remembering aspects of the class that we look at individually because…I am able to read through material at my own pace” (JR 3). These thoughts were also echoed in his final journal response. He wrote, “I think remembering class material is a lot easier because I can view it in front of me and look up anything I am unsure of” (JR 5). Both Patrick and James saw positive impacts on their memory because the iPad allowed them to store information differently and remember information more effectively.

**Auditory and visual processing.** Several participants reported positive impacts on their cognitive skills of auditory and visual processing due to the iPad. Maggie was one of the participants that perceived a positive impact on her auditory and visual processing skills. She wrote that she could “visualize something I downloaded and interacted with hands on better than simply seeing it in class” (JR 3). This statement directly addresses her perceived positive impact that the iPad had on her visual processing skills. Maggie also found “reading to be easier” (JR 5). In terms of her auditory processing, Maggie reported that she liked to “use apps like Adobe reader and keynote to follow along with what my teacher says and take notes directly on the iPad” (JR 4). Although she does not directly reference auditory processing, the example that she provided is just that. She was able to listen to what the teacher was saying and type notes at the same time. Even though she does not report a positive impact, Maggie does mention that the process was easy, a process that had she not had the iPad would have been impossible. Through
these different reports, it was apparent that Maggie enjoyed the positive impacts that the iPad had on her cognitive skills.

Participants displayed quality levels of auditory and visual processing in the classroom as well. These actions were most evident during the classroom observations that I conducted. Participants were very adept throughout the entire study at taking notes on their iPads when the teacher was instructing or lecturing (CO 2/12/13; CO 2/26/13; CO 3/12/13). More specifically, they were able to take notes on their iPad while listening to the rest of their group during the jigsaw activity (CO 2/12/13). While their group members were talking or reading selections, other members were easily able to take notes or write down thoughts and ideas from their fellow group members. Participants also used their iPads on numerous occasions to create diagrams and graphic organizers impacting their visual processing (CO 2/12/13; CO 3/12/13). This type of creation required them to use visual processing skills when they analyzed data on the board in front of them and transferred them into their own graphic organizers. These examples all relate back to the iPad having a positive impact on participants’ cognitive skills.

**Processing speed.** Some participants reported that the iPad had a positive impact on their overall processing speed. They reported impacts that included being able to find information quicker and making connections between information. Francis saw an increase in processing speeds, especially when it came to taking notes (JR 2). He wrote, “I am taking more notes…because it is so simple to type on the iPad and I can do it faster than writing” (JR 2). Since he was able to take notes faster, his ability to process the information increased as well. He also added a more explicit statement later in the study saying, “Another cognitive skill that has improved has been my processing speed” (JR 3). In his journal response he specifically was referring to having the iPad in lectures and being able to “look up words that my professors are
talking about helped me to understand the lecture easier” (JR 3). This in turn helped him to increase his processing speed and follow along with the presentation much more closely. In a more unconventional way, Owen also saw an increase in his processing speeds (JR 3). He said that the iPad “helped my processing speed through some of the games that I have downloaded” (JR 3). The games dealt with reaction speed and geometric aspects that Owen felt positively impacted his cognitive skill of processing speed (MF 5).

**Logic and reasoning.** Participants reported an increase in their comprehension and analysis skills. At first glance, these skills might not seem appropriate under the logic and reasoning key theme, but they were both listed as sub-skills in this section according to the list of cognitive skills I presented to the participants. More than half of the participants discussed positive impacts in this cognitive skill because of the iPad. Richard reported in his matrix that he used the Complete Class Organizer app to “study for a test and it was very useful” (MFI 4). This act increased his comprehension skills, although the results of his assessment were not available as data for the study. Richard was unique in that he was also the only participant to report downloading an app focused on a foreign language. He downloaded a French Dictionary app to “learn [new] vocabulary” (MFI 5). Through the French Dictionary app, Richard was able to comprehend and analyze new information and vocabulary, which may not have been available or as easy without the iPad at his disposal. Although Richard did not specifically mention it, and previously addressed, many participants used the iPad as a supplemental means to teacher lecture. Participants used the iPads to look up words or concepts they did not understand in order to boost their comprehension.

Participants in my one-to-one iPad deployment study reported many positive impacts, and very few negative impacts, on their cognitive skills when using the iPad. First, most
participants reported that they perceived positive impacts on their attention skills, but a few did mention that the iPad did become distracting because of its ubiquitous nature. Second, participants reported positive impacts in their memory, visual and auditory processing skills, and processing speed because the iPad provided them new avenues to take in information and process it accordingly. Third, the iPad exposed them to new information and was utilized effectively as a supplement device to in-class instruction. Many participants enjoyed using the iPad while listening to a class lecture or participating in a class activity because it allowed them to answer any questions that arose without disrupting the entire class.

**Student Motivation**

Over the course of the study, participants reported mixed impacts of the iPad on their motivation to learn, organized by three emergent key themes. First, participants initially reported an increase in their motivation to learn based on certain characteristics of the iPad such as transportability, mobility, and user-friendliness. Second, participants found the iPads novel and fun to use towards the beginning of the study, but not as much near the conclusion. Third, participants perceived mixed impacts on their motivation to learn towards the end of the study because of the ubiquitous nature of the iPads. The overall findings in this area were unique compared to those in the cognitive skills and organization framework categories, because several participants changed their opinions in their journal responses from the beginning of the study to the conclusion. Therefore, I ordered this section chronologically to show the evolution of opinions over the length of the study.

**Overall response.** Based on the data, it was apparent that the iPad may have increased students’ motivation to learn at the beginning of the study, but that feeling did not last throughout the entirety of the study for all participants, especially once students discovered the
ubiquitous nature of the iPads. In other words, once the novelty of using a new device wore off, students reported they were less likely to get tasks done, both in and outside the classroom, as efficiently. Although this may sound like an impact to the cognitive skill of attention addressed earlier, participants consistently related this topic to their motivation to learn. For example, Maggie was one of the participants who reported mixed results due to ubiquity towards the end of the study. She wrote in her final journal response that her “motivation was both increased and decreased. I was easily distracted by all the things I could do with the iPad sometimes…Other times I was willing to get to work and got work done quicker” (JR 5). These feelings were somewhat different than those she held in her second journal response when she reported that her motivation had not changed “either way since using the iPad” (JR 2). Although she was not the only participant who expressed these feelings, she serves as a great exemplar of a participant who not only saw mixed results on her motivation to learn, but also one who’s perceived impact changed over the course of the study.

Although participants were allowed to report impacts on their organization, cognitive skills, and/or motivation to learn during any of the journal responses, journal prompts two and five specifically focused on students’ motivation to learn. The journal prompt at the start of the third week of the study asked participants to write about the impact of the iPad on their motivation to learn (JR 2). The prompt asked participants to categorize the change in their motivation to learn because of the iPad as positive, negative, or no change and to provide examples or rationale for their response. Over half of the participants reported a positive impact while the rest reported mixed or no impacts. Owen was one of the participants who initially reported a positive increase in his motivation to learn. He wrote, “I think that my motivation has improved since I received my iPad. I am more likely to bring it to class…If I did not have an
iPad I think I would have to do a little more work outside of the classroom” (JR 2). Owen was more willing to bring his device to class and therefore presenting an attitude of increased motivation to do well in class.

The classroom observations provided valuable information of how the iPad impacted student motivation towards the beginning of the study. From my early classroom observations, students enjoyed being able to take notes, look up interesting facts or answers to questions on the Internet, or access relevant class documents on the class module. Perhaps the best example of this came when I observed one of the first class periods. It was early in the study and I was observing the morning class. I expected to see groggy college students who were not alert or even awake or ready to learn. Instead I saw students that were engaged and actively participating in the class activity. Students were learning about a jigsaw learning exercise. They had to form student groups of four people and take group notes. I heard one of the participants in my study say that they would take notes for their group because they had an iPad and it would be very easy to pass the iPad around for group collaboration and discussion (CO 2/12/13). Students seemed genuinely motivated to participate in class and expressed that through being willing to participate and become engaged in the class activities.

Later observations in the study confirmed what students reported in their final journal response (3/12/13 & 3/26/13). Specifically, the device no longer appeared to motivate the students as it did earlier in the study. During one of the observations I observed Dr. Benson leading students through a bellringer activity, listening to a PowerPoint presentation, and completing small group exercises (CO 3/12/13). Although some participants did use their iPad to fill in a class chart online and access important class websites, there were more negative impacts observed than in the earlier classroom observations. Out of the two participants in the afternoon
class, only one brought his iPad to class. The student that did not bring his iPad said that it was not connecting to the Internet and thus it would not make sense to bring it to class. He brought a laptop to class instead (CO 3/12/13). The student that did bring his iPad did not use it to take notes. Instead he worked on a homework assignment that was due later in the day. I knew the assignment was due later in the day because it was an assignment for Dr. Benson’s class. When he did take notes he took them via pen and pencil. In an appropriate ending, after about 25 minutes into class the student closed the cover on his iPad and moved it off to the side (CO 3/12/13). This short example brings to life the idea that participants may not have been as intrigued with their iPad as they were earlier in the study.

**Transportability, mobility, and user-friendly attributes.** The first key theme regarding participants’ motivation to learn found that students were motivated to learn with the iPad because they were easy to transport, mobile, and easy to use. Participants connected their motivation to learn to a variety of different aspects including preference over other devices, completing assignments, and easier access. Over half of the participants reported positive impacts of the iPad on their motivation in comparison to a traditional laptop. Dirks wrote, “Before, most of my work could be done on my laptop…However, I am much more inclined to take my iPad with me to my classes compared to my laptop” (JR 2). The main reason for this was that the iPad is “smaller and lighter making it easier to take to all my classes” (JR 2). Dirks’ motivation to learn was positively impacted because he was more likely to bring a device to class.

Participants also reported the iPads as being very user friendly and easy to access. James said, “The iPad makes it easy to access documents or easy online assignments. It is quicker to get on the Internet and do small assignments rather than using my laptop” (JR 2). This response
directly ties into the mobility and transportability issue addressed above. James reported again in journal response three about the easy access of the iPad, “The iPad is so easy to open and access things through apps that it really encourages me to do an assignment because it is less of a hassle” (JR 3). This last statement explicitly shows the relationship between easy access and an increased willingness, or motivation, to learn.

The classroom observations provided confirming data as well. In terms of the classroom observation, there was one example that embodied transportability and mobility extremely well. In one of the early observations, students were broken up into groups of about five. They were all required to read a selection and take notes. In this particular class there were four participants from my study and they were all in separate groups. Three of the participants took notes on their iPads, while the other took notes by hand. When it came time to share with the group, the three-iPad users simply passed their iPads around the group to allow students to read what they had written down. Users with laptops did not employ similar note sharing techniques (CO 2/26/13). Therefore, the iPads may have been more convenient and easier to share with the group because of their size and weight, and thus their transportability and mobility.

**Novel and fun.** The iPads were new to nearly all eight participants in the study. Therefore, most participants were getting their first experiences with a tablet in a classroom environment. As with any new device or toy, there is a certain novelty, and the iPad was no different. Siegfried related an increase in his motivation because of the organizing aspects of the iPad writing, “I have noticed an overall jump in my motivation to be more studious in class as it has made keeping class materials and taking notes…more fun” (JR 1). He then went on to write that he enjoyed taking notes on his iPad more than just by hand because the process is “more involved and fun” (JR 2). Some participants also reported in their matrix fill-ins that the iPad
was fun in terms of recreational use as well. Siegfried wrote, “This iPad can’t be all work and no play! Might as well explore the recreational options as well!” (MFI 1). Maggie downloaded the newest Sims Free app because it was “a fun iPad version of the Sims” (MFI 4). Several participants downloaded streaming music apps as well (MFI 1-5). By downloading these apps, participants showed that they had a continued interest in using the device on a daily basis, which ultimately means they were using them in the classroom as well.

Francis was one of the few participants whose perceived impact of the iPad on his motivation to learn stayed constant throughout the study. He supported the key theme of the iPads being novel and fun saying, “the iPad is simply a lot of fun to play around on” (JR 2), but these feelings were not all encompassing of his feelings towards the end of the study. He ended by reporting that, “When I first got it [the iPad] I was very interested in note taking and typing on it in my classes. After I had gotten used to having it I found myself surfing through apps on it instead of taking notes. I was constantly having to change my ways of taking notes to keep myself from getting distracted” (JR 5). Francis summed up what other participants reported as well: problems with distractions caused by the iPad’s ubiquity.

**Problems with ubiquity.** Students related getting off task as a decrease in their motivation to learn and therefore saw the iPad as having a mixed impact. Therefore, it seems like students had issues staying on track both in and outside the classroom. Not all participants reported positive impacts at the end of the study. Many blamed this on the ubiquitous nature of the iPad. All of the participants who reported a negative impact claimed that the iPad was distracting because it had so many possible uses. They were distracted during class, when they should have been taking notes. Instead they surfed the Internet, spent time on social media apps, or played games. Francis wrote, “After I had gotten used to having it, I found myself surfing
through apps on it instead of taking notes. I was constantly having to change my ways of taking notes to keep myself from getting distracted” (JR 5). He also added in journal response two that “I find myself doing homework one minute, but then the next I am surfing the Internet looking at fantasy hockey, ESPN, or random websites” (JR 2). Francis reported that the iPad’s ubiquity was a distraction and therefore impacted his motivation to learn in a negative way.

Richard was also one of the participants who reported mixed results in the final journal prompt regarding the impact of the iPad on their motivation to learn. Along with Richard, in response to the final journal prompt (JR 5), there were nearly as many negative impacts as positive impacts reported, and an increase in little to no impacts reported. This response was the most varied compared to the framework categories of organization and cognitive skills. Richard, who maintained throughout the entire study that the iPad both helped and hindered his motivation to learn, provided some insight as to his mixed results. His final journal response said, “I think having a device is beneficial [to motivation], but can be bad too. It is positive because it makes note-taking easy…but can be bad because there is a distraction factor” (JR 5). Richard found that the iPad was not impacting his motivation to learn because of its ubiquitous nature, especially inside the classroom.

The matrix fill-ins confirmed that participants were using the iPad for other purposes besides purely education both in and outside the classroom. As established, the iPads were administered to students with pre-loaded educational apps. Therefore, the majority of apps that students downloaded over the 10-week study were recreational. In all, students reported downloading 24 apps for recreational purposes over the 10-weeks of the study (MFI 1-5). Please reference Appendix F, which lists the apps reportedly used by participants throughout the study and their perceived impact (Positive, Negative, or Little/No Impact) based on framework
category (Motivation, Cognitive Skills, and/or Organization). These ranged from Facebook to ESPN to a mobile banking app (See Appendix E). Students also reported spending several hours a week on recreational apps, both in and outside the classroom.

During the last two observations I witnessed several students using their iPads for things unrelated to classroom activities. I saw students using recreational apps every single classroom observation that I completed, ranging from buying NHL hockey tickets online (CO 2/12/13) to the biggest culprits of Twitter and Facebook (CO 2/26/13) to completing an assignment due later in the day (CO 3/26/13). Most of the time students would access these apps during transition or downtime, but there were several instances where students would use them during instructional time as well (3/12/13 & 3/26/13). Therefore there were examples of participants using their iPads during transition, down, and instructional time in manners not appropriate to the classroom activities.

In summation, the overall impact of the iPad on students’ motivation to learn was mixed and varied. Participants reported that the iPad had positive impacts, negative impacts, little to none, or a combination of all three. Their reports of effects on motivation changed over the course of the study, with participants attributing their decline in motivation to the non-educational distractions afforded by the iPad, both in and outside the classroom.

**Conclusion**

As shown in Chapter Four, participants reported that iPads had significant positive impacts on their organization and cognitive skills and mixed impacts on their motivation to learn. Therefore, the study produced overall positive impacts in two of the three framework categories. Multiple emergent key themes showed that participants enjoyed apps that made it easy to bundle all classroom materials and the mobile and ubiquitous natures of the iPads, especially when it
came to transporting the devices and using them in class. Students reported and demonstrated a plethora of ways that the iPad could be used and its purported impacts, but unfortunately not all of them fit in a certain key theme. The ubiquitous nature of the iPad had a mixed impact on some participants’ motivation to learn because they reported being frequently distracted both in and outside of class by the countless possibilities of the iPad. I discuss these linkages and their implications further in Chapter Five.
CHAPTER FIVE: DISCUSSION AND IMPLICATIONS

Introduction

This study showed that college students’ perceived numerous and primarily positive impacts of iPads on their cognitive skills, motivation, and organization. In this chapter, I will discuss possible explanations for linkages I observed across the framework categories and the data sources from which they emerged, one of which is questioning the impacts of apps versus the iPad itself and other of which is the mixed findings on motivation to learn. I will then highlight the implications of the research and questions that still remain. The implications section will focus on professors/teachers, technology coordinators, and further research.

Discussion

The study found that participants reported a clear positive impact on their organization and cognitive skills because of the iPad, with mixed impacts on their motivation. This meant that out of the three framework categories, the iPad positively impacted participants’ cognitive skills and organization, while only mixed results on their motivation. In terms of organization, participants enjoyed being able to take notes and keep all of their class materials bundled in one location. They also reported that they were more likely to use their iPad (than a laptop or at all) because it was mobile, transportable, and easy to use. Some participants even synced their iPads with their other Apple devices so that they could have their materials with them at their convenience, while others used alerts and reminder functions on the iPad in order to remind themselves of upcoming deadlines.

Participants also reported positive impacts in regards to their cognitive skills. Throughout the study, I both observed and asked participants to relate the iPad’s impact on six specific cognitive skills: attention, memory, auditory processing, visual processing, processing speed, and
logic and reasoning. Out of the six skills, participants reported various positive impacts in every one. Some participants saw increases in their processing speed, because they had such a versatile tool at their disposal to use during class. Others saw positive impacts on their logic and reasoning, because they could use the iPad to enhance lectures by looking up relevant information in a timely way. A few participants reported that they remembered information better due to the way they were typing their notes on the iPad. All of these examples contribute to the positive impact that the iPad had on participants’ cognitive skills development.

Finally, participants reported mixed impacts of the iPad on their motivation to learn. Early in the study, a number of participants reported that the iPad was having a positive impact on their motivation to learn, because the tablets were new and fun to use. As the study progressed, several students began attributing not being able to stay on task due to the iPad as demotivating. Even though some participants reported that the ubiquitous nature of the iPad was a benefit in terms of enhancing class lectures, they also attributed it as having a negative impact on their motivation to learn. They specifically reported that the iPad could get distracting and take them off task when they should be doing homework, studying, or paying attention in class. Throughout the study, the majority of time that participants got off task was during down or transitional time. These were the times when no class instruction was going on, which allowed participants a free minute or two. There were a few isolated incidents of participants blatantly misusing their iPad during instructional time, but these were far outnumbered by participants using their iPads during transition or down time.

As evidenced, participants reported that these positive impacts occurred because of the iPad and their interaction with it on a 24/7 basis. These results were different from those reported by Li and Pow (2011), who found “students’ perceived impact of technology on enhancing their
learning motivation, developing their cognitive skills… and planning for their learning in their
daily learning activities was significantly higher in the Tablet-PC classes” (p. 325). Li and Pow
(2011) reported increases in all three of framework categories, while I only found consistent
positive impacts in participants’ cognitive skills and organization. One key difference between Li
and Pow’s (2011) study and mine was that students did not use the same tablets, which could
have accounted for some of the varying opinions. Also, Li and Pow’s (2011) study infused
quantitative research methods, while my study was strictly qualitative.

**iOS and PC devices.** One could argue that it was the apps themselves and not the iPad
that truly made the difference, and that the iPad only provided the gateway to the apps that
students used. I would disagree with this argument for several reasons. Apps are designed to
work on iOS (Apple) software, PC software (Windows or Android), or be compatible with both
systems. It makes sense to argue that the iPad itself positively impacted participants’ cognitive
skills and organization because of the IOS-specific apps that it exclusively offered students and
that other tablets cannot provide. For example, several of the apps that students used to take
notes and bundle class materials are only available on the iPad. These included Complete Class
Organizer, iNotes, Keynote, and iBooks. Participants reported and classroom observations
confirmed that these apps were crucial in improving their organization, cognitive skills, and
motivation to learn. Interestingly, many of the recreational apps that students reported using are
compatible on both iOS and PC operating systems. Some of these apps included: Pandora,
Spotify, ESPN, Angry Birds, NHL Gamecenter, and Ticketmaster. Had the students used a
different brand of tablet, they may not have reported similar impacts because of the different
operating systems and not being able to use specific apps. Additionally, the iPad may have also
impacted participants’ original motivation to learn, because Apple has sold the most tablets to
date and are therefore very recognizable to students (Ogg, 2013). Common sense would argue that students want to fit in and have access to popular technology, and thus be motivated by the cache of the iPad.

Many participants also liked the fact that the iPad was smaller, mobile, and easy to transport. To be fair, all of these attributes can be found in newer-generation tablets and even some newer mobile devices, but it may have benefited participants that they were all using the same device. This could have impacted their ability to collaborate with their peers, share notes or class materials, and/or reduce technology issues during class time. All tablets can connect to the Internet, take a form of notes, allow for game playing, stream music, and so on, but the true difference comes with the variance of apps afforded by specific operating systems. With that being said, the iPad would seem to work well in an educational environment because of the aforementioned desirable characteristics and specific educational apps that it offers.

**Staying on task.** Participants related not being able to stay on task due to the ubiquitous nature of the iPad as having a negative impact on their motivation to learn. Participants reported this off-task behavior both in the classroom and in the home environment. By staying on task in the classroom, I mean staying focused on the classroom activities/objectives and not using the iPad in a way that was detrimental to getting tasks accomplished or distracting fellow classmates. It is important to note when students were getting off task during class because of the iPad. During my observations, the majority of instances of students getting off task occurred during downtime or transition time. Downtime refers to time that students had because the teacher was not instructing. This ranged from the teacher needing to step out of the room, waiting for other students to finish an assignment or assessment, or when a teacher was working with an individual.
Transition time occurred when teachers handed out worksheets (rare because of the green environment), the class moved from one activity to another, or any free moments students had for a variety of reasons. During these instances, participants would usually check their Twitter feed, a sporting score, or their Facebook account. These checks usually lasted less than 30 seconds and participants rarely missed valuable class information or distracted their fellow classmates. These instances occurred much more frequently than examples of blatant misuse of the iPad to get off track during instructional time. Even though the cognitive skills journal prompts and portion of the classroom observation protocol specifically addressed the skill of “attention” or staying on task, students consistently reported that getting off task also related to their organization and motivation to learn, perhaps because of the distinction between in-class use and home use of the iPad.

Unexpectedly, because my classroom observations noticed few instances of blatant misuse in class, participants reported that they were unable to stay on task at times using their iPad and that it was directly effecting their motivation to learn and not their cognitive skills. One possible explanation for this was the difference in environments when using the iPad, specifically at home or in the classroom. In the classroom, there are fewer tasks that students can do than in a home environment. In other words, there are fewer things to distract a student in a traditional classroom than in a home environment. At home, a student can get distracted by chores, television, eating meals, sporting events or practice, working, and other tasks. In a classroom, students are forced to be in an environment where there are usually fewer opportunities for distractions or getting off task. That situation changes though with an iPad at their disposal. Suddenly students are exposed to the Internet or apps of their choosing with the click of a finger. They can play games or surf the web if they are uninterested in what is going on
in class, and usually can disguise the entire process by pretending to follow along with what the teacher is saying.

I propose that students may have related getting off task in the classroom as impacting their cognitive skills and motivation to learn because they should have been following along with the lesson. On the contrary, students in a home environment choose when they want to complete homework or other assignments to fit their schedule (which their motivation undoubtedly helps to decide), which effects if they stay on task or not. In other words, choosing when to do an assignment may impact a student’s motivation, while being forced to complete an assignment or in-class activity may impact their motivation, organization, and cognitive skills. In closing, the iPad encouraged participants in the beginning of the study to complete their assignments on a timely basis and increased their motivation to learn because of its novelty, but as the study went on and participants got accustomed to the device, their motivation to complete assignments both in and outside the classroom and stay on task appeared to decrease.

Implications

The implications section is set up to address four specific categories: myself as a teacher, professors/teachers, technology coordinators, and future research. I have also infused questions that still remain into each category as appropriate.

For the researcher as teacher. Although I have limited experience in a classroom, I have spent the majority of the past two years in an educational environment, with the past year researching the impacts of technology in the classroom. Based on my study alone, there are several reasons why I would integrate iPads into my classroom within a one-to-one deployment program. First, students overwhelmingly reported a positive impact on their organization and cognitive skills. These benefits included being able to bundle class materials, set alerts and
reminders for due dates and assignments, remember information and notes more efficiently, and an increase in processing speed. As many educators know, these impacts, especially relating to student organization, are extremely important in high school and secondary environments, and cannot be overlooked in my opinion.

Second, there are several ways to address the issue of students getting off task while using the iPads. As previously reported, the majority of instances when students got off task in the classroom by using their iPads was during transition and downtime; however there were also instances of blatant disregard for what was going on in the classroom when students used the iPads during purely instructional time. In order to minimize the opportunities that students can get off task, I would start by making sure that my lessons and classroom activities are engaging and interactive, similar to those taught by Dr. Benson. By making the daily classes student-centered, it will help to reduce the time that students get off task. This is by no means a cure all, rather a starting point because any teacher knows this alone with not eradicate the problem. One policy that I employ in my classroom is that for every 20 minutes of class time students will receive one minute to check anything they want on their mobile device. This policy would only be valid if students have respect for you and for the classroom policies. Also, the teacher could create a student technology contract that clearly lays out the details and penalties for the policy so that students are crystal clear about it. Obviously if students are not following the rules of the contract then students will not be awarded its free minute and class will go on without it. This minute is plenty of time for students to check a sports score, send a quick email, or check one of their social media websites and serves as a great way to break up class, especially if class periods are longer. The break also might help reduce the temptation that students might face to get off task. They could realize that if they are caught then they will ruin the privilege for their entire
class. I cannot imagine that many students would enjoy being that person who ruined an opportunity for the entire class. This free minute might also allow students to focus more attentively on what is going on in class instead of constantly wondering about an issue going on outside of class. For example, say you have a student who is really concerned about an email that he or she is expecting. Instead of mentally removing oneself from the class activities because of worrying over the email, the student might be able to focus more on the class because he or she knows that the one free minute is approaching. Then, when the minute arrives, they can easily check their email and respond to it appropriately. If followed accurately by students, it may do wonders for keeping them on track.

Third, it does not really bother me if students are using their iPads for something else during transition or down time. Some teachers may see it as distracting and disrespectful, but I see it more as managing time wisely and multitasking. In a society where the expectations for students keeps increasing, how can we berate them for not wanting to take advantage of any free minute that they have? I am not arguing that students should be able to use their iPads at any time they desire in order to multitask, rather that if they have a free minute when nothing is going on in class and want to check their email or work on a homework assignment, then by all means they should be able to.

Device-friendly policies like these easily can be adapted to meet the needs of the individual classroom. Some classes may need a shorter interval between free minutes, while others may need longer intervals. The technology contract would help to ensure that students and teachers are on the same page in terms of when technology may be used. Some classes may need a two minute interval for free time, especially in longer classes or those near lunch (for high schools) or in the morning (secondary education). Herein lies the importance of the teacher to
student relationship and rapport. An effective teacher in a democratic classroom should be able to devise a plan that best suits the context of the classroom in order to get the most educational benefit out of the iPads while keeping students on task as much as possible. In closing, an important issue to keep in mind is that students do not need an iPad to get distracted or off-task. Maintaining high levels of student motivation is the cherished “Holy Grail” of any classroom teacher, off-task behavior being as ubiquitous as the iPad itself but far less desirable. Beginning with the assumption that students will be distracted no matter what is going on in class, if the iPads at least hold promise for less distraction, this is an improvement to daily classroom environment. Introducing iPads in the classroom needn’t negatively impact the learning environment any further as long as rules and policies are agreed upon and consistently implemented.

**Professors/teachers.** First, it is important to address the impacts of this study upon professors/teachers. Even though this study has shown some of the positive impacts iPads can have on students, it is possible that some teachers will still be hesitant to implement a BYOD policy or fully engage in a one-to-one deployment program. Teachers have a right to be concerned about BYOD as distraction to students, but they would also have to consider the uniform positive impacts on student organization and cognitive skills shown in this study. In other words, many teachers are left to decide if the pros outweigh the cons. Can teachers sacrifice or justify students occasionally getting off task as long as they are seeing an increase in cognitive and organization skills? This study has shown that students perceived a positive impact in their organization and cognitive skills because of the iPad, and mixed, but still somewhat positive, impacts on student motivation.
Another aspect to consider is that in many cases participants in my study got off task when they were not engaged or during down and transition times. Their actions had little impact on the class itself and students would have been sitting idle as it is. These actions usually take less than thirty seconds and can easily be accomplished during down and transition times. Being able to interact with their Facebook or Twitter accounts, and not with their peers, may be a desirable outcome for some teachers, especially during testing situations. This is not to argue that students should have free reign and be able to access recreational apps at any time, rather it may benefit teachers to establish rules (as noted above) that allow students to use said apps during transition and down times as long as they do not abuse the policy and carry such actions into teaching and learning time. Basically, integration of one-to-one technology should come down to the personal preferences of individual teachers and whether or not they can manage a classroom with dozens of ubiquitous tools that can take students off task in mere seconds.

**Technology coordinators.** Second, there are a few implications for technology coordinators at the high school and college levels specifically. Technology coordinators are usually those that make recommendations on how technology should be integrated and incorporated into a classroom, school, or even district. That is a lot of responsibility for one person or a few people that requires research, reflection, and foresight. Not only do the decisions of the technology coordinators impact students educationally, they also impact the school district financially. With that being said, it should be the goal of technology coordinators to integrate the most effective type of technology within their budget. Some districts may be able to provide each student with the most expensive tablet or laptop available, while others may only be able to provide a set of tablets or laptops for the entire school. As shown earlier in the Discussion section, several of the positive actions and activities completed on the iPads can be replicated on
other, less expensive pieces of technology. Newer iPods can do nearly everything that an iPad can do. Other tablets provide similar capabilities to the iPad including access to Wi-Fi, note taking capabilities, annotating documents, and so on. The only foreseeable issue that would arise is that some apps are only available on Apple operating systems, which leads back to the responsibility of the technology coordinator. Not only do they have to determine if a one-to-one deployment program is beneficial in an educational environment; they also have to identify which mobile device is most appropriate to the culture, school district, and the students. It is my hope that this study can help technology coordinators in their quest.

**Future research.** Finally, there are implications for future research. As addressed in Chapter II, iPads are relatively new to the general public and even newer inside a classroom. Therefore, many educators are still waiting to determine all the impacts iPads are going to have on a student’s education. It may be years until we can truly grasp the entire spectrum of the educational impacts that iPads are having on students. My study represents a mere iota of data concerning the iPad and education. It is nowhere near as comprehensive or expansive as some recent findings (Goodwin, 2012), but it still adds valuable information to the research. There are still many opportunities for future research that could focus on off-task behaviors and learning outcomes in BYOD and regular classrooms, the impact of a technology student contract, and app research and future learning.

A large portion for future research could look into the impacts of off-task behaviors in BYOD and regular classrooms, especially in terms of student learning outcomes. In other words, do students get off task in class with an iPad as much as they would without one? This relationship would be worth examining because it would either add to the literature surrounding students getting off task more because of the mobile device or refute it. It may also be interesting
to determine if a certain device impacts how much and how often students are getting off task. This type of study would be beneficial because it would investigate the relationship between students getting off task and its impact on their learning.

Another possibility for future research relates to the technology student contract I recommended. I proposed that teachers award students with a free minute on their iPads for every 20 minutes of good behavior. In order to make the policies and penalties clear, a technology student contract would help to ensure all members are on the same page. The purpose of this policy would be to possibly reduce student temptation to get off task at the wrong times and allow students a quick email check or social network update at an appropriate time. This policy would theoretically also help to reduce students distracting their peers because they would all be “off task” at the same time instead of one or two students during instructional time. Future research could benefit from studying this policy to see its effectiveness in a classroom and how it relates to students using mobile devices for the correct purposes. In other words, can students benefit (i.e., stay focused and on task more efficiently) from taking short (one to two minute) breaks to use their mobile devices for every 20 to 30 minutes of instructional time? This type of study would further shed light on how to increase students’ focus on class content, while decreasing the possibility of getting off task because of the ubiquitous natures of mobile devices.

One final area for future research concerns the “app effect”—a deeper investigation of educational apps that students could use to further increase their overall educational experience. More specifically, what apps are students using to enhance their education both in and outside the classroom? It is important to determine what apps students are using and the impacts that they are having on students’ performance and their cognitive skills. Also of interest would be a
breakdown of the apps based on what operating system students are using. In other words, do students use apps that iOS based, PC based, or a combination of both to enhance their education?

In the end, participants answered my research question of “What are college students’ perceptions of how iPads impact their cognitive skills, motivation, and organization?” with an abundance of positive impacts, especially when it came to their cognitive skills and organization. There were mixed results on how the iPad impacted their motivation. My results were similar to those found in Li and Pow’s (2011) study and I would have to agree with Goodwin (2012) and Harmon (2010) about advocating for the use of iPads in the classroom. In today’s classroom teachers strive to make their content as up to date as possible, so why should they not apply this to their technology as well, especially when literature supports new technology. In closing, the U.S. Department of Education (2010) believes that using real-world tools, such as the iPad, in the classroom prepares students better to become active members in an internally competitive workforce, which is ultimately a goal of education. In the end, it is up to the teacher to be proactive and take the challenge head on of incorporating mobile devices in the classroom, while researchers determine the specific outcomes and effects of said devices (Banister, 2010).
REFERENCES


Erickson, F. (1985). *Qualitative methods in research on teaching (pp. 119-62)*. Institute for Research and on Teaching.


Fitzgerald, T. J. (2004). The Tablet PC takes its place in the classroom. New York Times,


McLoughlin, C., & Krakowski, K. (2001). Technological tools for visual thinking:


APPENDIX A.

STUDENT RECRUITMENT EMAIL
To Students in Dr. Benson’s EDTL 2760 Class,

Due to your placement in Dr. Benson’s class, you are eligible to participate in a research study being conducted by her Graduate Assistant, Mr. Chris Dyer. The study will take place during the Spring 2013 semester and will seek to understand the perceived impact of apps upon your motivation, organization, and performance.

In order for this to occur, The Center of Excellence for 21st Century Educator Preparation has purchased a number of iPads for student use. The iPads will be deployed on a one to one basis, meaning that you will be allowed to take them home, use them in other classes, and customize them with apps of your choosing. There are 58 students enrolled in EDTL 2760 for the spring, which means that not everyone will be able to participate in this study. In order to ensure consistency and fairness, if more than 30 students are interested in participating, I will conduct a lottery and pick names from a hat one at a time until I have thirty students to participate.

The amount of additional work from participating in this study will amount to no more than 30 minutes per week. Students will be responsible for participating in online group discussions posted on Google Docs every other week regarding app usage. In between these weeks, students will be responsible for one short journal response to prompts based on the information provided in the previous week’s online group discussion. I will also observe you in class on a daily basis.

If you are interested in participating in this study please take a look at the informed consent form that I have attached to this email. It may answer any questions your have at this time. You will receive a physical copy of the informed consent form in class that you must sign and return in order to participate.

Questions regarding the study can be sent to Mr. Chris Dyer at edyer@bgsu.edu.

I look forward to working with you.

Mr. Chris Dyer
Graduate Assistant
APPENDIX B.

INFORMED CONSENT FORM
Exchanging College Students’ Perceptions of App Usage on Motivation, Organization, and Cognitive Skills.

Informed Consent

I have been informed that I have the opportunity to participate in a study during my EDTL 2760 class, the purpose of which is to better understand college students’ perceptions of the impacts apps have on their motivation, organization, and cognitive skills. The results of this survey will benefit professors, teachers, administrators, and technology educators by establishing useful information that they can use in making decisions about the future of mobile devices and apps in the classroom. I have been informed that participants must be at least 18 years of age to participate in this study. I have been informed that Mr. Dyer will be collecting information from participants for 15 weeks this semester.

I have been informed that, as a participant in the study, I would be asked to provide weekly feedback to the researcher in the form of either a journal prompt or an online group discussion of app use on Google Docs. I have been informed that Dr. Patterson will not have access to this any of the information I provide for the study until grades are turned in, and that the information that I provide will have no effect on my grade in EDTL 2760. I have been informed that only Mr. Dyer will have access to the information I provide.

I have been informed that I am allowed to use the iPad in both recreational and educational settings. I have been informed that I am allowed to take the iPad home and should use the iPad in class activities, for studying, and any other educational processes as appropriate. I have also been informed that the researcher will be conducting regular classroom observations. I have been informed that my participation in this study should take no longer than 30 minutes a week and no longer than 450 minutes (7.5 hours) over the course of the entire semester.

I have been informed that all information I provide will be held in the strictest confidentiality, that no names will be included (only pseudonyms) in data analysis and reporting, and that no one aside from the researcher will handle the data. The data will be stored on a secure, password-protected server in the technology laboratory of the College of Education at BGSU. I have been informed that the risks of this study are no greater than that experienced in daily life.

I have been informed that this project will directly benefit students in that it provides them with 21st century technology. I have been informed that this technology could improve my organization, cognitive, and motivation skills.
I have been informed that the iPad I receive from Bowling Green State University is on loan to me for the semester. I have been informed that it is due back to Mr. Dyer on the last class on May 2nd, 2013. I have been informed that if I fail to participate in three (3) or more successive weeks then I will be removed from the research study and will be required to return the iPad to Mr. Dyer and Bowling Green State University.

This study has been described to me, and I have had the opportunity to ask questions about it. I have been informed that participation is voluntary, and that if I choose not to participate, I can withdraw at any time, and that there are no anticipated risks to my participation. I have been informed that should I choose to withdraw from the study, I will have to return my iPad to the instructor. I have been informed that my decision to participate or not participate in the research will have no impact on my relationship to Bowling Green State University or the grade I receive in my EDTL 2760 class.

I have been informed that if I have any questions about this study, I can contact Mr. Chris Dyer at (419) 372-9379, or by email at cdyer@bgsu.edu. I can also contact Mr. Dyer’s advisor, Dr. Nancy Patterson with any questions about this study at (419) 372-9379, or by email at ncpatte@bgsu.edu. I can also contact the chair at the Human Subjects Review Board of Bowling Green State University at (419) 372-7716 or by email at hsrp@bgsu.edu, if any problems arise during this study or questions arise regarding participant rights.

Signature: ______________________________________ Date: __________

Print Name: ______________________________________
APPENDIX C.

OBSERVATION PROTOCOL
Observation Protocol

Date:

Classroom Activities:

<table>
<thead>
<tr>
<th>Use in Class</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cognitive Skills</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivation</td>
<td>●</td>
</tr>
<tr>
<td>-----------</td>
<td>----</td>
</tr>
<tr>
<td>Organization</td>
<td>●</td>
</tr>
<tr>
<td>Other</td>
<td>●</td>
</tr>
</tbody>
</table>
APPENDIX D.

DATES AND COMPLETION RATES FOR JR’S

AND MFI’S
## Appendix D

### Dates and Completion Rates for Journal Responses and Matrix Fill-ins

<table>
<thead>
<tr>
<th>Type</th>
<th>Suggested Due Date&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Completion Rate&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matrix Fill-in 1</td>
<td>2/2/13</td>
<td>8/9 (89%)</td>
</tr>
<tr>
<td>Journal Response 1</td>
<td>2/9/13</td>
<td>9/9 (100%)</td>
</tr>
<tr>
<td>Matrix Fill-in 2</td>
<td>2/16/13</td>
<td>7/9 (78%)</td>
</tr>
<tr>
<td>Journal Response 2</td>
<td>2/23/13</td>
<td>8/9 (89%)</td>
</tr>
<tr>
<td>Matrix Fill-in 3</td>
<td>3/2/13</td>
<td>6/9 (67%)</td>
</tr>
<tr>
<td>Journal Response 3</td>
<td>3/16/13&lt;sup&gt;c&lt;/sup&gt;</td>
<td>8/9 (89%)</td>
</tr>
<tr>
<td>Matrix Fill-in 4</td>
<td>3/23/16</td>
<td>7/9 (78%)</td>
</tr>
<tr>
<td>Journal Response 4</td>
<td>3/30/13</td>
<td>8/9 (89%)</td>
</tr>
<tr>
<td>Matrix Fill-in 5</td>
<td>4/6/13</td>
<td>5/9 (56%)</td>
</tr>
<tr>
<td>Journal Response 5</td>
<td>4/14/13</td>
<td>7/9 (78%)</td>
</tr>
</tbody>
</table>

<sup>a</sup>Students were allowed to complete tasks later than the suggested due dates.

<sup>b</sup>Completion rates were based on participation once the study ended.

<sup>c</sup>This deadline was pushed back a week due to spring break for the participants.
APPENDIX E.

APPS DOWNLOADED FOR RECREATIONAL USE TABLE
### APPENDIX E

**Apps Downloaded for Recreational Purposes Only**

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Apps</th>
<th>Confirmed by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational</td>
<td>Jango, Twitter, Facebook, Gameinformer, Netflix, ESPN, Pandora, Clash of Clans, Solitaire, Temple Run, Sims Free, Angry Birds, NHL Gamecenter, NBC, Youtube, PGA Tour, 5/3 Banking, Crackle, March Madness, Flipboard, Spotify, Stumble Upon</td>
<td>Journal Response, Matrix Fill-in, or Observation JR, MFI, O</td>
</tr>
</tbody>
</table>
APPENDIX F.

APPS USED/DOWNLOADED PER FRAMEWORK CATEGORY
## APPENDIX F

*Apps Used/Downloaded per Framework Category*

<table>
<thead>
<tr>
<th>Framework Category</th>
<th>Apps That Reported Positive Impact</th>
<th>Apps That Reported Negative Impact</th>
<th>Apps That Reported Little/No Impact</th>
<th>Confirmed By: Journal Response, Matrix Fill-in, or Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation</td>
<td>iBooks</td>
<td>NHL Fantasy Hockey, ESPN Notes, Complete Class Organizer, Twitter</td>
<td>-</td>
<td>JR, MFI, O</td>
</tr>
<tr>
<td>Organization</td>
<td>Complete Class Organizer, Notes, iCal, Adobe Reader, Safari, Keynote, Word, Acrobat, iBooks, Google Drive, Evernote</td>
<td>-</td>
<td>-</td>
<td>JR, MFI, O</td>
</tr>
<tr>
<td>Cognitive Skills</td>
<td>iBooks, Adobe Reader, Cliff Notes, PBN, French Dictionary, Complete Class Organizer</td>
<td>-</td>
<td>-</td>
<td>JR, MFI, O</td>
</tr>
</tbody>
</table>