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An Inquiry into How iPads are Used in Classrooms

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DISSERTATION APPROVAL

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This mixed method study combined the paradigms of quantitative and qualitative research to examine how iPads are used from teachers' perspectives. In the first phase, the researcher collected and analyzed the quantitative data from classroom observations. The second phase consisted of collecting and analyzing the qualitative data to help explain, or elaborate on the quantitative results in the first phase. The researcher utilized a convenient sample of 21 elementary and secondary working teachers who had been using iPads in their classroom at their school in southern Illinois.

The findings showed that the majority of teachers did not have any iPad training. They all had to resort to different sources such as self-learning and colleagues' support to learn more about how to integrate the iPad and useful apps into their teaching. There were three practices of iPad use in the classroom. The first practice was that the teachers delivered each iPad to each learner. The second practice was similar to the first practice but the teacher checked out only five or six iPads and distributed each iPad to each group in the classroom. The third practice was that only the teacher used the iPad to deliver the lesson in the classroom. In all cases, the teachers combined the iPad with other technology devices to show the content to the students on the project screen. Students who were taught by the teachers with the iPad mainly worked either individually or in the whole class. In addition, the most common roles the teachers took were lecturing and facilitating when they integrated the iPad into their teaching. The most common level of activities or in-class assignments was "*knowledge representation*" equivalent of

"*comprehension*" level on the Bloom's Taxonomy. Regarding the frequency of iPad use in the classroom, while teachers at public schools sometime used the iPad, their peers at a private school frequently used it. The result also indicated that, according to the teachers, the use of the iPad in the classroom was somewhat useful (2.75 out of 5.00). The average time a teacher spent preparing an iPad-integrated lesson depended on whether he or she had any formal training in iPad use or not. Finally, the teachers observed differences in their students' motivation and/or behaviors when they were learning with the iPad. They were unsure about whether the use of the iPad had any impact on their students' achievements because there were many variables that could affect their achievements. However, they agreed that the quality of their students' tasks or assignments on the day the iPad was used were better than those on the day the iPad was not used.

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CHAPTER ONE

INTRODUCTION

Three events motivated me to explore the use of the iPad in educational settings as a research topic. First, I recently read an article in the Chronicle of Higher Education about a Chinese professor asking his students to have an iPad for his class with a famous quotation *"If you cannot earn merely 4,000 yuan (U.S. $618.40) in the two-month summer vacation (to buy an iPad), you are not suitable to learn finance or be my students.*" Second, my son always asked us to take him to Best Buy or Walmart for him to play with the iPad. I noticed that he learned a lot of skills from playing education-oriented games there. Seeing him so passionate about this gadget, we decided to buy him one. Third, I went to the SIUC Book Store at the Student Center to buy one because it had a 10% discount on Apple's devices for educational purposes. However, it turned out that the iPad was not categorized as a device for education. It is interesting that, on the one hand, educators and students or children like my son considered it as an educational tool to enhance their teaching and learning experiences. On the other hand, its own inventor, Apple Corporation, viewed it merely as an entertainment device. All these things made me more curious about this gadget, and are reasons why I selected this topic for my dissertation.

This chapter is composed of five sections and provides general information about the significance of the research topic. The first section describes the statement of the problem. The second section identifies the research questions. The third section presents the importance of the study. The fourth section examines the study's limitations. Finally, the chapter ends with a brief overview of iPad descriptions and features.

Statement of the Problem

Technological innovations have always excited educators and the use of technology has always been a trend in the American education system (Baker & O'Neil, 2003; Fletcher, 2003) because, as described by Harris (2005), technology integration into classrooms is a "Trojan horse" for educational reform. This metaphor of the Trojan horse implies that embedded with new technology integration is a catalyst that will eventually bring about radical changes in education. In addition, the inclusion of technology into school is also expected to prepare young learners in a wide array of technologies. They can become dynamic and informed "webizens" who are able to critically make judgments on information provided by media, books and journals (Ng, 2006), and to shape their lives as well as affect other people's lives in a positive way. With all these assumptions and expectations, policy makers and educational administrators since the mid 1980s have put technology as one of the top priorities in American educational policies. It is estimated that there are 13 official reports, policy and research documents addressing various roles of technology in K-12 education from congressional and presidential commissions, the National Research Council, the Education Commission of the States, and the National Association of State Boards of Education.

It is probably due to this technological enthusiasm that there has been an enormous increase in the number of computers in K-12 classrooms since the mid 1990s while in the 1980s, very few classrooms had computers for student use (Barron, Harmes, & Kemker, 2006). According to the National Center for Education Statistics (2003), in 1995 there were on average approximately 72 computers for instructional purposes in each American school. The number of computers reached 189 in each school by 2008. If we consider the late 1970s as a starting point for the launch of commercial personal computers, it took nearly three decades for personal

computers to become broadly introduced into the K-12 educational setting and widely used by 91% of American students in these classrooms (National Center for Education Statistics, 2003).

Conversely, since the debut of its first generation in 2010, Apple's tablet, iPad, has been introduced into K-12 classrooms more widely and speedily than any other previous computing device such as desktops or laptops. It is even predicted that this gadget will soon replace not only traditional computers such as desktops and laptops but also textbooks in classrooms. So far, there has not been any official report or statistics about the number of iPads in school across the United States. However, according to Hu (2011), an escalating number of schools around the country were replacing desktops and textbooks with iPads, and utilizing this Apple's latest device as an overall learning tool. For example, the New York City public schools spent $1.3 million purchasing more than 2,000 iPads; more than 200 Chicago public schools applied for 23 district-financed iPad grants totaling $450,000; The Virginia Department of Education oversaw a $150,000 iPad initiative which replaced history and Advanced Placement biology textbooks at 11 schools. In addition, the number of approximately 5,400 educational applications designed specifically for the iPad also indicated the pervasiveness of this gadget in education. It seems that across the nation, there was a rush to include this latest technological device in schools.

It is interesting to observe that while millions or even billions of dollars have been invested into technology integration programs in education (McKenzie, 1999), there are insufficient findings in the literature to confirm that technology integration actually leads to better outcomes in education (Bolick, 2008, Hardin & Ziebarth, 2000). While debates about the effectiveness of desktops and laptops in classrooms continue, the rushed inclusion of iPads into classrooms without any study poses several questions. Firstly, why is it only the iPad but not other tablets with equivalent features and functions but at lower prices such as Motorola Xoom,

Samsung Galaxy Tab, Blackberry PlayBook and Dell streak? Is this really a well-rounded decision in the financial crises and recession of recent years? Secondly, is this inclusion a trend or fad in American education? Will the iPad soon be replaced with another new computing device in classrooms as the fate of desktops and laptops in the next few years? Thirdly, are teachers and students ready to have the iPads as a learning tool in their classrooms? What does this latest computing device contribute to the learners' outcomes? Since the inclusion of the iPad into classrooms is still new to educators and researchers, there has not been any published study to answer those questions. An initial study of the iPad's classroom use could make a contribution to the body of knowledge in the field of technology integration in K-12 education.

Research Questions

To that end, this study is designed to answer the following questions:

1. What types of training have the teachers experienced to prepare them to use iPads in the classrooms?
2. In what ways are iPads used in the classroom?
3. What are the attitudes and beliefs of the teachers about utilizing iPads in their teaching after a year of iPad use in their classroom?
4. Do the teachers perceive any differences in students' motivation, students' behaviors and/or students' achievements since beginning the use of iPads in the classroom?

Significance of the Study

The findings of this study will be among the first to address the issue of integrating the iPad as a learning tool into K-12 education. It is expected that the study will offer some insight so that policy makers, educational administrators, teachers and even parents can adopt the most

appropriate policies for introducing new technology into classrooms. In addition, being among the very first studies on the use of iPads in K-12 education, it is suggested that aspects of this study can offer some lessons to other school districts considering the introduction of iPads for their students. The findings of the study also will contribute to the body of knowledge in the field of technology integration into K-12 education that has not been fully explored by researchers.

Study Limitations

This study focused on elementary and secondary teachers' perceptions of and attitudes toward the use of iPads in their classroom. Factors that may affect the limitations of this study are 1) the small scale of the sample, 2) voluntary sample, 3) time constraint, 4) new concepts and 5) self-reporting. This study examines only several elementary and secondary working teachers' interpretation and implementation of iPads after they used them in their teaching. Therefore, the findings of the study are only representative of the perceptions and opinions of this small survey population.

In addition, the data collection use in this study consists of observations and interviews. Interviews are self-report measurement techniques designed to question people about themselves, their attitudes and behaviors (Creswell, 2003). These types of measurements can be potential sources of unreliable answers because respondents may over-report or under-report for a variety of reasons. They may be embarrassed to state their true response, or they may simply forget the true account.

An Overview of iPads

The iPad, a line of tablet computers, is designed, developed and marketed by Apple Inc. mainly as a platform for multimedia such as music, books, periodicals, movies, games, and web content. Its weight and size lies between those of contemporary smart phones and laptops.

More specifically, according to information provided by Apple Inc., the size and weight of a Wi-Fi iPad is as follows

- Height: 9.50 inches (241.2 mm)
- Width: 7.31 inches (185.7 mm)
- Depth: 0.34 inch (8.8 mm)
- Weight: 1.33 pounds (601 g)

Like the iPhone and iPod Touch, the iPad is controlled by a multi-touch display, and managed and synced by iTunes on a personal computer via a USB cable. There are two models of iPads. The first model only allows a Wi-Fi data connection to browse the Internet, load and stream media, and install software. Another model has both Wi-Fi and a 3G wireless data connection which can connect to HSPA or EV-DO data networks. Currently, Apple Inc. has just released its latest version of this tablet, iPad 2, which has two cameras in the back and front of the device.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter establishes a contextual framework for this study by incorporating relevant research that is fundamental sources for understanding the topics of this study. Specifically, it contains four sections: the debates on the effectiveness of technology integration in K-12 education, teachers' perceptions and attitudes toward technology integration in education, technology training for teachers, and factors that affect effective use of technology in school.

The Debate on the Effectiveness of Technology Integration in K-12 Education

After investing millions of dollars into education, both policymakers and the public want to know the role of technology in education. Wenglinsky (1998) asserted that the purpose of including technology into schools is to enhance learner academic performance and other educational outcomes, not to equip schools with state-of-the-art equipment for its own sake. Legislators, administrators, teachers, and parents expect to have concrete evidence on its effectiveness. Unfortunately, there is no consensus among researchers and educators on whether technology integration in school really makes any radical changes. Even some findings of the same study both confirm and reject the roles of technology in education.

The Case against Technology

According to Harris (2005), despite more than two decades of attempts, the expectation that technology will function as a “Trojan horse” for educational reform has occurred in only a minority of K-12 settings. Similarly, Bolick (2008) observed that there has been a void in the literature about how the integration of technology influences teaching and learning. Critics even argued that few of the studies that gave credit to technology in K-12 education met rigorous

empirical methodological standards or directly linked use of technology in the classroom with improved standardized test scores (Angrist & Lavy, 2002; Cuban, 2001). Many studies found no relationship between the use of technology in classroom and students' academic achievements. For example, in their study, Baker, Gearhart, and Herman (1994) evaluated the impact of interactive technologies of the project Apple Classrooms of Tomorrow (ACOT) on learning and teaching in schools in California, Minnesota, Ohio and Tennessee. The researchers concluded that there was no significant difference in standardized tests achieved by learners in schools with ACOT and those who did not have access to learning and teaching reforms implemented in ACOT schools. Sharing the similar result, Wenglinsky (1998) reported that students who used drill and practice technologies did not perform as well as those who did not use those technologies on the National Assessment of Educational Progress. In this study, the researcher examined the impact of simulation and higher order thinking technologies on mathematic achievements of learners at the fourth and eighth grade levels with a sample of 13,373 students at the fourth and eighth grade levels.

Many researchers provided different explanations to the reason why technology integration did not have any positive impacts on students' achievements or outcomes. For instance, Sandholtz, Ringstaff and Dwyer (1997) speculated that when technology was introduced into school, educators had an unbridled expectation that it would result in the same kind of radical changes that had been observed in other areas such as business, science and industry. However, the role of technology in education was not so noticeable. These researchers argued that unlike other areas that have clear procedures and tangible products, educational procedures and products remain largely unspecified. It is easier and simpler to deal with hardware and software than to face complicated issues related to human cognition, cultural

values and politics. Consistent with this view, a review of studies conducted by the CEO Forum (2001) posited that without measurable educational objectives and standards, it is hard for technology integration to have the greatest impact on education as expected. In addition, as indicated by Sandholtz, Ringstaff and Dwyer, the disagreements about educational standards among stakeholders in such a cultural, ethnic and religious diversity of learners also adds more complexity to the picture.

The Case for Technology

In contrast to the arguments and findings about the limited success of technology integration in K-12 education, advocates of technology integration argued that the trend of technology inclusion in education is a necessity of life. Learners today have grown up in the world where handheld computing devices, Internet- enhanced cell phones, and other personal digital tools are common (Apple Classrooms of Tomorrow, 2008; Marshall, 2002; Prensky, 2005). According to the report of the Pew Internet & American Life Project (2005), 21 million young people, accounting for 87 percent of 12- to 17-year-old American teens, are Internet users. Therefore, these webizens or digital natives expect to learn in an environment that mirrors their current lives and their futures, which seamlessly integrates today's digital devices, supports a mobile lifestyle, and increases collaboration and teamwork in both physical and virtual spaces (Apple Classrooms of Tomorrow, 2008). In addition, we are living in the information era in which people are flooded with data and news from different sources thanks to the popularity of the Internet, computers, and mobile technologies. This era creates a new notion of digital literacy skills which learners need to learn how to find, process, sift and analyze data, and make meaning of it all. Therefore, technology integration into classroom is definitely a necessity of life not simply a trend or fad in education.

One of the most popularly cited studies about the impacts of technology integration on learners' outcome was a meta-analysis study by Sivin-Kachala and Bialo (19994). The researchers derived from 133 research reviews and reports on empirical research projects over 700 published and unpublished sources to evaluate the affect of technology integration in education on learning achievements across all learning domains and learners' ages. From this meta-analysis, the researchers reported the following consistent patterns.

- Learners in technology- enhanced environment achieved high academic outcomes from K-higher education regardless of learners with or without special needs.
- This high achievement occurred in all major subject areas.
- Students' learning attitude and their own self- concept developed consistently.
- The level of effectiveness of technology integration depended on many factors such as the software design, the teachers' attitudes and the levels of learners' access to the technology.

Recent studies also had similar findings about the impacts of technology use on learners' performances. For example, Goldberg, Russell and Cook (2003) reported that students who used computers when learning to write were not only more engaged and motivated in their writing, but also produced work that was of greater length and higher quality. This finding was especially significant at the secondary level. Similarly, O'Dwyer, Russell, Bebell, and Tucker-Seeley (2005) also found a positive impact of technology on students' performances in English language. In their study, both prior achievement and socioeconomic status of 986 fourth graders were controlled, students who used technology at school more frequently to edit their papers were likely to have higher total English language test scores and higher writing scores on fourth

grade test scores on the Massachusetts Comprehensive Assessment System (MCAS) English/Language Arts test.

In summary, there are two obvious mainstreams of opinion on the effectiveness of technology integration in K-12 education. In addition, although the term "technology" was used quite commonly in those previous studies, it almost referred to the computers, especially desktop computers. Technology in K-12 education today varies from simple tools such as calculators, projectors, desktops and digital cameras to the latest digital technologies such as handheld computers, Ipods, closed-circuit television channels, podcasting, two-way distance learning classrooms, cell phones and iPads (Honey, Culp,& Spielvogel, 2005; Marshall, 2002; Prensky, 2005). Moreover, various technologies provide various contents and serve various purposes in the classroom. Therefore, according to Honey, Culp and Spielvogel (2005), each technology is likely to play a different role in students' learning. Consequently, instead of describing the effects of all technologies in general as if they were the same, researchers need to think about what specific kind of technology is being implemented in the classroom and for what purposes to be able to have the right answers. Therefore, the next section is a closer review of studies on specific technologies, the handheld computing devices.

The Debate on the Effectiveness of the Integration of Handheld Electronic Devices in K-12 Education

Although the advantages of integrating desktop computers into K-12 education is reported by many advocates, the 1:1 ratio of one computer per student in the classroom is almost financially unfeasible in many school districts (Norris & Soloway, 2001). Even given the ideal fact that the classroom is equipped with the 1:1 ratio of one computer per student, the nature of interaction between and among the teacher and students will be affected. The students will face

the computers not their peers and the teacher. Therefore, human interactions between the teacher and students and among students in the classroom will hardly be achieved. Both the teacher and learners expect to have computing devices as small and convenient as their traditional study tools such as rulers, calculators…etc so that they can bring and access them anywhere and anytime they want.

The Case for Handheld Electronic Devices

Derived from the demand of having computing devices as small and convenient as their traditional learning tools, administrators, educators, and educational practitioners see computing handheld, portable or mobile devices as a great potential. Hooft (2009) asserted that handheld devices have the potential to enhance and realize a ubiquitous computing environment where the students can access different valuable resources on a shared and timely basis, and where the focus is no longer on the teaching and learning devices but on their use. In fact, Weiser first introduced the notion of ubiquitous computing environment in 1991. According to him, in a ubiquitous computing environment, users can learn to use available technology so well and often that they are not even consciously aware of its presence. Each computing device is earmarked for its intended purposes and is connected together via a network. The users have varied options to select what tools they need to use at a certain time at their convenience.

In the same vein, Fung, Hennessy and O'Shea (1998) called the introduction of handheld computing devices into classrooms a paradigm shift like the historic shift in reading from originally being done as an elitist activity in the center of the learning process to an integral part of everyday life. Handheld devices allow users to access whatever and whenever they want. In addition, the users can also interact with many other users and with more than one device at the same time, and thus enhance the collaboration among learners. This brings about the

fundamental difference from the more traditional desktop computing environment where users' access is restricted to location and time.

Adding to other advantages of handheld computing devices, Crawford and Vahey (2002) held that handheld computing devices can solve the issues of price that Norris and Soloway mentioned. Handheld computing devices are affordable enough to let schools envision a true 1-to-1 student-to-computing device ratio in the not-too-far future. They also are portable and small enough to be put in a pocket and taken to anywhere the student goes. In addition, they are powerful enough to run most common computer software and importantly do not have to wait for a significant startup time. These combined characteristics open up the possibility of more frequent technology use, and integrated throughout the curriculum while traditional computers face disadvantages. To support their view, Crawford and Vahey (2002) sought to explore the effective instructional uses of handheld computers by over 100 K-12 classroom teachers, as well as the conditions and implementation strategies that facilitated success through the Palm Education Pioneers program (PEP). In this program, Palm awarded a handheld computer for every student to more than 175 K-12 classrooms throughout the United States. According to the researchers, participants in this project were brilliant, innovative teachers who integrated handheld technology into a wide range of instructional activities in their teacher. The evaluation findings of the program were based on teacher designed and teacher-implemented use of handheld technology in their classrooms from grades 2 through 12 across the United States. The researchers found that the teachers were positive about the use of handheld computers in their classroom. The majority of the teachers (72% to 85%) said that handheld computers had the advantage over laptop and desktop computers because they were: easy to integrate into class, usable in many places, easy to share, and convenient to access. In addition, the participating

teachers reported increased technology use, higher student engagement, and more effective instructional activities when handheld computers were integrated into the classroom.

The Case against Handheld Electronic Devices

Admitting several advantages of handheld computing or electronic devices such as its portability, mobility, and affordability, but Chinnery (2006) still claimed that inherent in the strength of mobile media, the use of handheld devices in education also had several challenges such as reduced screen sizes, limited audiovisual quality, virtual keyboarding and one-finger data entry, limited power, and limited message lengths. Adams and Angeles (2008) even pointed out that handheld computing devices resulted in student misuse, and no clear tangible link between educational use of these devices and higher test scores of students. Several school districts even banned the use of these devices because the school administrators were concerned that these devices would do more harm than benefit their students' learning outcomes. For example, the New York City school district barred the use of any handheld computing devices such as cell phones, blackberries, and small laptops in school.

In summary, previous research provided the advantages and disadvantages of the use of handheld computing devices in education. Adams and Angeles (2008) provided several reasons to the differences among those studies. Firstly, there are significant differences among handheld computing devices and how they are applied in education. PDAs are one thing, internet-accessible cell phones with cameras quite another. Another problem is that these innovative devices are evolving so fast that much of the research and writing in this area has a short shelf life. Even evaluating students' performances also has its limitations because several hard-to-assess variables existing in the teaching and learning process. Due to all of these reasons and for the purposes of this study, the following section will focus specifically on one handheld

computing device, the Ipad, in the K-12 education context to examine what previous and current researchers viewed how effective this device was in the K-12 classroom.

The Introduction of Ipad into K-12 Education

In a paper entitled "*A Personal Computer for Children of All Ages*", Kay (1972) imagined a world in which children and adults would use personal, portable information manipulators to create art, read books, and learn about science. Although providing this imagination, he was still cautious to call it science fiction. However, to many educators and technology advocates, Kay's imagination is turning into true with the emergence of the iPad.

Although I was already aware of the fact that empirical studies on the iPad in education especially in K-12 classroom would be very rare due to its recent debut on the market before starting this topic, I am still surprised to discover that so far there has not been any empirical research on this topic in academic peer- reviewed journals. By using key words such as tablet, iPad, education and students' achievement in the Education Resources Information Center (ERIC), Academic Search Premier EBSCO and Google scholar, I identified 24 articles on the use of iPads in education. Nevertheless, all of them are either position articles or reflection papers by teachers or practitioners. It is interesting that like the case of technology integration into the classroom, the introduction of iPads into K-12 education also created a debate between its advocates and critics. According to the result of the poll by the International Society for Technology in Education (2011), 24% of its readers did not believe that the iPad was an impetus to revolutionize education and 76% believed that it was.

The Case for the iPad

Several reports indicated positive impact of the use of the iPad on teaching and learning performances in the mass media. In a debate about whether the iPad will revolutionize education in the journal of Learning and Leading with Technology, Walter (2011) reported three advantages of iPads with specific examples. According to the author, this gadget provided the teachers at his school with opportunities to transition from long-term projects which incorporated software-specific projects with a steep learning curve to smaller scales, apt-based learning tasks. Instead of spending many days on typical software programs, the teachers at his school were able to "test drive" and learn about the app "Writer's Studio" for a unit on earthworm in second grade science classes in less than a day. Another benefit is that the iPad allowed the teachers to experiment with technology with ease. He mentioned about a project at his school where 25 faculty members were selected to use the iPad to redesign their curriculum. For less than $200 to buy apps, the participating teachers developed innovative and ingenious learning activities for their classes using the tablet. Finally, the iPad allowed for the portability and kinesthetic interactions that traditional desktop or laptop computers could not offer. Walter cited another project at his school in which a tenth grade studio art teacher asked the students to sketch the "Big Bambu" exhibit at the Metropolitan Museum of Art. Each student was given an iPad installed with the Sketchbook Pro app so that they did not have to bring pencils and sketchbooks. In his conclusion, Walter asserted that the use of the iPad in school helped the teachers develop and implement learning activities allowing students reach the level of "create" on Bloom's taxonomy.

Also in the same year, Taborn (2011) reported the success of the pilot project to use the iPad in classrooms at Tower School in Marblehead, Massachusetts. The author did not provide

information on how the pilot project was conducted and how many iPads were provided to students. However, according to the Tower's head of school, teachers in the pilot project responded incredibly well to the adoption of the new technology. He believed that the introduction of iPads was the beginning of the platform that really was going to bring the information revolution into the hands of elementary school students. The success of the pilot project led the school to start a 1:1 iPad program for students in grades 3 through 8 in the fall semester 2011. The school would provide iPads for most of the students. Approximately 300 of them would have the iPad to use in the classroom and at home. Their parents also were encouraged to purchase their own since the gadget must be returned at the end of each school year. The students would be required to bring their tablets each day and take them home in the evenings for both homework and charging. The head of the school also mentioned the reasons why his school chose the iPad. According to him, the iPad represented the most widely accepted device with the widest range of applications ready for it. In addition, Apple had a head start on this technology and would for another few years.

The positive impact of the use of iPad in classroom was also reported outside the U.S. Speirs (2011) talked about the successful implementation of the iPad at his school in Greenock, Scotland. One hundred and fifteen iPads were deployed to each student and staff member. The children could keep the tablet all day, and those aged 10 and older could bring them home at night. The school's IT staff did not tell the teachers what the iPads were for, but made them always available for their use. According to the author, the biggest early change was in teaching art. Apps such as Brushes, MoodBoard Pro, and Photoshop Express allowed the kids to experiment with art and build confidence. Usually, children were often reluctant to try new things in art class for fear of getting something incorrect. With the feature of unlimited undo and

the freedom to simply try things, their imagination opened up dramatically. Similarly, in the English class the teachers now had to teach the art of keeping to a word limit because their students were producing longer and better pieces of writing than ever before.

The Case against the iPad

While advocates of iPads lauded their positive impact on the teaching and learning process, critics raised concerns that schools were rushing to invest in these expensive technological fads before their educational value were proven by research.

In response to Walter's (2011) view in the debate about whether the iPad will revolutionize education in the journal of Learning and Leading with Technology, Baum (2011) gave many concerns about the current enthusiasm of the iPad. According to him, he witnessed too many things that were going to revolutionize education: programmed learning, computers, the Internet, interactive whiteboards, and laptops. They all became popular and made some things possible or easier than before. However, the classroom practice and teaching approach were almost the same as they were 50 or 100 years ago. In addition, the current rush to the iPad is like the rush to digitize print content. Huge amounts of print material were already put online. In his opinion, if the content was effective pedagogy before, it was effective now. If not, putting it on a screen did not improve it. New technology revolutionized only if its new capabilities actually improved learning. Unless the new medium allowed the student to learn more, or faster, or with more retention, or with greater self-efficacy, that was no revolution, it was just regime change.

Taking a different perspective to raise concerns about the use of the iPad in education, Hu (2011) commented that when school districts were trying to get their budgets approved so they did not have to lay off teachers or cut programs, spending money on these fancy tablets without

any research-based evidence may seem like an extravagance. Hu cited a professor emeritus of education at Stanford University, who emphasized that the money would be better spent to recruit, train and retain teachers because there was very little evidence that children learned more, faster or better by using the iPad. Another issue is that school officials became so enamored with iPads that they overlooked less costly options, like smart phones or other tablets that offered similar features that the iPad provided at the lower prices.

Finally, Ben (2011) pointed out several downfalls of the iPad in education environment. The slow finger-typing actually made written course work more difficult. These fancy tablets were great for enjoying media and allowed learners to share readings. However, teachers could not use them to mark up material on the fly and show changes to learners in response to their questions, a type of interactivity that was a major thrust in pedagogy. According to Ben, when the University of Notre Dame tested iPads in a management class, its students reported that the finger-based interface on its glassy surface was not good for taking class notes and didn't get them to mark up readings. Therefore, in their online final exam, 39 of the 40 students put away their iPads in favor a laptop, because of concerns that the tablet might not save their material.

In summary, since its recent debut on the market, published studies on the impact of iPads on K-12 education were hardly available in any mainstream journal. Several successful and unsuccessful stories of pilot projects of iPads at a specific school or school district were introduced in the mass media. This practice brought about the paucity of clear evidence on iPads' impacts on education. In addition, most of the pilot projects or programs at these schools involved a specific intervention with a clear beginning and ending. However, the introduction of iPads involved the selection of apps, curricula adjustment and teacher/student training. This is an

ongoing process without a clear starting or closing point. Evidences of their effectiveness will, therefore, have to be based on various non-experimental environments.

Teachers' Perceptions and Attitudes toward Technology Integration in their Classroom

Studies about in-service teachers' perceptions and attitudes toward technology integration in their classroom have been widely conducted. These studies employed a variety of methods and perspectives to examine teachers' perceptions and attitudes. In their review of studies about educators' attitudes toward the use of computer technology in the school setting, Dupagne and Krendl (1992) reported that while teachers in the 70's and 80's had somewhat ambivalent attitudes toward computer technology, teachers in the 90s were enthusiastic about and had expressed positive attitudes toward the implementation of technology in the classroom and curriculum. Studies about this field in recent years also reported similar findings about teachers' perceptions and attitudes toward technology in their teaching.

Wozney,Venkatesh and Abrami (2006) examined personal and setting characteristics, teachers' attitudes toward the use of technology in their teaching, and current computer technology practices. The research participants were 764 secondary and elementary teachers from both public and private school sectors in Quebec. The instrument was a questionnaire consisting of 33 belief items categorized into three broad motivational categories: perceived expectancy of success, perceived value of technology use, and perceived cost of technology use. The results showed that: (a) expectation of success and perceived value were the most significant factor in differentiating levels of technology use among teachers; (b) personal use of computers outside teaching activities was the most important predictor of teacher use of technology in the classroom; and (c) teachers' use of technologies was mainly for "informative" purposes such as searching for information in the Internet and "expressive" purposes such as word processing.

Unlike Wozney,Venkatesh and Abrami's study which only focused on practicing or in-service teachers, Banas (2010) included both pre-service an in-service teachers in her study to examine their attitudes toward technology integration in education. The researcher collected 225 teacher candidates' responses to a course reflection regarding attitude toward technology to summarize and analyze. The findings showed that 52% of participants had positive attitudes toward technology and were integrating technology into their instruction. Twenty-eight percent had positive feelings but cited obstacles to integration, 13% were fully integrating technology, and 7% were not integrating technology at all.

Banas' findings were actually in line with what the Bill & Melinda Gates Foundation presented in a report entitled "Technology and Effective Teaching" in 2012. According to this report, it is estimated that the vast majority of classroom teachers used computer-related technology in their classroom but are still wary. Based on a survey of 400 teachers from across the U.S., the report revealed that 67% of teachers used technology in every class and 85% use it every day. Also according to the report, their goals were to help their students learn but they remained skeptical since there was little, widely accepted proof that technology tools really provided real value for student learning. It is interesting that also in the same year, a national survey from PBS Learning Media revealed that 93 percent of K-12 teachers believed that technology such as interactive whiteboards enriched classroom education and 81 percent felt the same way about tablets. However, this report did not indicate how many teachers participated in the survey.

In summary, through the literature review, we can observe the trend of increase in teachers' positive perceptions and attitudes toward technology integration in education. This study goes a little further by examining not only teachers' attitudes toward the use of the latest

technology device, the iPad, in their classroom but also how they use and integrate the device into their teaching.

Technology Training for Teachers

A large body of literature confirms the idea that technology training is one of the fundamental factors that can result in teachers' positive attitudes toward technology integration into their teaching and the desire to use technology in their classroom (U.S. Department of Education, 2005; Christense, 2002; Becker, 2001; Reynolds & Morgan, 2001; McCannon & Crews, 2000; Yildirim, 2000). However, research also showed that in reality, working teachers were not well prepared to integrate new technologies into their curriculum. According to a report by the U.S. Congress (1988), only 29% of the respondents to a national survey of education majors felt prepared to teach with technology. Similarly, in a survey commissioned by the Office of Technology Assessment (OTA), Willis, Austin, and Willis (1994) revealed that more than half of teacher education graduates who participated in the survey indicated they they were not prepared or poorly prepared to teach with technology. Approximately 25% of them said that they were minimally prepared and the remainder rated themselves as prepared to a certain degrees. A more recent study by McCannon & Crews (2000) revealed that technology training was often insufficient or nonexistent for in-service teachers. The focus of those technology trainings was mainly on showing teachers how to operate the equipment but not how to integrate the technology into their curriculum.

Zhao and Bryant (2006) made further elaboration on technology training for teachers. According to them, offering technology training for teachers was important, but selecting training types were even more important. Zhao and Bryant asserted that technology training that simply emphasized on teaching basic computer skills was unlikely to result in the successful integration of technology in the curriculum. To successfully integrate technology into the classroom,

teachers needed to take intensive curriculum-based technology trainings that could get them beyond the attainment of basic computer skills to activities that instruct them how to seamlessly infuse technology into their teaching.

Factors That Affects Effective Use of Technology in Classrooms

According to many researchers (Bitner & Bitner, 2002; Ringstaff & Kelly, 2002; Zhao, Pugh, & Sheldon, 2002; Hew & Brush; 2007), there were many factors that related to the successful integration of technology into classrooms. Some of the most important factors included finding sufficient annual funding, the establishment of dynamic plans, and decisions concerning platforms, hardware, software, and so forth. These authors also asserted that while these issues were probably the most obvious considerations, an often-overlooked but decisive factor of whether technology succeeded or failed in the classroom was the teachers. While attention to selecting suitable hardware and software for classroom use is essential, it is the skills, competences and attitudes of the teachers that determine the effectiveness of technology integration into the curriculum. Bitner and Bitner (2002) summarized the factors required to see effective technology integration by teachers in schools:

a. Fear of change

Change of any kind brings about fear, anxiety, and concern. Implementing new technology as a teaching and learning tool in the classroom results in more fear and anxiety because it requires both changes in classroom procedures and practices and the use of often-unfamiliar technologies.

b. Training in basics

Training must provide teachers with essential knowledge of technology use. Teachers need to have a fundamental understanding of how to operate a specific technology they are provided with. It is also imperative that they know how to perform basic tasks such as program

installation, backing up files and deletion.

c. Personal use

Personal technology competences and use can be used as a way to cultivate the teacher's interest. Those who use personal digital programs such as word processors, spreadsheets, PowerPoint presentation, graphics programs, and so forth, on a regular basis, tend to be more comfortable with new technology. With a background and familiarity of technology use, they will lose some of their fear of new technology while at the same time learn that new technology can make their teaching jobs easier and more effective.

d. Teaching models

Teachers need to be aware of how the use of various programs enhances their teaching and students' learning outcomes. This can more easily be achieved if they actually see technology demonstrations and attend training workshops. They also need to know different kinds of programs that can be used in large and small group instruction.

e. Learning based

Learning should always be an impetus that drives the use of technology in school. Technology integration can enable teachers and learners to become partners in the learning process. It can also help replace the traditional paradigm of the teacher offering wisdom and the learners absorbing knowledge with a new educational paradigm in which both the teacher and learners collaborate with each other to achieve new knowledge.

f. Climate

A supportive climate or constructive learning atmosphere needs to be created to allow teachers to experiment without fear of failure.

h. Motivation

Motivation to overcome the frustration and confusion of the change process needs to be available. Change is not easy and is sometimes even painful. For teachers to suffer this nervousness and worry, they must be motivated. Often the intrinsic motivation will come if teachers see the benefits that new technology can provide their learners.

g. Support

Technical support to teachers either ongoing and onsite must be provided. Teachers need prompt support to be effective in integrating technology in their teaching.

Quite similar to what Bitner and Bitner (2002) mentioned about factors that need addressing to successfully integrate technology into school, Hew and Brush (2007) identified problems and solutions to those problems. From 48 studies about technology integration from 1995 to 2006, the researchers identified 123 factors hindering the success of technology use in school. They categorized them into six main categories: (a) resources, (b) knowledge and skills, (c) institution, (d) attitudes and beliefs, (e) assessment, and (f) subject culture. On the basis of identification of those barriers, they synthesized strategies to overcome those problems from previous studies as below.

Table 1 Summary of strategies to overcome barriers of technology integration

Barriers	Strategies
Resources	*Obtaining the necessary resources*
• Lack of technology	• Introduce technology into one or two subject areas at a time to ensure that teachers and students in those areas have adequate technology and access to technology (Tearle, 2004) • Create a hybrid technology setup in classrooms that involved cheaper computer systems. (Sandholtz & Reilly, 2004) • Use laptops with wireless connections to save building and maintenance costs of the computer laboratories (Lowther et al., 2003)
• Lack of access to technology	• Putting technology into the classrooms rather than in centralized locations (Becker, 2000) • Rotate students through the small number of classroom (Sandholtz et al., 1997)
• Lack of time	• Teachers collaborate to create technology-integrated lesson plans and materials (Dexter & Anderson, 2002; Lim & Khine, 2006) • Reduce class loads for teachers in order to free up some school time (Snoeyink & Ertmer, 2001–2002). For example, reduce the overall curriculum content (MOE Singapore, 1998) • *Also include the strategy for time-tabling structure*
• Lack of technical support	• Use student technology helpers (Cuban et al., 2001; Lim et al., 2003)
Institution	*Shared vision and technology plan*
• Leadership	• Having a shared vision (Rogers, 2000; Sandholtz et al., 1997; Tearle, 2004; Yuen et al., 2003)
• Time-tabling structure	• Schools change their time-tabling schedule to increase class time to double period sessions (Bowman et al., 2001)
• Lack of technology integration plan	• Having a technology plan (Fishman & Pinkard, 2001; Lawson & Comber, 1999). Such a plan should center on teaching and learning, not merely on technology issues (Rogers, 2000)
Subject culture	• *No strategies currently mentioned in the studies reviewed*
Attitudes/beliefs	*Facilitating attitudes/beliefs change* • Institution support (having vision and plan; providing the necessary resources; providing ongoing professional development; encouraging teachers) (Lawson & Comber, 1999; Sandholtz & Reilly, 2004; Granger et al. 2002; Teo & Wei, 2001) • Subject culture • Assessment (*see strategies for assessment below*) • Professional development (*see strategies for professional development below*)
Skills	*Professional development* – have three essential overlapping facets: (a) appropriate to the needs of the teachers and classroom practice, (b) provides opportunities for teachers to engage in active learning, and (c) focuses on: technological knowledge/skills, technology-supported pedagogy knowledge/skills, and technology-related classroom management knowledge/skills.
• Lack of technology skills	• Provide basic technology knowledge/skills training (Mulkeen, 2003; Snoeyink & Ertmer (2001–2002)
• Lack of technology-supported-pedagogy skills	• Ground learning experiences in content-connected technology examples (Hughes, 2005). Can be achieved through the use of a buddy system approach (Lim & Khine, 2006)

Table 1 continued

Barriers	Strategies
• Lack of technology-related-classroom management skills	• Establishment of rules and procedures (Lim et al., 2003). • Classroom layout redesign (Zandvliet & Fraser, 2004)
Assessment	*Assessment* • New ways to assess students' multimedia work. For example, a contract that indicates how many slides would be produced, and evidence of how the information was obtained (Bowman et al., 2001) • Closely aligning the technology to their state's curriculum standards (Dexter & Anderson, 2002)

(Hew and Brush, 2007, p. 233-234)

Summary

As the literature revealed, there was not a consensus among researchers, educators and teachers about the impacts of technology, handheld computing devices and iPad use on teaching and learning performances. Findings of previous research also indicated the increasing trend of technology infusion in classroom in the past few decades. However, this rising trend of technology integration in education was not as high as expected. Researchers proposed different factors that could affect effective use of technology in classroom.

This study examined specifically how elementary and middle school teachers used the iPad in their teaching to provide more insights into questions or issues that previous research did not include. Chapter 3 would address the research methodology that frames this mixed methods study and guides the research procedures. A description of the research method and design, and data collection procedures are presented. The instrument that was used in the study and the data analysis process are also discussed.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter will address the methodology that frames this study and guides the research procedures. A description of research questions, research method and design, participant selection, research instruments, data collection and data analysis procedures are presented

Research Questions

As discussed in chapter 2, the effectiveness of handheld computing devices in general and iPads in particular in K-12 education has basically been reported in the mass media mainly through the views of the principals or technology heads on exemplary projects or programs in their school or school district. While such reports may be useful in offering examples of how tablets can be effectively used in education, they are limited in ways that make it difficult to determine whether tablets have any impact on education. This study takes at least a pioneering step in examining how iPads are used from teachers' perspectives. Specifically, it attempts to answer the following questions.

1. What types of training have the teachers experienced to use iPads in the classrooms?
2. In what ways are iPads used in the classroom?
3. What are the attitudes and beliefs of the teachers about utilizing iPads in their teaching after a year of iPad use in their classroom?
4. Do the teachers perceive any differences in students' motivation, students' behaviors and/or students' achievements since beginning the use of iPads in the classroom?

Research Method

This is a mixed methods study combining the paradigms of quantitative and qualitative research to ensure maximum insight into how iPads are used from teachers' perspectives. I believe that a mixed methods design is essential to best address the research problems of this study. According to Johnson and Onwuegbuzie (2004), a mixed method approach combines quantitative and qualitative research techniques, methods, approaches, concepts, or language into a single study, which offers the researcher a better understanding of the problem than if either dataset is used alone. Creswell and Plano Clark (2007) provided the following definition of mixed methods research:

> Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. As a method, it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone. (p. 5)

Specifically, in this study, the mixed methods design included two distinct phases: Quantitative phase followed by qualitative phase (Creswell, Plano Clark, Gutmann, & Hanson, 2003). In the first phase, the researcher collected and analyzed the quantitative data from classroom observations. The second phase consisted of collecting and analyzing the qualitative data to help explain, or elaborate on, the quantitative results in the first phase. The second phase, qualitative component, was built on the first phase, quantitative component. Both phases were

connected in the intermediate stage in the study. The rationale for this approach was that quantitative data and their resultant analysis provided a general understanding of the research problem. The qualitative data and their analysis refined and clarified the quantitative results by examining participants' views in more depth (Creswell, 2003).

Participants

In this study, I utilized a convenience sample of 21 elementary and secondary working teachers who had been using iPads in their classroom at their school in southern Illinois. Through personal contacts and introductions of many professors in the department of Curriculum and Instruction at Southern Illinois University Carbondale, I had a list of 35 elementary and middle school teachers who had been using the iPad in their teaching for at least a semester. Upon receiving SIUC Human Subject Approval, I sent an email to those 35 teachers to invite them to participate in the study. Within two weeks after the first invitation email, I sent the second email to remind those teachers. In addition, some of them were also contacted by telephone; others were contacted in person either by me or a friend to increase the high rate of research participation. After two weeks of those communication channels, 23 teachers agreed to participate in this study. During the time I negotiated and arranged schedules for classroom observations and interviews with the teachers, two teachers withdrew due to personal reasons. Therefore, the final total number of participants in this study was 21. Below is the detailed demographic information of 21 participants.

Table 2

Participants' Demographic Information

No	Gender	Subject Matter Taught During Classroom Observation	Grade Level	Years of Teaching Experience
1	Female	Math	2	4
2	Female	Language	4	8
3	Female	Science	6	7
4	Female	Math	7	10
5	Female	Language	5	8
6	Female	Science	7	6
7	Female	Math	5	5
8	Female	Math	5	11
9	Female	Science	4	9
10	Female	Reading	2	5
11	Female	Math	3	6
12	Female	Math	6	8
13	Female	Reading	2	4
12	Female	Science	4	6
13	Female	Reading	2	13
14	Female	Reading	1	5
15	Male	Math	3	6

Table 2 (continued)

16	Male	Math	6	6
17	Male	Science	4	5
18	Male	Science	7	5
19	Male	Language	3	5
20	Male	Science	8	7
21	Female	Reading	2	6

Instrumentation

For the quantitative component, the instrument was the ISTE Classroom Observation Tool (ICOT®). According to information available on ISTE's website, this tool was developed by staff and consultants in the Education Leadership Department at the International Society for Technology in Education (ISTE) to provide a set of questions to guide classroom observations of a number of key components of technology integration. Specifically, the tool had different focuses including the educational setting in which the observation occurred, types of learners' interactions in the classroom, teachers' roles, learning activities, the National Educational Technology Standards (NETS) created by ISTE, and three- minute chart (During each three - minute period, was the iPad in use by learners and/or teachers). Details of the tool can be found in Appendix A. ISTE held that ICOT covered the recognized standards for learning, teaching, and leading in the digital age and were widely recognized and adopted worldwide. The six standards areas introduced in ISTE website are:

1. *Technology operations and concepts*: Teachers demonstrate a good understanding of technology operations and concepts.

2. *Planning and designing learning environments and experiences*: Teachers plan and design effective learning environments and experiences supported by technology.

3. *Teaching, learning and the curriculum*: Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning.

4. *Assessment and evaluation*: Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.

5. *Productivity and professional practice*: Teachers use technology to enhance their productivity and professional practice.

6. *Social, ethical, legal, and human issues*: Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and apply those principles in practice.

In addition to areas covered in the ISTE Classroom Observation Tool (ICOT®), I also included "Student Engagement" and "Cognitive Abilities" into the observation form. These two categories were introduced in the ALTEC Classroom Observation Form designed by Hare, Rowland and Stanley (2009). Specifically, in the "Student Engagement" category, there were five levels of student engagements:

1. 0 students off task

2. 1-3 students off task

3. 4-6 students off task

4. 7-10 students off task

5. > 10 students off task

In the "Cognitive Abilities", there were also four Bloom's Taxonomy-based levels:

1. *Receipt of Knowledge* (For example, students listen to a lecture from the teacher, or students watch an audio-visual presentation, or students sitting and listening to instructions.)
2. *Applied Procedural* (For example, students completing a task in which they are applying some type of knowledge or skill they have learned after instructions are given.)
3. *Know. Representation* (For example, students summarize an article they have read online.)
4. *Know. Construction* (For example, students explain why there may be differences in information they have read online, or students are using media to portray information in a new or original way.
5. *Other*

For the qualitative component of this study, the interview protocol was the instrument. This interview protocol was developed before conducting the interviews, and the questions were used as guided conversation. The question order and information addressed before each interview were specified in advance, but I defined the sequence and wording of the questions during the interview. Minimization of researcher bias was done through careful, detailed, and thorough documentation of all interviews. Face-to-face interviews were recorded with a digital recorder while online interviews through Gmail chat or Skype were recorded through a recording software named "Super TinTin Call Recorder". All interviews were coded to avoid mismatch and then transcribed. Interview transcripts and observational data were analyzed and compared through triangulation. See the interview protocol in Appendix B.

Data Collection

The data collection methodology for this study addressed the research questions and relied primarily on 21 classroom observations and interviews with teachers who were using the iPad in their teaching for at least one semester. Informed consent forms were presented to the

participants prior to data collection and each participant was given the opportunity to review the informed consent document before signing it. Each classroom observation lasted 30 minutes to 50 minutes. I made an arrangement with the teachers on what day they would use the iPad in their teaching, so I could come in to observe their teaching performance. During the classroom observations, I used the technique of momentary time sampling to keep record of the whole classroom's activities every three minutes and recorded what was observed during that moment. All classroom activities were expressed in the ISTE Classroom Observation Tool in form of objective quantitative data.

For the interviews, I conducted 10 semi- structured interviews in person with the participants at their school after school time while 11 other participants were interviewed via Gmail and Skype. During the interviews, I did not take any detailed notes but just audio-taped the interviews. The recorded interviews were then transcribed verbatim. According to Merriam (1998), verbatim transcriptions of recorded interviews provided the best database for analysis.

Validity and Reliability

Validity and reliability in a mixed study involves the triangulation of different data sources. The researcher used the ISTE Classroom Observation Tool (ICOT®) to collect objective data from classroom observations and triangulate with data in the interviews. According to Maxwell (2005), the triangulation process of collecting information from different sources using a variety of methods reduced the risk that conclusions would reflect systematic biases and allowed a broader understanding of the study's issues. The comparison of data gathered supported the triangulation process and therefore enhanced internal validity. Efforts to control any threats to theoretical validity were also conducted by collecting and drawing attention to any discrepant data or alternative explanations.

In the first two classroom observations, I instructed a colleague on how to use the instrument to keep track of what happened in the classroom and asked her to come into the classroom with me to observe the classrooms, using the provided instrument. At the end of the observations, we both compared the instruments to see if there was any data difference between the two of us. In the first observation, we had three differences in the "Three Minutes Chart" while in the second observation, we had two differences in the "Cognitive Abilities" category. We later figured out the reason why there was a difference in those data was due to the fact that we misunderstood the detailed guidelines in those categories. By conducting this crosscheck, the reliability and validity of the study increased.

In addition, upon completing the analysis for all 21 interview transcripts, I randomly selected five written transcripts to analyze and sent them to the participants, asking for signed verification of content accuracy for the interviews conducted. Those participants were also asked to rewrite, clarify, or make notes on either the transcripts or analyses if further clarifications were needed. By having participants verify the content within the analysis, validity of my interpretations was strengthened and cross-checked. This strategy is known as member checking, which is a validity strategy used to establish the accuracy of findings by taking the final report or themes back to the participants and determining whether these participants feel that they are accurate (Creswell, 2003).

Finally, to eliminate my bias and to provide added strength to the interpreted findings written in the interview analyses, I cross-checked my analytical skills by asking a colleague, who took a course of advance qualitative research method with me, to write two analyses for two interviews and compared the results with what I had. To facilitate the analysis process, we ran two interview transcripts in the NViVo 10, a qualitative data analysis

software, Originally, we attempted to use this software to code and conduct the whole data analysis for us. However, we could not manage to order NVIVO 10 to do what we expected, so we decided to use only the feature of "Most Frequency Words" in the transcripts. Below is an illustration of the result of "Most Frequency Words" in the interview question "*Do you think that your students are motivated to learn with the iPad?*

From those initial results, we manually coded the data and indentified themes. Except for several differences in wording and phrase uses, we both almost found the same themes in our analysis.

Data Analysis

For the quantitative data analysis, information in the ISTE classroom observation tool was quantified and input into an Excel spreadsheet. These data were divided into three main categories: demographic information and iPad use in the classroom. For the qualitative data, the analysis consisted of examining and categorizing to address the purpose of the study. I made use of NVIVO 10 to identify the "most frequency words" in those transcripts then manually conducted the coding and theme analysis process. Data analysis did not always proceed in a

linear manner but it was an ongoing search for general statements about relationships between categories of data. The transcripts were analyzed through the coding process including open coding, axial coding, and selective coding. Themes emerged from the coding were also compared to data observations to determine patterns.

This chapter explained and justified the methods within the framework of the mixed method design that I used to allow readers to see how the teachers used their iPad in the classrooms and their attitudes toward using this device. The procedures for the selection, description and recruitment of the participants were presented. The overview of the methodology established the data collection and analysis methods that were used in the study in order to address the research questions of this study.

CHAPTER 4

FINDINGS

According to Creswell and Plano Clark (2007), mixing qualitative and quantitative data could provide a deeper understanding of research problems than either approach alone. Creswell and Plano Clark identified several advantages of mixed methods research. They: 1) provide strengths that compensate weaknesses of each type, 2) provide more in-depth evidence, 3) help answer questions which cannot be answered by either quantitative or qualitative approach alone, 4) encourage the use of multiple worldviews or paradigms, and 6) practicality, make use of both statistics and expressions. The intention of this study was to examine how teachers used the iPad in their teaching and their attitudes toward using this device in the classroom. The datasets were based on the participants' interviews and classroom observations that took place in response to the research questions.

Research Question 1. What Types of Training Have the Teachers Experienced to Use iPads in the Classrooms?

To gain the information for this research question, I asked the participants three sub-questions in the interviews.

1. *What types of iPad training did you receive before using it in your teaching?*
2. *What do you think about the training? Is it sufficient and helpful?*
3. *Did you take any informal learning to learn how to use it through your colleagues or by yourself…etc?*

From the responses to the first question, I could identify several types of iPad training the participants received before they used it in their classroom. The most common training type is

self-training. Thirteen out of 21 participating teachers reported that they did not receive any formal iPad training before they used it in their classroom. According to seven teachers in the same public school, except a formal training session provided by an Apple sales representative, they did not receive any formal training in iPad use. They had to resort to different sources to educate themselves about how to use the iPad in the classroom. Lindsey said that her husband was an engineer and technologically savvy so he showed her how to use the iPad and awesome apps related to her subject area he found on the App Store. Six other teachers in a private school reported that they did not have any training program or workshop before using it. They all did attend a "tech camp" in the summer to learn how to integrate a variety of technology into classroom. This "tech camp" did not cover the iPad use and it was before the iPad was introduced into their school, so according to these teachers, the "tech camp" was not considered as a formal iPad training. They managed to learn how to use it by searching information on the Internet or asked colleagues for help. Another type of training was through attending an iPad-integrated course provided by a professor at Southern Illinois University Carbondale (SIUC). Eight teachers from different school districts attended this course and were introduced how to integrate the iPad into their subject area teaching.

In the second question of the effectiveness of the training, six teachers in a private school who did not attend any iPad training workshop skipped this question. Seven teachers in the same school districts who attended a training workshop provided by an Apple sales representative indicated that the training was not really useful because the sales representative only introduced them to basic features of the iPad such as how to turn it off and on, how to charge it, how to use the web browser, how to search and download apps from the Apple app store…etc. According to Kim, a teacher who attended that training session, she did not learn anything new from that

training workshop. She had already used her iPad at home for two years, so she knew how to handle the iPad. Sharing the same idea, Keith said,

> "I expected more from him [Apple sales representative] to introduce us to useful educational apps or kind of experience, but it turned out a kind of product introduction. The information probably was useful for those who did not use the iPad before."

In contrast with the preceding experiences, those teachers who took an iPad-integrated course at SIUC held that the training was practical because they were introduced to useful apps that can be implemented in their lesson. Nick noted that he appreciated that the professor introduced him to many free interesting apps he could integrate into his science class. Similarly, Rose said that the course was an eye opening experience for her to learn about virtual simulations, animations and apps in science teaching in schools. Laura described her experiences,

> "My iPad is now full of science apps I learned from Dr. [ ] class. When I used a solar system journey, which is a free app, to demonstrate my lesson about solar system, the kids were so excited about it…. Yes, the training is absolutely useful for me."

For the third question related to informal training, except for nine teachers who took an iPad-integrated course at SIUC, which is considered a type of formal training, thirteen other teachers did not have any formal training, so informal training through self-learning or colleagues' support were common. All 21 participants said that they learned about creative ways of using the iPad in the classroom and new apps from their colleagues. Coppi said she knew how to use the iPad with the Elmo just by chance. She came across her colleague's classroom and saw him using it. Vivien mentioned that because there were too many apps for her to test and buy,

she consulted her colleagues in her school about what apps they already used before she decided whether to buy it or not. Sharing this concern about the apps, David said,

> " Some of them [apps] are free, but some, we have to pay and we can't return them if we don't like them, so I often checked with my friends before I buy any apps. They are not so expensive, you know, but it 's still better to talk with someone who already used them"

From the answers to the three sub-questions, it can be concluded that except for a group of nine teachers who took an iPad-integrated course at SIUC, which can be considered as formal training in iPad use, the rest of thirteen participants in this study did not have any formal iPad training before they used it in their classroom. All 21 teachers had to resort to different sources such as self-learning and colleagues' support to learn more about how to integrate the iPad and useful apps into their teaching.

Research Question 2. In What Ways are iPads Used in the Classroom?

To answer this research question, I combined data collected from classroom observations in the ISTE classroom observation tool and responses to the following sub-questions in the interviews.

- *How often did/do you use your iPad in your teaching?*
- *Can you describe educational activities by which you utilized the iPad the most for its efficiency?*
- *What kinds of activities do you think the iPad can be most useful in your teaching?*

Data from the classroom observations indicated three practices of iPad use in the classroom. The first practice was that the teachers delivered each iPad to each learner. This practice was available only in those schools that got state-funded grants to buy the iPad for both their teachers and students. Because none of the school districts in this study had enough money

to provide each student with an iPad, typically, they bought forty or fifty iPads for the whole school. If the teacher would like her or his students to use the iPads in the classroom, she or he would schedule in advance and check out the iPads from the school office or school library. The second practice was similar to the first practice but the teacher checked out only five or six iPads and distributed each iPad to each group in the classroom. The third practice was that only the teacher used the iPad to deliver the lesson in the classroom. The teachers took the iPad-integrated course at SIUC and could borrow an iPad from that course to use in their classroom. In all cases, the teachers combined the iPad with other technology devices to show the content to the students on the project screen. Some of them connected the iPad with the projector while others put it on the Elmo. Below is the detailed data analysis of how teachers used the iPad in their teaching in different categories on the ISTE classroom observation tool.

Table 3

Category 1: Student groupings

Individual work	Pair work	Small groups	Whole class	Other
40	11	9	52	0

I observed 112 activities or in-class assignments in the 21 classroom observations. As shown in Table 3, students who were taught by the teachers with the iPad mainly worked either individually or in the whole class in those class activities or in-class assignments.

Table 4

Category 2: Teacher roles

Lecturing	Interacting direction	Discussion	Facilitating/coaching	Modeling	Other
35	14	9	29	25	0

Among 112 activities or in-class assignments, the most common roles the teachers took were lecturing and facilitating. The teachers delivered the lectures or instructions of the assignments and facilitating their students by walking around the classroom offering individual supports. Discussion was the least common role the teachers took in the classroom.

Table 5

Category 3: Learning activities

1	Creating presentations	3
2	Research	28
3	Information analysis	14
4	Writing	19
5	Test taking	0
6	Drill and practice	20
7	Simulations	11
8	Teacher lecturing while students listening	17
	Total	112

As shown in Table 5, the most common activity or in-class assignment when the teachers used the iPad in the classroom was "*research*". The teachers asked the students to use the iPad to search for information in the internet to write a report, to collect data for an assignment or present in front of the class. The least common activity was "*Creating presentations*". This activity only occurred in grades six, seven and eight.

I categorized 112 activities and in-class assignments in Table 5 into four categories based on the cognitive domain on the Bloom's Taxonomy. As seen in Table 6 below, the most common level of activities or in-class assignments was "*knowledge representation*" equivalent of "*comprehension*" level on the Bloom's Taxonomy.

Table 6

Category 4: Cognitive Abilities

1	Receipt of Knowledge *Students listen to a lecture from the teacher, or students watch an audio-visual presentation, or students sitting and listening to instructions.*	17
2	Applied procedural *Students completing a task in which they are applying some type of knowledge or skill they have learned after instructions are given.*	31

Table 6 (continued)

3	Knowledge representation *Students summarize an article they have read online.*	47
4	Knowledge construction *Students explain why there may be differences in information they have read online, or students are using media to portray information in a new or original way.*	17
	Total	112

I categorized 112 activities and in-class assignments in Table 5 into four categories based on the cognitive domain on the Bloom's Taxonomy. As seen in Table 5, the most common level of activities or in-class assignments was "*knowledge representation*" equivalent of "*comprehension*" level on the Bloom's Taxonomy.

Category 5: iPad in use in classroom

Since there were three types of iPad use in the classroom in this study: one- iPad-for-each- student classrooms, one-iPad-for- all- students classrooms, and one-iPad-for-each- group classrooms, I presented separate observation data in the category of iPad in use between those classrooms.

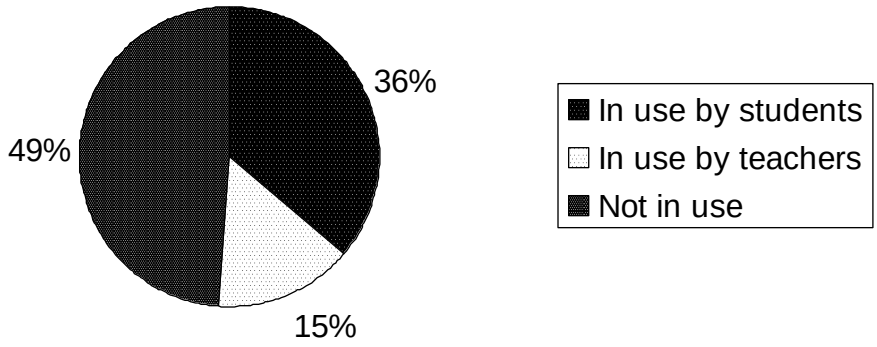

Figure 1

Average total time of iPad in use in one iPad-for-each- student classrooms

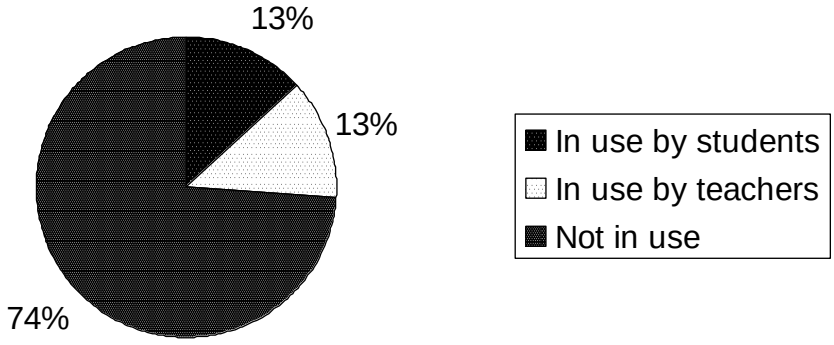

Figure 2

Average total time of iPad in use in one iPad-for-all- student classrooms

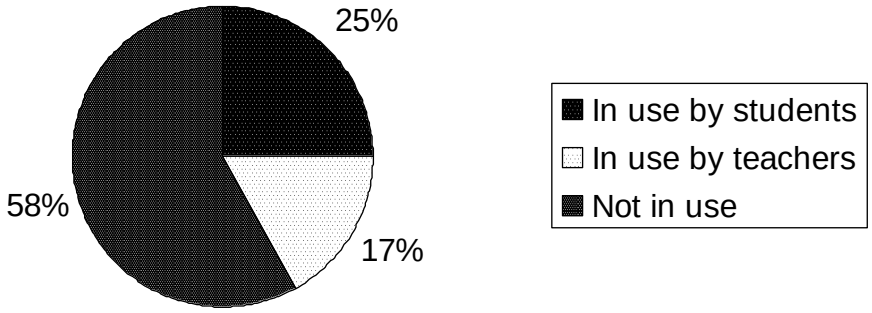

Figure 3

Average total time of iPad in use in one- iPad-for-each group classrooms

As presented in Figure 1, 2 and 3, there was not much difference in the total time of iPad use by the teachers between those three types of classrooms. However, there was a huge difference in the total time of iPad use by the students between those types of classrooms. The more iPads students had in the classroom, the more time they spent with the iPads.

Responses to the sub-questions in the interviews also revealed many interesting findings related to the research question of "*In What Ways are iPads Used in the Classroom?"*

In the first sub-question "*How often did/do you use your iPad in your teaching?*" responses to this question were categorized into two separate categories: "*Sometimes used*" and "*Often used*". In the "*Sometimes used*" category, the frequency of iPad use by the teachers in the classroom ranged from one or two times a month to several times during a whole semester. This category was dominant in the teachers at public schools in which 11 out of 15 teachers said that they sometimes used the iPad in the classroom. Two teachers even confessed that they did not have any plan to use the iPad in the classroom during the semester, but because I asked for voluntary research participation, they attempted doing so. The category "*often used*" was common in teachers at a private school. In this category, the frequency of iPad use by the

teachers in the classroom was one or two times weekly during a whole semester. Before conducting the classroom observations and interviews with these private school teachers, I had an informal meeting with the school principal to ask for school entrance permission. The principal introduced me to all teachers in the school and gave me an iPad check-out schedule for the whole semester. This schedule helped validate the teachers' responses about the frequency of iPad use in the classroom by the private school teachers.

Since there were two extreme practices of iPad use among the teachers, especially between teachers in public schools and teachers in a private school, I added one more question into the interview to understand why some of them used the iPad frequently (almost every week) while the others sometimes used them (one or two times/semester). It was noteworthy that all of the teachers in this study were technology-oriented teachers in their school in the principals' opinions when I talked with the principals about the purpose of this study. According to the teachers who sometimes used the iPad in their teaching, there were many obstacles to using the iPad in the classroom. Campbell said that she did not have an iPad at home so she did not know what app could be used for specific lessons while Tim mentioned the fact that he had to check out an iPad from SIUC and then returned it later. It took him almost two hours to drive back and forth from his school to SIU, so although he loved to use it, he did not use it as often as he would love to. Adding to another reason why she did not use the iPad so often, Kim explained,

" *My kids have to do Brainchild [an online learning program for students from grade one to eight] almost every week and taking all of them down to the computer lab to take Brainchild is a lot easier than doing it on the iPad*"

At the other end of the continuum, when asked why he used the iPad in the classroom every week, Eric said it was fun to try new technologies although his classroom already had

almost technologies such as an Elmo, TV and desktop. In addition to that, before the school year started the principal introduced the iPad to the teachers and asked the librarian to keep a record of iPad use among teachers. Similar to this view, Alice told that her school expected the teachers to use new technology in the classroom, so every teacher integrated the iPad into their teaching in this way or that way every week. In line with Alice's opinion, Anna explained,

"Using technology in the classroom is our school expectation. You know, we are a small school and […] You know, he [the principal] kind of technology oriented."

The second sub-question of "*Can you describe educational activities by which you utilized the iPad the most for its efficiency*?" provided further information of how teachers used the iPad in the classroom. Three dominant activities mentioned the most from teachers' responses were "*lesson introduction*", " *lesson demonstration*" and "*lesson-related information searching.*" Vivien said that she mainly used the iPad at the beginning of the lesson to get students involved in the lesson by playing an app related to the lesson. Sometimes, the app was not really relevant to the lesson, but it could work as a warm- up. Reed mentioned that the iPad had several interesting apps useful to make demonstrations. For instance, he used the "*Rat Dissection*" app to help students get a feel for dissecting a rat in a virtual lab to demonstrate his lesson. Having students use the iPad to search for information about the lesson and write about it was also good way to integrate the iPad into the teaching, according to Kim. This finding was actually in line with what I found in the classroom observations. As presented in Table 4 "*Learning Activities*", the most common learning activities in the classroom was "*researching.*"

In summary, data from classroom observations and responses to sub-questions provided an overall picture of the ways iPads were used in the classroom. There were three practices of iPad use in the classroom. The first practice was that the teachers delivered each iPad to each

learner. The second practice was similar to the first practice but the teacher checked out only five or six iPads and distributed each iPad to each group in the classroom. The third practice was that only the teacher used the iPad to deliver the lesson in the classroom. In all cases, the teachers combined the iPad with other technology devices to show the content to the students on the project screen.

Another aspect of how iPads was used was that students who were taught by the teachers with the iPad mainly worked either individually or in the whole class in those class activities or in-class assignments. In addition, the most common roles the teachers took were lecturing and facilitating when they integrated the iPad into their teaching while the most common activity or in-class assignment was "*research.*" The most common level of activities or in-class assignments was "*knowledge representation*" equivalent of "*comprehension*" level on Bloom's Taxonomy. In term of time of iPad use, there was not much difference in the total time of iPad use by the teachers in those three types of classrooms. However, there was a huge difference in the total time of iPad use by the students in those types of classrooms. The more iPads students had in the classroom, the more time they spent with the iPads.

Finally, regarding the frequency of iPad use in the classroom, there were two trends or categories. In the "*Sometimes used*" category, the frequency of iPad use by the teachers in the classroom ranged from one or two times a month to several times during a whole semester. This category was dominant with public school teachers. The category "*often used*" was common practice in teachers at a private school. According to the teachers who sometimes used the iPad in their teaching, there were many obstacles to using the iPad in the classroom while teachers in a private school indicated that it was their school's expectation to integrate new technologies into the classroom.

Research Question 3. What are the Attitudes of the Teachers toward Utilizing iPads in their Teaching after a Year or a Semester?

To find the answer to this research question, I included four sub-questions in the interview. The first sub-question was "*On the scale from 1 to 5 (1 is the least useful and 5 is the most useful), how would you rate the usefulness of the iPad in your teaching? Also explain your choice"* The mean for this question was 2.75, which indicated that according to the teachers in this study, the use of the iPad in the classroom was somewhat useful. On the scale of 5, Vivien explained,

> "*It is a great help. Its mobility and camera make it useful in recording club activities, outdoor classroom documentation and quick look-ups. Other than my projector and digital microscope, it is my most used aid*."

At the other end of the continuum, on the scale of 1, Eric clarified,

> "*I am comfortable with the equipment in my classroom right now. I can do search, PPT presentation, video with the Elmo, so the iPad is not really helpful. It has many useful apps to integrate into the lesson, but other than that, it is not a revolution*."

The researcher noted that those teachers who selected the scale of 1 or 2 were those who had only one iPad in the classroom while those teachers who selected the scale of 4 or 5 were those who delivered each iPad to each learner or each iPads to each group in the classroom.

In the second sub-question, *"Does it take a lot of time to prepare a lesson with an iPad?"* the responses varied, ranging from fifteen minutes to up to three hours. I noted that the teachers who took an iPad-integrated course at SIUC spent less time preparing a lesson with the iPad. The average time for a teacher who took this course to prepare an iPad-integrated lesson was thirteen minutes. Eric said that he used the iPad a lot in the course at SIU, so he knew how to handle

effectively in the classroom. In addition to that, he already knew what apps would be used for a specific lesson. Thus, it did not usually take a lot of time for him to prepare a lesson with the iPad. According to him, it took him approximately fifteen to twenty minutes to prepare an iPad-integrated lesson. In contrast, the teachers who did not have any formal training in iPad use spent more time preparing an iPad-integrated lesson. The average time for those teachers to plan a lesson with the iPad was three hours. Laura explained that whenever she wanted to have an iPad-integrated lesson, she had to consider many things from apps selection to iPad check-out and iPad connection. For example, she had to look for a suitable app on the apps store that covered the content of the lesson she was going to teach. Sometimes, she had to consult her colleague from another school about certain apps she was not so sure about them. Not worried about the issues of iPad check-out and connection, Kim had another concern which took a lot of her time to prepare an iPad- integrated lesson. She could not log into the Apps Store with her apple account via the school's iPad, so she could only use apps available in the iPad preinstalled by a technician who voluntarily assisted the school with technology. It took time for her to play with an app for a while to get familiar with it before she knew how to integrate it into her lecture.

The third sub-question asked the teachers if a colleague from another school asked them about using the iPad in teaching whether they would recommend it to him or her. Twenty-one out of twenty- one participating teachers in this study confirmed that they would recommend their colleague trying the iPad. Laura commented,

> *" It worth trying, especially for those who teach science. There are a lot of excellent apps to integrate into the teaching. […] Yes, it took time to prepare but the kids would love to play with the apps to learn and explore."*

Explaining why she strongly recommended her colleague to use the iPad in the classroom, Mirriam said that sooner or later big-sized technologies in the classroom such as TV and desktop computers would be replaced by small-sized devices like the iPad with more powerful features. Teachers could use the iPad to play video clips, search information on the Internet and more importantly, they helped to illustrate concepts and allowed students to interact utilizing apps.

In summary, responses to three sub-questions provided an overall answer to the research question of teachers' attitudes towards using the iPad in the classroom. First, according to them, the use of the iPad in the classroom was somewhat useful (2.75 out of 5.00). The average time a teacher spent preparing an iPad-integrated lesson depended on whether he or she had any formal training in iPad use or not. Finally, although as shown in the first sub-question, not all teachers agreed that the use of the iPad was useful in their classroom, they all indicated that they would recommend their colleagues using it in their classroom.

Research Question 4. Do the Teachers Perceive any Differences in Students' Motivation, Students' Behaviors and/or Students' Achievements since Beginning the Use of iPads in the Classroom?

I included two sub-questions to find the answers to this research question. The first sub-question was "*Do you see any differences in your students' motivation and/or behaviors when they are learning with the iPad?"* One hundred percent of the participating teachers said "Yes" to this sub-question. The emerging theme from the responses was "the iPad motivated learners". Daniel stated, "*Yes. I only have mine, however, when I utilize it the students love it and they constantly ask why we cannot get them for every student*." Similarly, Kim said,

> *"Yes, I think iPads are a great resource in aiding learning. In my advanced classes, I allow students to use their iPads and smart phones. They are often used to update the*

textbook on scientific findings and to follow up on discussion questions via search engines. My students love to have them in the classroom and they often look forward to have a lesson with iPads"

In line with these opinions, Eric stated that the iPads made students more focused in tasks. Since each of them had one iPad and used it to search for information, they seemed to pay more attention to what they were doing than they were doing with computers in the library or PPT presentation. Also sharing his same view on how iPad kept his students focused, Bob said that even two of his students with special needs behaved better than normal when they were given the iPad to learn with. They were more likely on task with the iPad than without the iPad. Before using the iPad, he had difficulty handling these students. Sometimes, he had to send them to another room for a voluntary Special Ed teacher to work with them or Special Ed students from SIU came to work with them in the classroom. All of these responses actually aligned with what I observed in the classroom. Whenever students found out that they would learn with the iPad, they were excited about it. Sometimes, the teachers had to cool them down before they started the lesson.

The second sub-question was "*Do you see any differences in your students' achievement when they are learning with the iPad?"* According to all the participants, it was difficult to evaluate the real impacts of the use of the iPad on the students' academic achievements, not to mention the fact that the iPad was not used often in the classroom except in the private school. Laura said that there were too many variables in students' achievement such as family background, students' motivations and teachers' instruction, so it was almost impossible to be able isolate the impact of iPad use on students' achievement. Holding the same view, Kim explained that her class did not evaluate students every day, so she could not know if students

performed better on the days the iPad was used than on the day the iPad was not used. Although unable to identify differences in students' achievements, participating teachers agreed that the quality of tasks or assignments by students during the day the iPad was used was better than that of on the day the iPad was not used. Eric gave the researcher one student's writing paper on dinosaurs in his class on the day the iPad was used and confirmed that the quality of the student's paper was far higher than what he usually had in previous years or compared with current students who performed without the iPad. Further explaining why students performed better with the iPad, Eric said that students used the iPad to search for diverse sources of information on the Internet and combined them together into a completed writing paper. Previously, his students mainly used one source of information available in the textbook and their writing was not creative. Sharing the same view, Diana said that her students seemed to perform better in math when the iPad was used. Diana used an app called "*Math Puppy*" to help her students to play with the puppy while solving mathematics problems. According to her, the kids thought that they were playing a game with the iPad rather than learning. Also commenting on students' work on math, Rina stated that her students did math quicker when they used the iPad with an app called "*Motion Math*" than when they did not use the iPad.

In all, according to the participating teachers, they observed differences in their students' motivation and/or behaviors when they were learning with the iPad. They were unsure of whether the use of the iPad had any impact on their students' achievement because there were many variables that could affect their achievement. However, they agreed that the quality of their students' tasks or assignments on the day the iPad was used were better than those on the day the iPad was not used.

Summary

In this study, the combination of quantitative and qualitative methods helped examine how teachers used the iPad in their classroom and their attitudes toward this device. The quantitative data from the classroom observations provided a starting point from which qualitative data were collected via interviews. The results of the quantitative probe led me to generate and triangulate qualitative data to provide insights into how teachers used the iPad, practices and attitudes towards the use of iPads in the classroom. Chapter 4 analyzed the quantitative and qualitative data from the classroom observations, and interviews. Chapter 5 presents discussions, implications and recommendations.

CHAPTER 5

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The intent of this study was to examine how teachers used the iPad in their classroom with four research questions:

1. What types of training have the teachers experienced to use iPads in the classrooms?
2. In what ways are iPads used in the classroom?
3. What are the attitudes and beliefs of the teachers about utilizing iPads in their teaching after a year of iPad use in their classroom?
4. Do the teachers perceive any differences in students' motivation, students' behaviors and/or students' achievements since beginning the use of iPads in the classroom?

To accomplish this goal, I used a mixed methods study combining the paradigms of quantitative and qualitative research to ensure maximum insight into how iPads are used from teachers' perspectives. The results of this study do not claim to generalize beyond those 21 teacher participants, although the results regarding how classroom teachers used their iPad in their classroom might have implications for other interested parties aside from the participants.

Discussions of Findings

Research Question 1

What types of training have the teachers experienced to use iPads in the classrooms?

Responses to three sub-questions showed that besides a group of nine teachers who took an iPad-integrated course at SIUC, which can be considered as formal training in iPad use, the

remainder of the thirteen participants in this study did not have any formal iPad training before they used it in their classroom. In other words, those teachers were not well prepared for iPad integration into their classroom. Actually, this finding was in line with the findings of previous studies in teachers' preparedness and readiness to use technology in their classroom (Willis, Austin, & Willis, 1994; McCannon & Crew, 2000). For instance, according to a report by the U.S. Congress (1988), only 29% of the respondents to a national survey of education majors felt prepared to teach with technology. Similarly, a survey by the National Center for Education Statistics (NCES) (2000) found that only one-third of participating teachers responding to the NCES survey reported feeling well prepared or very well prepared to use technology in classroom instruction. This practice echoed the concerns that Jones (2001) raised. According to Jones, providing teachers with access to computers, software, and the Internet was just part of incorporating technology effectively into schools. One of the most decisive factors for successful technology integration into classrooms was teachers' technology training. It seems that after more than one decade since this concern was raised, findings from studies kept providing the same patterns in which teachers were not well-prepared or trained to integrate technology into their classroom.

Another issue with teachers' technology training is the type of technology training that should be offered to help them integrate new technologies into the classroom. In this study, participating teachers received three separate types of technology training. One group did not have any training. One group attended an iPad training workshop provided by an Apple sales representative. Another group took an iPad integrated course at Southern Illinois University. While seven teachers in the same school district who attended a training workshop provided by an Apple sales representative indicated that the training was not really useful, nine teachers who

took an iPad- integrated course at SIUC believed that the training was practical because they were introduced to useful apps that can be used in their classroom. The finding validated what Zhao and Bryant (2006) discussed the effectiveness of intensive curriculum-based technology trainings. In the same vein, McKenzie's (2001) speculated that schools relied too much on unsuccessful business-oriented technology training models for teachers. According to this author, after 20 years of training teachers to use new technologies, a majority of teachers reported feeling ill prepared to use technologies in curriculum-rich ways. McKenzie explained that those training models failed because many software and hardware training companies used business examples and knew little or almost nothing about education. In addition, those training models sometimes put teachers under pressure by rushing them through too many skills in too short a time without sufficient guided practice to reach a comfortable level of familiarity. It was likely that seven participating teachers in the same school district who attended a training workshop by an Apple sales representative faced the challenges as what McKenzie mentioned. In contrast, providing teachers with professional development opportunities was an effective strategy to help teachers successfully integrate technology into their teaching. As in the case in this study, nine teachers took an iPad-integrated course and valued what they learned from it to implement into their classroom with the iPad.

Responses to the first research question also provided an interesting finding on how participating teachers managed to learn how to use the iPad in their teaching. That is, all of them learned about creative ways of using the iPad in the classroom and new apps from their colleagues. This finding virtually supported McKenzie's suggestions in identifying the most effective technology learning strategies for teachers. McKenzie suggested having teachers work together creating an environment for teachers to share and exchange their experiences would

help teachers significantly learn from each other. Similarly, Alden (2003) proposed that effective programs for training teachers on technology integration should have incentives and support, teacher-directed training, adequate access to technology, community partnerships, and ongoing informal support and training opportunities.

Research Question 2

In What Ways are iPads Used in the Classroom?

There were three practices of iPad use in the classroom: each iPad to each learner, each iPad to each group in the classroom, and only the teacher using the iPad. In all cases, the teachers combined the iPad with other technology devices to show the content to the students on the projector screen. These practices of iPad use in the classroom really reflected the creativity and flexibility of the teachers in their effort to integrate new technology into their teaching. I did not ask the participants about which approach to the use of the iPad was the most effective. However, data from the average total time of iPad use in classroom showed that there was a huge difference in the total time of iPad use by the students between those types of classrooms. The more iPads students had in the classroom, the more time they spent with the iPads.

Data from classroom observations also indicated that current teaching practice was largely a teacher-centered approach in which learners' roles were mainly information receivers, and the teacher's role was an information deliver. This practice was different from what researchers and educators talked about as the complementary relationship between technology use in the classroom and constructivism. For example, Nanjappa and Grant (2003) asserted that there was a complementary relationship between computer technologies and constructivism and that the implementation of each one benefited the other. Likewise, Matzen and Edmunds (2007) found in their study that teachers who integrated technologies into their teaching were viewed

more as constructivists. I did not know how much of a teacher-centered approach those participating teachers embraced before they integrated the iPad into their teaching. One possible hypothesis for this was that the teachers may already have changed a lot from very teacher-centered approach to less teacher-centered approach. Palak and Wall (2009) introduced another possible explanation. In their study, they reported that teachers in technology-rich schools continued to use technology in ways that supported their already existing teacher-centered instructional practices. In other words, they did not change their teaching approach with the technology integration into the classroom.

Data from the interviews also provided interesting findings on how the teachers used the iPad in classrooms. While the teachers at public schools used the iPad from one or two times a month to several times during a whole semester, teachers at a private school used the iPad on a weekly basis. It was noteworthy that all of those participating teachers were considered technology savvy in their school. According to the teachers who sometimes used the iPad in the classroom, there were hurdles to their effort of using iPad in classroom. By contrast, according to the teachers who often used the iPad in classroom, the expectation of the school leader was one of their driving forces. The reasons why teachers did or did not use the iPad in the classroom so often in this study were virtually in line with factors that affect effective use of technology in classrooms that Hew and Brush (2007) identified. Those factors included: lack of technology (many teachers in this study did not have the iPad in their school, so they did not want to use it); lack of access to technology (many teachers could not get access to the Apple store to download and install apps for their teaching); Lack of technical support (teachers had to manage to handle the iPad themselves without any technical support from school); leadership (teachers at a private

school used the iPad more often than their peers because they knew their school administrators' expectation.)

In contrast to their colleagues in public schools, teachers in a private school in this study used the iPad in their classroom on a weekly basis. Those teachers' responses indicated that one of the reasons they used the iPad so often in their classroom was their school leader's expectation. This finding again confirmed many researchers and educators' emphasis on the role of school leaders in the teachers' technology integration into classroom (Fullan, 1996; Hallinger & Heck, 1996; Hoffman, 1996; Maurer & Davidson, 1998; Picciano, 1998; Hall & Hord, 2001; Atto & Albion, 2002; Schiller, 2003). For example, Atto and Albion (2002) pointed out that beliefs of school principals could influence the uptake of technology integration into their schools. In the same vein, Schiller (2003) concluded in his study that when educational technologies were integrated into the classroom as learning tools, and when teachers were required to incorporate technology into their teaching practices, principals who demonstrated their leadership and change facilitation were more likely to be successful in efforts to have teachers integrate technology into their teaching practices.

Research Question 3

What are the Attitudes of the Teachers toward Utilizing iPads in their Teaching after a Year or a Semester?

According to the teachers in this study, the use of the iPad in the classroom was somewhat useful. On a scale from 1 to 5 in which 1 is the least useful and 5 is the most useful, the mean is 2.75. This finding was rather different from what news and mass media described as the fever of iPad integration into the classroom in American public schools. While the mass media cited teachers and educational administrators' excitement and enthusiasm about the

usefulness of the iPad in the classroom, teachers in this study were not highly enthusiastic. Although this finding was different from what the mass media reported, it echoed the findings of previous studies about teachers' attitudes toward technology integration in classroom (Wozney,Venkatesh , & Abrami, 2006; Banas, 2010; Dupagne & Krendl, 1992). It is also noteworthy that there were also two extreme poles among participating teachers in the study. While teachers who delivered each iPad to each student rated the usefulness of the iPad very high (4-5), teachers who used only one iPad in the classroom rated the usefulness of the iPad ver low (1-2). This fact indicated that the perceptions of teachers on the usefulness of the iPad were likely to be based on how teachers used the iPad in their teaching practices. If this explanation is correct, then it will also explain the reason why in the literature, research reports had different perceptions and attitudes of teachers toward the usefulness of technology in the classroom. It was interesting to realize that although not all teachers agreed that the use of the iPad was really useful in their classroom, they all indicated that they would recommend their colleagues using it in their classroom. I could not find any studies from the literature to explain why there was such a conflict between what teachers perceived and what they recommended to their colleagues.

Research Question 4.

Do the Teachers Perceive any Differences in Students' Motivation, Students' Behaviors and/or Students' Achievements since Beginning the Use of iPads in the Classroom?

According to participating teachers, the use of the iPad in the classroom motivated learners to perform and behave better. This finding confirmed the findings that Chang, Mullen and Stuve (2005) found in their study with kindergarten learners using PDAs. These researchers noted that the use of PDAs helped maintain the child's focus and interest. Hin and Subramaniam

(2006) also had similar findings. The researchers reported that the use of Tablet PC empowered students to take charge of their own learning.

Regarding students' academic achievements, unlike many findings in previous studies highlighting students' high academic performances when using technology such as the Tablet PC, Palm and Apple iPod (Patten & Craig, 2007; Ng & Nicholas, 2009), teachers in this study were quite unsure of the impact of iPad use on their students' academic performances. This attitudes of teachers about the impact of the iPad's use was in line with what the Bill & Melinda Gates Foundation presented in a report entitled " Technology and Effective Teaching" in 2012. According to this report, teachers were still skeptical about the influences of technology integration on students' academic achievements since there was little accepted proof that technology tools really provided real value for student learning. It was interesting to realize that, although unable to identify differences in student achievements, participating teachers agreed that the quality of tasks or assignments by students during the day the iPad was used was better than that of when the iPad was not used.

Implications

School districts and/or educational administrators

The finding of this study showed that one of the reasons teachers did not integrate the iPad into their teaching frequently was the lack of proper iPad training. This result presents an implication for school districts. Instead of "putting the cart before the horse"- in other words, putting an emphasis on the purchase and installation of new technology without providing sufficient funding for teachers to learn how to integrate new technologies into their teaching, school district administrators should have sufficient financial resources for teacher training or

professional development opportunities to help them learn about how to integrate new technologies into classroom.

It is also worth mentioning that not all training workshops are effective. As a finding in this study showed, an introductory training workshop by a sales representative did not meet teachers' expectations, one of the most useful ways to help them successfully integrate the iPad into the classroom was via iPad-integrated courses related to their subject matter like the course many of the participating teachers took at SIUC. In addition, creating a learning and collaboration community or network among faculty within a school district for teachers to share and exchange their experiences and ideas in teaching with technology was also another way to help teachers learn from each other. Finally, technology learning for teachers should be considered as a life-long on-going learning process, not a stand-alone and cut-off event through a single training workshop or a course, school districts should combine and maintain different training methods such as providing a training course and creating a community or network for teachers.

The iPad purchase decision should also be made carefully and wisely to avoid resource waste. School district administrators need to answer the question why the school needs to buy the iPads while its classrooms are already equipped with up-to-date digital technologies such as Elmo, projector, computers, and/or even a smart board. A finding in this study revealed that the frequency of iPad use in the school was low in the public schools. In addition, the total real time of iPad use in each teaching period was also very low. Another issue with iPad purchase is how many iPads school districts need to buy. This issue may be related to a question of whether the decision to buy how many iPads should be based on financial resources available or the need of

the teachers. In this study, it is indicated that those teachers who had only one iPad in the classroom rated the usefulness of the iPad very low.

Another concern regarding the use of the iPad in school districts was app installation and management. All of the schools in this study used the same account for all the iPads they had, and not all teachers could get access to the account to download apps from Apple's App Store. This practice discouraged teachers from searching for new apps and implementing in their teaching. Furthermore, not all apps on the store are free to download, so school districts need to allocate appropriate financial resources for teachers to buy apps. Finally, each app is often designed for a specific grade level and subject matter. An app for a science class in fifth grade cannot be used for a reading class in second grade. School districts should assign someone in charge of app installation and management to both provide timely technical support to teachers and avoid app mismanagement in each iPad.

Finally, the teachers in a private school used the iPad more frequently than their colleagues in public schools. According to those teachers, the reason they used the iPad every week was because of the school leader's expectation. This result gives an implication for school districts to consider communicating a clear message to teachers about their expectations. The principal should be more involved in a school district's technology integration initiative so teachers know what they are expected to do with new technologies. In addition, because not all classrooms can be equipped with the iPad, the principal also should work with the teachers to make sure that teachers in each class have fair and appropriate use rather than over use in this class and under use in another class.

Teachers

One of the findings in this study showed teachers could make use of the iPad flexibly either with one iPad or five or twenty five iPads. Either of them could motivate students to learn. This result provides an implication for teachers to take into account how frequently they integrate the iPad into their teaching. Data from classroom observations also revealed that teachers should take more advantage of prominent features of the iPad such as interaction and educational apps on the Apple's Apps Store rather than simply connecting with a projector or via an Elmo and turn the iPad into a traditional laptop or desktop.

Recommendations

Data Sources

The data for this study consisted of 21 classroom observations and semi-structured interviews with 21 voluntary teachers at different levels and from different school districts including both public and private schools in Southern Illinois. All of the teachers in this study were identified as technology savvy in their school. In future studies, I believe a more diverse sample of teachers who are not identified as technology savvy would be more beneficial. In addition, future studies may also look at how teachers at each school integrate the iPad into their teaching and compare with each other so that best practices of iPad integration can be recognized. In addition, instead of using semi-structured interviews with each teacher, future studies can use focus group interviews. I think that a focus group would likely offer a richer description of the components of such studies. Participants in a focus group tend to discuss with each other the questions and respond to one another’s answers to the questions. Another advantage of a focus group is that responses from participants can also be elaborated during a focus group discussion because one participant’s answer may cause an emotion with another

participant. Another recommendation is to involve students' voices in the study to acquire a deeper understanding of the issue being researched.

Timing of Study

This study was completed after the iPad had been used in the classroom for only a short period of time. Some teachers in this study even used their iPad just several times before participating in this study, so the opinions and attitudes of the teachers were to some extent not comprehensive. Therefore, a longitudinal study may be more helpful to understand teachers' opinions and attitudes toward the use of the iPad in the classroom and determine the impact on students' performances.

Interviews

I conducted the interviews with teachers via different channels such as face-to-face interview right after classroom observations, Skype or phone interviews several days after classroom observations and Gmail chat interviews several days after classroom observations. The differences in diverse interview formats and time lapse between classroom observations and interviews may have several effects on the quality of the data collections. The face-to-face interviews were mainly conducted at the end of the school day, so the interviews were often rushed to ensure that everything on the interview protocol was discussed. Future studies may select only interview channel to prevent possible differences in responses and plan more time for each interview.

Summary

In this chapter, I presented the discussions, implications and recommendations for future studies. What I found in this study such as teachers' unpreparedness for iPad integration into their classroom, types of technology training for teachers, and the influences of school leaders'

expectations on teachers' technology use was in line with the findings of previous studies. The results of this study had several implications for school districts and/or educational administrators in decisions about technology purchase and management. I then offered implications for future research in the areas of technology integration in general and iPad integration in particular into classroom.

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APPENDICES

Appendix A

Observation Protocol and Framework

The **ISTE Classroom Observation Tool** (ICOT®) is a free online tool that provides a set of questions to guide classroom observations of a number of key components of technology integration. ICOT was developed by staff and consultants in the Education Leadership Department at the International Society for Technology in Education (ISTE)with support from Hewlett-Packard Company. For free access to the ICOT software and online tools, visit **http://www.iste.org/icot**.

1. Setting

Date: _____ School: _____

Project/Program: _____ Site Code _____

Observer: _____ Teacher: _____

Grade: _____ Subject: _____

#Students: _____ Observation Start time: _____ End time: _____

(You can track technology use by three-minute intervals throughout the observation using the three-minute chart at the end of this form.)

2. Room description and student characteristics:

_____

_____

_____

_____

3. Student groupings (check all observed during the period):

____ Individual student work
____ Student pairs
____ Other (please comment):
____ Small groups
____ Whole class

_____

_____

_____

_____

4. Teacher roles (check all observed during the period):

____ Lecturing
____ Interactive direction
____ Discussion
____ Other (please comment):
____ Facilitating/Coaching
____ Modeling

5. Learning activities (check all observed during the period):

____ Creating presentations
____ Research
____ Information analysis
____ Writing
____ Other (please comment):
____ Test taking
____ Drill and practice
____ Simulations
____ Hands-on skill training

6. How essential was technology to the teaching and learning activities?

____ 1. Not needed; other approaches would be better.
____ 2. Somewhat useful; other approaches would be as effective.
____ 3. Useful; other approaches would not be as effective.
____ 4. Essential; the lesson could not be done without it.

Comment:

7. Technologies used by teacher (check all observed during the period):

____ Calculator
____ CD-ROM
____ Database
____ Desktop Computer
____ Digital Camera
____ Drill/Practice
____ E-mail
____ Graphics
____ Handheld Computer
____ Laptop Computer
____ Library Database
____ Outliner
____ Podcast
____ Presentation
____ Science Probe
____ Shared Editor (wiki)
____ Simulation
____ Spreadsheets
____ Tablet Computer
____ Video Camera
____ Videoconferencing
____ Web Authoring
____ Web Browser
____ Web Log
____ Word Processing

____ Other (please comment):

8. Technologies used by students (check all observed during the period):

____ Calculator
____ CD-ROM
____ Database
____ Desktop Computer
____ Digital Camera
____ Drill/Practice
____ E-mail
____ Graphics
____ Handheld Computer
____ Laptop Computer
____ Library Database
____ Outliner
____ Podcast
____ Presentation
____ Science Probe
____ Shared Editor (wiki)
____ Simulation
____ Spreadsheets
____ Tablet Computer
____ Video Camera
____ Videoconferencing
____ Web Authoring
____ Web Browser
____ Web Log
____ Word Processing

____ Other (please comment):

9. NETS Teacher Standards Addressed:

____ 1A.1. operating system procedures
____ 1A.2. routine hardware and software problems
____ 1A.3. content-specific tools
____ 1A.4. productivity tools
____ 1A.5. multimedia tools
____ 1A.6. interactive communication tools
____ 1A.7. curriculum-based presentations/publications
____ 1A.8. curriculum-based collaborations
____ 1A.9. appropriate technology selected
____ 2A.1. developmentally appropriate learning activities
____ 2A.2. technology-enhanced instructional strategies
____ 3A.1. learning experiences address content standards
____ 3A.2. learning experiences address student technology standards
____ 3B.1. technology supports learner-centered strategies
____ 3C.1. technology applied to develop students' higher order skills
____ 3C.2. teacher applies technology to develop students' creativity
____ 3D.1. class management facilitates engagement with technology
____ 3D.2. technology integrated as a teacher tool
____ 3D.3. technology integrated as a student tool
____ 3D.4. student grouping varied as needed to facilitate learning
____ 4A.1. student learning of subject matter assessed with technology
____ 4A.2. teacher assesses student technology skills
____ 4A.3. teacher employs a variety of assessment strategies
____ 6A.1. teacher models legal and ethical technology practices
____ 6A.2. teacher explicitly teaches legal and ethical technology practices
____ 6B.1. diverse learners enabled and empowered.
____ 6D.1. safe and healthy use of technology promoted
____ 6E.1. equitable access to technology for all students.

Comments:

_____

_____

_____

10. Three-Minute Chart.

During each 3-minute period, was technology *in use* by students and/or teachers, and was the time spent with technology *used for teaching and learning* (as opposed to recreation or routine tasks such as boot-up and log-on)?

Technology is:	:00-:03	:03-:06	:06-:09	:09-:12	:12-:15	:15-:18	:18-:21	:21-:24	:24-:27	:27-:30	:30-:33	:33-:36	:36-:39	:39-:42	:42-:45	:45-:48	:48-:51	:51-:54
In use by students																		
Used for learning																		
In use by teacher																		
Used for learning																		

11. Estimated time technology used (if 3 minute chart is not used)

Total minutes technology used by students _____
Minutes students used for learning _____
Total minutes technology used by teachers _____
Minutes teachers used for learning _____

Appendix B

Interview Protocol

I. Interview introduction

The interviewer will start the interview with the self-introduction and the following statement:

"Thank you for agreeing to participate in my study! The interview will be about your perception and attitudes toward the use of the iPad in your teaching. Your answer will be confidential. There are no right or wrong answers, so please be open and honest in your responding. I will use a tape recorder to record your answers so that I can analyze them later. During the interview, if you don't feel comfortable, you may stop at any time you may want."

II. Interview questions

1. What types of iPad training did you receive before using it in your teaching?
2. What do you think about the training? Is it sufficient and helpful?
3. Did you take any informal learning to learn how to use it through your colleagues or by yourself…etc?
4. How often did/do you use your iPad in your teaching?
5. Can you describe educational activities by which you utilized the iPad the most for its efficiency?
6. What kinds of activities do you think the iPad can be most useful in your teaching?
7. What apps/programs do/did you use in your iPad to teach?
8. Could you show me some artifacts such as learners' assignments or products that your learners used the iPad to create in your classroom?

9. On the scale from 1 to 5- 1 is the least useful and 5 is the most useful, how would you rate the usefulness of the use of the iPad in your teaching? Also explain your choice.
10. Does it take a lot of time to prepare a lesson with an iPad?
11. If a colleague from another school asks you about using the iPad in teaching, will you recommend him or her?
12. Do you see any differences in your students' motivation or behaviors when they are learning with the iPad?
13. What about their academic achievements?

III. Closing

"Thank you so much for your answers. Your answers will be used for our study purpose only and they will all be erased when the study is completed."

Appendix C

Consent Form

Dear participant,

Thank you for agreeing to participate in our study. Because the study aims to examine how working teachers perceive the use of the iPad in their teaching, beside the online survey and classroom observations, I will interview you to find the answers to my research questions. If you agree to join my study, please send me your available schedule so that I can set up an appointment for the classroom observation and interview after completing my survey. The interview can be conducted face to face at the student center or Morris Library or online via Gmail chat or Skype. All of the data will be confidential. There is no right or wrong answers, so please be open and honest in your responding. I will use a tape recorder to record your answers in the interview so that I can analyze them later. During the interview, if you don't feel comfortable, you may stop at any time you may want. Your answers will be used for my study purpose only and they will all be erased when the study is completed. You will also be asked to give me a class schedule so that I will come and observe your teaching performance (I won't look at your students' performances.)

Be aware that participation in this study is VOLUNTARY and if you change your mind, you may withdraw at any time without hesitation. Moreover, all your responses will be confidential. The people who will have access to the data will be myself and my advisor, Dr. John McIntyre. After the study is completed, all the records and classroom observations will be destroyed. I will take all reasonable steps to protect your identity. In the research itself, you will be identified only by the general name: a student A or a student B.

For additional information, you may contact me, Phu Vu, 313 E Mill St Apt 1 Carbondale, IL, 62901. Email: vphu@siu.edu. or Dr. John McIntyre, my academic advisor, Department of Curriculum and Instruction, Wham 3223, SIUC, Carbondale, IL 62901 Phone (618) 453-2415, e-mail: johnm@siu.edu.

Thank you for your valuable collaboration and assistance in this research.

Thank you for your valuable collaboration and assistance in this research.

I agree to participate in the study and know that my responses will be recorded on a tape recorder by the researcher under the supervision of Dr. John McIntyre, Department of Curriculum and Instruction, Southern Illinois University Carbondale. I have made this decision based on the information I have read in the Information-Consent Letter. I realize that I may withdraw without prejudice at anytime.

Participant's signature

(Please sign below)

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, Southern Illinois University, Carbondale, Illinois 62901 – 4709. Phone (618) 453-4533. Email: siuhsc@siu.edu

Appendix D

E-MAIL SOLICITATION REQUEST

From: Phu Vu

Subject: Research Request

Dear friends

I am a PhD candidate in the Department of Curriculum and Instruction at Southern Illinois University Carbondale.

You voluntarily provided me with this email and your name to contact you when I talked with you in our class about my intention of doing a study on the use of iPad in your classroom. A blind copy format will be used so that the list of recipients will not appear in the header.

The purpose of the enclosed survey is to collect teachers' perceptions on the use of iPad in your classroom.

You were selected to participate in this study because you are a teacher who is using iPad in your teaching.

The survey will take approximately 30 minutes to complete. All your responses will be kept completely confidential and all resulting data will only be reported in the aggregate. Only I will have access to the surveys.

After the survey, please give me at least three time slots so that I can come to observe your teaching and another three time slots that I can interview you either face to face or online.

After the study is completed, I will erase all of the data I collect in those processes.

Completion and return of this survey, having the interview with me and letting me observe your teaching indicate voluntary consent to participate in this study. Neither your responses nor your decisions to participate will be shared with the instructor.

Questions about this study can be directed to me or to my supervising professor, Dr. John McIntyre at 4610, Department of Curriculum and Instruction, SIUC, Carbondale, IL 62901 Phone (618) 453-2415, e-mail: johnm@siu.edu.

If you do not respond to this survey or return the opt-out message, you will be contacted again with this request 2 times during the next 3 weeks.

Thank you for taking the time to assist me in this research.

Phu Vu

Tel: 618 203 2577

E-mail: vphu@siu.edu

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

Appendix E

Taping Consent Form

Dear participant,

Thank you for agreeing to participate in our study. Because the study aims to examine how working teachers perceive the use of the iPad in their teaching, beside the online survey and classroom observations, I will interview you to find the answers to my research questions. The total time for the interview should be no longer than 30 minutes. If you agree to join my study, please send me your available schedule so that I can set up an appointment for the interview. The interview can be conducted face to face at the student center or Morris Library or online via Gmail chat or Skype. You can tell me which option you prefer to do. All of the data will be confidential. There is no right or wrong answers, so please be open and honest in your responding. I will use a tape recorder to record your answers in the interview so that I can analyze them later. During the interview, if you don't feel comfortable, you may stop at any time you may want. Your answers will be used for my study purpose only and they will all be erased when the study is completed.

Be aware that participation in this study is VOLUNTARY and if you change your mind, you may withdraw at any time without hesitation. Moreover, all your responses will be confidential. The people who will have access to the data will be myself and my advisor, Dr. John McIntyre. After the study is completed, all the records will be destroyed. I will take all reasonable steps to protect your identity. In the research itself, you will be identified only by the general name: a student A or a student B.

For additional information, you may contact me, Phu Vu, 313 E Mill St Apt 1 Carbondale, IL, 62901. Email: vphu@siu.edu. or Dr. John McIntyre, my academic advisor, Department of Curriculum and Instruction, Wham 3223, SIUC, Carbondale, IL 62901 Phone (618) 453-2415, e-mail: johnm@siu.edu.

Thank you for your valuable collaboration and assistance in this research.

Thank you for your valuable collaboration and assistance in this research.

I agree to participate in the study and know that my responses will be recorded on a tape recorder by the researcher under the supervision of Dr. John McIntyre, Department of Curriculum and Instruction, Southern Illinois University Carbondale. I have made this decision based on the information I have read in the Information-Consent Letter. I realize that I may withdraw without prejudice at anytime.

Participant's signature

(Please sign below)

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, Southern Illinois University, Carbondale, Illinois 62901 – 4709. Phone (618) 453-4533. Email: siuhsc@siu.edu

VITA

Graduate School

Southern Illinois University

Phu H Vu

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EDUCATION

Ph.D., Curriculum and Instruction, Southern Illinois University at Carbondale, IL, USA, expected in May 2013.

Dissertation Topic: *An Inquiry into How iPads are Used in Classrooms*

Master of Arts – Teaching English to Speakers of Other Languages, Southern Illinois University at Carbondale, IL, USA, August 2010.

Bachelor of Arts – English Language Teaching, Quy Nhon University, Vietnam, May 2001.

PUBLICATIONS

Vu, P., & Vu, L. (2013). Videotape and reflection -based feedback to student teachers: A case study. *Critical Issues in Teacher Education. 20*, 11-19.

Vu, P., & Fadde, P. (2012). Traits of effective instructors in an online setting. *Bulletin of IEEE Technical Committee on Learning Technology. 14*(4), 50- 53.

Howard, J., **Vu, P**., & Vu, L. (2012). How do undergraduate students use their iPads? *Journal of Technology Integration in the Classroom. 4*(3), 5- 12.

Vu, P., & Vu, L. (2012). Teaching English as a foreign language major to gifted students. *The Southeast Asian Journal of English Language Studies. 18*(2), 57- 66.

Vu, P., & Vu, L. (2012). Techniques to bring humor and create a pleasant learning environment in ESL adult classroom. *Journal of Research and Practice for Adult Literacy, Secondary, and Basic Education, 1*(1), 50-53.

Vu, P. (2011). Gifted students' profiles and their attitudes toward a gifted program: The case of Vietnam. *Gifted and Talented International, 26*(1), 81-87.

HONORS AND AWARDS

Quy Nhon University, *Excellent Student of the Year* (2000)

U.S. Department of State, *Fulbright Student Scholarship* (2008-2010)

GRANTS

Civil Society Grant by the U.S. Embassy to Vietnam, establishing an E-center for Teachers' Professional Development (2011-2012) to provide a free online ESL training program to 150 ESL in-service teachers.

Vietnamese Ministry of Education and Training Grant (2012- 2013) to establish and administer a massive open online program (MOOP) in ESL.