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A MODEL-BASED APPROACH TO MOBILE LEARNING
AND DIGITAL LITERACY

by

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A dissertation in practice submitted in partial fulfillment of the requirements
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ABSTRACT

The purpose of this research study was to 1) explore models of technology implementation programs and professional development interventions that promote the successful integration of mobile devices (iPads) in a small elementary school in a large Central Florida school district, and 2) identify the needs of the instructional staff to design a professional development intervention to meet these needs. This school will be referred to as School A.

In the U.S., the ownership of mobile devices, such as iPads is on the rise. For example, 88% of American teenagers between ages 13 and 17 have access to a mobile phone, and 73% of teenagers have a smartphone (Pew Research Center, 2015). This has increased from 2013, when 78% of teenagers ages 12-17 had a cell phone, 47% of which were smartphones (Pew Research Center, 2013). Also, 58% of teens in this age group have a tablet (Pew Research Center, 2015). These devices, over other devices such as desktop computers, are becoming more commonly used to access the Internet (Pew Research Internet Project, 2014). This rise in mobile device ownership and usage by students and young adults in their daily lives has prompted educators to look toward mobile devices as potential educational tools to engage students (Herro, Kiger, & Owens, 2013). Developments in mobile technology have made these devices more accessible and versatile with Wi-Fi capabilities and a variety of applications (Wu et al., 2012).

In this research study, a case study design using mixed methods was used to identify problems that exist in teachers' using and integrating iPads and to suggest solutions. The mixed-method data collection incorporated elements of qualitative research through a case study and elements of quantitative analysis through the use of descriptive statistics. An iPad survey was

developed by the researcher and used to gather qualitative data at School A regarding teacher perceptions and experiences related to integrating iPads into classroom instruction. The sample population ($n = 15$) consisted of classroom teachers, support teachers, and academic coaches. The total population of teachers at School A was 34. Teacher responses were analyzed for common emergent themes as well as through the use of descriptive statistics consistent with data analysis methods for case study research (Cresswell, 2006). Additional qualitative data was gathered through the review of documents related to School A's iPad initiative and observational data regarding teacher training, and the applications loaded and used on the iPads were gathered via the researcher's role as the Apple Program Facilitator. Demographic data was also collected via the iPad survey and analyzed using descriptive statistics.

The results revealed that 23% percent of teacher respondents were not currently integrating iPads into their classroom instruction, whereas 73% of teacher respondents reported that they were. Common instructional activities and strategies implemented via iPads included small group instruction, assessment, research, and projects. Additionally, it was found that 53% of the teacher respondents expressed interest in face-to-face (F2F) or Web-based professional development (PD) sessions, which included both users and non-users of the iPads. Further research should be conducted regarding how to best maximize teacher involvement in PD designed to train them how to effectively integrate iPads into their classroom instruction, and how to evaluate the effectiveness of a mobile device PD program, once in place, with respect to how classroom instruction is enhanced through the integration of the iPads and the impact on student learning.

This dissertation is dedicated to my family, who always instilled in me, from a young age, a love for learning and knowledge, and an understanding of the value of an education. Their unconditional support through all my years of school has helped shape me into the person that I am today, and for that I am grateful.

ACKNOWLEDGMENTS

There are many individuals over the course of these past three years who have helped me reach my goal to complete my doctorate degree. These three years have been an educational journey and learning experience that I will always remember. I would like to recognize the following individuals who have been integral throughout my journey in helping me accomplish this educational milestone.

First, I would like to express my gratitude to Dr. Glenda Gunter. I remember first becoming your student when I began my educational technology master's program in your class in 2010! I had just started out my career as a teacher, and I was curious to learn about the relationship between technology and student learning and how that could shape my teaching. The first-generation iPad was still a few months away from being released, but I knew it would be a game changer in the classroom. Little did I know at the time that I would eventually work at a school with almost 200 iPads and have the opportunity to positively impact my school and its teachers with my own research. Thank you for your support and guidance in helping me reach this accomplishment.

I would also like to thank Dr. Patrick C. Coggins, who has been my mentor since I was an undergraduate at Stetson. Thank you for always encouraging me to push forward in my education and to continue growing as an educator. Thank you for letting me pick your brain over the years, and for all that I have learned about teaching from you.

I would also like to extend my thanks to my dissertation committee. Thank you for serving on my committee, and providing your time, feedback, and support along the way. I will always appreciate your gracious contributions.

A special thank you goes to my husband, Mike. Thank you for being my cheerleader and helping me through my frustrations, providing continuous encouragement, positive vibes, and love throughout the course of this program. Thank you for being flexible and "holding down the fort."

Thank you, all!

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LIST OF ABBREVIATIONS/ACRONYMS

ACOT   Apple Classrooms of Tomorrow

APF   Apple program facilitator

ESE   Exceptional Student Education

ESEA   Elementary and Secondary Education Act

ESOL   English for Speakers of Other Languages

F2F   Face-to-face

FLDOE   Florida Department of Education

ML   Mobile learning

PD   Professional development

SALT   Subject Area Leadership Team

TIM   Technology Integration Matrix

TPACK   Technological Pedagogical and Content Knowledge

UCF   University of Central Florida

CHAPTER ONE: INTRODUCTION

Background

Ownership of mobile devices such as tablets, e-readers, iPods, and smartphones has increased in the past five years, particularly among K-12 aged students (Herro, Kiger, & Owens, 2013). For example, 88% of American teenagers between ages 13 and 17 have access to a mobile phone, and 73% of teenagers have a smartphone, specifically (Pew Research Center, 2015). This has increased from 2013, in which 78% of teenagers ages 12-17 had a cell phone, 47% of which were smartphones (Pew Research Center, 2013). Also, 58% of teens in this age group have a tablet (Pew Research Center, 2015). These statistics highlight an emerging trend in the way students learn and access content. Students are learning in environments in which non-linear and non-print forms of text are emerging, and developments in mobile technology, such as Wi-Fi capabilities and a plethora of applications, have made these types of devices more accessible and versatile (Wu et al., 2012). This rise in mobile device ownership and usage by students and young adults in their daily lives has prompted educators to look toward mobile devices as potential educational tools to engage students (Herro, Kiger, & Owens, 2013).

Mobile devices, instead of other devices such as desktop computers, are more commonly used to access the Internet for information and to communicate (Pew, 2013). In educational contexts, the iPad is viewed as having great potential in terms of integrating mobile devices into classroom settings. For example, a survey of Advanced Placement (AP) and National Writing Project (NWP) teachers revealed that 73% of them and/or their students used their mobile phones in the classroom for assignments. Furthermore, 43% said that they or their students used tablets

in the classroom to complete assignments. This included primarily online activities such as locating information, submitting assignments, posting work on a Website, wiki, or blog, and participating in online discussions (Purcell, Heaps, Buchanan, & Friedrich, 2013). The iPad's portability, touch-screen, wireless Internet connectivity, and access to mobile apps are features that are ideal for use in the classroom environment (Falloon & Khoo, 2014).

Statement of the Problem

The school that was the focus of this dissertation in practice is a Title I school that has access to a total of 180 Wi-Fi enabled iPads that can be used for instruction with a student population of approximately 400 students. Despite access to this technology, teachers at the school presented varying levels of experience and knowledge with using iPads effectively as an instructional tool. This began to result in the lack of use or ineffective use of the iPads and not necessarily having a positive impact on student learning. As a faculty member of this school organization, the researcher was able to glean the levels of experience ranging from reluctant teachers with little to no experience with integrating iPads into classroom instruction, to teachers who were embracing the iPads and eager to use them. Furthermore, teachers did not receive consistent professional development related to the effective integration of iPads into their classroom instruction.

Statement of Purpose

The purpose of this study was twofold: 1) to explore models of both technology implementation programs (specifically related to iPads and/or mobile devices) and professional development intervention strategies that promote the successful integration and maintenance of a

mobile device initiative at the elementary school being studied, and 2) to identify the specific needs of the instructional staff at the school in order to design a professional development intervention that would best suit these needs.

Research Questions

The following research questions were used to guide this study:

1. What are the experiences of instructional staff as related to the integration of iPads into classroom instruction among users of the iPads at School A?

2. What are the experiences and perceptions of instructional staff as related to the integration of iPads into classroom instruction among non-users of the iPads at School A?

3. How are members of the instructional staff at School A integrating iPads into classroom instruction?

4. What are the professional development (PD) interests of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

5. What are the professional development (PD) needs of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

The research questions guided the development of an ongoing professional development intervention program to support teachers at the school in the effective integration of iPads into instruction through the use of appropriate strategies and resources to support student learning and achievement.

Theoretical Framework

The key factors that influenced the absence of pedagogically appropriate integration of the iPads at School A included a) the varying levels of experience and knowledge of integrating the devices as an instructional tool, and b) the lack of consistent professional development to support teachers and develop their knowledge in applying sound practices to integrate the technology appropriately into their classroom instruction. These key factors guided the study toward examining this problem of practice using the TPACK model.

The framework chosen as a guide for this study was the Technological, Pedagogical, and Content Knowledge framework, or TPACK. The TPACK framework focuses on the interactions between and among the technological knowledge, pedagogical knowledge, and content knowledge that should be considered when incorporating technology effectively into instruction (Koehler & Mishra, 2009). The basis for this framework is to assess the shift from the perspective of technology as an instructional supplement to a core instructional tool for content, pedagogy, and student learning.

As Koehler and Mishra (2009) state, "…integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts" (p. 62). Figure 1 visually summarizes the interplay between the elements of the TPACK framework, which shows the multifaceted aspects of effective technology integration, in that it goes beyond just knowledge ability of a technology form but should also include the appropriate pedagogical and content knowledge needed to implement it appropriately.
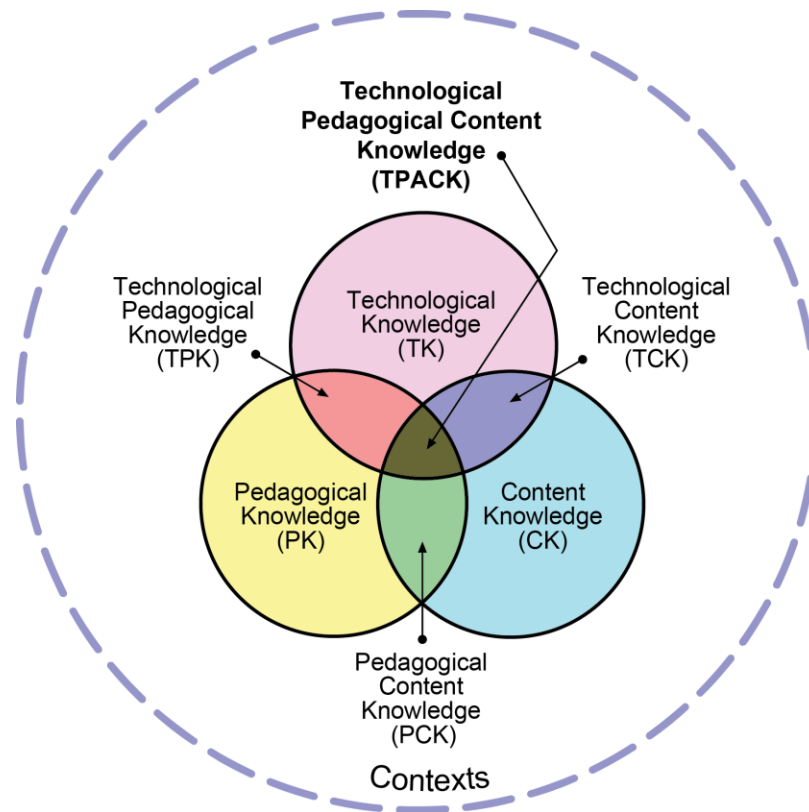
Figure 1: The TPACK Framework
Reproduced by permission of the publisher, © 2012 by tpack.org

Furthermore, the company that developed the iPad, Apple Inc., also state what they consider to be five best practices that schools they have deemed as Apple Distinguished Schools all exhibit in their use of technology in the classroom. These elements include 1) Visionary leadership, 2) Innovative learning and teaching, 3) Ongoing professional learning, 4) Compelling evidence of success, and 5) Flexible learning environment (Apple, n.d.). Specifically, ongoing professional learning is defined as professional development that is timely and relevant through a cycle of inquiry that encourages reflection, experimentation, and sharing (Apple, n.d.).

For example, Dwyer (1994) illustrates this in his discussion of Apple Classrooms of Tomorrow (ACOT), a program that began in the late 1980s and introduced Apple computers to

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select ACOT classrooms across the nation that were observed to see how the new technology impacted the teachers and students. Teachers embraced the technology and were able to adapt its uses and limited software applications to best suit their instructional needs, quickly making it apparent that students were engaged with the technology, and teachers reported working more as guides than lecturers, with students interacting more often while using the computers. A mix of traditional and non-traditional teaching approaches took shape in the ACOT classrooms, with the teachers experimenting with new tasks to engage their students.

While Dwyer's (1994) account of the ACOT program is specific to computers during the 1980s, the observations made are consistent with social practice theory and technology that is used in schools today. Social practice theory involves "practices," which are the interactions between individuals and the relationships of those interactions (Merchant, 2012). Practices, or routines, can change as new innovations emerge (such as technology) and merge with existing practices (Merchant, 2012). Hence, social practice theory has implications for schools such as School A that are implementing a mobile device initiative with students and teachers. Social practice theory highlights the importance of understanding the existing practices of students and teachers in terms of technology usage, so that when new innovations are introduced, the new practices can seamlessly merge with the existing ones.

Related to practices, the Technology Integration Matrix (TIM) also served as a framework to examine the levels of technology integration into classroom instruction and the curriculum by teachers at School A. The TIM is organized into two overall categories: 1) Levels of Technology Integration, and 2) Characteristics of the Learning Environment. These two categories are divided into levels of teacher descriptors for each cell in the matrix. The five

levels of technology integration in the matrix are entry, adoption, adaptation, infusion, and transformation. There are also five learning environment characteristics included in the TIM: active, constructive, goal directed, authentic, and collaborative (FCIT, n.d.). Individual teacher technology integration could be assessed using the TIM by aligning the level of technology integration and characteristics of the learning environment that best described what was occurring in the classroom instruction.

<p style="text-align:center">Setting, Population and Sample</p>

Setting

The school organization that was the setting for this Dissertation in Practice (DiP) is a small Title I elementary school in Central Florida that serves approximately 400 students from PK-5. This school will be referred to as School A. As defined by the U.S. Department of Education (2015), Title I is a designation assigned to schools under the Elementary and Secondary Education Act (ESEA). The Title I provision provides funding to schools with high percentages of students coming from low-income families to implement school-wide programs that will assist students to meet academic standards (U.S. Department of Education, 2015). In the past three school years, School A's state-assigned grade declined from a C to an F, and the school was listed on the lowest 100 schools in the State of Florida in 2012 and 2013 (Florida Department of Education FLDOE, 2014). These school grades were based upon the performance of students in grades three through five on standardized tests in Mathematics, reading, and science.

In the past four school years, the school personnel experienced several leadership changes which involved a different principal each year, with the principal shared with a neighboring elementary school for three of those years. In the 2014-2015 school year, the school was assigned a full-time principal. The school also had a full-time assistant principal and Teacher on Assignment (TOA), who served in an administrative capacity in handling student discipline (e.g., student referrals).

The iPads in use at School A (and other Title I schools across the county) were purchased by the school district with Title I funds to support technology use during summer school programs. During the school year, the iPads were housed at schools across the school district, including School A, but could be used in classrooms for student use. The district allowed for the schools to develop a school-based distribution plan to allocate sets of iPads to specific teachers, classrooms, and/or grade levels. School A experienced a gradual but substantial increase in its number of mobile devices from the 2011-2012 school year to the 2014-2015 school year. As School A gained more devices, like other Title I schools in the district, training of faculty members from their respective schools to serve as managers of the devices began taking place. Title I schools with iPads each have a faculty member identified as the Apple Program Facilitator (APF), a role in which the researcher has served. The role of APF was created by the school district as part of the organizational structure within the school district to have a school-based faculty member to oversee to management of the devices.

Due to its state school grade status, the school established Subject Area Leadership Teams (SALTs), which were begun as a mechanism for teachers to collaborate and make decisions in the areas of behavior management, science, Mathematics, literacy, and technology.

During the 2014-2015 school year, the literacy and technology teams were merged and consisted of diverse representation of school faculty and administration, however, no other iPad trainings were scheduled after this, primarily due to required trainings on academic learning areas (e.g., reading and Mathematics).

Population and Sample

The study focused primarily on classroom teachers in grades PK-5, as the students in these grades were the primary intended users of the iPads. An iPad survey was completed by teachers prior to the development or delivery of any new training or professional development in an effort to explore teacher perceptions and experiences regarding the school's iPad implementation, and to identify specific teachers interested in participating in PD sessions. Fifteen classroom and support teachers served as a purposive sample for the survey.

Significance of the Study

In the past three school years, School A's grade declined from a C to an F, and the school was listed on the lowest 100 schools in the state of Florida in both 2012 and 2013. School A was listed on the 2013-2014 Lowest 300 Performing Elementary Schools in the State of Florida (Florida Department of Education, 2014). Raising student achievement in reading was an overall goal of the school, and integrating the iPads within these circumstances was an ongoing undertaking.

At the same time, the overarching goal of the iPads was also centered upon student usage of the devices; hence, the problem of practice examined in this study primarily affected the administrators, teachers, and students. A high rate of teacher turnover from year to year and a

lack of consistent school-based professional development opportunities related to iPad

integration presented a challenge in establishing the expectation for effective use of the iPads in

instruction. In the case of School A, the iPads were purchased by the Title I department and

received by the school without integration expectations, class distribution plans, or teacher

training plans in place. This is reflected in the literature related to how technology is often

purchased without a clear vision or plan of how the devices can be used to support student

learning (Mouza & Barrett-Greenly, 2015). This begins to illustrate a need for a focused

knowledge management plan at the school that can be systematically adjusted as needed from

year to year.

On a grander scale, examining the use of mobile devices in the classroom setting is a

relevant and timely issue in education. As recognized by Leu, Zawilinski, Forzani, and Timbrell

(2014), the use of digital sources, technology, and the Internet are prevalent in the English

Language Arts (ELA) Common Core State Standards, particularly with reference to writing,

reading informational text, and digital literacies.

Furthermore, the National Council of Teachers of English, or NCTE (2015), outlines four

areas of action for literacy learning in its Education Policy Platform. Two of these areas address

elements related to promoting digital literacy in schools: 1) capacity building, and 2)

comprehensive, evidence-based literacy education. Capacity building involves providing

teachers with the resources needed to collaborate with others and engaging in professional

learning, (NCTE, 2015). Comprehensive, evidence-based literacy education involves integrating

literacy instruction across disciplines while promoting the use of multimedia materials. This is

further reflected in the organization's 21st-century literacy framework, which includes such

competencies as developing fluency with various technology tools; creating, analyzing, and evaluating multimedia; and synthesizing multiple sources of information simultaneously (NCTE, 2013).

<div align="center">Limitations</div>

The following limitations are recognized and apply to this research study:

1. Generalization is limited to the sample of teachers at the elementary school that was the subject of the case study.

2. Validity is limited by the teachers who voluntarily completed the survey and the honesty in their responses.

3. Since the sample was taken from the population of School A, the results may apply only to that particular population.

4. Internal and external validity are limited to the reliability of the qualitative instrument that was used in the study.

<div align="center">Assumptions</div>

The following assumptions were made while investigating the research questions:

1. Study participants were representative of all grade PK-5 teachers at School A.

2. The participants in the study responded honestly to the survey items.

3. The participants' answers were based on their own perceptions and beliefs.

4. The participants were able to access the Web-based online questionnaire.

5. The participants answered the questionnaire without the help of other individuals.

<center>Operational Definitions</center>

For this dissertation, a brief list of definitions is provided.

Digital literacy: The ability to use information and communication technologies to access, create, and communicate information (Visser, 2012).

Mobile devices: Portable, handheld electronic devices such as tablet computers, smartphones, laptops, and digital readers (Macmillan Dictionary, n.d.).

Mobile learning: Also referred to as m-learning; learning methods that involves the use of mobile phones or handheld electronic device (e.g., tablet devices) and are not tied to a fixed location (Macmillan Dictionary, n.d.).

Professional development: The process of learning skills and obtaining experience that help one progress within his or her career.

Title I: A designation assigned to schools under the Elementary and Secondary Education Act (ESEA). The Title I provision of ESEA provides funding to schools with high percentages of students coming from low-income families to implement school-wide programs that will assist students to meet academic standards (U.S. Department of Education, 2015).

Technology integration matrix (TIM): The TIM is a framework developed by the Florida Center for Instructional Technology (FCIT) to guide the implementation and use of iPads in the classroom for instruction and focuses on four areas: a) defining and evaluating technology integration, b) setting a clear vision in teaching with technology, c) establishing a common language for teachers and administrators, and d) effectively using professional development resources (FCIT, n.d.).

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CHAPTER TWO: LITERATURE REVIEW

Introduction

Ownership of mobile devices such as tablets, e-readers, iPods, tablets, and smartphones has increased in the past five years, particularly among K-12 aged students (Herro, Kiger, & Owens, 2013), highlighting an emerging trend in the way students learn and access content. Students are learning in environments where non-linear and non-print forms of text are emerging, and developments in mobile technology have made mobile devices such as iPads more versatile, thus prompting educators to look toward mobile devices as potential educational tools to engage students (Alexander & Fox, 2004; Herro, Kiger, & Owens, 2013; Wu et al., 2012).

Mobile devices, instead of other devices such as desktop computers, are becoming more commonly used to access the Internet for information and to communicate (Pew, 2013). In educational contexts, the iPad is viewed to have great potential in terms of integrating mobile devices into classroom settings. The iPad's portability, touch-screen, wireless Internet connectivity, and access to mobile apps are features that are ideal for use in the classroom environment (Falloon & Khoo, 2014).

Studying the integration of mobile devices such as iPads in classroom settings is a relevant and timely issue in education. As recognized by Leu, Zawilinski, Forzani, and Timbrell (2014), the use of digital sources, technology, and the Internet are prevalent in the English Language Arts (ELA) Common Core State Standards, particularly with reference to writing, reading informational text, and digital literacies.

For example, organizations such as the National Council of Teachers of English, NCTE, (2015) posit the need to engage teachers in professional learning that equips them with the skills to use a variety of multimedia materials. Also stipulated is that students should have access to the appropriate digital tools and receive the necessary support that can allow them to develop multimedia literacy (NCTE, 2015).

Furthermore, the International Society for Technology in Education, ISTE, also recognizes the rapid development of technology as an educational tool. Reminiscent of Traxler's (2010) views, the organization's rationale posits their stance that technology is not only changing what we learn, but how we learn as well (ISTE, 2014). ISTE has published standards for students, teachers, administrators, and coaches that provide a framework for the expectations of integrating digital strategies and technology as a tool for critical thinking and collaboration (ISTE, 2014). The developments of Bring Your Own Device (BYOD) initiatives and mobile device initiatives in schools and school districts are becoming a common strategy to implement the use of mobile devices for student learning (Herro, Kiger, & Owens, 2013).

The overarching goal in the use of the iPads in School A was centered upon student use of the devices in the classroom. There was great potential in using the iPads to support classroom instruction, however, there was a lack of consistent school-based professional development opportunities on effective strategies for using the iPads. Also, establishing and maintaining a common vision and expectation at the school for effective use of the iPads in instruction was not clearly articulated to teachers. This is often the case in schools as technology is often purchased without a clear vision or plan of how the devices can be used to support student learning (Mouza & Barrett-Greenly, 2015). This illustrated a need for a focused knowledge management plan at

School A.

<div align="center">Background</div>

Schools and school districts across the U.S. and internationally are beginning to explore and form their own mobile device programs or initiatives to use mobile devices as a learning tool and examine the impact on student learning (Herro, Kiger, & Owens, 2013). The following sections describe the contexts of schools that have implemented a mobile device initiative. These examples illustrate the varied approaches to mobile device implementation in classroom settings and the intended and unintended outcomes that can potentially result. These two studies also highlight the role of professional development and teachers, and how it contributes to the successful formation and implementation of a mobile device program.

School-based implementation of mobile devices: Nationally and internationally

Herro, Kiger, and Owens (2013) examined an elementary school in one Midwestern district of 5,200 students that was chosen for a pilot program that implemented the use of iPod Touches. The goal of the program was to examine the logistic, technical, and instructional needs for implementing the iPods at the pilot school and then at five additional schools.

Teachers at the pilot school were provided with professional development in using the iPods, specifically with the use of apps. The iPods were preloaded with Mathematics and reading apps, which the teachers evaluated in terms of their instructional usefulness (Herro, Kiger, & Owens, 2013). They were encouraged to explore other instructionally relevant apps that could be used for instruction. The iPods were stored in a syncing cart and rotated between Kindergarten through fourth grade classrooms. The apps used on the iPods addressed topics and units appropriate for each grade level in reading, Mathematics, and science. Kindergarten students

<div align="center">15</div>

used basic apps to practice letter, number, and shape recognition; first grade students read interactive stories that were downloaded to the devices and then used an app to create their own stories; second grade students used the voice recorder on the iPods to monitor their reading fluency; third grade students practiced math facts; and fourth grade students used an accelerometer app to measure the acceleration of cars they created **(**Herro, Kiger, & Owens, 2013). One of the outcomes of the pilot program included a study completed by the district to examine the use of mobile devices and Mathematics achievement, however, the impact of the use of the iPods and the apps on student learning was not clear.

Establishing and implementing a school-based mobile device initiative

Ng and Nicholas (2012) focused on the sustainability of mobile learning initiatives in schools by focusing on the roles of the individuals that would be involved in such an effort. They referred to this as the person-centered framework. This includes the actions of stakeholders such as teachers, students, and parents, and their interactions with other stakeholders such as the school's leadership and technical support.

Ng and Nicholas (2012) explored their framework in a research study conducted at an Australian secondary school. The three-year study examined the school's implementation of a mobile device initiative, or mLearn program. The study focused specifically on the leadership and management of the program, the teachers and students, and their interactions with the mobile devices. The devices used by the students and teachers were HP iPAQ PDAs.

The principal of the school envisioned the mLearn program as a way to provide students with a tool that could access multimedia, foster cooperative learning between students and teachers, and provide "just-in-time information for learning" (Ng & Nicholas, 2012, p. 700). The

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principal coordinated professional development for teachers in which 20 PDAs were purchased

for teachers to try for seven months before the mLearn program was to begin. These teachers

shared their experiences at an mLearn conference held at the school five months before the

program was to begin. Fifty-seven students and 25 teachers participated in the program in the

first year. Parents with students participating in the program purchased the devices for their child

(2012).

The mLearn researchers gathered data via questionnaires, classroom observations, focus

group interviews, and individual interviews with relation to the implementation of the mLearn

program and the use of the devices in classrooms (Ng & Nicholas, 2012). Students completed

pre- and post-questionnaires and participated in focus group interviews at the end of the first

year. In the interviews, the students generally received the program well, citing that they enjoyed

being able to access the Internet and the interactivity of the devices. Some criticisms they cited,

however, included technical issues with the PDAs and their desire to have been able to use them

more during class.

The teachers' perceptions of the mLearn program reflected five themes centered on issues

that they encountered during the course of the mLearn program. Based on the teacher responses

in the post-questionnaire, the themes that arose included technical issues, time issues,

competence issues, student issues, and miscellaneous issues (Ng & Nicholas, 2012). Table 1

summarizes some of the pertinent issues cited by teachers that impacted their use of the devices

with students.

Table 1
Teacher-cited Issues During the mLearn Program

_____

Issue Type	Teacher Perceptions
Technical	Battery life and the quality of the features and programs.
Time	Extra time to plan lessons.
Competence	Relying on one's own knowledge to fix issues with the devices.
Student	Students would not bring the devices to class or properly care for their devices; distraction of games.

_____

Despite these issues, the teachers did cite examples of student engagement and

collaboration through projects completed using the PDAs (Ng & Nicholas, 2012). The principal

and the mLearn program coordinator were both interviewed at the end of the first year of the

program. The principal, despite high enthusiasm for the program, cited that it did not go as well

as expected, that too many classes began in the program at once. The mLearn program

coordinator agreed that the technical issues impacted the use of the PDAs in the classroom and

indicated that the teachers needed more support, especially with teachers having to understand

the difference in pedagogy when teaching with mobile devices. In the second year of

implementation, the principal decided to add two additional classes with plans to make

improvements to the Wi-Fi, increase technical support, purchase replacement PDAs, and provide

mentoring to the teachers participating in the program. The next year, there were a total of five

PDA classes, however, according to the mLearn coordinator, the issues continued and it was

decided that the school would switch to netbooks for the third year of the program (Ng &
Nicholas, 2012).

Despite high enthusiasm and interest at the outset of the mLearn program and financial
backing, based on Ng and Nicholas's (2012) person-centered framework, it was not sustainable,
because of conflicts. They posit that dissension between the principal and the mLearn
coordinator and flagging enthusiasm from teachers over time contributed to the unsustainability
of the program. Additionally, the availability of technical support staff was limited, which
delayed device repair. The researchers indicated that while the PDAs were being used, they
found no evidence that the devices were used in conjunction with other technology, such as data
projectors, in the classrooms. Lastly, indications that the teachers were not ready to make the
pedagogical shift to using the PDAs also played a role in the program's unsustainability. While
the school's mLearn program was not successful in this particular case, the person-centered
framework offers a potential framework for implementing a mobile device program in a school
and highlights the various elements and stakeholders that should be considered in such an
endeavor (2012).

School-based implementation of mobile devices: Local context

The use of iPads (and/or iPod Touches) at schools in the district discussed in this
dissertation is a fairly new initiative and exists two-fold: in schools with iPads provided through
Title I funds (such as School A), and in schools designated as part of the school district's Bring
Your Own Technology (BYOT) program. Both initiatives began taking shape during the 2011-
2012 school year. School A was not part of the BYOT program, and received all of its iPads
through Title I funding. The school district's learning technologies department oversees these

initiatives in terms of communicating updates to the school-based Apple Program Facilitators and training them in using the software to manage the iPads. This department also provides school-based professional development upon request from schools, however, resources are limited and training sessions tend to be sporadic.

The learning technologies department of the school district of which School A is a part also encourages that schools use the Technology Integration Matrix (TIM) developed by the Florida Center for Instructional Technology (FCIT) to guide the implementation and use of iPads in the classroom for instruction. The TIM is a framework that focuses on four areas: a) defining and evaluating technology integration, b) setting a clear vision in teaching with technology, c) establishing a common language for teachers and administrators, and d) effectively using professional development resources (FCIT, n.d.). While schools are encouraged to use this as a resource, School A had not adopted the TIM and was not using it as a framework to guide its implementation plan for the iPads.

Student use of mobile devices

Other studies have also explored the use of mobile devices in specific classroom environments. In a research study conducted by Falloon and Khoo (2014), they explored the use of iPads during a small-group literacy activity to observe the collaboration and types of talk that the students engaged in during the course of the activity. The study built upon the observations made by Fisher, Lucas, and Galstyan (2013) in using iPads to promote collaboration among students in a business calculus class. They found that compared to a laptop, the iPads supported better transitions between using the device as a private workspace and a shared workspace (Falloon & Khoo, 2014). The researchers attributed this to the design of the iPad, which lends

itself to be used as such (Falloon & Khoo, 2014). In their study, Falloon and Khoo (2014) examined a group of 19 year-one (first-grade) students as they engaged in a literacy activity in pairs using three different apps on a shared iPad. They observed the different types of talk the students exhibited during the activity, such as exploratory, disputational, and cumulative. Exploratory talk referred to constructive criticism, disputational talk referred to disagreements that occurred between the partners, and cumulative talk referred to talk that demonstrated agreement between the partners (Falloon & Khoo, 2014).

At the end of their study, Falloon and Khoo (2014) observed that the students demonstrated a high frequency of engagement characterized by cumulative talk. Two of the pairs demonstrated some engagement in exploratory talk, and three of the pairs demonstrated disputational talk, making up 3-4% and 6-7% of the total talk time, respectively. The results seem to indicate that the use of the iPads supported collaborative talk amongst the pairs. The students were observed working agreeably through the tasks and alternating between roles in which one student completed the task and the other served as an observer or checker (Falloon & Khoo, 2014). Overall, they found these results to be positive.

Despite qualitative research studies examining the implementation of mobile devices in classroom environments, empirical research linking educational technology and student learning, especially in K-12 settings, is scant (Kiger, Herro, & Prunty, 2012). Kiger, Herro, and Prunty (2012) conducted such a study at a Midwestern elementary school to determine how a Mobile Learning Intervention (MLI) would impact third grade Mathematics achievement, specifically in multiplication facts, compared to students who used traditional methods for practice.

The study took place for nine weeks during the third quarter of the school year. Eighty-

seven third grade students participated in the study across four classrooms. In these classrooms, the Everyday Mathematics (EM) program was used to teach students Mathematics where teachers used whole group, small-group, and individual instruction as part of this program. Prior to the study, the students were administered a 50-question pre-test. During the study, two classroom teachers used EM coupled with traditional techniques such as flash cards, Mathematics games, and number sequences for practice of multiplication facts. The remaining two classrooms used EM but were part of the MLI group. These classes used several Mathematics apps that had been preloaded to a set of 24 iPod Touches. Following a whole-group lesson, the students would use one to two specific apps for 10 minutes to practice multiplication facts. The teachers and students in the MLI classes received support from the learning resource teacher (LRT), who would demonstrate to students how to use the apps and change the settings, so that they could focus on the Mathematics facts on which they needed the most practice (Kiger, Herro, & Prunty, 2012).

At the conclusion of the study, a 100-item post-test was administered to the students. With an average score of 54.5, the MLI students performed better on the 100-item post-test than the comparison group, whose average score was 46.3. Additionally, the MLI students answered on average more double-digit multiplication items correctly than the comparison students. Controls for prior student achievement and other covariates were accounted for (Kiger, Herro, & Prunty, 2012). Based on their findings, Kiger, Herro, and Prunty (2012) stipulated that combining traditional curriculum (e.g., Everyday Mathematics) with mobile devices was a cost-effective way to improve student learning. Potential limitations to the study, such as effect size and pre-treatment group differences, did not impact the results significantly.

The review of current literature suggests that successful and sustainable technology integration programs have a strong focus on professional development that involves teachers in the PD process, is consistent and ongoing, and allows for reflection, experimentation, and sharing (Mouza & Barrett-Greenly, 2015; Apple, n.d.). Furthermore, cases such as the MLI example described above, in which teachers are actively involved with the professional development and implementation of the technology in the classroom, tended to have a positive impact on student learning and achievement. Hence, the role of effective professional development for teachers with relation to technology integration and student learning appear to be closely related. The following section explores a case in which a strong professional development program for teachers resulted in positive benefits for both teacher and student learning.

<div align="center">Professional Development and Mobile Learning</div>

Apple Distinguished Schools

As previously discussed, Apple Inc. outlined five best practices that schools that they have deemed as Apple Distinguished Schools exhibit in their use of technology in the classroom. These elements are 1) Visionary leadership, 2) Innovative learning and teaching, 3) Ongoing professional learning, 4) Compelling evidence of success, and 5) Flexible learning environment (Apple, n.d.). Specifically, ongoing professional learning is defined as professional development that is timely and relevant through a cycle of inquiry that encourages reflection, experimentation, and sharing (Apple, n.d.). These five elements are relevant considerations in a mobile device initiative.

The research explored by Ng and Nicholas (2012) also exemplifies some of these elements that contribute to the seamless implementation of mobile devices in schools and classrooms. These elements include:

1. The need for buy-in from stakeholders (e.g., students, parents, school administration, and teachers)

2. Shift in pedagogy by teachers (teacher-centered to student-centered)

3. Ongoing professional development

4. Consistent technical support

School-based professional development initiatives

Mouza and Barrett-Greenly (2015) highlight an important shift in the way "mobile learning" is defined. Specifically, early definitions of mobile learning were device-centered, focusing on the mobility of such devices. For instance, mobile learning has been defined as, "learning methods and materials that involve the use of mobile phones or handheld computers" (Macmillan Dictionary, n.d.). This is in contrast to human- or learner-centered definitions, which consider the implications of the interactions between learners, devices, and the environment.

This human- or learner-centered definition of mobile learning has relevant implications in educational settings, such as schools, in that successful mobile learning depends partly on maximizing the advantages that the devices can have (e.g., apps) and the individuals who will be using the devices (e.g., teachers and students). Furthermore, Mouza and Barrett-Greenly (2015) aptly made the observation that professional development (PD) is a key factor in supporting the integration of mobile devices into classroom instruction as well as in helping teachers realize the potential of such devices.

In their study, Mouza and Barrett Greenly (2015) examined four classroom teachers at low-performing schools in urban, low-income neighborhoods and their integration of iPads into their classrooms to support student learning. They specifically sought to observe how a PD initiative centered around best practices could support these teachers in using the iPads and apps effectively and successfully. These included such apps as Science360, iMovie, iBooks, Safari, iTooch, iCardSort, and KidBiz3000. In their study, the researchers applied five identified principles of effective PD: 1) a focus on content learning, 2) sufficient duration, 3) active learning for teachers, 4) allowance for collaboration, and 5) alignment with student learning standards and outcomes.

Based on these principles, the teachers participating in the study received PD in three components: a summer institute, lesson design, and follow-up classroom support. The teachers learned how to use the iPads and familiarize themselves with the educational apps, and learned about recommended practices for aligning the use of mobile technology consistently with how people learn. Over the course of two months, teachers also created lesson plans that were appropriately fit to their instructional standards and student needs while they incorporated the use of the iPads and apps. Teachers received feedback on their lessons and were able to make adjustments prior to implementing it in the classroom. The participating teachers in the PD initiative cited that the hands-on aspect of the training and the fact that they could apply their learning into practice in their classrooms was beneficial. As a result, "…implementation of mobile apps for instructional purposes fostered student academic growth, and empowerment" (Mouza & Barrett-Greenly, 2015, p. 6).

Based upon the relevant literature, it is clear that there are many facets to implementing mobile device initiatives in a school setting as well as in ensuring that the initiative is successful and sustainable. Some key commonalities include:

1) A school-based plan must be established for the distribution and access to the iPads

2) A clear vision for the expectations for the use of the devices

3) PD for teachers that reflects best practices to support learning

4) Opportunities for teachers to plan, collaborate, and receive feedback

Summary

Research related to the implementation of mobile device initiatives in school settings is burgeoning, specifically in terms of the role that professional development serves in supporting teachers who integrate mobile devices such as iPads into their classroom instruction. Furthermore, cases in which teachers are actively involved with the professional development and implementation of the technology in the classroom tended to impact student learning and achievement positively (Mouza & Barrett-Greenly, 2015); hence, the role of effective professional development for teachers with relation to technology integration and student learning.

CHAPTER THREE: RESEARCH METHODOLOGY

Introduction

The purpose of this research study was multifaceted. First, this study sought to examine the perceptions and experiences of teachers as related to iPad integration (among both users and non-users of the iPads). Second, this study sought to examine how teachers were integrating iPads by identifying instructional strategies used and activities conducted by teachers who were integrating iPads into their classroom instruction. Lastly, this study sought to identify the content areas in which teachers, both users and non-users of the iPads, had an interest in participating in professional development (PD) sessions to support their use of the technology and improve their skills and knowledge in order to inform the creation of a future PD plan at School A. The TPACK framework, which focuses on the interactions between and among the technological knowledge and pedagogical knowledge when technology is incorporated into instruction (Koehler & Mishra, 2009), was used as a guide to interpret the data gathered from teachers by examining the practices of teachers. Importantly, the TPACK framework could be used to assess the shift from the perspective of technology as an instructional supplement, to a core instructional tool for content, pedagogy, and student learning. In addition, the TIM was used as an evaluative tool in examining the current practices of teachers in two overall aspects: 1) levels of technology integration into the curriculum, and 2) characteristics of the learning environment (FCIT, n.d.). The TPACK framework and TIM were used as guides to identify areas of strength and areas of improvement in School A's iPad implementation efforts and classroom integration practices that could be addressed with a future school PD plan to support teachers. This included reviewing teacher responses for trends in the types of instructional strategies being implemented

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through the use of iPads, the most common apps being used by teachers and students, and the instructional activities in which students were engaged. In this chapter, the study design, study population, instrumentation, data collection, and data analysis are explained.

Research Questions

The following research questions were used to guide this study:

1. What are the experiences of instructional staff as related to the integration of iPads into classroom instruction among users of the iPads at School A?

2. What are the experiences and perceptions of instructional staff as related to the integration of iPads into classroom instruction among non-users of the iPads at School A?

3. How are members of the instructional staff at School A integrating iPads into classroom instruction?

4. What are the professional development (PD) interests of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

5. What are the professional development (PD) needs of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

Design of the Study

This study used a case study design that utilized mixed methods to explore teachers' experiences with using and integrating iPads and to formulate a plan for future PD at School A. The mixed-method data collection incorporated elements of qualitative research through a case

study and elements of quantitative analysis through the use of descriptive statistics. Case study research is appropriate when it is used to collect descriptive data by examining an event pertaining to a particular group, organization, or situation over a period of time (Roshan, 2009). As a type of qualitative research, a case study is exploratory in nature through the collection and analysis of data that provides the researcher with insights and explanations as to why a particular phenomenon is occurring in an organization, for example (Roshan, 2009). As explained by Creswell (2006), a case study approach can focus on one bounded system to develop an in-depth description and analysis of an event, program, or an activity. The case study approach was chosen as it would allow for an in-depth exploration into the school's iPad initiative from the perspectives of key stakeholders (e.g., teachers) within the context and environment of School A. Specifically, these were the faculty members who would be the primary individuals implementing the devices in classrooms with students and could provide their perceptions about using the iPads and their PD needs.

This case study approach incorporates elements of practical participatory program evaluation approaches that focus on the organization itself, the context of the program in the organization, and the individuals within the organization, in order to deliver evaluation results that can and will be used by the key stakeholders of the organization (Fitzpatrick, Sanders, & Worthen, 2011). This approach to a case study was valuable in that faculty members at School A had a role in describing how they integrated iPads into their classroom instruction as well as identifying the areas where they desired support or PD. The data gleaned from the case study was used to develop a comprehensive PD plan for the future to support teachers.

In addition, elements of quantitative research can also be incorporated as a supplement to case study research. For example, descriptive statistics are appropriate to summarize and graphically present data such as numerical figures and percentages, but interpreted through qualitative analysis. The use of descriptive statistics can provide insights into questions that can be explored by numerical data (Roshan, 2009). In this research study, descriptive statistics were used to summarize and/or present numerical data such as teacher demographics, the number of teachers integrating and not integrating iPads, and the percentages of teachers using specific apps and instructional strategies, for example. Furthermore, this case study provided insight as to the reasons why teachers were not using the iPads and what types of PD support they needed (e.g., using apps, how to integrate the iPads into the various content areas, instructional strategies, etc.). Identifying these reasons helped to inform recommended solutions to promote the effective integration of the iPads and to provide PD that is relevant to the teachers' needs.

The researcher also collected observational data based from experience gained in serving as the Apple Program Facilitator (APF) (e.g., trainings attended and experience managing the devices) and information obtained from training materials, the APF handbook, and past SALT meeting notes. As an observer as part of this case study, the researcher took into account the importance of the phenomenon of self-serving bias. Self-serving attributional bias refers to the tendency to attribute negative or undesirable outcomes as caused by external factors versus positive or desirable outcomes as attributable to personal performance (Gioia & Simms, 1985). Therefore, the data collected through observation should seek to inform any potential factors – internal and external to School A and its teachers – that contribute to the state of iPad integration at the school.

External Validity

      Due to the in-depth and subjective nature of qualitative research methods such as a case study, it can be argued that these methods are less reliable and valid (Roshan, 2009). Although this study focused on the experiences of one specific school during the course of one school year, this allowed for reflexivity to take place on part of the researcher and allowed the organization (School A) to be able to gain a better understanding of its environment and how it could improve itself with respect to its iPad integration efforts by teachers in classrooms and how it trains its teachers. Case studies are advantageous in this respect in that they can demonstrate how things occur in practice, thus providing useful information for the organization (Roshan, 2009). Furthermore, efforts to strengthen the external validity were made by ensuring that the sample of teachers was representative of School A's faculty as a whole and that those participating included classroom teachers, support teachers (e.g., ESOL and ESE), and instructional coaches – job roles common across elementary schools in School A's district. This use of purposive sampling helped the researcher obtain information from individuals at School A that could provide information regarding their experiences with integrating the iPads into their classroom instruction.

Data Analysis Methods

      This case study sought to explore the experiences and perceptions of teachers with integrating iPads into their classroom instruction. Additionally, this case study sought to identify specific content areas, instructional strategies, and apps with which the teachers at the school would prefer to receive professional development in relation to integrating iPads into their classroom instruction. Specifically, these content areas included the core subject areas that were

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taught at the elementary school level at School A: Mathematics, language arts, science, and social studies. The qualitative data garnered from this case study was used to inform the development of a long-term professional development plan for the school related to the integration of iPads into the classroom. Descriptive statistics were completed to summarize the demographic data that was collected, as well as the teacher perceptions of and experiences with iPad integration into their own classrooms.

<div align="center">Setting for Study</div>

School A is a small Title I elementary school in Central Florida that serves approximately 400 students from grades PK-5. This Title I designation, as part of the Elementary and Secondary Education Act (ESEA), is assigned to schools with high percentages of students coming from low-income families. School A is located in a high-crime, economically depressed area of its city. Approximately 98% of the school's student population receives free or reduced lunch, and 81% of the population is composed of minority students. Specifically, 45% of the school population is composed of Black/African American students, and 36% is comprised of Hispanic/Latino students (FLDOE, 2015). The Title I provision of ESEA provides funding to such schools, including School A, to implement school-wide programs to help students meet academic standards. The school's grade as assigned by the State of Florida declined from a C to an F in the past three school years and was listed on the lowest 100 schools in the State of Florida in both 2012 and 2013, and on the lowest 300 list in the 2013-2014 school year (Florida Department of Education FLDOE, 2014). School grades were based upon the performance of students in grades three through five on standardized tests in Mathematics, reading, and science.

As a result, School A received visits from the Florida Department of Education and was required to have a daily supplemental one-hour-long reading intervention block.

In the past four school years, the school personnel experienced several leadership and teacher changes with a different principal each year, with the principal shared with a neighboring elementary school for three of those years. In the 2014-2015 school year, the school was assigned a full-time principal who remained principal for the 2015-2016 school year. The school also had a full-time assistant principal and Teacher on Assignment (TOA). At this school, the TOA was a fairly new position. The TOA served in an administrative capacity, primarily in handling student discipline (e.g., student referrals). The school has had two different TOAs within these three years, both of whom were faculty members at the school prior to becoming the TOA. Teacher turnover was common, with approximately half of the teaching staff having left School A at the end of the most recent school year.

Due to its Title I status, the school was selected by the school district's Title I department to receive iPads, which were housed at the school during the school year for summer school programs, but may be used in classrooms for student use. This is consistent with trends in other school districts in Florida that are creating pilot programs seeking to digitize schools and integrate mobile devices into classrooms through the use of iPads purchased with Title I funding (FLDOE, 2011). The district allows the distribution of the iPads to be a school-based decision and varies from school to school depending on the number of devices. School A experienced a gradual increase in its number of mobile devices and has had to modify its distribution each school year. Beginning in 2011, the school received a set of 20 iPads to begin using in selected classrooms, with more added in the 2013-2014 school year, bringing the total to 90. In the 2014-

2015 school year, an additional 90 iPads (iPad Air generation) were added, bringing the total

number of iPads to 180. The iPads were stored in six iPad syncing carts with 30 iPads per cart.

As at other Title I schools in the district, School A received more iPads, and training of a faculty

member to serve as a manager of the devices began taking place.

In terms of the school-based management of the devices, a faculty member is identified

as the Apple Program Facilitator (APF), a role in which the researcher has served. The role of

APF at these schools was created by the school district to have a school-based faculty member

serve as a liaison to oversee management of the devices and receive training from the Title I

department related to the management of the devices. The APF is responsible for the

maintenance, storage, and distribution of the iPads during the school year. This includes updating

the iPads' iOS operating system and apps as needed, with the support of the school district's

technical support. At School A, the APF was the media specialist, with the researcher serving as

a Co-Apple Program Facilitator.

In the past two school years, School A established Subject Area Leadership Teams

(SALTs), per the FLDOE, because of its school grade status. The SALTs were begun as a

mechanism for teachers to collaborate and make decisions in the areas of behavior management,

science, Mathematics, literacy, and technology. During the 2014-2015 school year, the literacy

and technology teams were merged. The team developed an iPad distribution plan which

involved assigning an iPad cart for grades K-5. The iPads in the cart were shared equally among

the teachers in each grade level to ensure that each classroom had iPads. The same distribution

plan was implemented for the 2015-2016 school year. Although the distribution plan was

implemented to provide equal numbers of iPad across classrooms by grade level, teachers could

share additional iPads with other teachers in their grade level if needed for a special project or lesson that might require more iPads. During the 2014-2015 school year, the team was able to arrange for two school-based training sessions: (a) a teacher-led session with an overview of iPads, and (b) a session led by the Title I Apple Teacher on Assignment from the district. No further Professional Development (PD) with faculty took place at School A specifically related to iPads and classroom instruction, as PD had primarily focused in other areas (e.g., reading and Mathematics).

<div align="center">Study Population</div>

The total population of all classroom teachers in grades PK-5 and support teachers were identified as the target population. The population for this study was the 34 faculty members of School A, consisting of classroom teachers in grades PK-5, ESE teachers, ESOL teachers, instructional coaches, and intervention teachers. Table 2 summarizes the number of teachers per grade level and support personnel at School A.

Table 2

Faculty Population by Grade Level

Grade Level	Number of Teachers	% of Population
PK	1	3
K	4	12
2nd	5	15
3rd	4	12
4th	3	8
5th	3	8
ESE	3	8
ESE Support	3	8
ESOL Teachers	2	8
Instructional Coaches	3	8
Intervention Teachers	3	8
Total	34	100

Sample

The purposeful sample for this study consisted of 15 teachers ($n = 15$) from the total

population of all classroom teachers in grades PK-5 and support teachers (who serviced students

in grades PK-5), as these would be the individuals with the most access to the iPads and the

opportunity to integrate them into their classroom instruction. In the 2015-2016 school year, a

total of 34 classroom teachers, support teachers, and instructional coaches composed the faculty

population at School A. These 34 faculty members were invited to participate in this study, and

15 voluntarily completed the online survey instrument for a return rate of 44%. The purposive

sample consisted of 15 faculty members who work with students in grades PK-5.

Instrumentation

A qualitative instrument (herein referred to as the survey; see Appendix B) for this

Dissertation in Practice was created by the researcher to gather data and analyze perceptions and

experience of School A's classroom and support teachers in grades PK-5. The 21-question

survey was used to glean the following information: 1) to gather teacher demographics; 2) to

determine teachers' perceptions of and experiences with iPad implementation at the school and

in their classrooms; and 3) to determine areas of interest with regard to PD delivery (e.g., content

areas and how to effectively use the iPads and the apps downloaded to them) to be able to design

teacher PD to meet those needs in the future. School A had experienced a lack of PD for teachers

related to iPad integration; therefore, the survey served to inform potential areas for

improvement specific to the context and environment of School A. The researcher also obtained

observational data from experience gained in serving as the APF (e.g., trainings attended and

experience managing the devices) and information obtained from training materials, the APF

handbook, and past SALT meeting notes.

Data Collection

The 21-question survey was created electronically using Qualtrics and disseminated via

email. The survey consisted of multiple-choice, multi-select, and open-ended questions related to

the perceptions and experiences of teachers and the integration of iPads into classroom

instruction, and their PD needs. Open-ended questions allowed teachers to elaborate on their

responses regarding why they were not using iPads (if applicable), and to describe their iPad

instructional practices and how students used the iPads in their classrooms. The survey was

distributed to all classroom and support teachers in grades PK-5 and was completed voluntary.

Demographic data was also collected using the survey, which included a) number of years of

teaching experience, b) number of years of teaching at School A, c) grade level, d) job role, and

e) number of years in the current job role. Data were collected using the following steps.

Step 1: The researcher placed the teacher survey instrument online using a secure server.

Step 2: The researcher drafted the invitation e-mail to accompany the survey, which was

submitted to and approved by IRB (see Appendix A). The researcher sent out an e-mail

invitation to the target population at the school for participation in the survey using the school

district's e-mail system. The e-mail invitation provided a link to an online informed consent

form. If teachers elected to participate, the link directed them to the Website, where they

electronically signed the informed consent form.

Step 3: After teachers electronically signed the informed consent form, the survey was

displayed.

Step 4: Study participants completed the online survey, and data were captured electronically.

Step 5: One week after the initial e-mail invitation was sent, the researcher sent out follow-up reminders via e-mail.

Step 6: Approximately two weeks after the initial e-mail invitation was sent, the survey link was removed so that it could no longer be accessed.

Step 7: The data were downloaded from the secure server and imported into Microsoft Excel.

Step 8: The data were reviewed and checked for duplicate entries using the teachers' names. No duplicate entries were found. Each entry was time and date stamped. The researcher accepted the first survey completed and removed any additional submissions. The final sample consisted of 15 surveys, for a response rate of 44%.

Step 9: The researcher employed a holistic approach (Cresswell, 2006) to analyze the data collected from the survey to develop detailed descriptions of the emergent themes within the case as identified from the survey, observational data, and relevant documents.

Step 10: The researcher completed the interpretive phase, in which meaning was derived from the data analysis and what was learned from the data was explained. This involved examining the data for emergent themes and commonalities that informed the research questions guiding the study (Cresswell, 2006). To complete this step, the researcher categorized teacher responses into categories related to teacher experiences or perceptions, integration strategies/activities, and professional development. Then, the responses were cross-referenced to the Technological Pedagogical and Content Knowledge (TPACK) framework and Technology

Integration Matrix (TIM) to identify areas of strength and areas of improvement that could be addressed with a future school PD plan. Descriptive statistics were completed to summarize the demographic data that was collected as well as the teacher perceptions of and experiences with iPad integration into their own classrooms.

<u>Data Analysis</u>

The data analysis for this research study consisted of qualitative and quantitative analysis techniques appropriate for case study research. In order to answer research questions 1 and 2— What are the experiences of instructional staff as related to the integration of iPads into classroom instruction among users of the iPads at School A/What are the experiences and perceptions of instructional staff as related to the integration of iPads into classroom instruction among non-users of the iPads at School A—an analysis for common themes among teacher responses in the survey was conducted. An analysis for common themes allowed for the researcher to be able to generate detailed descriptions and collate similarities among teacher perceptions regarding the experiences and perceptions about iPad integration. Observational data garnered from the review of documents such as training materials, the APF handbook, and meeting minutes informed the researcher as to the distribution of the iPads and the types of apps downloaded.

In order to answer research question 3—How are members of the instructional staff at School A integrating iPads into classroom instruction—an analysis of teacher responses was conducted to identify specific instructional practices, strategies, and activities implemented by teachers in their classrooms and how students were using the devices.

In order to answer research questions 4 and 5—What are the professional development interests of the instructional staff at School A with relation to the integration of iPads into their classroom instruction/What are the professional development needs of the instructional staff at School A with relation to the integration of iPads into their classroom instruction—an analysis for common themes among teacher responses in the survey was conducted. The analysis for common themes focused primarily on the questions related to areas of the type of professional development desired by teachers with relation to iPads and how teachers who were integrating iPads into their classroom instruction were doing so. Here, an analysis of common themes among teacher responses allowed for the researcher to explore how teachers were integrating the iPads into their classroom instruction, to cross-reference it to the TPACK framework and TIM, and to identify areas of strength and areas of improvement that could be addressed with a school PD plan. This included reviewing teacher responses for trends in the types of instructional strategies being implemented through the use of iPads, the most common apps being used by teachers and students, and the instructional activities in which students were engaged. Descriptive statistics were used to present this data. The analysis revealed any commonalities among the teachers with regard to the desired iPad PD.

<div align="center">Summary</div>

This case study explored the current practices of 15 PK-5 teachers at a small elementary school in a Central Florida school district with relation to the integration of iPads into their classroom instruction. The case study used a survey coupled with observational data from several sources to garner teacher experiences related to the integration of the iPads into classroom instruction, teacher practices, and teacher PD needs specifically regarding how to effectively

integrate iPads into their classroom instruction. Demographic data of the survey participants were also collected as part of the survey. The sample for this case study consisted of 15 teachers in grades PK-5 at the elementary school. A holistic approach (Creswell, 2006) was employed in the analysis of data for both research questions to develop detailed descriptions of the emergent themes within the case as identified from the survey and observational data, as well as descriptive statistics for the demographic data that were collected. Chapter Four provides a summary of the data analysis.

CHAPTER FOUR: ANALYSIS AND RESULTS

Introduction

The purpose of this research study was to 1) examine the perceptions and experiences of teachers as related to iPad integration (among both users and non-users of the iPads), 2) examine how teachers were integrating iPads by identifying instructional strategies used and activities conducted by teachers who were integrating iPads into their classroom instruction, and 3) identify the content areas in which teachers, both users and non-users of the iPads, had an interest in participating in professional development (PD) sessions to support their use of the technology and improve their skills and knowledge in order to inform the creation of a future PD plan at School A. Relevant demographic data was also collected using the survey to determine teachers' years of overall teaching experience, years of experience at School A, and current job role at School A.

This chapter provides the results of a case study that used mixed methods to answer the following research questions:

1. What are the experiences of instructional staff as related to the integration of iPads into classroom instruction among users of the iPads at School A?

2. What are the experiences and perceptions of instructional staff as related to the integration of iPads into classroom instruction among non-users of the iPads at School A?

3. How are members of the instructional staff at School A integrating iPads into classroom instruction?

4. What are the professional development (PD) interests of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

5. What are the professional development (PD) needs of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

<u>Demographic Data</u>

This research study consisted of a purposive sample ($n = 15$) of the classroom and support teachers working with students in grades PK-5 at School A during the 2015-2016 school year in a mixed-method design (i.e. a case study supplemented with quantitative analysis using descriptive statistics). In the 2015-2016 school year, a total of 34 classroom teachers, support teachers, and instructional coaches composed the faculty population at School A. Thirty-four faculty members were invited to participate in this study, and 15 educators voluntarily completed the online survey instrument for a return rate of 44%. The purposive sample consisted of 15 faculty members who worked with students in grades PK-5.

Descriptive statistics were used to summarize the demographic data of the sample population obtained via the survey. As detailed in Table 3, the study sample consisted of a representation of various instructional job roles at School A, with the majority of the study sample (60%) working as classroom teachers. Other job roles included instructional coaches (7%) and support teachers (13%). Another 13% reported "other" for their job role, and one teacher did not respond to this question on the survey. Table 3 summarizes the job roles of the respondents and the percentage of the sample population represented.

Table 3
Job Roles Represented by Teacher Respondents

Job Role	Number of Respondents
Classroom Teacher	9
Instructional Coach	1
Support Teacher	2
Other	2
Did not respond	1
Total	15

The second piece of demographic data collected, which are summarized in Tables 4 and 5, were in relation to the years of current job role experience at School A, and overall years of experience at School A as represented by the study sample. Although not the majority, close to half of the study sample (47%) reported having 0-2 years of experience in their current job role at School A, followed by teachers with 3-5 years of experience in their current job role (20%) at School A. Table 4 provides a summary of the years of job role experience as reported by the sample population at School A.

Table 4
Years of Experience in Current Job Role

Years of Experience	Number of Respondents
0-2 Years	7
3-5 Years	3
6-9 Years	2
10 or more years	2
Did not respond	1
Total	15

Seven out of fifteen teachers reported having 0-2 years of overall experience at School A, followed by three teachers with 3-5 years or 6-9 years of experience at School A. Table 5

provides a summary of the years of overall experience as reported by the sample population at

School A.

Table 5
Years of Experience at School A

Years of Experience	Number of Respondents
0-2 Years	7
3-5 Years	3
6-9 Years	3
10 or more years	1
Did not respond	1
Total	15

Demographic data was also collected to determine the current grade levels represented by

the teacher respondents. Fourth grade had the most representation from the teacher respondents,

including a fourth-grade classroom teacher, support teachers, and coaches who also provide

instructional support to students in that grade level. This was the case as well with grades K, 1, 2,

3, and 5, in which support teachers worked with students in addition to classroom teachers.

These support teachers, which included an instructional coach and ESOL, ESE, and intervention

teachers, provided instructional support to students in multiple grade levels and classrooms as

assigned. Table 6 summarizes the current grade levels represented and job roles held by the

teacher respondents to the survey.

Table 6
Grade Level Representation of Teacher Respondents

Survey Respondent	Current Grade Level(s) Represented or Taught	Job Role
Teacher 1	2nd, 4th, 5th	Instructional Coach
Teacher 2	2nd	Classroom Teacher
Teacher 3	3rd, 4th, 5th	Support Teacher
Teacher 4	4th	Classroom Teacher
Teacher 5	3rd	Classroom Teacher
Teacher 6	ESE	Support Teacher
Teacher 7	2nd	Classroom Teacher
Teacher 8	5th	Classroom Teacher
Teacher 9	3rd	Classroom Teacher
Teacher 10	K	Classroom Teacher
Teacher 11	ESE	Classroom Teacher
Teacher 12	K, 4th, 5th	Other
Teacher 13	1st, 2nd, 4th	Other
Teacher 14	Pre-K	Classroom Teacher
Teacher 15	No response	No response
Total	15	

Research Question 1

What are the experiences of instructional staff as related to the integration of iPads into classroom instruction among users of the iPads at School A?

Results gathered from teacher respondents to the survey revealed that a large portion of teachers at School A were currently using iPads in their classroom instruction. When asked, *"Are you currently integrating iPads into your classroom instructional lessons and activities?"* 73% ($n = 11$) of teachers responded, "Yes." Based on the teacher responses, these teachers were accessing and using varying numbers of iPads in their classrooms, ranging from three iPads to ten iPads, depending proportionally on the number of iPads and teachers assigned per grade level. The teacher respondents also reported using the iPads to support their classroom

instruction, anywhere from one to four days per week, with 53% using them three or four days per week, and 47% using them zero to four days per week. Time spent per day using the iPads to support instruction also varied among the teacher respondents, ranging from 20 minutes to 2 ½ hours per day, and for other purposes such as planning and research, ranging from 20 minutes to two hours per day.

<center>Research Question 2</center>

What are the experiences and perceptions of instructional staff as related to the integration of iPads into classroom instruction among non-users of the iPads at School A?

Results gathered from teacher respondents to the survey also revealed that there were teachers at School A not integrating iPads into their classroom instruction. Twenty-seven percent of teacher respondents ($n = 4$), when asked, "*Are you currently integrating iPads into your classroom instructional lessons and activities?*" responded, "No." The teachers who responded "No" were automatically directed to answer survey Question 13 and questions related to professional development.

In response to Question 13, "*Please share why you have not used iPads in your classroom,*" three rationales were revealed among these respondents. Based upon the survey results, these rationales included 1) lack of access to the iPads, 2) availability of the iPads, and 3) knowledgeability. These three rationales demonstrate what some teachers are experiencing related to their ability to successfully and effectively integrate iPads into classroom instruction. For example, two teacher respondents specifically cited having no access to the iPads or that iPads were unavailable when needed. Teacher 12 stated, "I am a resource teacher here and iPads are not given to us." and Teacher 13 stated that, "There are usually not enough iPads available."

This was further supported by the researcher's knowledge of the iPad distribution plan, which was intended to provide classroom teachers with primary access to the iPad carts assigned to their respective grade levels. In relation to knowledgeability, Teacher 8 specifically cited her reason for not integrating iPads into her classroom as, "Difficulty generating creative uses for their usage." With knowledgeability being reported as a challenge, this harkens back to the TPACK framework in terms of the technological-pedagogical knowledge (TPK) needed for successful and effective technology use. The researcher gathered a better understanding of the environment through observations and review of relevant documents. The observations made by the researcher in her role as Apple Program Facilitator (APF) at the school in managing the iPads and a review of Subject Area Leadership Team (SALT) meeting notes reveals sporadic opportunities for school-based professional development (PD) specifically related to effective iPad integration, with only two sessions offered within the past four years.

Question 14 stated, *"Please indicate if you are interested in iPad professional development (PD) sessions (face-to-face) and/or Web-based for integrating iPads into your instructional lessons and activities*." Teachers (*n* = 8) indicated interest in F2F or Web-based PD sessions, which included two of the teachers not integrating iPads. These findings support that there was a desire for professional development amongst both users and non-users of the iPads at School A. Observations made by the researcher in her role as APF found that in the time the school has had iPads, only two school-based training sessions with faculty have taken place, approximately two years apart for about an hour apiece. These sessions focused primarily on the operating functions of the iPads and an overview of some of the approved apps on the devices, but did not include training for lesson planning, time to explore the specific apps that had been

downloaded to the devices, or opportunities for feedback, all of which the literature has stipulated to be key components for effective mobile device implementation efforts in classroom settings.

Research Question 3

How are members of the instructional staff at School A integrating iPads into classroom instruction?

The following section discusses Research Question 3, which relates to how the instructional staff at School A was integrating iPads into classroom instruction, as cited by the teacher respondents. Based on the survey responses, a qualitative analysis for commonalities, coupled with descriptive statistics, was conducted to examine the manner in which teachers were currently integrating iPads into classroom instruction.

First, In response to Question 8, teachers were asked, "*In what subject area(s) do you use iPads to support instruction?*" it was found that the majority of teachers, 66%, integrate the iPads to support English Language Arts (ELA) instruction, followed by Mathematics with 53% of teachers. Social studies and science were both identified by 27% of the teacher respondents, and 7% of teachers integrate the iPads to support ESE instruction for students. Table 8 summarizes the percentage of teacher respondents integrating iPads into classroom instruction by subject area.

Table 7

Subject Areas with iPad Supported Instruction

Subject Area	% of Teachers
Mathematics	53
ELA	66
Science	27
Social Studies	27
ESE	7

Secondly, Question 9 asked, *"In which subject(s) listed in Question 8 do you most frequently use the iPads?"* Mathematics and ELA were cited most at 47% and 57%, respectively. The high frequency of iPad usage in ELA and Mathematics suggests a correlation with School A's focus on raising Mathematics and reading scores across all grade levels, particularly grades 3 through 5.

Based on the findings, the researcher developed six categories to group the instructional strategies or activities teachers were asked to report regarding how they were currently integrating iPads into their classroom instruction with their students. These categories included:

1) Assessment of student learning

2) Student-led research

3) Student projects

4) Presentations

5) Small-group instruction

6) Creation of a product

Descriptive statistics were used to examine responses to Question 12 from the survey, which was, "*In what types of learning activities do your students engage using iPads?*" which

specifically addressed how teachers are using the iPads with their students. Sixty percent of teachers cited small group instruction across the grade levels, with student-led research and creation of a product, both following close behind at 53%. In the category of assessment, 33% of teacher respondents reported using apps such as Kahoot on the iPads as a way with which to assess their students' learning. Student projects, such as creating a Pic Collage or a video project, were also reported by 33% of teachers as an instructional activity. Lastly, presentations were also cited by 20% of teachers as an instructional activity being implemented (See Table 8). Some teachers also reported having students use the iPads to access educational programs that the school and/or classrooms had subscriptions to, such as Front Row and IXL for Mathematics, Raz-Kids for reading, and SuccessMaker for both subjects. For example, Teacher 9 reported, "My students use the iPads to access IXL independently, I give extra assistance using questioning to guide them to the answer." Instructional strategies also reported by teachers included formative assessment, graphic organizers, the gradual release model, partner work, questioning, and thinking maps.

Table 8
Summary of Instructional Strategies and Activities Implemented by Teachers

Category	%
Assessment (e.g., Kahoot)	33
Research	53
Student Projects	33
Presentations	20
Small-group instruction	60
Creation of a product	53

These findings relate to the Technology Integration Matrix (TIM), a tool that can be used to gauge levels of technology integration within a learning environment. The TIM outlines five levels of technology integration within the learning environment. These include entry, adoption, adaptation, infusion, and transformation. Based on the teacher responses, the instructional strategies and activities implemented aligned with the entry and adoption level in that the iPad usage tended to be teacher-directed (e.g., small group instruction or Kahoot for assessment), but with some teachers guiding students through activities such as research and projects. These findings were also closely related to what the teacher respondents reported in regard to participating in iPad professional development (PD), which is discussed in the next section.

<div align="center">Research Question 4</div>

What are the professional development (PD) interests of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

Descriptive data was gathered to explore and compare which subject areas teachers are integrating the iPads, and which subject areas teachers were interested in participating in PD sessions (either F2F, Web-based, or both). In response to Question 14 on the survey, which was, "*Please indicate if you are interested in iPad professional development (PD) sessions, F2F or Web-based,*" 53% ($n = 8$) of the teacher respondents reported that they were interested in PD sessions. Their response to Question 15, *"In which subject area(s) are you interested in receiving professional development (PD)?"* was used to identify the specific subject areas the teachers reported having an interest in PD. Revealed was that 75% of the eight teachers stated interest in receiving PD in Mathematics, 100% stated interest in receiving PD in ELA, 50% in science PD, and 38% in social studies PD, and 25% stated interest in receiving PD to support

ESE students. This data aligned with the teacher responses to Question 9 which revealed that teachers were integrating iPads in Mathematics and ELA most frequently, compared to the other core subject areas. This indicated that teachers were most interested in PD in the subject areas into which they integrated the iPads the most. Figure 3 visually presents the percentage of the eight teachers by subject area who reported interest in receiving iPad professional development.
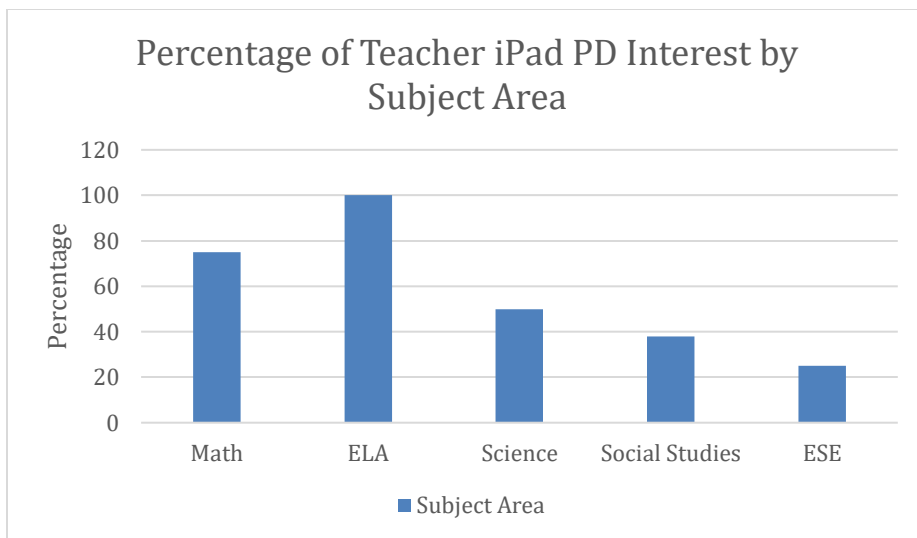

Figure 2: Percentages of the eight teachers who reported interest in iPad PD by subject area.

Finally, descriptive statistics were also used to analyze the apps and instructional activities in which teachers were interested in learning. In response to Question 16, which asked, "*What instructional strategies and/or activities are you interested in learning about?*" teachers selected multiple instructional apps and activities that they would be interested in learning about via PD sessions. Forty-seven percent of teachers responded that they would be interested in learning about video projects, with 33% of teacher respondents identifying the apps Nearpod and Educreations. Thirty-three percent of teacher respondents also reported interest in learning how to create and use QR codes as an instructional tool. Other apps, including Shadow Puppet, Pic

Collage, and Popplet, were also selected by 27% of teacher respondents, and 20% selected the

Kahoot and Explain Anything apps. This data (summarized in Table 9) provided the researcher

with further insights as to the specific PD needs of teachers with relation to apps and

instructional activities.

Table 9
Teacher PD Interests by Instructional Strategies, Activities, and Apps

Subject Area	Number of Teachers
Video Projects	7
Nearpod	5
Educreations	5
Creating and Using QR Codes	5
Shadow Puppet	4
Pic Collage	4
Popplet	4
Kahoot	3
Explain Everything	3

Research Question 5

What are the professional development (PD) needs of the instructional staff at School A

with relation to the integration of iPads into their classroom instruction?

As explored in Research Question 4, the teacher respondents reported interest in various

instructional strategies, activities, and apps, as well as professional development interests related

to integrating the iPads in primarily the subject areas of Mathematics and ELA. At the same

time, the data related to teacher PD interests is also suggestive of the PD needs of teachers at

School A.

Question 17 asked, *"Have you implemented any of the items mentioned in the previous*

question in your instruction? If so, which ones and how have you used them?" The teachers

primarily responded with online research, Pic Collage, and Kahoot. This suggests a potential

need for professional development to address other apps for the iPads that are loaded onto the

devices, such as Shadow Puppet, Popplet, and Tellagami, that can be integrated within the

context of the core subject areas, learning standards, and learning contexts. In terms of subject

areas, although science was a subject area identified by only 27% of teachers as one in which

they were using iPads to support instruction, 50% indicated that they wanted to receive iPad

professional development for science instruction.

Summary

This study was conducted during the 2015-2016 school year at a small elementary school

in a large Central Florida school district. The purpose of this case study was to examine the

perceptions and experiences of teachers as related to iPad integration (among both users and non-

users of the iPads), to examine how teachers were integrating iPads by identifying instructional

strategies used and activities conducted by teachers who were currently integrating iPads into

their classroom instruction, and to identify the content areas in which teachers, both users and

non-users of the iPads, had an interest in participating in professional development (PD) sessions

to support their use of the technology in order to design a professional development

program/intervention to meet these needs. An iPad survey was developed by the researcher and

used to gather qualitative data, and was analyzed for common emergent themes, as well as

through the use of descriptive statistics consistent with case study research (Cresswell, 2006;

Roshan, 2009). Qualitative data were also related to the TIM to gain an understanding of the

levels of integration occurring at School A. Additional qualitative data were gathered through the

review of documents related to School A's iPad initiative, and observational data regarding

teacher training were gathered through the researcher's role as the Apple Program Facilitator.

Demographic data were also collected via the iPad survey and analyzed using descriptive

statistics. Chapter Five provides an interpretation of the results of the qualitative analysis and

descriptive statistics, and recommendations for further research.

CHAPTER FIVE: DISCUSSION AND CONCLUSION

Chapter Five presents a discussion of the results of the data analysis presented in Chapter Four, and recommendations for future research are provided. The purpose of this research study was to 1) examine the perceptions and experiences of teachers as related to iPad integration (among both users and non-users of the iPads), 2) examine how teachers were integrating iPads by identifying instructional strategies used and activities conducted by teachers who were integrating iPads into their classroom instruction, and 3) identify the content areas in which teachers, both users and non-users of the iPads, had an interest in participating in professional development (PD) sessions to support their use of the technology and improve their skills and knowledge in order to inform the creation of a future PD plan at School A.

Qualitative and quantitative data was collected using an iPad survey that was administered to teachers to collect data to determine their perceptions and experiences with integrating iPads into their classrooms, how teachers were integrating the iPads, and the PD interest/needs of the teachers at School A. In addition, the researcher, in a past role as Apple Program Facilitator (APF), was able to garner observational data regarding the applications installed and being used on the devices, as well as the PD history of the school with relation to iPad integration. This qualitative and quantitative data was analyzed for common themes and using descriptive statistics. Relevant demographic data was also collected using the survey and analyzed using descriptive statistics.

<u>Discussion of Results of Research Question 1</u>

What are the experiences of instructional staff as related to the integration of iPads into classroom instruction among users of the iPads at School A?

Based on the survey responses, it was found that 73% ($n = 11$) of the teacher respondents were integrating iPads into classroom instruction. While a majority of the teacher respondents indicated that they were integrating iPads into their classrooms, the experiences related to the iPads varied. One difference that was evident from the data was the number of iPads being accessed, which ranged from three iPads to ten in a given classroom. As delineated by the school's distribution plan, each grade level team received a cart of 30 iPads that was stored in one teacher's classroom for that team. The other teachers in the grade level team would then sign out a set of iPads for his or her classroom. For example, the 2nd grade team consisted of five teachers, which allowed for each teacher to have a set of six iPads each. In a 2nd grade class of 18 students, that would allow for one-third of the students to use the iPads individually at one time. The 5th grade team consisted of three teachers, which allowed for each teacher to have a set of 10 iPads each. In a 5th grade class of 22, that would allow for almost half (45%) of the students the use the iPads individually. Since a 1:1 device ratio is not feasible as a whole school because of the total number of devices (180), it is important for School A to consider how to maximize integration within classrooms using the amount of devices available and to address this as part of the future PD that is developed and delivered to teachers.

These findings are also closely related to the data related to what the teacher respondents reported in terms of what other purposes (aside from supporting their classroom instruction) for which they utilize the iPads. A small percentage of the teacher respondents cited using the iPads

for planning – a component that PD efforts and implementation programs as described in the studies by Ng and Nicholas (2012) and Mouza and Barrett-Greenly (2015) stipulate are contributors to effective mobile device programs. Based on the teachers' responses that described their experiences with using the iPads coupled with the researcher's overall observations and knowledge of the ways in which iPads were being used revealed that although specific apps were being used to assist with learning, technology integration was occurring at a basic level (as discerned using the Technology Integration Matrix). Future PD delivered at School A should involve teachers in coordinated planning efforts that interweave within the lessons and/or instructional units the apps that are appropriate within the learning context and subject areas.

<center>Discussion of Results of Research Question 2</center>

What are the experiences and perceptions of instructional staff as related to the integration of iPads into classroom instruction among non-users of the iPads at School A?

Once the survey and observational data were completed through the analysis for commonalities and via descriptive statistics, the interpretive phase revealed three rationales related to why teachers were not integrating iPads into their classroom instruction. These three areas were 1) lack of access to the iPads, 2) availability of the iPads, and 3) knowledgeability. Responses on the iPad survey revealed that some teachers currently do not use iPads in their instruction, citing one of the three aforementioned areas as their reason. Gunter and Gunter (2015) state, "First, integration by itself is defined as bringing different parts together into a whole. Therefore, technology integration, also called curriculum integration, is the combination of all technology parts, such as hardware and software, together with each subject-related area of

curriculum to enhance learning (p. 212). This definition of integration relates to the Technology Integration Matrix (TIM), which is organized into two overarching categories: 1) Levels of Technology Integration and 2) Characteristics of the Learning Environment. These categories are further divided into teacher descriptors for each cell in the matrix. There are five levels of technology integration: entry, adoption, adaptation, infusion, and transformation, and five learning environment characteristics: active, constructive, goal directed, authentic, and collaborative (FCIT, n.d.).

Since it was found that there are some teachers who did not have access to iPads, or that iPads were unavailable to them, the need is highlighted to revise the school's iPad distribution plan to ensure that access is inclusive of all instructional staff. The teachers who cited access to and availability of the iPads were support teachers who provided instructional support to students in the grade levels to which they were assigned; however, these teachers were very important in the classroom but were not the assigned classroom teacher. School A's distribution plan allowed for classroom teachers to have access to an iPad cart per grade level with a certain number of iPads assigned per classroom. Not all support teachers had this accessibility and, therefore, may not have been able to gain access to the iPads as needed, because all the devices were assigned by grade and classroom for student use.

Additionally, difficulty in developing ways in which to use the iPads for instruction was cited in the survey as a reason for not integrating iPads. Based on the TPACK framework, effective technology integration involves the interactions between technological knowledge, content knowledge, and pedagogical knowledge. Koehler and Mishra (2009) stated, "Integration efforts should be creatively designed or structured for particular subject matter ideas in specific

classroom contexts" (p. 62). In order for teachers to be successful, they must not only be knowledgeable about how the technology being implemented works and how to use it, but how to integrate it appropriately within their classroom and subject areas. This finding highlighted an important need among teachers at School A to be equipped with the appropriate knowledge and skills to be less apprehensive toward the integration of iPads and move toward the successful and effective integration of the devices. Before teachers can successfully integrate any technology, they must go from novice to expert with continuous and supportive technical support and training. Gunter and Gunter (2015) state, "As teachers become facilitators of learning and incorporate technology into their instructional strategies, they will progress through several developmental stages" (p. 217). As teachers develop their skills and knowledge related to integrating a specific form of technology, they will be able to move upward in the TIM toward transformation and collaboration, and gain a better understanding of the difference between use and integration as it relates to implementing technology.

<u>Discussion of Results of Research Question 3</u>

How are members of the instructional staff at School A integrating iPads into classroom instruction?

The survey responses demonstrated a wide range of instructional strategies being implemented by teachers during classroom instruction, as well as a variety of apps that students used to complete tasks and assignments. The Technology Integration Matrix (TIM) served as a frame of reference for the researcher to examine the levels of technology integration into classroom instruction and the curriculum by teachers at School A. The TIM is organized into two overall categories: 1) Levels of Technology Integration and 2) Characteristics of the Learning

Environment. These two categories are divided into levels of teacher descriptors for each cell in the matrix. The five levels of technology integration in the matrix are entry, adoption, adaptation, infusion, and transformation. There are also five learning environment characteristics included in the TIM: active, constructive, goal directed, authentic, and collaborative (FCIT, n.d.). Based on the teacher responses related to the types of instructional strategies and activities implemented using the iPads, this included teacher-led activities such as Kahoot assessments and small group instruction, and student use of adaptive programs such as Success Maker, IXL, Raz-Kids, and Front Row. Student-centered use of the devices typically centered on apps such as Popplet, Pic Kids, and Safari in activities that allowed for students to conduct research or create a product. Using the TIM as a guide, these types of instructional activities range in level from entry to adoption to adaptation within learning environments that are active and constructive because of the teacher-focused and individual nature of the activities and uses of the iPads.

In summary, the use of the TIM served as a guide for the researcher to identify the range in levels of technology integration within the classroom learning environments across School A and may serve as a useful tool for PD sessions. The TIM can be used as a tool for teachers at the outset of the PD program to reflect upon their own integration efforts and their instructional practices related to iPads within their class. Professional development sessions that are developed should focus on expanding upon the existing practices of the teachers to be able move upward in the TIM toward the infusion and transformation levels of technology integration and build collaborative learning environments (FCIT, n.d.). Gunter and Reeves (2016) conducted a study on properly developing teacher training to integrate iPads and mobile devices into classroom instruction. Their findings supported the belief that "…when teachers' time is spent in

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professional development activities that include planning, designing and integrating technology (specifically mobile technologies) to deliver instruction in their own classroom, it is viewed much more positively" (p. 12). Since the TIM is not formally adopted by School A, a future PD program can be benefited by integrating its use as a reflective tool for teachers throughout the PD process – before training, after instructional lessons, and at the end of the training. The TIM can also serve to set an expectation as to the integration level that is the goal or ideal level for the school and each grade level.

<center>Discussion of Results of Research Question 4</center>

What are the professional development (PD) interests of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

The results of the teacher responses on the survey revealed mixed views regarding interest in participating in PD sessions about iPad integration. Fifty-three percent of the teacher respondents ($n = 8$) expressed interest in F2F or Web-based PD sessions. Of those eight teachers, six were currently using iPads in their classrooms, whereas two were not. Observational data showed infrequent school-based PD related to the integration of iPads into classroom instruction. This lack of consistent, ongoing PD contradicted research conducted by Mouza and Barrett-Greenly (2015), which supports the stipulation that involving teachers in the PD process, as well as maintaining the PD program consistently by providing frequent feedback to teachers, is effective in sustaining the implementation of a technology program. This finding suggested that teachers involved in this study were expressing a need for building their technological-pedagogical knowledge (TPK) as outlined in the TPACK framework. This finding also demonstrated that, although six of the eight teachers who expressed interest in PD were currently

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using iPads in their classrooms, both users and non-users of the iPads were interested in receiving training to increase their knowledge and skills, and in learning how to use apps as instructional tools. Based on the research and results of the study, the PD plan for School A should offer interested teachers consistent, ongoing sessions that allow for teachers to collaborate, explore the devices and apps, develop instructional lessons, and receive feedback throughout the duration of their participation in the PD program.

Also demonstrated by the analysis of themes among the survey responses were the subject areas cited by teachers interested in participating in PD sessions. The core subject areas of Mathematics, English/language arts, and science were cited most frequently as areas in which teachers wanted training. These core subject areas were found to also be the subject areas in which teachers reported using the iPads the most. Furthermore, descriptive statistics related to the types of instructional activities and specific apps teachers wanted to learn to be able to do and use provided insights as to the specific areas that should be addressed in PD sessions that are developed. This finding is essential to the formation of a PD plan at School A, because the PD sessions can be designed to address the core subject areas identified by teachers and how to integrate specific instructional strategies and apps within those core subject areas, which can help to build the Technological-Content Knowledge (TCK) of teachers within the TPACK framework.

<div align="center">Discussion of Results of Research Question 5</div>

What are the professional development (PD) needs of the instructional staff at School A with relation to the integration of iPads into their classroom instruction?

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Based on the responses gathered from the iPad survey, teachers indicated their professional development interests related to the specific subject areas, apps, and instructional strategies in which they would want training. This included training primarily in how to integrate iPads in Mathematics, English/language arts (ELA), and science, and how to incorporate, through the integration of iPads, instructional activities and/or strategies using the available apps on the iPads (e.g., creating and using QR codes, video projects, Shadow Puppet, and Nearpod). Similarly, examination of the survey responses yielded insight as to the PD needs existent at School A.

The researcher's experience in the role of Apple Program Facilitator (APF) made it possible to observe that PD in the area of technology was infrequent, with training focused on other areas of instruction. Furthermore, there was no training on how to use and incorporate the apps that were downloaded to the devices into instructional lessons or instructional activities. To learn how to use and incorporate the apps, teachers would have had to take their own initiative to familiarize themselves with the apps and/or plan ways to incorporate them into their instruction. According to the survey, the most common apps being used included Kahoot, Pic Collage, and Safari (for research purposes). Teachers cited specific apps they wanted to learn about, such as Nearpod, Shadow Puppet, and Explain Everything, as well as instructional activities such as video projects and using QR codes. All of these findings suggested the need for PD to address 1) how to operate the apps on the iPads, 2) providing teachers opportunity to explore and use the iPads and apps themselves, and 3) developing instructional lessons and activities that align with the instructional practices implemented at School A (e.g., the gradual release model, 5E model, and common assessments). Relating to the TPACK framework, doing so would bridge together

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the integration of the technology (technological knowledge) to the pedagogical knowledge associated with the instructional practices implemented at School A.

Lastly, findings related to the ways in which teachers integrate iPads to engage their students also provided insight as to some additional PD needs. Teachers reported engaging their students through the use of the iPads in a variety of teacher-centered ways – small-group instruction, assessment using Kahoot, online research, and access to programs such as IXL, Raz-Kids, and Front Row. As explained in the discussion of Research Question 3, the use of the Technology Integration Matrix (TIM) as a reference to evaluate the levels of technology integration and the characteristics of the learning environments suggests that integration efforts were primarily in the entry, adoption, and adaptation levels in active and constructive learning environments. These levels are characterized as more teacher-led. Considering these findings, PD efforts should address and use the TIM as a guide for teachers to move toward higher levels of integration and as a tool for teachers to reflect on their instructional practices.

Significance of the Study

The findings from this study shed light on the current practices of teachers who were using iPads in their classroom instruction (e.g., apps used and/or instructional strategies), as well as the PD needs of the teachers to support the integration of the iPads as an ongoing endeavor. As evidenced by other researchers (Mouza & Barrett-Greenly, 2015; Ng & Nicholas, 2013), mobile device programs in schools are most successful and sustainable when teachers 1) are involved in the PD process by providing their input, 2) have opportunities to explore the devices, and 3) receive ongoing support and feedback and opportunities for reflection. Alternatively, when mobile devices and apps are purchased by schools or provided to schools by school

districts without a clear vision for how the devices will be used or plan for supporting teachers, a sustainable program is challenging (Mouza & Barrett-Greenly, 2015; Ng & Nicholas, 2013). This research, coupled with the findings that were gleaned from the teacher survey and observational data, helps to inform the next steps for School A to form a differentiated PD program that meets the needs of all teachers in the subject areas, instructional strategies, and apps that the teachers themselves cited as those in which they need the most support. The research and findings also help to inform the development of a PD program that allows for continued teacher input, exploration of the devices, and opportunities for feedback and reflection. For example, The TIM can be used as a pre- and post-reflective tool of the PD program to reflect on teachers' perceptions of their own integration efforts and their instructional practices related to iPads before and after the PD sessions are complete. PD sessions that are developed should focus on expanding upon the existing practices of teachers to support them in increasing their knowledge and skills to effectively integrate iPads into their classroom instruction, while providing ongoing feedback and time to explore and use the devices. The findings of this study allow for School A to be in the position to reflect and improve its current distribution plan, identify teachers' needs related to using iPads as an instructional tool in classrooms, and create a comprehensive PD program that meets these needs of teachers while including them in the process.

Conclusion

This research study sought to 1) examine the perceptions and experiences of teachers as related to iPad integration (among both users and non-users of the iPads), 2) examine how teachers were integrating iPads by identifying instructional strategies used and activities

conducted by teachers who were currently integrating iPads into their classroom instruction, and 3) identify the content areas in which teachers, both users and non-users of the iPads, had an interest in participating in professional development (PD) sessions to support their use of the technology. Important to understand are the factors that contribute to successful technology integration efforts in classroom settings, as the purchase and use of mobile devices by school districts is an emerging trend (Herro, Kiger, & Owens, 2013). Also important to consider is the role of adequate and consistent PD in ensuring that teachers are equipped with the technological, pedagogical, and content knowledge necessary to effectively integrate the iPads into their classroom instruction (Koehler & Mishra, 2009). Furthermore, the review of current literature suggests that successful and sustainable technology integration programs have a strong focus on PD that involves teachers in the PD process, is consistent and ongoing, and allows for reflection, experimentation, and sharing (Mouza & Barrett-Greenly, 2015; Apple, n.d.).

The results of the data analysis demonstrated that there were three overall areas that were considered barriers to teachers' integration of iPads into their instruction: lack of access, lack of availability of the iPads, and lack of knowledgeability on how to integrate the iPads creatively into their instruction. In addition, 53% of the teacher respondents expressed interest in PD sessions in the core subject areas of Mathematics, English/language arts, science, and social studies. Of this 53%, three-quarters were currently integrating the iPads into their classroom instruction, which illustrated the desire of these teachers to expand upon their current technological-pedagogical knowledge (TPK).

Recommendations for Future Research

Based on the review of the current literature and the results of this research study, the following suggestions are made for future research:

1. Further research that investigates the iPad implementation efforts in school environments similar to School A, but with a larger sample to enhance generalizability of the data and findings.

2. Further research as to how a continuous and sustainable school-based PD program can be designed to involve maximum teacher input and participation with relation to the implementation of iPads into the classroom setting (Mouza & Barrett-Greenly, 2015).

3. Further research as to how a continuous and sustainable school-based iPad PD program can be developed and implemented at schools with characteristics similar to School A.

4. Further research that explores the impact that a comprehensive PD program related to the integration of mobile devices has on teacher instructional practices.

5. Further research that focuses on equitable mobile device distribution and availability in school settings and its correlation/relationship to successful integration by teachers.

6. Further research on how to evaluate the effectiveness of a mobile device PD program for teachers once in place.

7. Further research related to the role of reflection and how using reflective tools like the TIM can guide PD.

8. Further research on the link between effective PD and the impact on student learning/achievement with relation to the implementation of mobile devices into the classroom setting.

9. Further research related to the extent of preparation of pre-service teachers in teacher education programs in the area of technology integration.

APPENDIX A

UCF IRB APPROVAL LETTER

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Zena Ramsey**

Date: **March 21, 2016**

Dear Researcher:

On 03/21/2016, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	A Model Based Approach to Mobile Learning and Digital Literacy
Investigator:	Zena Ramsey
IRB Number:	SBE-16-12133
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Joanne Muratori

Signature applied by Joanne Muratori on 03/21/2016 08:50:18 AM EDT

IRB Manager

APPENDIX B

SURVEY INSTRUMENT

Q1 Are you currently integrating iPads into your classroom instructional lessons and activities?
○ Yes
○ No

Q2 How many iPads do you have access to in your classroom?

Q3 How many iPads do you have access to in your grade level?

Q4 On average, how many days per week do you integrate the iPads to support your classroom instruction?
○ 0 Days
○ 1-2 Days
○ 3-4 Days
○ 5 Days

Q5 On average, about how much time per day do you use the iPads to support your instruction?

Q6 On average, about how much time per day do you use the iPads for other purposes?

Q7 For what other purposes do you use the iPads?

Q8 In what subject area(s) do you use iPads to support instruction? Select all that apply.
❑ Math
❑ English Language Arts (ELA)
❑ Science
❑ Social Studies
❑ ESE

Q9 In which subject(s) listed in question 8 do you most frequently use the iPads?
❑ Math
❑ English Language Arts (ELA)
❑ Science
❑ Social Studies
❑ ESE

Q10 Please describe the instructional strategies you incorporate into your instruction when using iPads.

Q11 Please describe how your students use the iPads during instruction.

Q12 In what types of learning activities do your students engage using iPads? Select all that apply.
- ❑ Creation of student projects
- ❑ Presentations
- ❑ Word processing
- ❑ Thinking maps
- ❑ Creating Pic Collages
- ❑ Flipping the classroom
- ❑ Video projects (e.g., iMovie, Shadow Puppet)
- ❑ Kahoot
- ❑ Nearpod
- ❑ Small group instruction
- ❑ Online research
- ❑ Other

Q17 Have you implemented any of the items mentioned in the previous question in your instruction? If so, which ones and how have you used them?

Q13 Please share why you have not used iPads in your classroom.

Q14 Please indicate if you are interested in iPad professional development (PD) sessions (face-to-face and/or Web-based) for integrating iPads into your instructional lessons and activities.
- ○ Yes
- ○ No

Q15 In which subject area(s) are you interested in receiving professional development (PD)? Select all that apply.
- ❑ Math
- ❑ English Language Arts (ELA)
- ❑ Science
- ❑ Social Studies
- ❑ ESE

Q16 What instructional strategies and/or activities are you interested in learning about? Select all that apply.

❑ Nearpod
❑ QR Codes (creating and using them)
❑ Video Projects
❑ Kahoot
❑ Shadow Puppet
❑ Pic Collage
❑ Educreations
❑ Explain Anything
❑ Popplet
❑ Other

Q18 What is your job role at Starke Elementary?
○ Classroom teacher
○ Support teacher
○ Instructional Coach
○ Other

Q19 How many years have you worked in your CURRENT job role at Starke Elementary?
○ 0-2 Years
○ 3-5 Years
○ 6-9 Years
○ 10 or more

Q20 How many years have you worked at Starke Elementary?
○ 0-2 Years
○ 3-5 Years
○ 6-9 Years
○ 10 or more

Q21 What grade do you teach? If you are not a classroom teacher, what grade level(s) of students do you work with the most?

- ❑ Pre-K
- ❑ Kindergarten
- ❑ 1st Grade
- ❑ 2nd Grade
- ❑ 3rd Grade
- ❑ 4th Grade
- ❑ 5th Grade
- ❑ ESE (Self-contained)

Q23 Please type your name.

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