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Primary Teachers' Perspectives on iPad Integration: Barriers, Challenges, and Successes

Richard Cory Campbell
Walden University

Walden University

COLLEGE OF EDUCATION

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Richard Cory Campbell

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Review Committee
Dr. David Falvo, Committee Chairperson, Education Faculty
Dr. Carol Todd, Committee Member, Education Faculty
Dr. Karen Hunt, University Reviewer, Education Faculty

Chief Academic Officer

Eric Riedel, Ph.D.

Walden University
2016

Abstract

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by

Richard Campbell

MA, Walden University, 2009

BS, Cape Breton University, 1999

Final Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Despite the rapid expansion of mobile technologies in K-12 schools, recent research has shown that many teachers are ill prepared to take advantage of these new tools. This study was designed to address the problem of lack of effective iPad integration in primary classrooms at an international school in South Korea. The purpose of this case study was to examine primary teachers' perceptions of the implementation of an iPad initiative begun in 2012. Framed by Koehler and Mishra's technological pedagogical content knowledge model (TPACK), the study was guided by research questions that involved teachers' perceptions of the barriers, challenges, and successes regarding iPad implementation in the primary classroom. A purposeful sample of 5 K-2 teachers who use iPads in the classroom was chosen. The case study design entailed semi-structured interviews, classroom observations of each participant, and examination of teachers' lesson plans. Data were coded and analyzed using inductive analysis based on components of a conceptual logic model. Credibility and trustworthiness were ensured through member checking and triangulation of data. Results showed lack of experience, collegial support, and iPad-specific training as barriers and future preparation for teachers as a challenge. Successes were demonstrated through formative assessments and digital portfolios. The resulting project was a comprehensive professional development plan to provide primary teachers with the knowledge and skills to implement technology in the classroom and ongoing support to develop a professional technology learning network. In terms of broad social change, this research and project might provide insight to better prepare educators to make the best use of integrated learning technologies for efficient and effective teaching and learning in classrooms.

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Dedication

This project study is dedicated to my wife and daughter. Without your support over the years I never would have had the confidence or determination to complete this long and difficult journey. Also I dedicate my work to my parents who always supported me in everything I did!

Acknowledgments

I would like to take this opportunity to acknowledge the many people who supported me throughout this long journey. First, my committee, Dr. David Falvo, had tremendous patience when dealing with my numerous emails about his revisions. He never gave up on me and gave me motivation I needed to push forward! Dr. Carol Todd my second member, who always offered encouragement just when I needed it the most. To Dr. William Washington, we started this journey as classmates but we ended it as friends. Your constant support and pep talks got me through the most difficult times.

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Section 1: The Problem

Introduction

At an international school in South Korea (School X), understanding primary teachers' perceived needs and challenges with iPad implementation is critical in terms of the school's goal to successfully integrate iPads into the primary classrooms. According to the information technology (I.T) facilitator, in September 2012 at this particular international school located in the southeastern region of South Korea, an instructional iPad initiative intended to integrate 21st century teaching best practices into the curriculum was implemented (IT facilitator, personal communication, March 24, 2014). However, as of March 2014, teachers had yet to fully integrate them into their primary curriculum (IT facilitator, personal communication, March 24, 2014). Framed by the technological pedagogical content knowledge model (TPACK) established by Koehler and Mishra, this study was guided by questions that explored teacher perceptions about the barriers, challenges, and successes concerning iPad implementation in the primary classroom. The results of data analysis identified a lack of experience and collegial support, as well as insufficient iPad specific training as barriers to iPad integration.

TPACK is the framework that guided this study. Koehler and Mishra (2009) developed the TPACK framework based on the Shulman's (1986) framework. Shulman (1986) documented the importance of combining content knowledge and pedagogical knowledge to support authentic learning of content (Maor & Roberts, 2011). Koehler and Mishra (2006) extended Shulman's framework to include technology, which enabled teachers to implement technology in the classroom to support student learning. The

TPACK framework has been the guide for several iPad integration studies. In a study of pre-service special education teachers, Anderson, Griffith, and Crawford (2014) found that when integrating the iPad, special education teachers relied on multiple sources of knowledge when making decisions. In a similar study of in-service teachers, Ohlson et al. (2014) noted that teachers' knowledge of the TPACK was limited to the use of iPads for whole group and small group instruction. However, further investigation lead to the discovery that in-service teachers were comfortable with their current knowledge in regard to integrating iPads in the classroom (Ohlson et al., 2014).

With two sets of 20 iPads for eight teachers, teachers at School X sought to improve lesson preparation, differentiate instruction, and provide students with a device that was more suitable than notebook computers for younger students. The iPads were introduced in 2012 and, as of March 2014, the teachers relied on the iPads mainly for teacher lesson preparation (IT facilitator, personal communication March 24, 2014).

Schools around the world approach iPad implementation in different ways (Chou, Block, & Jesness 2012; Henderson & Yeow, 2012; Pegrum, Oakley, & Faulker 2013). For example, some schools have elected to pilot iPad use among a small group of students, while other schools and districts have committed fully by placing iPads in the hands of every student (Johnson et al., 2012). There is no standard for iPad implementation; however, there are important factors, including professional development, ongoing support, and teaching practices, for teachers to consider before moving ahead with integrating iPads into curriculum in the classroom (Henderson & Yeow, 2012; Pegrum et al, 2013).

When integrating technology into the classroom it is important to understand the barriers that may hinder technology integration. One notable barrier to technology integration is lack of planning and setting clear goals (Thomas et al., 2012). In School X, administrators supplied teachers with iPads upon request from the teachers without setting goals or planning for implementation of the technology. Having technology in place does not guarantee successful technology integration. Other barriers relevant in the literature were teachers' attitudes and beliefs, quality of technology specific professional development, teacher self-efficacy, lack of time, and technological problems (Anderson & Groulx, 2013; Hechter & Vermette, 2013; Khaddage, F., Knezek, G., Norris, C., & Soloway 2015; Minshew & Anderson, 2015; Ryan & Bagley, 2013).

Because I conducted a project study, the project study defined a problem and then described the details of the purpose, framework, related literature review, and the methods for my study. In general, the goal of a project study is to identify and document a problem in a local setting and create a project that would help solve the problem. I investigated the local problem and supported my findings in the professional literature. Finally, based on the findings of an extensive literature review, data collection, and analysis I created a project to support the local site and to promote scholarly change within the school and community.

In Section I of this project study, I defined a problem in regard to teacher needs, successes, and barriers with iPad integration in the primary grades at School X. I offered evidence of the local problem, documented it, and confirmed it in a literature review. The literature review provided information of a local problem as well as confirmation of the

problem in a broader context. Furthermore, I provided definitions pertinent to the research topic for precision and unity. In addition, I described the significance, which showed why the problem is important to the local setting. Finally, I provided four research questions that helped me investigate the nature of the problem.

Definition of the Problem

In School X, an instructional iPad initiative, implemented in 2012, intended to integrate 21st century teaching best practices into the curriculum was not fully implemented at the primary level (IT facilitator, personal communication March 24, 2014). The primary level at the school consisted of kindergarten, grades 1-3 and the English as another language (EAL) program. Understanding primary teachers' perceived needs and challenges with iPad implementation was critical for School X's goal of successfully integrating iPads into the primary classroom. Since 2012, primary teachers at the School X have had access to iPads. However, teachers have not fully implemented iPads into their daily instructional practices (IT facilitator, personal communication, June 19, 2015). According to the IT facilitator who assists teachers with implementing technology into the classroom, teachers were only using iPads on a daily basis for planning and other teacher preparation activities (IT facilitator, personal communication, June 19, 2015). In the 2015-2016 school year grades 1-5 had four iPads per class as well as access to a mobile cart with 16 iPads. The purpose of this study was to examine the perceptions of teachers concerning the needs, successes, and barriers of implementing iPads in the primary classroom.

Without a detailed implementation or professional development plan, School X in South Korea purchased 20 iPads for the primary grades in the fall of 2012 (Administrator, personal communication September 2013). The class set of 20 iPads was to be shared among the kindergarten, EAL program, and the first through third grade classrooms. Primary teachers requested the iPads, making a case for them to the head of the elementary school as well as the IT committee. The former head of the elementary school noted that the school did not have a plan for implementation when purchasing the iPads. Furthermore, he noted that a new technology plan was under development, and the school was preparing to include an iPad implementation plan in the technology plan (Administrator, personal communication, October 2, 2013).

Teachers advocated for iPads for three reasons. First, they believed that iPads would allow them to create a wide range of media, such as video tutorials and lessons that would be easy for students to navigate (IT facilitator, personal communication, December 17, 2013). Second, teachers noted that iPads, as compared to notebook computers, are relatively easy for primary students to use. Finally, teachers believed that iPads would provide them with an additional tool for designing differentiated activities quickly for various groups of students (IT facilitator, personal communication, December 17, 2013). Teachers had access to the iPads through an online calendar program called Roombooker (IT facilitator, personal communication, December 17, 2013). Roombooker allows teachers to reserve the iPads quickly and easily throughout the week. Teachers do not have to specify their intentions when reserving iPads; however, the IT facilitator noted that teachers reserved iPads to support students in creating projects and several drill

and practice activities (IT facilitator, personal communication, April 24, 2015). According to the former head of the elementary school, sharing the iPads proved to be difficult because of the devices' low memory capacities (Administrator, personal communication, October 2, 2013). Each iPad purchased in the 2012 class set had 16GB of memory, which did not provide enough space for apps and data shared among classes and the EAL department. In 2013, a year after purchasing the first set of iPads, the school purchased a second set of 20 iPads with a larger memory capacity (32GB) (Administrator, personal communication, October 2, 2013). In the 2015-2016 school year, teachers in the grades 1-5 had four iPads, with 32GB of memory each, per class to complement the existing iPads. The addition of the four iPads, as well as the 16 iPads stored on carts, allowed teachers to use the iPads in a one-to-one setting.

Although implementing iPads in primary classes at School X was a new initiative, teachers did not receive formal professional development to assist with initial implementation in 2012 (IT facilitator, personal communication December 17, 2013). Formal professional development to support teachers in implementation, differentiation, and instruction was delayed because the IT facilitator was not available to conduct training (IT facilitator, personal communication March 24, 2014). At the school's orientation week in August 2013, the IT facilitator offered a professional development session, which focused on technological pedagogical content knowledge. However, the professional development training session was voluntary and the IT facilitator noted that only two of the eight primary teachers attended. The current head of the elementary school noted that the professional development session was poorly timed, leaving

teachers little room to attend the session (Administrator, personal communication April 21, 2015).

According to Schrum et al. (2013), the quality of professional development is crucial to creating a 21st century educational environment in schools. Over the course of the 3 years with the iPads, the IT facilitator acted as a mentor for primary teachers by attending curriculum-planning meetings as well as running short professional development sessions at the beginning of each school year. The purpose of this case study was to examine primary teachers' perceptions of needs, barriers, and successes for program implementation.

To support technology implementation, Blackwell et al. (2014) suggested that technology professional development should focus on how teachers can support student understanding with technology. Pegrum, Oakley, and Faulkner (2013) furthered this thought by stating that technology professional development's main focus should be on pedagogy and contextualized content. Past models of professional development have focused developing teacher competency in using specific hardware or software programs and so do not necessarily suit the needs for technology support in today's classrooms (Kiley & Gable, 2013; Uslu & Bumen, 2012).

Rationale

Evidence of the Problem at the Local Level

For iPad implementation to be successful, it is important to understand the insights of primary teachers on the necessities and barriers of iPad implementation (Minshew & Anderson, 2015). Teachers at School X requested iPads to support

differentiated instruction, the creation of multimedia for lesson support, and a device that students could use more easily than notebook computers. However, the IT facilitator and the current head of elementary school noted that teachers were using iPads for professional practice and drill and practice activities in the classroom (IT facilitator, personal communication, March 24, 2014; Administrator, personal communication April 21, 2015). School X has the technology and support staff to integrate iPads into curriculum at the primary school. At School X, each classroom has an interactive whiteboard and the school has 74 iPads, 259 PCs, 23 Apple computers, and five IT specialists on staff as well as an IT facilitator who works with the primary and elementary teachers. The IT facilitator provides support for teachers through training, troubleshooting, and technology implementation support. However, the IT facilitator noted that primary teachers have yet to fully integrate iPads into the primary curriculum (IT facilitator, personal communication, March 24, 2014).

School X's curriculum is part of the International Baccalaureate (IB) program. (International Baccalaureate, 2015). The school is authorized to offer the IB Primary Years Program, Middle School Years Program, and the IB Diploma Program. Information and Communication Technologies (ICT) is part of the IB program ("Help IT Australia," 2015). In the past, the school offered ICT as a separate program. The school introduced the Primary Years Program in 2006 and the IB authorized the program in 2009, with a final evaluation in 2012. The PYP consists of kindergarten through grade 3. According to the IB website, a school must meet the following criteria to be authorized for the PYP program: (a) have at least two consecutive grades/years; (b) appoint a PYP

coordinator to lead the program and communicate with the IB; (c) commit to the mandatory professional development of PYP teachers; and (d) guarantee that the student understanding is constant, with students moving from one program to the next without any breach, in cases where a school chooses to offer other IB programs successively with the PYP ("PYP authorization process," 2015).

School X began to move away from a separate ICT program in 2011 and integrated ICT into the daily curriculum of the primary and elementary teachers (Administrator, personal communication October 2, 2013). Furthermore, the role of the IT facilitator changed to more of a supporter of technology integration than an ICT teacher (Administrator, personal communication June 20, 2015). However, the school did not allocate sufficient personnel to support the initial iPad implementation (IT facilitator, personal communication, December 17, 2013). For the PYP program, the IB recommends that schools create a collaborative plan for ICT integration. In addition, schools authorized to offer the PYP should maintain teacher development through regular professional development and professional learning networks. Finally ICT should support give key learning outcomes: (a) students learn to investigate and carryout personal inquiry through ICT, (b) ICT should support the students' ability to create and innovate, (c) teachers should offer students the chance to communicate with different audiences with a variety of media devices, (d) sharing knowledge through collaboration should be encouraged, (e) students should be able to understand that ICT can be organized in multiple ways; and (f) integrity and honesty will be developed through digital citizenship ("PYP authorization process," 2015).

Although School X has the technology and IT staff to support iPad integration, as of 2016 primary teachers have not integrated iPads into the primary curriculum. With the shift away from ICT classes to technology integration into the primary curriculum, it is essential to understand the needs and barriers of the teachers for iPad integration into the primary curriculum. A comprehensive examination of the barriers, needs, and successes of iPad integration in a larger context was needed to assess the specific needs of the local problem.

Evidence of the Problem from the Professional Literature

Since the release of the iPad in 2010, schools around the world have adopted the iPad as class sets, one-to-one programs, or as bring-your-own-devices (Pegrum, Oakley, & Faulkner, 2013; Song, 2014). However, the research suggested that while planning may be in place, how teachers choose to use the technology in class might be different than originally intended (Blackwell, Lauricella, & Wartella, 2014). Often teachers are incorporating technology in ways that mimic their old teaching practices. In addition, current research noted that iPads may hinder student achievement, therefore teachers need the skills to use iPads to "enhance curricular integration and support identified learning goals and is not simply used for technical integration or as an instructional add-on" (Northrop and Killeen, p. 532, 2013). Furthermore, teachers may lack the skills to choose the correct learning style to fit classroom or individual student needs (Khalid, Kilic, Christoffersen, & Purushothaman, 2015; Liu, 2013).

New technologies are implemented into schools every year. Montrieux et al. (2013) stressed that for a tablet PC implementation program to be successful, teachers

who will use the tablets need to be well trained and have a clear vision of how to use the new technology. Furthermore, Montrieux et al. noted that teachers either used the technology to make current teaching practices easier or transformed lessons and teaching practices based on the potential of the devices used. However, Peluso (2012) suggested that teachers might not have sufficient background knowledge to encompass technology into the classroom. Furthermore, simply placing technology in the classroom did not lead to the intended goals set by the administrations or schools (Peluso, 2012).

Brantley and Ertmer (2013) suggested that teachers should focus on learning rather than on technology. Furthermore, Brantley and Ertmer noted technology integration should be redefined as technology learning. This redefinition would allow teachers to focus more on the goal of learning and not on technology itself (Ertmer & Ottenbreit- Leftwich, 2013; Sutherland, Eagle, & Joubert, 2012). Harris and Hofer (2011) furthered this point by stating "To effectively integrate educational technologies into instruction, K–12 teachers' planning must occur at the nexus of curriculum requirements, students' learning needs, available technologies' affordances and constraints, and the realities of school and classroom contexts" (p.211). In other words, planning for students' learning needs should be the focus, while technology is a tool that supports learning.

Researchers have examined strategies to support iPad implementation in curriculum. In a study of the adoption of iPads in 10 Western Australian schools, Pegrum, Oakley, and Faulker (2013) recommended four strategies for iPad professional development: (a) Allocated time for professional development; (b) a focus on pedagogy, not technology; (c) targeted and contextualized professional development; and (d) the

building of a professional development network. Bracketed time for iPad professional development would allow teachers to attend formal professional development, meet informally to discuss teaching practices, and "build familiarity" with the devices (Pegrum, Oakley & Faulkner, 2013, p. 76). Furthermore, iPad professional development should focus on teaching practices and theory, not only on the devices (Pegrum et al., 2013). iPads are a teaching tool, which teachers use to support instruction (Pegrum et al., 2013). Accordingly, teachers need support in justifying their decision to incorporate iPads into specific lessons.

Contextualized professional development or one-on-one training supports individual teacher needs. Crichton, Pegler, and White (2012) reiterated that teachers need personalized support for iPad implementation. Finally, Pegrum et al, 2013 stipulated that for iPad implementation to be successful, a professional development community or network is needed. Such a network would encourage teachers to seek support from other schools, collaborate, and save time and energy. Consequently, supporting teachers through professional development could aid in successful technology implementation. The purpose of this case study is to examine primary teachers' perceptions of barriers, successes, and needs for program implementation.

Definitions

The purpose of this section is to define terms that are particular to this study. The terms are:

English as Another Language (EAL): The English as another language department at School X oversees all English language learners (ELL) in the primary and elementary

school. The EAL teachers assist students in developing proficiency in the English language (Administrator, personal communication, October 2, 2013).

Educational Technology: ‘‘Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources’’ (Januszewski & Molenda 2008, p. 1).

iPad: A type of tablet made by the computer company Apple. It has a 9.7-inch screen and a multitouch display. The iPad runs a unique operating system called IOS (Henderson & Yeow, 2011).

International school: The international school in the case of this project study is a privately funded internationally accredited school located in South Korea that caters to students of other countries as well as to students of multicultural parents (Hayden & Thompson, 1995).

Levels of Use: An individual’s behavior as they experience change (Hosman & Cvetanoska 2013). Furthermore, levels of use show activities and performance changes as the person becomes more acquainted with the improvement and more practiced at using it (Hosman & Cvetanoska 2013).

Professional development: A formal and informal means of helping teachers learn new skills as well as develop new insights into their teaching practices. Furthermore, professional development encompasses the support for teachers when they encounter challenges as they incorporate new practices into their teaching (Chaudary & Imran, 2012)

Stages of Concern: The stages of concern is based on the framework known as the concerns-based adoption model and measures how "individuals or groups perceive an innovation and how they feel about its use in their work" (Overbaugh & Lu 2008, p.45).

Technology implementation: The incorporation of technology and the use of technology in all facets of learning and teaching. Moreover, technology implementation is the assimilation of suitable technology for student learning (Wachira & Keengwe, 2011, p. 17).

Technology integration: The use and dependence on technology for instructional delivery of daily lessons (Bauer & Kenton, 2005).

Significance

Teachers and administrators recognize the importance of technology integration. Technology integration involves using technology as a tool to support teaching and student learning (Keengwe & Onchwari, 2009). Research today focuses on effective integration of technology to promote successful instructional strategies and student success (Kristen, Wendt, Wendt, & Beach 2014; Minshew & Anderson, 2015; Ryan & Bagley, 2015). Technology integration is meant to offer new opportunities of teaching and learning and partnership between teachers and students. Integration should be continuous, routine, effective and support student learning (Chein, 2013). Furthermore, well-planned technology integration involves technology specific professional development, ongoing support, and collaboration among teachers (Ciampa & Gallagher, 2013; Pegrum et al., 2013; Schrum et al., 2013).

The benefits of using iPads as an educational tool are increasingly featured in research studies. Unlike past technologies, iPads are not a trend in education (Engel, Palloff, & Pratt, 2011). Elbert, Code, and Irvine (2013) conducted a small-scale study of an urban high school at which teachers integrated iPads into the classroom. Results of that study indicated that student motivation increased and that teachers needed more time to plan for technology in the classroom. In a larger study, Pegrum et al, 2013 investigated the adoption of iPads in 10 Australian schools. Unlike the Elbert et al. (2013) study Pegrum et al, 2013 investigated the importance of pedagogically sound technology professional development. In addition to an increase student engagement, Pegrum et al, 2013 found that professional development contributed to the success in the classroom. This study may contribute to research concerning the needs and challenges for educators teaching with iPads in the primary classroom.

The iPad has the potential to make a positive impact on classroom instruction and student success. As a tool, teachers can use iPads to engage students and help those succeed who in the past would see themselves as failures (Reis et al., 2010). Furthermore, the significance of the problem is apparent in the impact technology has on student engagement and success in the classroom. Overlooking the importance of professional development for effective iPad integration will result in new technologies being reserved for simple drill and practice activities (Murray & Olcese, 2011). By examining the perceptions of primary teachers in regard to the needs and challenges in the implementation of iPads for successful teaching and learning in the primary classroom,

this study may guide other teachers who have implemented iPads in their primary classrooms without professional development.

Guiding/Research Question

The purpose of this case study was to examine primary teacher perceptions of barriers, successes, and the perceived needs to effectively implement iPads in the curriculum for instructional purposes. As the popularity of using the iPad in education increases, more and more studies have been conducted to measure the effectiveness of the iPad in the classroom (Elbert et al., 2013; Pegrum, Howitt, & Striepe, 2013; Vu, McIntyre, & Cepero, 2014). Furthermore, recent studies have examined teacher perceptions of the effectiveness of the iPad (Elbert et al., 2013; Montrieux, Vanderlinde, Courtois, Schellens & De Marez, 2014). However, few studies have investigated the perceptions of primary teachers in the context of their needs and challenges for iPad integration. In this study I used a case study design to discover how teachers' perceptions of the needs, successes, and barriers of iPad integration impact their integration of iPads into primary classrooms. The following research questions guided this case study:

1. What are the needs of primary teachers to effectively implement iPads in the classroom?
2. What are primary teachers' perceptions of the effectiveness of implementing iPads in the primary classroom?
3. What barriers do teachers face when implementing iPads in the primary classroom?
4. How do teachers demonstrate the implementation of iPads in the primary

classroom?

Review of the Literature

This literature review consists of five subsections focused on research concerning iPad implementation in school. The first subsection is a summary of the conceptual framework, which is guiding this project study. The second subsection explores research into how the iPad is being used in the classroom. The third subsection is based on research regarding teacher preparations for successful implementation of iPads and the impact of iPads on student achievement. Understanding the importance of professional development and technology implementation is described in section four. Finally, foundational research on technology adoption, stages of concern, and barriers to technology implementation research and the solutions are discussed in subsection five.

Technology in the classroom has been influencing education for the past 3 decades. However, over the past 15 years, mobile technology has been making a more significant impact. Although research into mobile technology integration is still in the early stages, one relevant theoretical framework has emerged: technological pedagogical content knowledge (TPACK) (Koehler & Mishra, 2009). TPACK is based on Shulman's (1987) concept of pedagogical content knowledge. By combining knowledge of educational technologies with pedagogical knowledge, teachers are able to effectively utilize technology in class (Koehler & Mishra, 2009). My literature review focused on integration of iPads into curriculum and teaching, iPads and student achievement, professional development in technology implementation, and barriers to technology integration.

Literature for this review was retrieved from Walden University online library databases. Many research articles were found through the Education Research Complete and Ed/IT Digital Library databases. In addition, I used Google Scholar to locate relevant resources using the key terms: *iPad implementation, technology integration,* and *iPads and professional development*. Various research studies reported the importance of professional development and technology implementation. Comprehensive research into technology implementation and professional development framed the study to determine primary teacher's perceptions of barriers and affordances for program implementation.

Conceptual Framework

Much of the research about technology integration is based on TPACK (Ciampa & Gallagher, 2013; Harris & Hofer, 2011; Semiz & Ince, 2012). TPACK is defined as a framework of understanding and examining the skills and knowledge needed for the integration of technology into the classroom (Koehler & Mishra, 2009). TPACK is composed of seven categories. First, content knowledge is the teacher's knowledge of the subject matter. Next, pedagogical knowledge is the knowledge teachers have about the process and practices of teaching and learning. Pedagogical content knowledge "covers the core business of teaching, learning, curriculum, assessment, and reporting" (Koethler & Mishra, 2009, p. 64). Fourth, technology knowledge assists teachers in identifying when information technology can aid or obstruct students' learning as well as inform teachers in how to adjust to changes in technology. Technology content knowledge allows teachers to understand how content can be altered by specific technologies. Fifth, technological pedagogical knowledge is the understanding of how teaching and learning

can change when technologies are used in learning environments. Finally, technological, pedagogical, content knowledge is different from its individual components: "It arises instead from multiple interactions among content, pedagogical, technological, and contextual knowledge (Harris, Mishra, & Koehler, 2009, p. 401).

The TPACK framework served as a guide for creating research questions and collecting and analyzing data to support my understanding of the perceptions of primary teachers' needs and challenges in regard to iPad implementation. In addition, by applying the TPACK model to professional development, teachers can come to understand the basis for concepts using technologies, teaching techniques that use technology, and how technologies can be used to combine present knowledge with background knowledge to develop new epistemologies (Koehler & Mishra, 2009).

Strategies Teachers use for Technology Integration

iPads are becoming more popular in educational institutions every year. The mobility and versatility of the device, along with its potentially thousands of educational applications, make for a very attractive educational tool. One example of the iPad's burgeoning popularity is a bold initiative underway in the Netherlands. Seven schools opened in the fall of 2013 under the name Steve Jobs Schools, with a one-to-one iPad program. Teachers at the Steve Jobs Schools took on a new role as facilitators or guides for students rather than conveyors of knowledge. In addition, with access to learning 365 days a year, the schools implemented flexible schedules as well as vacations.

Technology use has been a trend in American education for over 30 years (Vu et al., 2014) and iPads are a large part of a new trend in today's classrooms. Moreover, Vu

et al. (2014) noted that iPads have been implemented faster in K-12 classrooms than any other technological device such as notebook and desktop computers. However, Walters and Baum (2011) worried that teachers and schools were rushing to adopt these new technologies without considering the impact on student learning.

Researchers noted that there are distinct advantages and disadvantages to adopting the iPad in a K-12 classroom (Burden, Hopkins, Male, Martin, & Trala, 2012; Elbert et al., 2013; Henderson & Yeow, 2012; Montrieux, et al., 2014). First, with the mobility of iPads learning became more reachable and dynamic (Henderson & Yeow, 2012). This tool allows students to become more productive, which could lead to learning through applications (Henderson & Yeow, 2012). Second, existing research shows that iPads made teachers alter their instructional practices and rethink their professional roles (Burden et al., 2012; Clark & Luckin, 2013; Montrieux, et al., 2014). This alteration allowed teachers to create a wide variety of learning activities that promoted more ubiquitous learning (Montrieux, et al., 2014).

Although iPad initiatives such as this one focusing on iPads are underway, there is a limited amount of research on the implementation of iPads in the classroom. In the past, research has focused on mobile technologies such has tablet PCs, cellular phones, and other handheld devices (Mueller, Wood, De Pasquale, & Cruikshank, 2012; Rashid & Elahi, 2012). The era of technology integration goes back to the 1980s when personal computers where more readily available to the public (Cennamo, Ross, & Ertmer, 2010). However, it wasn't until the late 1990s, when the Internet became widespread, did technology become more prominent in schools. (Roblyer & Doering, 2013).

In the early 2000s, with the introduction of smart phones and tablets, learning with technology became more ubiquitous (Roblyer & Doering, 2013). In a 2002 study, Sharples (2002) used prototype tablet computers to examine the implications of mobile technology in three primary schools. To design the mobile device for learning, Sharples (2002), defined seven requirements: (a) highly portable, the devices should be able to move to wherever the students' needs to learn; (b) individual, the device should adapt to the learners needs, abilities, and learning styles; (c) unobtrusive, the student should be free to "capture situations and retrieve knowledge without technology obtruding on the situation" (Sharples, 2002, p. 511); (d) available, the devices should be available anywhere for students to communicate with teachers or outside experts; (e) persistent, the device should support that management of learning so that students will be able to carry over knowledge and skills to new technology; (f) useful, devices should be useful for everyday needs of students; and (g) intuitive, students should be able to use the devices without prior technology experience. Sharples (2002) noted in his results that students were excited to use the devices and teachers expressed interest in using the devices to manage students learning outside of the classroom.

When considering implementing iPads or other tablets into the classroom, there are different models for schools and teachers to choose from. McFarlane (2012) recognized five models for iPad learning and teaching: class sets, iPads for individual teachers, a few iPads to be signed out, one-to-one, and bring-your-own device. Class sets are usually purchased as a pilot program before the school commits to a larger purchase (McFarlane, 2012).

Crichton et al. (2012) found that when iPads were used as a class set and shared with other classes, the devices become just another technology tool for use in the classroom. iPads are devices that are meant to be used with individual users. Teachers have to repurpose the devices in an environment where class sets are being used (Pegrum, Oakley, & Flaulkner, 2013). Moreover, with class sets teachers are encouraged to use whole-class instruction rather than individualized learning (Bennet, 2011). Successful one-to-one programs have yielded positive outcomes in the classroom. In separate studies, Magley (2011) and Foote (2012) witnessed increased student engagement, personalized learning, and collaboration when iPads were used in the classroom. A few or just one iPad can encourage collaboration in small group work, communication, and problem solving (Bennet, 2011). BYOD programs have found that devices have become integral and an indispensable part of student learning (Peluso, 2012). However, McFarlane (2012) noted that it is vital that administrators and teachers "understand the learning possibilities and effects with iPads before their implementation" (McFarlane, 2012, p.1690).

Teacher Preparations for iPad Integration

Researchers have debated whether the implementation of technology such as iPads has a positive impact on student achievement. In a quantitative pretest/posttest study, Chu (2014) found that fifth grade students in a control group without mobile devices scored higher than students in the experimental group with access to mobile devices. In a similar study, Martin and Ertzberger (2013) noted that students without mobile devices scored higher than students who used mobile devices. However,

Pruet, Ang, and Farzin (2014) showed that weaker and average students with technology enhanced their learning outcomes. Moreover, in a study of primary students' math achievement, Herro, Kiger, and Prunty revealed that students with tablets performed better than students who learned math in a traditional manner (2012). Although researchers' results differ on whether or not student achievement increases because of technology, many researchers have found some benefits of technology in the classroom.

Since the introduction of the iPad in the spring 2010, many educators around the world have implemented iPads in their schools. One of the first schools to integrate iPads into the classroom was a primary school in Auckland, New Zealand (Henderson & Yeow, 2012). The school piloted 10 iPads over the course of 4 months with different age groups. Once the iPads were deemed successful, the school made a larger investment of 48 iPads.

The iPads were primarily used in the senior part of the primary school for such tasks as researching, typing up reports, presenting, and reading eBooks. In addition, drill and practice games were used in math classes to support student retention. Henderson and Yeow (2012) noted several benefits to iPad use experienced by the school. Teachers noted that collaboration increased among students. Furthermore, students adjusted quickly and engagement remained high during class activities. Management of the iPads, however, proved to be more difficult than expected. Updating apps on individual iPads proved time consuming. Moreover, even though classroom polices were clearly delineated for student use, students would still go off task. It should be noted that, at the time, the primary school used the first edition of the iPad, which did not have a camera or other functions to support more content creation, as did the second generation.

In a U.S. based study, Chou, et al. (2012) reported on a 4-month iPad one-to-one pilot program for ninth grade geography students. Chou et al. (2012) focused on the benefits and challenges for both students and teachers. Benefits for students included more active engagement, increased time for projects, and improved digital literacy and digital citizenship (Chou, et al., 2012). Teachers were able to create more student-centered activities as well as provide "enhanced teaching with updated information" (p. 20). Even though integrating the iPad into the curriculum provided many benefits, Chou et al. noted several drawbacks. For students, using the iPad proved to be a distraction at times. For example, students would go off task while browsing the web or open apps that provided more entertainment than educational value. One of the greatest challenges for the teachers was the lack of specific apps to support their geography lessons. In addition, Chou et al. noted that teachers needed more specific training with the iPads for successful integration in to their classrooms.

In a larger case study in Scotland, Burden, et al. (2012) examined eight primary and secondary schools where educators had begun to integrate iPads into the classrooms. Over the course of the case study, Burden et al., (2012) reported many benefits of the pilot study. For instance, teachers noted more collaboration between students and teachers, student motivation increased, and students began to take more responsibility for their own learning. Furthermore, teachers in the study noted more instances of students coaching and teaching fellow students without the aid of teachers. Finally, after only a month into the study, students reported that the quality of teaching greatly improved.

Although this was a large study, no formal iPad training was supplied to teachers. Teachers learned through play and collaboration with fellow teachers and students.

Professional Development in Education

Effective professional development has specific qualities. Guskey and Yoon (2009) recognized the use of outside experts as well as summer institutes as two important aspects of professional development. In addition, Guskey and Yoon (2009) noted that professional learning opportunities that centered on train-the-trainer and peer coaching did not yield successful results for students. Martin et al. (2010) found that long duration, follow-up support, and active engagement contributed to teacher success and student achievement. Smith (2010) added that professional development with a content focus was more successful than generic workshops with teachers in the classroom (Gerard et al., 2011). Tamim, Bernard, Borokhovski, Abrami, and Schmid (2011) added technology professional development needs to center on teacher pedagogy, content knowledge, and instructional goals. Furthermore, professional learning activities and training are more successful when conducted in the teachers' classroom rather than a neutral site (Klieger, Ben-hur, & Bar-Yossef, 2009; Kopcha, 2012). Professional learning should give teachers the technical knowledge to account for everyday troubleshooting as well as the skills to adapt technology to the curriculum

With the advance of technology come more opportunities for teachers to enhance their classroom instruction. However, just because a classroom has or is equipped with the latest technology does not mean teachers know how to use it or that students will

achieve at a higher level (Potter et al, 2012). In addition, teachers need the expertise to implement lessons that are student-centered and rich in technology (Gronseth, Brush, Ottenbreit-Leftwich, Strycker, Abaci, Easterling, van Leusen, 2010). In a case study of eight secondary schools with exemplary professional development programs, Schrum et al. (2013) analyzed and identified essential components to successful technology professional development. First, in a successful professional development program, school administrators took advantage of teachers' talents and supported their development as leaders. In addition, teachers at the eight secondary schools were able to recognize their professional needs as well as teaching themselves what they need to know and sharing that knowledge with other teachers. Furthermore, Schrum et al. (2013) noted that technology professional development needed to be differentiated. Each session would offer teachers choices of what they wanted to learn as well as the way they wanted to learn. Likewise, Pegrum, Oakley, and Flaulkner (2013) found that individualized professional development based on individual teacher needs was more effective than standardized professional development. Moreover, Ciampa and Gallagher (2013) noted that when teachers received individualized support, they were able to overcome any obstacles or barriers and felt more effective in their delivery of content through technology.

Additionally, strategies included, surveys, outsourcing training, using local technology experts, and professional learning communities. Administrators would routinely gather information from surveys and find the professional needs of the teachers. Next, because of time constraints and budget concerns, administrators would send out

one or two teachers to be trained in new technologies and teaching practices. These teachers would become experts in their schools and support the integration of new technologies into the classroom (Schrum et al., 2013). Exemplary schools would take advantage of technology coordinators by having them demonstrate new technologies in a classroom setting. These sessions would be recorded and shared throughout the district. Finally, Schrum et al. (2013) found that professional learning communities played an important role in successful technology integration. Teachers would spend time co-planning lessons, observing each other's classes and discussing the effectiveness of each lesson. Liu (2013) confirmed that technology professional development based in schools that utilized professional learning communities was one of the most effective ways to support technology integration.

Barriers for Technology Integration

In the early days of adapting digital instructional technologies for learning, the focus was on innovation rather than on instruction and assessment (Dwyer, Ringstaff, & Sandholtz, 1991). In the mid-1980s and early 1990s Apple's Classrooms of Tomorrow (ACOT) lead the way in technology adoption and integration. ACOT was a collaboration set up in 1985 between public schools, universities, research agencies, and Apple Computer Company. Teachers and students in an ACOT classroom were given access to a wide range of technologies and educational software. For 10 years' researchers studied the impact that a technological rich environment would have on teachers and students (Dwyer, Ringstaff, & Sandholtz, 1991). The results of the study led to the creation of the ACOT Stages of Concern (Dwyer, Ringstaff, & Sandholtz, 1991). Based on the

Concerns-Based Adoption Model (Hall & Hartford, 1987) (see Table 1) the ACOT Stages of concern consisted of five stages teachers progressed through as they incorporated technology into their classrooms.

Table 1.

Concerns-Based Adoption Model

Stages of Concern

	Stage	Name	Description
Self	0	Awareness	I am not concerned about it
	1	Informational	I would like to know more about it.
	2	Personal	How will using it affect me?
Task	3	Management	I seem to be spending all my time getting materials ready.
Impact	4	Consequence	How is my use affecting learners? How can I refine it to have more impact?
	5	Collaboration	How can I relate what I am doing to what others are doing?
	6	Refocusing	I have some ideas about something that would work even better.

The first stage Entry, teachers are uncomfortable using technology, often avoid using it, and stick to whole class instruction. In the second stage Adoption, teachers begin using technology for them to plan instruction. Students only used the technology sparingly or not at all. In the third stage, Adaptation, teachers begin using technology with students. However, students used technology to replace pencil and paper activities. Often technology is used for drill and practice activities. In the fourth stage, Appropriation, teachers consider learning objectives and the best tools to complete those

objectives. Teachers assign more open-ended tasks and students are involved in more problem-solving, critical thinking, and collaborative tasks. In the final stage, Innovation, the students are at the center of learning. Objectives and standards are addressed through student projects and presentations.

Technology integration brings a unique set of challenges for district leaders, administrators, and teachers. One barrier repeatedly noted in the literature is technology is often acquired without creating clear learning goals (Thomas et al., 2012). Without sufficient planning and goal setting, administrations fail to see the barriers to technology implementation. Simply having the technology professional development available is usually "unsuccessful because it is more about pedagogy than what the learner has determined he or she needs and wants to learn" (Hexom & Kutaka-Kennedy, p 4, 2012).

A primary barrier to technology integration is teachers' attitudes and beliefs (Ryan, & Bagley, 2015). In a multiple case-study designs, Ottenbreit-Leftwich et al. (2010) found that teachers rated attitudes, beliefs toward technology, and their existing levels of technological knowledge and skills as the strongest barriers to technology integration. Hixon and Buckenmeyer (2009) also recognized teacher beliefs, attitudes, knowledge, and skills as obstacles to technology integration. In a study of 1:1 iPad integration, Minshew and Anderson (2015) noted that teacher-centered instructional beliefs had an adverse impact on technology integration. However, many researchers suggested that positive experiences with technology integration would help teachers change their views and successfully integrate technology in the classroom (Hammonds, Matherson, Wilson, & Wright, 2013; Minshew, & Anderson, 2015; Shin, Han, & Kim,

2014). Hammonds, et al. (2013) believed that with the right tools teachers could change their adverse preconceptions of technologies. Furthermore, Shin et al. (2014) furthered this point by adding that positive attitudes and the teachers' environment would support a change in their approaches triggering a more student-centered instructional method.

However, Hixon and Buckenmeyer (2009) looked at barriers in a different perceptive. Barriers that were beyond the control of teachers were considered first-order barriers. First-order barriers included technology access, resources, and administration. Second-order barriers, which Hixon and Buckenmeyer considered being more prevalent in technology integration, encompassed attitudes, knowledge, and skills (2009).

Another barrier that impedes technology integration was a lack of training or lack of quality training. Hechter and Vermette, (2013) found that teachers believed that professional development was profoundly needed to support their training to integrate technologies, and build a knowledge base to integrate effectively technology into the science classroom. In an investigation of elementary student teachers, Anderson, and Groulx (2013) noted that teachers lacked insufficient modeling and support from mentoring teachers and administration. Anderson and Groulx (2013) proposed that carefully selected specially trained mentoring teachers, and university professors should clearly state the importance of technology usage and provide support for teachers to do so.

Through an integrative literature review of ICT research, Ryan and Bagley (2015) showed that a common theme among the barriers to technology integration was limited and insufficient professional development and a lack of constant support. Furthermore,

the authors illustrated that professional development often took place away from the classroom and, therefore, professional development was disengaged from the teacher's environment. Yu (2013) noted that teachers did not have the ability to integrate technology as an educational tool. According to Hammonds, et al. (2013) educators must learn to use technology beyond the basics as well as learn how to use the technology in an instructional way. Therefore, a new more individualized approach to professional development is needed (Hixon & Buckenmeyer, 2009). In addition, Ryan and Bagley (2015) stipulated that ongoing and continuous professional development supports teachers in mastering of technological skills needed to integrate technology in the classroom. Levin and Wadmany (2008) suggested that teachers needed to have a variety of experiences involving technology to create opportunities to develop the necessary abilities to integrate technology.

In a systematic literature review of 13 peer-reviewed studies of the barriers iPad integration in primary and secondary schools, Khalid et al. (2015) noted that teachers often lacked the ability to choose applications that met the curricular goals or the students' competence. In a study of a 1 to 1 tablet initiative, Minshew, Caprino, Anderson, Justice, and Bolick, (2014) illustrated that modeling new applications was an effective method to support teachers' understanding of instructional strategies. In a 1 to 1 study of iPad integration, Minshew and Anderson (2015) found that teachers were not prepared to integrate technology in genuine ways. Using the TPACK framework as a guide, Minshew and Anderson (2015) designed a series of workshops to give teachers the knowledge and experience needed to integrate iPads effectively into their content areas.

Teacher self-efficacy is a barrier that many teachers face when integrating technology in the classroom. During the implementation of a co-designed iPad integrated instructional design study, Minshew and Anderson (2015) noted that teachers struggled with self-efficacy, which hindered technology integration. This issue was not just evident with iPad integration but with general teaching practices as well. For example, Minshew and Anderson (2015) found that a teacher who was part of the study struggled with classroom management. The teacher stipulated the importance of the iPad in the interviews but failed to implement the iPad successfully notwithstanding the support from the researchers (Minshew & Anderson, 2015). Hammonds et al. (2013) noted similar findings and that the lack of teacher self-efficacy may be due to low technological skills and the lack of positive experiences with technology. Hammonds et al. recommended easy to use technology tools to support technology usage during planning and regular tasks. This recommendation may allow teachers to build confidence to use technology in other ways. Furthermore, Hammonds et al. (2013) suggested that teachers needed guidance with the new tools to change habits and increase technology self-efficacy. Finally, Ryan and Bagley (2015) determined that teachers' low self-efficacy was due to fear of looking inadequate in front of students. Ryan and Bagley (2015) proposed that helping teachers created student-centered learning environments and collaboration with peers would build teachers' self-efficacy and increase the chances of successful technology integration.

The integration of technology requires a lot of commitment by administrators and teachers. A time has to be set aside for teachers to learn new technologies and formulate

authentic lessons to support technology integration. Nonetheless, the lack of time and resources is another barrier to successful technology integration. In a study of elementary student teachers, Anderson and Groulx (2013) noted that although teacher held a positive attitude toward technology integration, they were hampered by restricted access to technologies. With swift changes in technology coupled with quantity of technology tools in schools, teachers lack the time and resources to keep up (Ryan, 2014). In a study of 12 elementary and secondary teachers, Yu (2013) noted that the availability of computers was a problem for teachers. In addition, Yu's study revealed that it teachers lacked the suitable educational software. Moreover, teachers were not part of the selection process for the software. Furthermore, schools restricted the teachers from loading their own software onto school computers. Teachers would have to make a request for software to be loaded onto computers, which would often take days or weeks. Yu (2013) recommended that teachers benefit from online resources to support their knowledge of technology integration. Workshops would provide teachers with the proper training needed to improve technology skills. In addition, teacher education programs need to reflect the integration of technology so that elementary and secondary teachers can take the knowledge gained in their school settings. Lastly, teachers should be a part of the "design, implementation and evaluation of teacher education programs" (Yu, p.9, 2013).

Although the integration of technology offers teachers an abundance of tools to improve instruction, technical problems can hinder and even incapacitate a teacher's ability to deliver that lesson. Each year mobile devices get thinner and lighter. However, the durability of these devices becomes difficult to manage. In a study of elementary

school children's usage of mobile devices in Singapore, Khaddage, Knezek, Norris, & Soloway (2015) found that one barrier to technology integration was that devices were susceptible to breakage. Repairing damaged devices would be costly and time consuming. Ryan and Bagley (2015) found that technology problems such as system crashes and low memory obstructed successful technology integration. In a one-to-one study of iPad integration Minshew and Anderson (2015) noted that teachers' instruction was hindered by a slow response from the IT department to download requested applications. However, Kristen et al. (2014) proposed that teachers did not let technological problems prevent them from using technology in the classroom.

Summary of Literature Review

TPACK is a framework that combines the technological, pedagogical, and content knowledge so that teachers can use this framework to understand successful technology integration. Mishra and Koehler (2009) believed that the basis for TPACK was that successful technology integration could not take place with technology as the center of learning. Instead, the emphasis must be on the content and pedagogy with the technology being used as a tool to produce engaging and interactive experiences that support student learning (Koehler & Mishra, 2009). The popularity of iPads for classroom instruction has grown over the past few years. iPads offer a versatile tool for teachers to support technology integration in the classroom. McFarlane's (2012) five models for implementation: class sets, iPads for individual teachers, a few iPads to be signed out, one-to-one, and brings your own device offer insight into the many implementations mentioned in the research. Although research on the integration of iPads has grown there

is still debate over the benefits to student achievement. Research studies have reveled several benefits to iPad integration: increased collaboration, high student engagement, increased digital literacy and digital citizenship, increased student motivation, and student coaching (Burden et al. 2012; Chou, 2012; Yeow, 2012). However, authors from these studies also noted the drawbacks of iPad integration; management of devices, students going off task, and lack of specific applications for content specific lessons (Burden et al. 2012; Chou, 2012; Yeow, 2012).

To better understand how to integrate technology it is important to understand the barriers that teachers and schools face. Research in to barriers revealed several barriers to technology integration. With the popularity of iPads and technology integration, schools often purchase technology with no clear goals or planning. This was the case in School X for this project study. In addition, when integrating technology schools must take into account teacher attitudes and beliefs. Positive attitudes often resulted in successful integration (Minshew and Anderson 2015). Training and the quality of training also had an impact on technology integration. Teachers need support with technology skills as well as developing lesson plans. With technology changing every year it is difficult for teachers to find the time and resources to stay up to date (Ryan & Bagely, 2015). Furthermore, research indicated that teacher self-efficacy in regard to technology and teaching in general can be a barrier to technology integration (Hammonds et al. 2013; Minshew and Anderson, 2015). Finally, although technology provides teachers with an advanced tool for student learning technological problems can disrupt class and must be planned for (Minshew & Anderson, 2015; Ryan & Bagley, 2015).

The purpose of this case study was to examine primary teachers' perceptions of barriers, needs and successes for program implementation. The literature review provided evidence of barriers teachers faced when integrating technology in the classroom. Furthermore, the literature on effective use of technology in the classroom clearly highlighted the importance of technology specific professional development. In this project study, I created a professional development workshop to guide teachers in creating professional learning networks.

Implications

A qualitative research study that intends to provide data regarding primary teacher perceptions of the barriers, needs, and successes to technology integration may provide information to schools that could help support the integration of technology in the classroom. In addition, school leaders may use the information provided by this study to combat the barriers teachers face when integrating technology into the classroom. Therefore, the results of this qualitative project study could have a positive impact on the ability of teachers to successfully integrate technology into their primary classrooms. Based on potential findings, projects may include targeted professional development aimed at improving iPad integration or the development of professional learning networks on site and online.

Summary

Section 1 provided evidence that School X did not have an iPad implementation plan in place, before purchasing a set of 20 iPads for the primary classes. The goal for the teachers was to promote differentiated instruction, add an additional tool for lesson

planning and provide students with a technology device more suited to their age. However, according to the IT facilitator in 2014, teachers' main usage of the iPads recently has been for planning purposes and drill and practice activities (IT facilitator, personal communication March 24, 2015). In addition, School X did not allocate the personnel resources necessary to provide professional development in the first year of implementation (IT facilitator, personal communication March 24, 2014). For technology integration to be successful teachers need to focus on building strong curricula with technology acting as a support tool. The literature on effective technology integration clearly noted that planning is an essential step to successful technology integration.

This project study was developed based upon the TPAK model as a framework. TPACK brings together technological, pedagogical, and content knowledge (Mishra and Koehler, 2009). For teachers to be successful in the integration technology in the classroom, an understanding of technology as well as pedagogical practices is needed (Ryan & Bagley, 2014). Teachers struggle to integrate technology into their regular curriculum (Minshew & Anderson, 2015). Prominent specialists on education and technology continue to demonstrate that barriers such as lack of effective professional development, teacher self-efficacy, and technological problems hinder technology integration (Minshew & Anderson, 2015; Ryan & Bagley, 2015). The literature points out the benefits of understanding these barriers to support the successful integration of technology in the classroom (Anderson and Groulx, 2013; Hammonds et al., 2013). In the next section, I will provide the details about the methodology design of this project study,

which includes a purposeful sampling of five primary teachers who were observed and interviewed.

Section 2: The Methodology

Introduction

The purpose of this case study was to examine primary teachers' perceptions of barriers, successes, and perceived needs for an iPad program implementation. I collected data that reflected the teachers' views of iPad implementation in regard to their needs, challenges, and successes in the primary classroom. According to Merriam (2009), "Qualitative researchers are interested in understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences" (p. 5). Lodico, Spaulding, and Voegtle (2010) also supported the idea that qualitative researchers concentrate on participants and on providing a voice for their feelings. I used a case study design for this investigation. In a case study, the researcher examines "an individual group, organizational, social, political, and related phenomena" (Yin, 2009, p.334). Moreover, Creswell (2012) noted that a case study is an investigation of a "bounded system" (p. 465), which is separated in the form of a time period or place.

With limited participants to interview and the setting limited to a single school, a case study design best suited this research study. The particular group that was examined in this case study was made up of primary teachers at School X. As of the date of this study, the primary teachers had yet to integrate iPads into their curriculum. Framed by TPACK, this qualitative case study was guided by research questions that explored primary teachers' needs, successes, and barriers in regard to iPad integration. The design of the study included data from teacher interviews, teacher PYP planners, and classroom observations. Qualitative data were coded and analyzed using inductive analysis based on

components of a conceptual logic model. In regard to social change, the findings from this study could inform professional development and curriculum development planning within the local context.

Justification for Selected Research Design

I used a qualitative case study design to examine the perspectives of five primary teachers in School X in South Korea by analyzing their perspectives of the needs, successes, and barriers of iPad implementation in the primary classroom. Yin (2009) defined a case study design as a first-hand analysis of a phenomenon within its actual context. Furthermore, Yin (2009) described a case study as a design that "relies on multiple sources of evidence, with data needing to converge in a triangulating fashion" (p.18). Furthermore, case study research is a kind of qualitative study that researchers use to investigate and describe a bounded system (Merriam, 2009). Creswell (2012) described a bounded system as a group categorized by time, place, and physical boundaries. For this study, the bounded group consisted of teachers from School X, and the phenomenon studied and described was primary teachers' perceptions of their needs, successes, and barriers in regard to iPad integration. Creswell (2012) divided a case study into types: intrinsic, instrumental, and collective. An intrinsic case study involves the researcher investigating the specific case (Creswell, 2012). When focusing on a specific issue, researchers are conducting an instrumental case study (Creswell, 2012). Finally, a collective case study is the investigation of multiple cases (Creswell, 2012).

For this project study, an instrumental case study was closely related to the purpose of research, which was to understand a specific issue in School X. Moreover, it

was the goal of this case study to understand the "holistic and meaningful characteristics of real-life events" (Yin, 2009, p. 14), such as the barriers teachers face when integrating iPads into the primary curriculum. The teachers at School X had unique perceptions with regard to their needs, successes, and barriers related to iPad implementation. Conducting an instrumental case study allowed me to gather in-depth information on their perceptions of their needs, successes, and barriers with iPad implementation.

I considered other research designs for this study. However, those designs failed to capture the primary teachers' perspectives as effectively as a case study research design. Merriam noted that grounded theory focuses on building a theory by attending to questions and focusing on a process. Therefore, I considered the qualitative framework grounded theory for my project study. Developing a theory is vital to the design phase of a case study, but in a grounded theory approach, no theoretical designs are considered until the data collection phase (Yin, 2008). Furthermore, researchers who use a grounded theory approach often generalize their findings to other settings (Lodico, et al., 2010). I considered ethnography as another qualitative design. The purpose of an ethnographic study is to discern the spirit of a culture "in order to paint a portrait of the group its, interactions, and its setting" (Lodico et al. p.267, 2010). This type of design would be suitable if conducted in a Korean school where all of the teachers are Korean. However, the primary teachers who participated in this study were from several different countries. A quantitative design would have been best if the goal of this study were to focus on discovering the number of teachers using iPads in the classroom throughout the region. Instead, the goal was to determine how primary teachers at School X perceptions of the

barriers, needs, and successes impacted their implementation of iPads into the classroom. During qualitative studies, researchers concentrate on personal perspectives (Stake, 2010). Because this study concentrated on personal perspectives, a qualitative design was the most practical design to answer my research questions. Therefore, I am confident in my choice of a case study design as my main research methodology.

Participants

For this case study I used purposeful sampling to acquire five primary teachers as participants as there were only eight primary teachers at the school. Topics covered in this subsection included criteria by which potential participants were considered eligible to be part of the study, rationale for the number of participants proposed for inclusion in the study, and procedures for gaining access to participants for data collection.

Selection Criteria

The selection criteria for this study included a purposeful sample of participants who were currently utilizing iPads for instruction, as well as formative and summative assessments tools in their classrooms. The purposeful sampling process used to select primary teachers as participants in this study included gaining their consent and confirming that each teacher was knowledgeable about the research questions (Lodico, et al., 2010). Merriam (2009) noted that researchers need to choose participants that have critical information to address the research questions. Therefore, I selected participants who had critical information to address each of my four research questions. In this study, the target participants were the primary teachers willing to share their ideas and concerns.

I emailed primary teachers asking for those who had been using iPads to participate in this qualitative research study.

Justification for Number of Participants

I conducted my project study at an international school in South Korea. The school consisted of students in primary, elementary, middle, and high school grade levels. For the purposes of this project study, I gathered my data from the primary school. Because teachers in kindergarten, the EAL program, and first to third grades use iPads, I concentrated my focus and my research in those areas. The primary school has two classes per grade level with the exception of first grade, which has one. Therefore, I included all three teachers from kindergarten to second grade, as well as one kindergarten teacher and one EAL teacher. A larger sampling of participants would have been possible if I included administrators and members of the information technology team. However, as I was interested in teachers' perceptions, including these additional participants who are not teachers would not have been appropriate. It was my goal to investigate the perceptions of my participants; thus, a small purposeful sample resulted in a greater level of understanding.

Gaining Access to Participants

Before I obtained permission to conduct the study from the research site, I obtained permission from Walden University's Institutional Review Board (IRB) (approval number 03-23-16-0120162). To gain access to participants, I contacted the principal of School X and the head of the elementary school. I gained access to participants by first submitting a letter of cooperation to the head of the schools. The

letter included a description of my study and details about the research procedures. Furthermore, I outlined the measures I took to ensure the confidentiality of School X and the participants. Once I gained access to School X and participants, I asked the head of the elementary school for permission for me to speak to the primary teachers who were interested in participating in the study. The head of elementary school was in a position similar to that of a principal at a public school and was responsible for overseeing all teachers and staff in the school. She spoke to the teachers; however, two grade 3 teachers decided not participate in the study. I emailed each teacher a letter that detailed the purpose of my study, as well as what was required on their part.

Researcher's Role

I have never worked in any capacity at School X. The selected research site's iPad implementation in the primary school was the basis for this study. In addition, the openness of the administration and the teachers contributed to my consideration of this site for my project study. Throughout the data collection process, my role was that of a researcher whose primary purpose was to collect data in an impartial and unbiased way. I have never worked at an international school with technology integration; therefore, I do not have biases in this area.

Establishing Researcher-Participant Working Relationships

Qualitative researchers establish rapport and trust with participants to accomplish research goals and objectives (Merriam, 2009). However, researchers argue that the more intense and trusting the relationship, the more credible the qualitative research (Pitts & Miller-Day, 2007). Pitts and Miller-Day (2007) identified five turning points that

researchers experience in building rapport with participants. In the initial stages of fieldwork, researchers are set on establishing a working relationship with participants. This stage is known as *other-orientation* (Pitts & Miller-Day, 2007). Shortly after this stage, researchers and participants begin to understand how each can benefit from each other. This subsequent stage is known as the *self-in-relation to other* (Pitts & Miller-Day, 2007). By reaching this second stage, qualitative researchers begin to add more credibility to their studies.

In the third stage, *self-and-other linking*, the relationship between researcher and participants begins to develop. Moreover, participants begin to open up and researchers feel more appreciated (Pitts & Miller-Day, 2007). In the fourth stage, *interpersonal connection*, participant openness increases and participants offer information unsolicited by the researcher. Furthermore, participants often ask for personal information, personal advice, or opinions from the researcher. In the final phase, *partnership*, the personal relationship between the researcher and participant takes precedent over the professional relationship. Pitts and Miller-Day (2007) noted that if a researcher reaches this final phase it is often difficult to leave the site without negative consequences to the participants. For this study I do not believe I had time to reach the partnership stage. However, over the course of my data collection I worked to establish a mutual trust between participants and myself. This trust allowed us to understand the mutual benefits of this project study.

Measures of Ethical Protection

Lodico, et al. (2010) noted three major issues related to the ethical protection of research participants. First, all participants must give informed consent to participate in the research project. A researcher must help each participant understand her or his role in the study as well as any risks involved. Second, researchers must ensure they will do everything in their power to protect participants from harm, be it emotional, mental, physiological, or physical. Finally, ensuring the participants that every step is being taken to ensure that their confidentiality is being protected is the duty of all researchers. Based on these three issues, I gained written consent from each participant by presenting them with the necessary information of the procedures and risks involved in my project study. Furthermore, I explained to all research participants that participation in the study was be voluntary and that they can withdraw from the project study at any time without fear of any repercussions. In addition, I communicated to each participant that information obtained in the study will be kept secure over the course of the study. To guarantee confidentiality I used pseudonyms and all information was kept on my password protected, personal computer to which only I have access. All data will be kept for 5 years after the completion of the study. Finally, I established the methods and tools for my research, and gained approval from the IRB at Walden University.

Data Collection

The first step in data collection was to enlist primary teachers at School X and to complete one-to-one semi-structured interviews. I used an interview protocol with open-ended questions (see Appendix B). The next step was to observe primary teachers in their

classrooms while they were implementing iPads in a lesson. I conducted five 40 minute observations of primary teachers during a class in which iPads were utilized. I used an observation protocol (see Appendix C) to log teacher instructional practices, as well as iPad management and teacher student interaction with regard to iPads. After completing the one-to-one interviews, the PYP coordinator sent me copies of the PYP planners from the previous year. Documents offer a stable source of information that cannot be altered by the presence of the researcher (Merriam, 2009). All information gathered from the interviews will be kept in a password-protected computer for 5 years after the research was completed. At the end of 5 years the information will be deleted permanently.

Interviews

For this case study, I conducted semi-structured interviews with each of the five participants. Prior to the interviews, I provided each participant with the list of open-ended interview questions, which I had produced, as well as the purpose of the study (see Appendix B). Open-ended questions are critical to reaching a deeper understanding of each participant's perspectives of the phenomenon. Furthermore, I audio recorded each interview to sustain the integrity of the data collected. I informed participants that follow-up questions may be asked to seek clarification and or deeper understanding. Finally, I let participants know that follow-up interviews may be needed. The open-ended questions created before the interview served as a guide to gain rich descriptions of the phenomenon (Lodico et al., 2010 Interviews were he held at the school in a location chosen by the teachers. Each interview lasted 30-45 minutes.

Observations

I conducted observations of five teacher volunteers from the selected sample, using an observation protocol modified from the ISTE Classroom Observation Tool (International Society for Technology in Education, 2008) (see Appendix C). The first observations were conducted prior to the interview. I conducted one 40-minute observation for each grade level K-2 as well as one observation of the special education teacher. I asked teachers to suggest lessons to observe that would involve the use of iPads. Observations can provide discussion points in the interviews as well as provide understanding of the context (Merriam, 2009). Lodico et al. (2010) and Merriam (2009) indicated the elements that researchers should observe in their setting are (a) physical setting, (b) participants, (c) activities and interactions, (d) conversations, and (e) researcher behaviors. When observing a teacher in his or her classroom I first took in the physical layout of the classroom. For example, I created a diagram of the classroom, noting the behaviors it is designed for and how the space is allotted for study. More important to my study, I made note of where the technology was located and where students and teachers interacted with the technology. iPads are a unique tool in that they allow students to move around the room or to complete activities anywhere in the classroom. Next, I observed the participants in my study, who included the teachers. I noted how the teachers organized themselves and their interactions in the setting. For example, I observed how they managed the distribution and collection of iPads at the beginning and end of each lesson. In addition, I noted how teachers used the iPads for differentiated instruction as well as difficulties teachers faced while utilizing iPads in the

classroom.

Another element I observed was the activities and interactions. Merriam (2009) noted that researchers should pay close attention to how the participants and activities are connected. Conversations between teachers, and visiting administrators were also noted in my field notes. Finally, it was important to note how my presence and behavior impacted the participants and the setting. Merriam (2009) and Lodico et al. (2010) stipulated that a researcher must think about the level or the degree of his or her participation. In the beginning of my data collection it was important to be an observer participant (Lodico et al., 2010; Merriam, 2009). Teachers understood I was there as an observer. However, as a participant, I had the ability to observe the activities from the views of teachers (Creswell, 2012).

Documents

The final method for collecting data was the examination of primary teacher PYP planners. Primary teachers have the "flexibility to plan the way that works best for them" (Administrator, personal communication, December 3, 2015). Although the head of elementary school does not require teachers to submit lesson plans for individual classes, teachers do submit an International Baccalaureate Primary Years Program planner for each semester based on six transdisciplinary themes (see figure 1) or International Baccalaureate Units of Inquiry (UOIs) (IT facilitator, personal communication, December 2, 2015). The PYP coordinator emailed a copy of 2014-2015 PYP lesson plans for the primary grades. The six UOIs are: who we are, where we are in place and time, how we express ourselves, how the world works, how we organize ourselves, and sharing

the planet. According to the PYP coordinator, primary teachers collaborate with the I.T facilitator, PYP coordinator, librarians, and EAL teachers to plan each UOI for the semester (Administrator, personal communication, December 4, 2015).

I asked teachers to volunteer individual lesson plans as well as their PYP planners for the semester. I used a Technology Integration Assessment Rubric developed by Harris, Grandgenett, and Hofer (2010) to examine primary teacher PYP planners.

By examining lesson plans I was able to corroborate information from interviews and observations pertaining to the research questions. Furthermore, lesson plans offered additional information not found through interviews and observations. Documents in qualitative research offer several benefits. Yin (2008) and Merriam (2009) agree that documents are stable resources for qualitative case studies. Yin (2008) noted that stability allows the researcher to review the document several times while Merriam (2009) suggested that stability refers to documents that were not altered by the researcher. Creswell (2012) found that documents offer insight into a problem because they are often written in the words of the participants. By using multiple methods of data collection, I was able to "shore up the internal validity" of my study through data triangulation (Merriam, 2009, p. 215).

Figure 1 Primary Years Programme.

Reprinted from www.ibo.org, n.d., Retrieved December 6, 2015, from http://www.ibo.org

Alignment of Research Questions and Data Collection

It was important to align each research question with each method of data collection to achieve an authentic understanding of this case study. The research questions were designed to explore the perceptions of primary teachers and their experiences implementing iPads in the primary classroom. First, to address the issues about primary teacher needs and their perceptions of the effectiveness of iPads, the interview questions provided insights from teachers' perspectives. Second, classroom observations addressed the issue of what barriers teachers face, as well as, how teachers demonstrate the implementation of iPads in the primary classroom. Finally, the

examination of teacher lesson plans supported classroom observations by addressing the issue of how teachers demonstrate their implementation.

Data Analysis

Data analysis in a qualitative study occurs concurrently with data collection (Merriam, 2009). To organize and keep track of my data, I used a reflective journal and research log. The reflective journal allowed me to note my insights from interviews, documents, and observations, thus keeping track of all my field notes. A research log was used to keep track of participant information such as interview scheduling and pseudonyms. I kept both my research log and reflective journal on my personal notebook computer.

Interviews

I transcribed each individual interview within a few hours of completion. Lodico et al. (2010) noted that transcribing an interview verbatim would help researchers remove some of their biases associated with the phenomenon. Once data was transcribed, I began the coding process. Interview responses were organized into categories and codes were assigned. To achieve this, I used the TPACK framework as a lens to focus on connections among the interviews and observation data by investigating and coding the raw data for, specific phrases, sentences, or entire paragraphs to produce themes. I employed a qualitative analytic software program to assist with analyzing data (NVivo). The software assisted with organizing the participant responses to support themes. Preliminary themes were recognized from the regularity of their occurrence in the participant responses and

actions in the observations. Finally, I analytically intertwined the themes in order to write a narrative description of the analysis in the findings of the study.

Observations

An observation protocol (see Appendix C) was used to document field notes of teacher use of iPads. The notes were written using an iPad app called Noteability. The notes were retyped and coded for patterns, themes, categories, and relationships (Merriam, 2009).

Documents

PYP planners were the last source of data collected. Lesson plans provided insights into the findings from observations and interviews (see Appendix D). Once all data was collected I continued to organize findings into themes. Creswell (2012) noted that there are five categories of themes: ordinary, unexpected, hard-to-classify, and major and minor themes. After analyzing the different themes, I began to interpret data in view of past research from the literature review (Creswell, 2012). To ensure the internal validity and credibility of my analysis, I used member checks with all of the participants. Member checking involves taking my findings back to the participants and checking to see if my interpretations were accurate (Merriam, 2009; Creswell, 2012). Moreover, through member checking, I was able to identify any biases in my analysis (Merriam, 2009). Furthermore, it is important to deal with discrepant data that may emerge from data sources. Maxwell (2012) suggested that researchers report discrepant findings and allow readers to evaluate the data and generate their own conclusions.

Data Analysis Results

The purpose of this case study was to examine primary teachers' perceptions of barriers, successes, and perceived needs for program implementation. Data was collected from five lower elementary teachers. To help readers better understand the context of this project study I will give a brief introduction of each teacher with data collected from interviews. All names are pseudonyms.

Anne, is a kindergarten teacher with extensive experience with technology in the classroom. In previous schools Anne was part of a one-to-one iPad program in third grade. During our conversations I learned that Anne was very open minded to technology in the classroom however, she prefers to use concreate materials such as traditional print based materials over technology at the kindergarten level.

Rose is the only first grade teacher at School X. Many of School X students are from various countries. The majority of those students' parents work in the shipping industry. With the price of oil down, the population of the school has declined this year. Therefore, the school has only one first grade classroom this year. Rose the first grade teacher, came into the school with little experience with technology in the classroom or at home. In our conversations she noted that she has trouble keeping up with all the advances with technology and does not own an iPad herself. However, through my observations I learned that even though Rose lacks the experience and training, she utilizes the iPads during her literacy time in an effective way. Rose is a technological novice that teachers first grade and literacy.

Lucy is a one of the two second grade teachers. She is in her first year teaching at School X. Like Rose she does not have much prior experience with technology in her classroom. Unlike Rose, she does not feel she needs more training or knowledge to integrate technology into her classroom. She prefers that they iPads be a choice for students. Lucy mentioned that she has only used the iPad once or twice this year as a project choice for students. At that time, she sent students to work with the IT facilitator to complete their projects. Lucy is a technological skeptic that does not see the benefits of technology in her classroom.

Kate, is the special education (SEN) and English as another language (EAL) teacher for the lower elementary school. She works with students with learning disabilities as well as English language learners. Kate has a lot of experience integrating technology into her teaching. Thorough our conversations I learned that she has conducted research on technology in the classroom and she has a very objective view on iPads in the classroom. Kate is a technologically well-informed special education teacher with a very objective view of technology.

Lydia is the other second grade teacher. She has taught at this school for seven years. She is very passionate about technology in the classroom and played an instrumental role in bringing iPads in to the school in 2012. Lydia is very comfortable integrating technology into her lessons and spends a lot of time on self-professional development. Lydia is a self-taught Technological leader at the school with a passion for bringing technology into the second grade classroom. This year Lydia is mentoring a student teacher.

The five primary teachers expand a wide range of teaching and technological experience. In addition, each teacher had her own unique view of technology's role in her classroom. Anne, the kindergarten teacher, had specific experience with iPads in a one-to-one environment. Although she felt technology played an important role in a student's development she believed her students would benefit from more tactile or hands on experiences. With the least amount of technological experience, Rose struggled to implement iPads into her classroom. On the other hand, she has had great success using the iPads to support her literacy centers. Lucy, a second grade teacher, was more skeptical about the importance of technology in her classroom. When students chose technology as a project option she sent students to learn with the IT facilitator. Kate, a scholar of technological research, has an open mind to using technology in her classroom. However, she requires proof from research before she will implement technology into her lessons. Finally, Lydia, the champion for technology in the school, set an example for other teachers by self-educating in areas of technology that will benefit her students. In the next subsections I will share the results of my data analysis by presenting the themes that were discovered in my analysis.

Open and axial coding methodologies were employed to analyze data from observations, interviews and documents. Using Nvivo, I coded each data set into nodes or themes. Using Nvivo, I coded each data set into nodes that represented specific concepts or ideas. From those nodes I narrowed and organized my data into four themes. The four main themes discovered in my data analysis were past experience with technology, teacher support, preparation for the future, and barriers to implementation. In the next

few subsections I will explain each theme by presenting evidence from the interviews, observations and data collection. In addition, I will present any discrepant and salient data. Following those explanations, I will provide the results in relation to my four guiding research questions.

Past Experience with Technology

The first theme of the data analysis was how past experience with technology affected the teacher's perceptions of iPad effectiveness. Past experience with technology related to the research question about teachers' perceptions of the effectiveness of implementing iPads. Through interviews and observations, the data indicated that teachers with more experience with technology in the classroom perceived the iPad as an effective tool. Ottenbreit-Leftwich et al. (2010) found that teachers existing technical knowledge and skills affected their integration of technology. Anne, the kindergarten teacher, speaking on past experiences, believed that iPads played an important role in primary classroom by stating:

> The children had their own iPads, from home. So it was like a personal iPad they had permission to bring back and forth from home. That was really nice and I could see how that could be a limiting problem if you didn't have that situation if you had a cart or something, because the students had their own camera rolls they could access, they had their own settings already loaded, so when I asked them to get online Kidblog it was really fast, they had everything already saved into their own iPads. That

> could a problem if you were using an iPad cart. Or it you had multiple users. We didn't so that worked really well.

Lydia, one of the teachers who was instrumental in bringing iPads into the primary classrooms at School X, noted the importance of technology in her classroom. She emphasized that she wanted technology to be a part of the classroom. She wanted students to feel comfortable and perceive that the technology was as much of a part of the classroom as any other tool used for learning.

Consequently, the data indicated teachers with less or little prior experience with technology did not view the iPads as an essential part of their classroom. In her first year at School X, Lucy was surprised by the amount of technology used by primary students. She noted that this school had more technology for second graders than she had in any of her previous teaching assignments. Furthermore, she was surprised by how much technology was available to students with in the school.

Support

The data revealed support was the theme that connected to the needs of primary teachers to successfully implement iPads in to the classroom. Support for iPad implementation was identified as, teacher support from other teachers and support from the IT facilitator. Anderson, and Groulx (2013) noted modeling and support from mentoring teachers and administration was essential to effective technology integration. In regard to supporting each other teachers noted that there was not as much support as in previous years as stated by Lydia:

> We really haven't done much this year in particular but in the past we have lower elementary meetings we have staff meetings where we will if there's a need something they we'll practice that or I'll ask the IT facilitator to come in for a meetings and we'll… "Mr. Lee will you show us how to use these apps?" We'll have more sessions which apps are you using lately are they good why, what are you using them for so it's just kind of collaborative planning. But we haven't done that much this year.

The kindergarten teacher also noted that teachers have not supported each other. She noted that kindergarten was moved to the elementary school. In the past, kindergarten was part of the Early Learning Center (ELC). Therefore, she suggested that a reason why there is not has much collaboration or support between kindergarten and grade one is that she does not feel her students ready for the added screen time.

Other teachers emphasized that there was some support from other teachers, but limited to discussions about apps used in class. Lucy mentioned that in lower elementary meetings teachers often discussed which applications they are using in class. However, she expressed concern that this was the only way teachers supported each other with regard to iPad integration.

The inexperienced teachers noted that they were given iPads that were not configured at the beginning of the year and they were told to choose the apps they would use. However, no training was offered to help teachers select the apps for their classes. Furthermore, well-planned technology integration involves technology professional development, continuing support, and cooperation among teachers (Ciampa & Gallagher,

2013; Pegrum et al., 2013; Schrum et al., 2013). In addition, the interview data revealed inexperienced teachers did not have the time to learn about each app on their own. While there was an absence of support from other teachers in certain areas, all teachers stressed that they received a lot of support from the IT facilitator. Anne explained that the IT facilitator would often spend time in the classroom when primary teachers were utilizing iPad specific lessons. Kate the SEN teacher furthered this explanation by noting that the IT facilitator supported teachers by suggesting different apps for their individual classrooms.

During my observations the IT facilitator routinely came into the primary classrooms and supported teachers with, summative assessments being completed on the iPads, technical problems, and pulling students out of class to work individually with them on iPad related activities. To help introduce kindergarten students to digital portfolios, the IT facilitator worked individually with several students on how to capture and upload work to a blogging app. In addition, one of the second grade teachers mentioned that when two of her students chose to create projects on the iPads, she sent them to work with the IT facilitator. Although primary teachers' usage of iPads varied, they all agreed that it was important to expose students to technology to prepare them for the future.

Preparation for The Future

School X has a one-to-one laptop program for grades 5-12. The teacher data emphasized that their main goal was to prepare students for technology implementation at the next grade level. As previously stated, Kate the kindergarten teacher has a lot of

experience with one-to-one iPad implementation at past schools. However, she limited her usage of iPads because of the age of her students. On the other hand, she understands that students should be at least familiar with technology in preparation for the next grade:

> But I do believe the school needs to take initiative integrating technology beginning at an early age, but I am just not sure where that age is. I would probably say grade one-ish I would start doing that and in grade 2 where there able to write there able to read, becoming more fluent in those things and my view on that changes as we get up into the upper grades and as we get into middle school the expectations of the school increases a lot. But in my classroom for this age the expectations in my class is that for example, you don't take a picture of someone unless you ask them first. Again digital citizenship starts really young.

Rose also stressed that one of the expectations of the school was for teachers to prepare students for future technology in the classrooms. School administrator expectations of teacher technology integration often influenced teacher attitudes (Sadaf, Newby, & Ertmer, 2012). She believed that the school expected her to prepare students for the next grade level because as students move up into upper elementary, technology becomes a more prominent part of their learning. Primary teachers understood the importance of technology integration for preparing students for the upper grade levels. However, as indicated by the case study data, this preparation was often hampered by technical problems, lack of available iPads, and lack of iPad specific training.

Barriers

Finally, the data revealed barriers teachers faced when implementing iPads in the primary classroom as a theme. Numerous technical problems while implementing iPads in the classroom, a lack of iPads per classroom, and a lack of training with iPads impacted or proved to be a barrier to effective iPad implementation. With regard to managing four classrooms with iPads Emily stated: "It's just that management piece that's a struggle you know of setting up the schedule of who gets it, how are we going to rotate it and sometimes with the little kids." The EAL and SEN teacher noted that she only has one iPad to work with and that limits her use in class. She suggested that students would feel uncomfortable if their classmate had access but they did not.

In addition to a lack of available iPads teachers faced many technical challenges when implementing iPads in the primary classroom. Technical issues hinder a teacher's ability to complete a lesson and break the engagement of students (Ryan & Bagley, 2015). During my observations I noted several technical problems that hindered the students completing their lessons. In one grade two classroom students used iPads to demonstrate their understanding of a unit of inquiry. More specifically, students were creating videos with an app called *Puppet Pals*. The second grade teacher reserved the iPads for her 14 students to have the number of iPads needed to complete their videos. However, the teacher noted that several students were unable to complete their projects during this class because the iPads did not have the full version of the app installed. She also noted that this was just one of many problems she faced while implementing iPads into her classroom. She emphasized the importance of having a student teacher in the

classroom. With assistance, she does not have trouble handling technical problems. However, the student teacher is only in class with her in the mornings. She mentioned that without a student teacher in the class or a teacher assistant, managing technical problems can become very difficult.

Finally, some teachers felt overwhelmed with implementation because of a lack of training with iPads. The first grade teacher explained:

> It seems like they change so fast. For one thing. Like I haven't heard of airdrop. I don't even own an iPad of my own. I don't have a lot of training. And it seems like apps are being added every day. Also I felt like there was given these iPads and not a lot of training about apps that are available. I've never been in a classroom that has iPads available so I don't feel like there is a lot of support with them.

With millions of Apps to choose from, and thousands of Apps begin added daily, it is difficult to know which Apps are suitable for your classroom (Khalid, Kilic, Christoffersen, & Purushothaman, 2015; Henderson & Yeow, 2012). Furthermore, she explained that at the beginning of the year she was given iPads without apps and or software installed and told by the IT facilitator to select which apps she wanted installed. However, with no past experience with iPads, she noted that it was a struggle to find the time to learn about each app and how it would benefit her students.

Teachers faced numerous barriers while implementing iPads in the classroom. Technical problems, such as lack of proper applications installed hindered lesson completion. In addition, teachers lacked iPad specific training and collegial support

throughout the school year. In the next section I noted evidence that did not follow my analysis or discrepant cases.

Discrepant Case

In the above evidence, less experience was one factor in iPad usage. However, in one case, a teacher with past experience chose not to implement iPads in her classroom as a personal decision. Anne expressed concern that her students received a lot of screen time at home. She noted that her students told her about using iPads at home and parents also explained their children's usage outside of the classroom. Therefore, she felt it necessary for students at the kindergarten age to focus on concrete learning materials and with tools students do not have access to at home.

Salient Data

The purpose of this study was to examine the perceptions of primary teachers' needs, successes, and barriers for iPad implementation at a primary school. Technology pedagogy content knowledge (TPACK) served as the conceptual framework for this project study. Teacher perceptions were framed in the TPACK framework through analysis (Mishra and Koehler, 2009). In addition, TPACK helped to frame the four guiding research questions using a case study design (Merriam, 2009).

The first research question addressed teachers' needs in regard to iPad implementation. Within the TPACK conceptual framework Mishra and Koehler (2009) noted that there needs to be "an interaction between what teachers know and how they apply what they know in the unique circumstances or contexts within their classrooms"

(p.62). Research participants at School X needs varied from iPad specific training, more collaboration between teachers, and additional iPads.

The second research question dealt with teachers' perceptions of the effectiveness of implementing iPads in the classroom. I addressed this question through the interviews by asking teachers to describe successes with iPads in their classrooms. Instances of success differed among the amount of iPad usage in the classroom. For example, teachers that used iPads sparingly noted that it was important to have it has a choice, students valued the projects they had completed, and the SEN teacher stated "The fact that they love it. So I have to push way less my students less to try it." On the other hand, teachers that used iPads daily shared different perceptions of successes. Lydia the second grade teacher with the most experience among the participants commented:

> There is successes, just in just having the kids have a mindset to use technology and not really, just be a little more independent. It's really the goal in grade 2 to get them more independent by grade using that kind of technology.

The third researched question addressed the barriers teachers faced while implementing iPads in the classroom. Teachers faced numerous barriers while implementing iPads in the classroom. Teachers stressed that technical problems often inhibit their ability to successful complete lessons involving iPads. The first grade teacher explained that technical problems delayed her lesson timeline and created a problem for students. She mentioned that iPads were often not configured and she had trouble collecting and printing student work to add to their paper portfolios.

The final research question investigated how teachers demonstrated their implementation of iPads. I addressed this question during my observations as well as in follow-up interviews. Using an observation protocol (see Appendix C). I witnessed primary teachers utilizing iPads in several different ways. In the kindergarten class, the IT facilitator came to the class and worked with individual students on blog posts. According to the kindergarten teacher the goal is to have students capture their progress and to introduce them to reflecting on their work. She noted that the IT facilitator visited her class two to three times a week. During those visits he would take students out of the class and help them take photos and write reflections about their work. Her goal for her students was for them to combine their photos and reflections into some kind of simple portfolio.

In first grade, iPads played an important role in literacy centers. During my observation time, students used iPads for individual reading. The teacher assigned the iPads to different pairs throughout the morning. In a follow-up interview the first grade teacher noted that her students listen and read interactive audiobooks with the iPads. In addition, she stressed that the app used *Raz Kids* engages her students. She noted that students preferred the app because it was very individualized. "They prefer to use *Raz Kids* because it is more individualized they get their own character, their own avatar and they get rewards if they make progress."

In second grade I observed a regular lesson as well as an ICT class, which was co-taught by the second grade teacher and the IT facilitator. In the first lesson the second grade teacher used the iPads as a tool for creating projects based on the students' unit of

inquiry. The teacher faced many technical difficulties such as iPads not having applications needed for the lesson and the full version of applications were not installed, which impeded some students' progress. However, in a second interview she explained that she was able to overcome the problems by working with the IT facilitator and reserving the iPads for one additional period.

Using the TPACK framework as a lens, I concluded that evidence collected and analyzed from my data sources addressed each of the four guiding research questions: What are the needs of primary teachers to effectively implement iPads in the classroom, what are primary teachers' perception of the effectiveness of implementing iPads in the primary classroom, what barriers do teachers face when implementing iPads in the primary classroom, and how do teachers demonstrate the implementation of iPads in the primary classroom? Results indicated that teachers need more support from colleagues and iPad specific training to effectively implement iPads. In addition, data revealed that with prior technology experience viewed the iPads as an effective tool. Furthermore, teachers faced numerous barriers, such has lack of support and technical problems when implementing iPads in the classroom. Finally, some teachers demonstrated their implementation by integrating iPads into specific reading and project based lessons. In the following paragraph I will address the validity and reliability of my data analysis.

Validity and Reliability

Merriam (2009) offers different strategies for qualitative researchers to improve credibility of data collected. One strategy I used in this study was methodological triangulation. According to Yin (2009), triangulation is the use of multiple sources. In my

project study I conducted semi-structured interviews, observed classes, and examined PYP planners. Furthermore, once I began data analysis I solicited feedback from research participants using member checking. Merriam (2009), noted that by requesting feedback or member checking, researchers can rule out misinterpretations of analysis.

To address reliability concerns, I carefully reviewed transcripts, documents, and field notes to assure accuracy. In addition, I used NVivo to compare data sets with codes and I carefully documented the research process. Merriam (2009) indicated that information from qualitative research studies cannot be generalized. Therefore, the transferability of this case study should be evaluated by the reader. It is the job of the reader to conclude if information provided through detailed description in this study presents enough resemblance to their own location.

Conclusion

Merriam (2009) and Lodico et al. (2011) noted that qualitative research provides researchers with the opportunity to explore the essence of human experience. Therefore, for my project study I chose a case study design to determine how five teachers from School X perceive their needs, successes, and barriers for iPad implementation. Teachers were selected by their usage of iPads in the primary classroom. All primary teachers from kindergarten through grade two were asked to participate in this study. Data collection consisted of individual interviews, observations and examination of PYP planners. Semi-structured interviews provided information to support observations (Creswell, 2012). This section delineated the processes for data collection, recording, and analysis to take place during my project study. A research log and a research journal was used to support

my organization of data as well as to assist me in analyzing the data. Through coding and thematic analysis, I applied findings from the data to create a project that will help teachers effectively integrate iPads into the primary classroom. Findings were organized into four major themes, past experience with technology, support, preparation for the future, and barriers. Results indicated that teachers with more prior experience utilized iPads on a daily basis. Teachers with less experience were less likely to use iPads in lessons on a regular basis. Support among teachers was less evident than in previous years, however, teachers noted that support from the IT facilitator met their needs. All teachers iterated that their goal was to prepare students for technology usage in the next grade level. Finally, technical and lack of training hindered iPad implementation among the teachers.

The purpose of this project study was to examine primary teacher's perceptions of barriers, successes, and needs for iPad integration. School X had the means to support iPad integration, however, teachers had yet to fully integrate iPads into the primary curriculum. The professional literature points to the importance of planning and understanding the barriers teachers face when integrating technology into the classroom. Building from the TPACK framework it was the goal of this project study to create a project that will assist the teachers, at the selected local, to successfully integrate iPads.

The project will be a professional development workshop to support teacher implementation of iPads. Furthermore, other schools looking to implement iPads into the classroom may benefit from the results of this study and the project that was created. Enhancing teacher understandings and skills about effective integration of instructional

technologies gives them and their schools the ability to support student learning in the classroom. In Section 3 I will introduce and describe the project in detail.

Section 3: The Project

Introduction

In this section I will describe the outcome project of this project study, which is a three-session professional development plan (see Appendix A). This professional development plan was created based on the results of my research to address the essential problem of teachers not integrating iPads into the primary classroom. I will also explain comprehensively how the results of this research and the results of a specifically targeted literature review support the goal and objectives of this professional development plan. The goal of the plan is to provide primary teachers with the opportunity to learn the necessary knowledge and skills to understand the concept of Professional Learning Networks (PLN) to support iPad integration for effective teaching and learning in to the primary classroom. Teachers will implement a PLN to collaborate with other teachers who have similar teaching assignments and to work with those teachers to effectively implement iPads into the primary classroom. The specific objectives of the plan are: (a) as a result of the workshop, primary teachers will be able to identify the benefits of PLNs and the factors that create a successful PLN; (b) primary teachers will be able to create and build their own PLNs as a result of collaborating with colleagues; and (c) primary teachers will have the necessary knowledge and skills to work effectively with colleagues online. In addition, I will explain how the project will be implemented and provide a detailed evaluation plan that is based upon Kirkpatrick's evaluation model (Kirkpatrick & Kirkpatrick, 2006) that may be implemented to evaluate the effectiveness of the project both formatively and summatively.

Rationale

Findings from this study demonstrated that primary teachers lacked proper training and support from the school to implement iPads effectively in their classrooms. In addition, a limited number of grade level teachers lacked support from colleagues. For instance, the first grade teacher noted that planning for iPad usage in class was difficult because she did not have a colleague with similar students with which to plan. Without another first grade teacher to plan with, she felt isolated because her students were not as developed as the second or third grade students. Therefore, it was very challenging to plan iPad related activities with other teachers. The findings in the project literature review suggested that professional learning networks support teachers in isolation (DuFour & Reason, 2015). Through PLNs, teachers gain access to experts and mentors that can address teachers' individual needs. The rationale for this study, therefore, is to support teachers in the development of individual professional learning networks as well as creating a central online form for teachers to share ideas with colleagues from around the world to support implementation of iPads in the primary classroom. Primary teachers at School X often teach in isolation because they are the only teacher at their grade level. Although primary teachers collaborate on their PYP planners, results from the study indicated that teachers want more collaboration with teachers that are like minded and in the same grade level.

A professional development workshop will provide primary teachers with the means to create their own professional learning networks. Liu (2012) suggested that PLNs build strong learning communities. Therefore, the participants in this research

study will be able to build a strong professional learning community with shared goals and meaningful collaboration. Furthermore, the online central form will support asynchronous learning by allowing teachers to learn at their own pace and work with colleagues that teach at the same grade level and share their teaching beliefs.

Review of Literature

The purpose of this project study was to examine primary teacher's perceptions of barriers, successes, and needs for iPad integration in the classroom. The findings from data collected suggested that primary teachers lacked collegial support and iPad specific training to implement iPads in the classroom. In addition, data from major themes proposed past experience was related to primary teachers' successful use of iPads. However, all teachers agreed that students need technology experience for upper grades. Therefore, the project will consist of a series of three professional development workshops spread over the school year with teacher-centered symposiums between sessions. The goal of the workshop and teacher-centered symposiums will be to support teachers in their development of professional learning networks as well as guiding them in the use of Edmodo (www.edmodo.com) as a central form for collaboration with outside teachers and experts to support iPad implementation in the classroom. Edmodo is an educational website that mimics the ideas of a social network and improves them for use in the classroom.

The literature review for this project included a variety of resources in an effort to examine all aspects of the project thoroughly. Search terms such as professional learning networks (PLNs), professional learning communities, online professional development,

social media and online learning, teacher isolation, and collaboration helped me collect research from peer reviewed journals and dissertations located in Google Scholar, and databases such as LearnTechLib, ERIC, Education Research Complete, and ProQuest Central.

Professional Learning Communities

DuFour and Reason (2015) defined a professional learning community (PLC) as "an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve" (p.673-674). Research suggests that when teachers take part in PLCs, they accept the responsibility for their professional development as well as student learning (DuFour & Reason, 2015). For School X, primary teachers lacked the support for technology integration within the same grade. Teachers often feel isolated when no other teachers are teaching the same grade level with students' unique characteristics and needs. PLCs offer teachers the opportunity to collaborate with colleagues within the same grade level who share similar goals (Tohill, 2016). Furthermore, PLCs "reduce isolation, promote autonomy, and provide inspiration by offering access to support and information not only within a school but also around the globe" (Flanigan, 2011 p.42). However, PLCs only have the potential to improve teacher instruction and student learning if teachers are engaged actively and PLCs are applicably designed (DuFour & Reason, 2015).

DuFour and Reason (2015) identified three ideas that make up the foundation of effective PLCs. PLCs must: (a) ensure that all students learn at high levels, (b) work collaboratively to meet students' needs, and (c) create a results-oriented culture. To

ensure that all students learn at high levels, DuFour and Reason (2015) suggest that PLC teams recognize the knowledge, skills, and characters that all students must obtain to reach goals. DuFour and Reason (2015) also noted that teachers take into account how to identify student learning and develop a response for when students do not reach learning goals. In PLCs, collaboration plays a major role in meeting the needs of students. DuFour and Reason (2015) stressed the importance of teachers working interdependently to meet shared goals, as well as insert time for collaboration into their daily routines. More importantly, teachers in PLCs must keep commitments to their aims and responsibilities to the PLC team. In a study of 9000 teachers over a two-year period, Ronfeldy, Farmer, McQueen, and Grisson (2015) found that better collaboration leads to increased student achievement. DuFour and Reason's (2015) last idea centers around SMART goals: Strategically and specifically aligned with school and district goals: (a) measureable, (b) attainable (c) results oriented, and (d) time bound.

Using SMART goals, teachers work together to collect and analyze data about student learning as well as recognize the needs of individual students (DuFour & Reason, 2015).

Online Professional Development

Research shows that teachers have become discontented with traditional professional development (Avalos, 2011; Brown, 2013; Lieberman & Mace, 2010; Liu, 2012; Lock, 2006; Postholm, 2012; and Tohill, 2016). In regard to School X, some teachers felt that they lacked the specific training to implement iPads into the primary classroom, while other teachers revealed that isolation prevented them from collaborating on iPad specific projects with other grade level colleagues. Online professional

development offers teachers the opportunity to interact and collaborate with teachers in similar situations around the globe (McConnell, Parker, Eberhardt, Koehler, & Lundeburg, 2013). While traditional PLCs work within a school, DuFour and Reason (2015) noted that virtual teams can also work in an online, asynchronous environment.

Virtual PLCs offer a number of benefits and challenges. According to DuFour and Reason (2015), virtual PLCs "unite experts in specialized fields working at a distance from each other" (p.588). Teachers in School X are trained specifically in the Primary Years Program (PYP). Virtual PLCs would provide teachers the chance to connect with other PYP specialists around the world. Furthermore, technologically inexperienced teachers from School X would have access to more experienced teachers at the same grade level. In addition, virtual PLCs enable originality and creativity (DuFour & Reason, 2015).

Although virtual PLCs offer several benefits, there are many challenges that teachers and schools will face when implementing virtual PLCs. One key component of a successful PLC is trust. However, building trust in an online environment can be difficult because of the lack of informal interactions and socializing (DuFour & Reason, 2015). DuFour and Reason (2015) also noted that trust in virtual PLCs is "measured in terms of reliability, consistency, and responsiveness" (p.575). To overcome trust issues, DuFour and Reason (2015) suggested that teachers explain their specific commitments by identifying their specific skills and conditions in which they can contribute to the ideal group.

Another issue with online collaboration is the lack of social interaction. In a study that compared face-to-face PLCs and virtual PLCs through video conferencing, McConnell, et al. (2012) found that social interaction was an important part of an effective PLC. Video conferencing as a tool for virtual PLCs is valuable for teachers in isolation or teachers who are the only teacher in a specific subject or grade level (McConnell, et al, 2012). According to the principal, School X has one kindergarten and grade one class and grade two will be reduced to one class in the 2016-2017 school year (Administrator, personal communication, April, 24, 2016). Therefore, video conferencing is a valued tool as part of an online PLC. Although virtual PLCs offer many benefits to teachers, building a virtual PLC can take a lot of time and effort by the entire school. However, individual teachers build PLNs to meet their differentiated needs.

Professional Learning Networks

Research has shown that teachers dedicate time each week for informal online learning with peers (Campana, 2014; de Laat & Schreurs, 2013; Eraut, 2011). In addition, current research has demonstrated that professional development among peers through collaboration has had a positive impact on student achievement (Moolenaar, Sleeers, & Daley, 2012). Professional learning networks offer asynchronous learning opportunities through shared knowledge, which can augment teacher professional development (Macia & Garcia, 2016).

Trust (2012) defines a PLN as "a system of interpersonal connections and resources that support informal learning" (p.133). Flanigan (2011) offers a more specific definition, suggesting that a PLN is an online community that allows for the "sharing of

lesson plans, teaching strategies, and student work, as well as collaboration across grade levels and departments" (p.42). A PLN offers a distinct advantage over PLCs because a PLN is built by each individual teacher to meet their specific needs. Furthermore, a PLN is built around ideas that can be adapted to meet new requirements or demands (Hirschy, 2016). Thus, teachers can become more active and self-directed in their learning as well as make connections with other teachers who can help them solve specific problems (Lieberman & Mace, 2010; Marcia & Garcia, 2016).

However, PLN networks are not without their faults. Exclusively online learning networks suffer from regular lack of engagement (Marcia & Garcia, 2016). In a study of a teacher-created online community, Seo and Han (2013) noted that only 1% of participants shared materials for the rest of the teachers. Teachers in the study excused their lack of participation by citing busy schedules and lack of experience (Seo & Han, 2013). In a meta-analysis of 99 studies, Marcia and Garcia (2016) found the moderators play a key role in encouraging teachers to participate and share knowledge with the network. Tseng and Kuo (2014) suggested that it is a teacher's confidence in their self-efficiency and their abilities to use PLNs that motivate contribution. Closely related to this study, Coutinho and Lisboa (2013) proposed that the TPACK model would help cultivate teachers' self-confidence to become independent learners in professional learning networks.

Social Media

Social media is a developing technology that allows teachers to learn, interact, share, and collaborate with other teachers from all over the world (Mills, 2013). Current

research shows that teachers have engaged social media to connect with other educators with similar interests, share resources, overcome isolation, and develop professional learning communities (Carpenter & Krutka, 2014, 2015a; Wesely, 2013). Beaudin and Cowie (2014) believed that teachers' use social media more because of ease of use, access, mobility, and immediacy of social media software. Largely, social media programs are constructed to encourage "collaboration, draws upon collective intelligence, and allows users to give and take according to their abilities and needs" (Carpenter, Hervey, Krutka, Linton, & Price, p.1932, 2016).

Two popular forms of social media among teachers are Twitter and social networking sites such as Edmodo. Forte, Humphreys, and Park (2012) found that professional development through Twitter supported teachers by increasing the range of civic dialogue, enhancing networking and collaboration, and helping teachers with developing new ideas to bring back to their schools. In a 2013 study of world language teachers, Wesely (2013) discovered that teachers who felt isolated were more motivated to use Twitter for professional development. Also, Wesley (2013) noted that using Twitter for professional development caused teachers to make real changes to their teaching methods as well as taking connections further through video chats and face-to-face meetings. In a qualitative and quantitative survey of 494 educators, Carpenter and Krutka (2015) discovered that exchanges on Twitter were much preferred to traditional professional development. Furthermore, educators conveyed that they enjoyed learning from educators with like-minded views as well as educators with opposing views.

According to Pugalee (2012), teacher professional development has to engage teachers in cooperative experiences that are constant with a focus on subject content and the learning process. Social networking sites provide educators with a place to share ideas, materials, and resources. In a study of 119 teachers over a four-year period, Puglalee (2012) noted that Ning a popular social networking site for teachers, offered three collaborative features: photos, forums, and blogs. Teachers used Ning as an extension of their week long STEM professional development course. The first collaborative feature, photos was used for posting photos of content from the workshop. The second feature proved to be more useful for teacher learning. Pugalee (2012) noted that forums were seen as a source for resources and teaching materials. The blogs, which Pugalee (2012) viewed as an extension of the forums, provided another feature to share additional resources through attachments. The difference between the forums and blogs was that teachers used to blogs to share personal perspectives and ideas. Consequently, Pugalee (2012) concluded that Ning was an effective site for continuing face-to-face workshops online.

Social media is an important tool for teachers to use to build an online community. The purpose of this project study was to examine the teacher perceptions of iPad implementation. Through interviews, observations, and document analysis, the data showed that teachers lacked the support from colleagues. In addition, the data results indicated that primary teachers understood the importance of implementing technology in the classroom. However, some teachers lacked the experience and motivation to integrate iPads into their daily curriculum. The purpose of the project is to guide teachers in the

development of a PLN. Communicating online within a PLN allows teachers to expand their professional perceptions and gain knowledge from leaders in the fields of education and technology (Perez, 2012). The goals of the project are to provide teachers with the knowledge and confidence to build a PLN to further their educational technology experiences, and to provide more opportunities for collaboration with outside teachers and experts. In the next section I will give a detailed description of the project.

Project Description and Implementation

The results of the study indicated that primary teachers at School X lacked peer support to successfully implement iPads in the classroom. The project is a professional development plan that will consist of a series of 3 professional development workshops for primary teachers. The first session of the workshop will be held during the teacher orientation week before the beginning of the 2016 – 2017 school year in August. The second and third workshop sessions will be scheduled during teacher professional development days during the year. In addition, teacher-centered symposiums will be held between each workshop session. The workshops will take place in one of the primary classrooms as it is equipped with the technology needed to complete the project.

Potential Resources and Existing Supports

The resources for the professional development workshops are minimal. A classroom with a smartboard or Apple TV to hold the workshop and an iPad or notebook computer for each teacher is needed. In addition, I will need access to the school's wireless network. Existing support would come from the IT facilitator. The IT facilitator will be able to supply all resources needed as well as support the setup of devices. In

addition, the IT facilitator could provide assistance in supporting teachers during the workshop with technical problems that may arise.

Potential Barriers

There are several potential barriers that could hinder the implementation of the professional development workshop. One possible barrier could be a lack of teacher interest. During the data analysis I indicated that some primary teachers specified technology integration was not a priority. Another barrier could be the availability of primary teachers. The proposed time for the first day of the workshop would be during the orientation week in August for the 2016 – 2017 school year. This could prove to be difficult because the project would be competing with other important teacher development sessions. These barriers could be addressed by working closely with the IT facilitator who works closely with primary teachers and is responsible for scheduling existing professional development sessions during orientation week.

Timetable for Implementation

A professional development coordinator with knowledge and experience with PLNs and online learning will run the workshops and teacher-centered symposiums. In the first session in August, the coordinator will begin by discussing my findings from the research and the goals and expectations of the workshops. Next, the coordinator will define a PLN and provide examples of PLNs that are related to their learning. Also, the coordinator will encourage teachers to share their experiences with PLNs. In the middle of the workshop the coordinator will introduce Twitter as a tool for developing a PLN. The coordinator will share popular chats and professionals that the coordinator believes

teachers should follow. Then teachers will have their first breakout session in which they will follow a tutorial to create accounts and follow each other. The first session will end with teachers participating in short chat with each other using a hashtag. For added practice the coordinator will schedule open-ended chats for teachers to participate over the course of August. Teachers will use the hashtag #PYPedtech. The chats will last 40 minutes and the coordinator will invite experienced educational technology teachers to participate.

In September, the coordinator will meet with teachers to discuss their experiences using Twitter as a PLN tool. The coordinator will use a short survey (see Appendix A) to assess teachers' commitment and skill development. In the second workshop session in December, the coordinator will begin by asking the teachers to share their experiences using Twitter as a professional development tool. After discussing their experiences, the coordinator will introduce Edmodo as another PLN tool. The coordinator will model how to navigate the site and how to find and connect with other teachers. Then teachers will breakout into pairs and follow a tutorial to sign-up and spend some time exploring the site. Next, teachers will end the session by discussing how Edmodo can be used as a tool for developing a PLN. Over the holidays the coordinator will ask teachers to meet on Twitter to discuss their experiences with Edmodo. They will use the hashtag #Edmodo. Also, the coordinator will invite experienced Edmodo users to offer more insights on how to use Edmodo effectively as a PLN.

In January teachers will meet to share experiences using Edmodo as a PLN tool. Also, the coordinator will invite a guest speaker to discuss using Twitter and Edmodo as

a PLN tool. In March, teachers will begin the final professional session by sharing experiences from the last months Twitter chats. Next teachers will breakout into pairs and create content specific groups based on their experiences with iPads in the primary classroom. Once their groups have been created on Edmodo, teachers will use Twitter and Edmodo to share and promote their Edmodo groups to other primary teachers. As a final experience with Twitter, the coordinator will invite a guest moderator to facilitate an educational chat with teachers during the workshop. During the final hour of the workshop teachers will complete a survey using the online site Survey Monkey.

Table 2.

Timeline for professional development workshop and follow-up support

Topics	Activities	Resources	Timeline
August	Professional Development Workshop Day 1	Classroom iPads/Notebooks	August 8 9am-12pm
September	Follow up discussion	Classroom iPads/Notebooks	September 2 9-10am
December	Workshop Day 2	Classroom iPads/Notebooks	December 17 9-10am

Table 2 (continued)

Topics	Activities	Resources	Timeline
March	Workshop Day 3	Classroom iPads/Notebooks	March 17 9-10am
May	Year Review	Classroom iPads/Notebooks	May 5 9-10am

Roles and Responsibilities

The development and implementation of this project is the responsibility of me, the coordinator. The coordinator will create the materials for the workshop and will lead the workshop for primary teachers at School X. The coordinator will collect and examine the evaluations after delivery of the project. It will also be the responsibility of the coordinator to work with the school administration and IT facilitator to schedule an appropriate time and location for the workshop. The workshop participants have an important role in the success of the workshop. Primary teachers will need to be actively engaged during the presentations and breakouts. Primary teachers will need to commit to the time and work collaboratively in order to foster a deeper understanding for professional learning. The coordinator will monitor commitment and engagement through a survey at the end of each session.

Project Evaluation Plan

Many evaluation studies of teacher professional development place an emphasis on learning fulfilment (Koh, Woo, & Lim, 2013; Lawless & Pellegrino, 2007; Wu, Hu, Gu, & Lim, (2016). To obtain a wide-ranging and efficient perspective on professional development for primary teachers, this study referred to Kirkpatrick's new world evaluation model (Kirkpatrick & Kirkpatrick, 2006).

Kirkpatrick's model of evaluation includes four levels (see Figure 2): (a) results level refers to the outcomes of the training and support throughout the organization; (b) behavior level refers to the amount that participants apply their learning to their jobs; (c) learning level refers to the measurement of learning in terms of skills, knowledge, attitude, confidence, and commitment taught in the professional development session; and (d) reaction level refers to level of a participants active involvement in their learning. A pre and post survey on iPad integration (see Appendix A) will be used to assess if the goals and objectives of the professional development sessions have been met at the beginning and end of the school year. Six questions that ask teachers to rate their perceptions on iPad usage, skill levels, and collaboration with colleagues on a Likert Scale ranging from very frequently to very rarely was developed. A formative survey assessment questionnaire based on Kirkpatrick's model was developed for primary teachers to complete at the end of each session to evaluate learning (see Appendix A). Teachers will complete surveys online through a survey site www.surveymonkey.com.

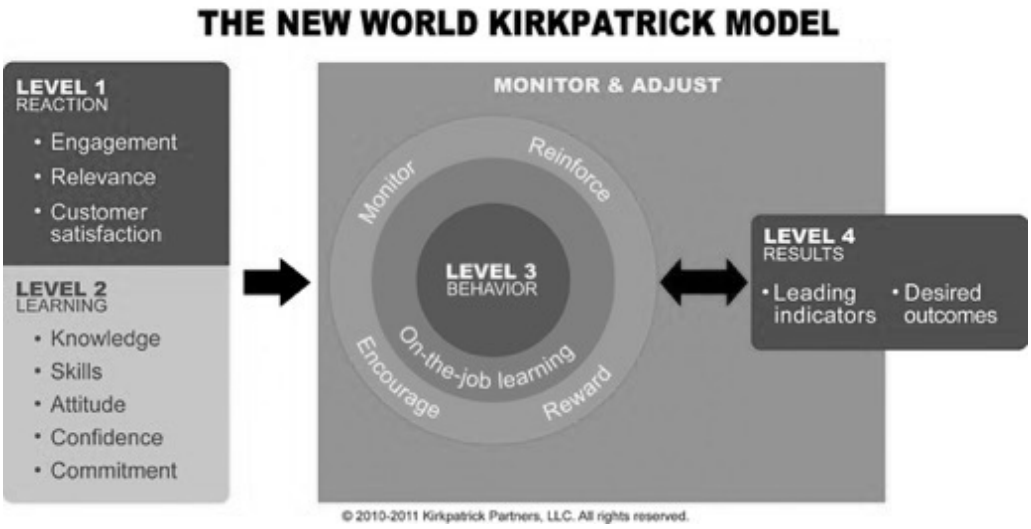

Figure 2 The new world Kirkpatrick model.

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After the completion of the professional development plan, the coordinator will analyze data from the 5-point Likert scale surveys. The survey questions measured the effectiveness of professional development session and whether or not learning outcomes and objectives were met.

Project Implications

The literature reviewed and the results of the data analysis indicated that a professional development workshop to guide teachers in the creation of professional learning networks was the best project to pursue. While the focus of the project was on the primary teachers, the project could benefit teachers in the upper elementary and the middle high school. The project could reach beyond the school with the connections

primary teachers make for their PLN. By collaborating with educators with common interests and sharing their knowledge from the workshop, primary teachers could help advance the professional development of outside teachers (Holmes, 2013).

Conclusion

A professional development plan was developed to address the problem of primary teachers failing to integrate iPads into the classroom. The professional development will consist of a series of professional development workshops to support primary teachers in the development of professional learning networks. Results from a comprehensive literature review indicated that professional learning networks provide teachers with access to experts as well as provide opportunities for collaboration. Possible barriers to this professional development plan include lack of teacher interest and competition with other professional development sessions held at the school. An evaluation plan was developed based on Kirkpatrick's evaluation model. Workshop coordinator will administer summative surveys to evaluate the effectiveness of the workshop. Section 4 will address the strengths and limitations of the project as well as recommendations for alternative approaches.

Section 4: Reflections and Conclusions

The purpose of the current study was to examine primary teachers' perceptions of iPad integration in the classroom. This small project study began by examining a small group of educators. However, it grew into a project that could offer other schools around the world an opportunity to address their technology integration problems. This section begins with a description of project strengths and limitations. In the next section I describe alternative approaches to the project study, as well as how the project has impacted my growth as a scholar and practitioner. The final sections include suggestions for social change and future research.

Project Strengths and Limitations

This project was intended to address the problem of teacher integration of iPads in the primary classroom. The qualitative nature of the study enabled me to acquire detailed data about the participants. Interview transcripts and classroom observations revealed that most teachers had a positive impression of iPads in the classroom. However, barriers such as lack of experience, lack of training, and lack of collegial support prevented them from fully implementing iPads into their everyday curriculum.

This study empowered me to create a project that would attempt to remove each of these barriers. The development of professional learning networks for each individual teacher will provide them with lifelong professional development as well as unlimited access to experts in the field of education technology. In addition, the opportunity to share their own experiences assists teachers in thinking about their actions in relation to what they have learned as a result of being active in professional learning networks

(Davis, 2015). Moreover, writing about their experiences results in new understanding (Davis, 2015). Another strength of the project is that teachers will be able to collaborate and find solutions to problems with teachers at the same grade level. As I previously mentioned, the data revealed that some teachers felt they did not have the support of colleagues. This was due to the fact that half of the teachers taught in isolation with only one teacher per grade level. This project will connect primary teachers with teachers at the same grade level in other schools.

A major limitation of this project is that it relies on teacher commitment. One of the problems with virtual communities is the gradual release of engagement (Marcia & Garcia, 2016). In addition, Marcia and Garcia (2016) found that a very small percentage of teachers contributed to the growth of online communities. Teachers who did not contribute cited busy schedules and lack of time as reasons for not participating (Marcia & Garcia, 2016). To address these barriers, it will be imperative to follow up with teachers or to work with the IT facilitator to follow up with teachers during their planning meetings.

Recommendations for Alternative Approaches

An alternative approach to study the problem of teacher implementation of iPads would be to examine the problem from the perspective of the IT facilitator. The IT facilitator works closely with all the primary teachers in lesson planning and implementation of technologies. Therefore, examining his role in supporting the teachers would assist me in finding a solution to the problem. Another approach would be to have teachers complete iPad professional development online through Apple professional

development sessions. Apple has specific iPad training available for teachers through their website. In addition, the training is free and self-paced. Teachers would have the opportunity to learn iPad specific skills on the latest software, as well as connect with other like-minded teachers who have completed the Apple professional development sessions.

Scholarship

Engaging in research and data collection has contributed to my understanding of what it means to be a scholar. Throughout this doctoral journey, I have come to the understanding of the importance of reflection. Reflecting on the work I have completed has enabled me to push forward. One aspect of scholarship that was difficult to comprehend was the time commitment. At the residencies, instructors laid out a plan for completing each section of the project study. It was the support of colleagues and my committee members that helped me overcome time management issues and complete this journey after 5 years.

The work on this project study has expanded my interest in technology integration. I am interested in pursuing future research in the areas of mobile technology integration, as well as computer programing and the benefits each may have to English language learners.

Project Development and Evaluation

Defining the problem took so long that creating a project to address the problem proved to be difficult. The local problem was not unique in the literature. However, the local context, an international school in South Korea, separated the problem from the

current literature because it was situated in a unique context. The project to address the problem did not have a lot of support in the literature. Literature on personal learning communities within schools was abundant. However, peer reviewed research on developing professional learning networks for technology integration was scarce. To address these issues I relied on the conceptual framework for guidance. Through the conceptual framework I was able to frame the project to address issues that came up in data analysis.

Leadership and Change

Through my second literature review I learned a lot about leadership. One of the important aspects of leadership for change was working with others to form a shared sense of purpose (DuFour & Reason, 2015). Traditional leaders were seen as the answer to the problem. However, in today's society, leaders lead by working with others (DuFour & Reason, 2015). Before starting this project study, I considered myself a lead by example kind of leader. However, leading by example is not enough. Patience plays an important role in leadership and change. Through this project study I have come to realize that change happens slowly. Teachers and students need time to adjust to new circumstances and teaching practices. Also, with change comes failure. Not all new ideas will result in success. Therefore, it is imperative to collaborate with others to meet common goals.

Reflection on Importance of the Work

Discovering and defining a local problem was the most difficult part of this journey. It took two residencies and a lot of guidance from committee members and

colleagues to arrive at the problem that I should focus on. I discovered the problem through observation and practicum experience while enrolled in a Walden University doctorate course. Although the local setting was unique, there was ample literature on technology integration as well as a noted framework on which I could build my study.

As a practitioner, I have compiled the knowledge and experience to begin applying my expertise to local problems. It is my goal to publish my project study to assist other leaders in the area of education technology to guide classroom teachers with technology integration.

Implications, Applications, and Directions for Future Research

While working on this project study, it was clear to me that technology support was not the only factor in effective technology integration. Past experience and teacher attitudes also played a role in successful technology integration. Implications for future research include applying this project study to larger group of participants. As I mentioned, there is a lot of research on PLCs; however, more research is needed in the development of teacher PLNs.

Implications for social change lie with empowering teachers with the confidence and skills to create and participate in their own professional development. Teachers that take charge of their professional development engage in collaboration with colleagues. DuFour and Reason (2015) recognized that teachers can no longer teach in isolation, they must be allowed to take advantage of networking opportunities.

Conclusion

Teachers are ill prepared to deal with the rapid deployment of technologies in schools. By examining data from interviews, observations, and documents, I was able to produce a project to address barriers which prevented primary teachers from implementing iPads in the classroom. The project, a professional development plan, will provide teachers with the knowledge and skills to build PLNs to support their implementation of iPads in the primary classroom.

Overall, this project study was the result of rigorous course work and research. The journey has taught me to put aside my biases and focus on the data. I have learned to analyze and synthesize data to promote a positive impact on a local setting. Improvements in collaboration between grade level teachers as well as teachers in PLNs could greatly affect the successful integration of iPads in the primary classroom.

References

Anderson, S., Griffith, R., & Crawford, L. (2014, March). Applying TPACK: Integrating iPads into instruction for students with mild disabilities. In *Society for Information Technology & Teacher Education International Conference,* 2014 (1), 2427-2433. Retrieved from http://site.aace.org

Anderson, S., & Groulx, J. (2013, March). Elementary student teachers' technology use and intentions for technology integration. In *Society for Information Technology & Teacher Education International Conference* 2013, (1), 2000-2005. Retrieved from http://site.aace.org

Avalos, B. (2011). Teacher professional development in teaching and teacher education over ten years. Teaching and Teacher Education, *27*(1), 10-20.

Barbour, M. K. (2012). Teachers' perceptions of iPads in the classroom. *MACUL Journal*, *32*(4), 25-26.

Bauer, J., & Kenton, J. (2005). Toward technology integration in the schools: Why it isn't happening. *Journal of Technology and Teacher Education*, *13*(4), 519. Retrieved from http://auth.waldenulibrary.org/ezpws.exe?url=http://go.galegroup.com.ezp.waldenulibrary.org/ps/i.do?id=GALE%7CA138483291&v=2.1&u=minn4020&it=r&p=EAIM&sw=w&asid=d99bf9a878ece4ab956ddc64ecfb05d3

Beaudin, L., & Cowie, B. (2014, March). Educators' perceptions of and practices for using social media for professional development. In *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp.

2434-2439).

Bennett, K. (2011). Less than a class set. *Learning and Leading with Technology, 30*(4), p. 23-27.

Blackwell, C. K., Lauricella, A. R., & Wartella, E. (2014). Factors influencing digital technology use in early childhood education. *Computers & Education*, *77*, 82–90. doi:10.1016/j.compedu.2014.04.013

Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theories and methods (5th ed.)*. Boston, MA: Allyn & Bacon.

Brown, J. M. (2013). Professional development: The teacher's perspective. (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (Accession Order No. 3572656)

Burden, K., Hopkins, P., Male, T., Martin, S., & Trala, C. (2012). iPad Scotland evaluation. *University of Hull,[online]* Retrieved *from http://www. janhylen.se/wp-content/uploads/2013/01/Skottland.pdf.*

Carpenter, J., Hervey, L., Krutka, D., Linton, J., & Price, G. (2016, March). How and why to use social media in teacher education*. In Society for Information Technology & Teacher Education International Conference, 2016(1),*p. 1931-1935.

Carpenter, J. P., & Krutka, D. G. (2014). How and why educators use Twitter: A survey of the field. *Journal of Research on Technology in Education*, 46(4), 414-434.

Carpenter, J. P., & Krutka, D. G. (2015). Engagement through microblogging: educator professional development via Twitter. *Professional Development in Education*,

41(4), 707-728.

Cennamo, K.S., Ross, J.D., & Ertmer, P.A. (2010). Technology integration for meaningful classroom use: A standards-based approach. Belmont, CA: Wadsworth, Cenage Learning.

Chaudary, I. A., & Imran, S. (2012). Listening to unheard voices: Professional development reforms for Pakistani tertiary teachers. *Australian Journal of Teacher Education*, *37*(2). doi:10.14221/ajte.2012v37n2.8

Chou, C. C., Block, L., & Jesness, R. (2012). A case study of mobile learning pilot project in K-12 schools. *Journal of Educational Technology Development and Exchange*, *5*(2), 11–26. Retrieved from http://www.sicet.org/journals/jetde/jetde.html

Chu, H. C. (2014). Potential negative effects of mobile learning on students' learning achievement and cognitive load-a format assessment perspective. *Educational Technology & Society*, *17*(1), 332-344. Retrieved from http://www.ifets.info

Ciampa, K., & Gallagher, T. L. (2013). Professional learning to support elementary teachers' use of the iPod Touch in the classroom. *Professional Development in Education*, *39*(2), 201–221. doi:10.1080/19415257.2012.749802

Clark, W., & Luckin, R. (2013). *iPads in the classroom*. *What the research says*. Retrieved from http://www.lkldev.ioe.ac.uk/lklinnovation/wp-content/uploads/2013/01/2013-iPads-in-the-Classroom-v2.pdf

Clarke, B., Svanaes, S., & Zimmermann, S. (2013). One-to-one tablets in secondary schools: an evaluation study. *Tablets for Schools*. Retrieved from

http://tabletsforschools.org.uk/wp-content/uploads/2012/12/FKY-Tablets-for-Schools-Stage-2-Full-Report-July-2013.pdf

Corbin, J., & Strauss, A. (Eds.). (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Boston, MA: Sage, Publications.

Coutinho, C. P., & Lisbo^a, E. S. (2013). Social networks as spaces for informal teacher professional development: challenges and opportunities. *International Journal of Web Based Communities*, 9(2), 199e211.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (Laureate custom ed.). Boston, MA: Pearson Education.

Crichton, S., Pegler, K., & White, D. (2012). Personal devices in public settings: Lessons learned from an iPod Touch/iPad Project. *Electronic Journal of E-Learning*, 10(1), 23-31. Retrieved from http://www.ejel.org/main.html

DuFour, R., & Reason, C. S. (2015). *Professional learning communities at work and virtual collaboration: On the tipping point of transformation*. Bloomington IN: Solution Tree Press

Duran, M., Brunvand, S., Ellsworth, J., & Sendag, S. (2012). Impact of research-based professional development: Investigation of inservice teacher learning and practice in Wiki integration. *Journal of Research on Technology in Education*, 44(4), 313-334. Retrieved from ERIC.

Dwyer, D. C., Ringstaff, C., Haymore, J., & Sandholtz, P. D. (1994). Apple classrooms of tomorrow. *Educational Leadership*, *51*(7), 4-10.

Elbert, J., Code, J., & Irvine, V. (2013). iPads on practicum: Perspective of a student-teacher. *The Arbutus Review*, *4*(1), 1-18. Retrieved from http://journals.uvic.ca/index.php/arbutus

Engel, G., Palloff, R., & Pratt, K. (2011). Using mobile technology to empower student learning. In *27th annual conference on distance teaching and learning, Madison, WI. Retrieved from http://www. uwex. edu/disted/conference/Resource_library/proceedings/46307_2011. pdf*.

Flanigan, R. L. (2011). Networking professionals. Education Week, 31(9), 510-512. Retrieved from http://www.edweek.org/ew/index.html

Foote, C. (2012). The evolution of a 1:1 iPad program. *Internet schools, 19*(1), 14-18. Retrieved from http://www.internetatschools.com/Articles/Editorial/Features/Learning-Together-The-Evolution-of-a-11-iPad-Program-79728.aspx

Forte, A., Humphreys, M., and Park, T., 2012. Grassroots professional development: how teachers use Twitter [online]. In: Proceedings of the 6th international AAAI conference on weblogs and social media,5–7 June, Dublin, Ireland, 106–113. Available from: http://www. aaai.org/ocs/index.php/ICWSM/ICWSM12/paper/view/4585/4973

Gerard, L. F., Varma, K., Corliss, S. B., & Linn, M. C. (2011). Professional development for technology-enhanced inquiry science. *Review of Educational Research*, *81*(3), 408–448. doi:10.3102/0034654311415121

Gronseth, S., Brush, T., Ottenbreit-Leftwich, A., Strycker, J., Abaci, S., Easterling, W.,

… Leusen, P. van. (2010). Equipping the next generation of teachers. *Journal of Digital Learning in Teacher Education*, 27(1), 30–36. doi:10.1080/21532974.2010.10784654

Guskey, T. R., & Yoon, K. S. (2009). What works in professional development? *Phi Delta Kappan*, 90(7), 495–500. doi:10.1177/003172170909000709

Hall, G. E., & Hord, S. M. (1987). *Change in schools: Facilitating the process.* Albany: State University of New York Press.

Hammonds, L., Matherson, L. H., Wilson, E. K., & Wright, V. H. (2013). Gateway tools: Five tools to allow teachers to overcome barriers to technology integration. *Delta Kappa Gamma Bulletin*, *80*(1), 36-40. Retrieved from https://www.dkg.org/category/library/publications/bulletin

Harris, J. B., & Hofer, M. J. (2011). Technological pedagogical content knowledge (TPACK) in action. *Journal of Research on Technology in Education*, 43(3), 211–229. doi:10.1080/15391523.2011.10782570

Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types. *Journal of Research on Technology in Education*, 41(4), 393–416. doi:10.1080/15391523.2009.10782536

Harris, J., Grandgenett, N., & Hofer, M. (2010, March). Testing a TPACK-based technology integration assessment rubric. In *Society for Information Technology & Teacher Education International Conference* (Vol. 2010, No. 1, pp. 3833-3840).

Harlan, C. (2012). In South Korean classrooms, digital textbook revolution meets some

resistance. *The Washington Post*, *24*. Retrieved from http://50.56.5.55/documents/users/juliestella/in-south-korea.pdf

Hayden, M., & Thompson, J. (1995). International schools and international education: a relationship reviewed. *Oxford Review of Education*, 21(3), 327–345. doi:10.1080/0305498950210306

Hechter, R. P., & Vermette, L. A. (2013). Technology integration in K-12 science classrooms: An analysis of barriers and implications. *Themes in Science and Technology Education*, *6*(2), pp-73. Retrieved from http://earthlab.uoi.gr/theste/index.php/theste

Henderson, S., & Yeow, J. (2012). iPad in education: A case study of iPad adoption and use in a primary school. IEEE. doi:10.1109/HICSS.2012.390

Help IT Australia - IT and hosting solutions, D.Y.O. Web ... (n.d.). Retrieved from http://www.helpit.com.au/

Herro, D., Kiger, D., & Owens, C. (2013). Mobile technology. *Journal of Digital Learning in Teacher Education*, 30(1), 30–40. doi:10.1080/21532974.2013.10784723

Hexom, D., & Kennedy, J. K. (2012). iPads and professional development in teacher education: A Heutalogical Approach. *Global Science Technology Forum*. doi:10.5176/2251-1814_EeL12.79

Hirschy, S. T. (2016). Creating a personalized learning network for professional development and growth. *Exchange*, (229), 73-76.

Holmes, B. (2013). School teachers' continuous professional development in an online

learning community: Lessons from a case study of an eTwinning learning event. *European Journal of Education*, *48*(1), 97-112.

International Society for Technology in Education. (2008). *Classroom observation tool*. Retrieved from http://www.iste.org/icot

Januszewski, A., & Molenda, M. (2008). *Educational technology: A definition with commentary.* Mahwah, NJ: Lawrence Erlbaum Associates.

Johnson, L., Adams, S. and Cummins, M. (2012) *The NMC Horizon Report: 2012 Higher Education Edition*, *The New Media Consortium*, Austin, Texas.

Keengwe, J., Georgina, D., & Wachira, P. (2010). Faculty training strategies to enhance pedagogy-technology integration. *International Journal of Information and Communication Technology Education, 3*(6), 1-10. doi: 10.4018/jicte.2010070101.

Khaddage, F., Knezek, G., Norris, C., & Soloway, E. (2015, March). Barriers and limitations of mobile device integration: The case of Nan Chiau primary school (Singapore). *In Society for Information Technology & Teacher Education International Conference* (Vol. 2015, No. 1, pp. 2420-2424). Retrieved from http://site.aace.org

Khalid, M., Kilic, G., Christoffersen, J., & Purushothaman, A. (2015). Barriers to the integration and adoption of iPads in schools: A systematic literature review based on the philosophy of" think global, act local." *In Global Learn , 15(1),* 58-67). Retrieved from http://www.aace.org/conf/glearn/

Kiley, M. L., & Gable, R. K. (2013). Assistive technology: Identifying professional

development needs of independent school teachers. Retrieved from http://scholarsarchive.jwu.edu/cgi/viewcontent.cgi?article=1013&context=k12_ed

Kim, J. H.-Y., & Jung, H.-Y. (2010). South Korean digital textbook project. *Computers in the Schools*, 27(3-4), 247–265. doi:10.1080/07380569.2010.523887

Kiser, B., Allen, L., & Montgomery, M. (2012). A Format for digital learning and continuous growth within Jacksonville State University and the K-12 school environment. Paper presented at the Society for Information Technology & Teacher Education International Conference.

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). Evaluating training programs: The four levels (3rd ed.). San Francisco, CA: Berrett-Koehler Publishers.

Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary Issues in Technology and Teacher Education*, *9*(1), 60–70. Retrieved from http://www.citejournal.org/vol15/iss3/

Koh, J. H. L., Chai, C. S., & Tsai, C. C. (2013). Examining practicing teachers' perceptions of technological pedagogical content knowledge (TPACK) pathways: A structural equation modeling approach. *Instructional Science*, 41(4), 793–809.

Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education*, *59*(4), 1109–1121. doi:10.1016/j.compedu.2012.05.014

Kristen, K., Wendt, J., Wendt, S., & Beach, J. (2014, June). Teachers' experiences and perspectives on the integration of technology. In *World Conference on Educational Multimedia, Hypermedia and Telecommunications, 2014(1),* 1592-

1599). Retrieved from http://www.aace.org/conf/edmedia/

Lawless, K. A., & Pellegrino, J. W. (2007). Professional development in integrating technology into teaching and learning: Knowns, unknowns, and ways to pursue better questions and answers. *Review of Educational Research*, 77(4), 575–614.

Levin, T., & Wadmany, R. (2008). Teachers' views on factors affecting effective integration of information technology in the classroom: Developmental scenery. *Journal of Technology and Teacher Education*, *16*(2), 233-263. Retrieved from https://www.aace.org/pubs/jtate/

Lieberman, A. & Mace, D. P. (2010). Making practice public: Teacher learning in the 21st

century. Journal of Teacher Education, 61(1-2), 77-88.

Liu, K. Y. (2012). A design framework for online teacher professional development communities. Asia Pacific Education Review, 13, 701-711.

Liu, S.-H. (2013). Teacher professional development for technology integration in a primary school learning community. *Technology, Pedagogy and Education*, *22*(1), 37–54. doi:10.1080/1475939X.2012.719398

Lock, J. V. (2006). A new image: Online communities to facilitate teacher professional development. Journal of Technology and Teacher Education, 14(4), 663-678.

Lodico, M. G., Spaulding, D. T., & Voegtle, K. H. (2011). Methods in educational research, from theory to practice. San Francisco CA: Jossey-Bass.

Looi, C.-K., Zhang, B., Chen, W., Seow, P., Chia, G., Norris, C., & Soloway, E. (2010). 1:1 mobile inquiry learning experience for primary science students: a study of

learning effectiveness. *Journal of Computer Assisted Learning*, 27(3), 269–287. doi:10.1111/j.1365-2729.2010.00390.x

Magley, G. (2011). Grade 8 mobile one-to-one with iPads. *Millis Public Schools Evaluation Report.* Retrieved from http://www.millis.k12.ma.us/node/982

Maor, D., & Roberts, P. (2011). Does the TPACK framework help to design a more engaging learning environment? Retrieved from http://www.aace.org/conf/edmedia/

Macià, M., & García, I. (2016). Informal online communities and networks as a source of teacher professional development: A review. *Teaching and Teacher Education*, *55*, 291–307. http://doi.org/10.1016/j.tate.2016.01.021

Martin, W., Strother, S., Beglau, M., Bates, L., Reitzes, T., & McMillan Culp, K. (2010). Connecting instructional technology professional development to teacher and student outcomes. *Journal of Research on Technology in Education*, 43(1), 53–74. doi:10.1080/15391523.2010.10782561

Martin, F., & Ertzberger, J. (2013). Here and now mobile learning: An experimental study on the use of mobile technology. *Computers & Education*, *68*, 76-85. Retrieved from http://www.journals.elsevier.com/computers-and-education/

McConnell, T., Parker, J., Eberhardt, J., Koehler, M., & Lundeberg, M. (2012). Virtual professional learning communities: Teachers' perceptions of virtual versus face-to-face professional development. Journal of Science Education and Technology, 1-11.

McFarlane, C. (2013). *iPads and their potential to revolutionise learning.* Paper

presented at the Proceedings from the World Conference on Educational Multimedia, Hypermedia and Telecommunications.

Mehr, A. (2012, January 17). What teachers need to know for effective technology integration: Teachers' TPACK. Retrieved from http://eductechalogy.org/index/?s=what teachers need to know for effective technology integration

Merriam, S. B., (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Mills, M. S. (2013). Engaging teacher professional development through digital curation. Paper presented at the Society for Information Technology & Teacher Education International Conference.

Minshew, L., & Anderson, J. (2015). *Teacher implementation of a co-designed iPad integrated science instruction.* Paper presented at the Society for Information Technology & Teacher Education International Conference.

Minshew, L., Caprino, K., Anderson, J. L., Justice, J. E., & Bolick, C. (2014). *Teacher efficacy in 1: 1 tablet integration.* Paper presented at the Society for Information Technology & Teacher Education International Conference.

Montrieux, H., Vanderlinde, R., Courtois, C., Schellens, T., & De Marez, L. (2014). A Qualitative study about the implementation of tablet computers in secondary education: The teachers' role in this process. *Procedia - Social and Behavioral Sciences*, *112*, 481–488. doi:10.1016/j.sbspro.2014.01.1192

Mouza, C. (2011). Promoting urban teachers' understanding of technology, content, and

pedagogy in the context of case development. Journal of Research On Technology in Education, 44(1), 1-29. Retrieved from ERIC.

Mueller, J. L., Wood, E., De Pasquale, D., & Cruikshank, R. (2012). Examining mobile technology in higher education: Handheld devices in and out of the classroom. *International Journal of Higher Education*, *1*(2). doi:10.5430/ijhe.v1n2p43

Munawar, M., & Ryerson, U. (2011). Assessing the m-learning hype: Do mobile technologies enhance the overall learning experience? In *Proceedings of World Conference on elearning in corporate, government, healthcare, and higher education 2011* (pp. 792–807). Retrieved from https://www.editlib.org/p/38808/proceeding_38808.pdf

Murray, O. T., & Olcese, N. R. (2011). Teaching and learning with iPads, ready or not? *Techtrends Tech trends*, 55(6), 42–48. doi:10.1007/s11528-011-0540-6

Nussbaum-Beach, S. (2013). Just the facts: Personal learning networks. *Educational horizons*, *91*(2), 26-27.

Ohlson, T., Wehry, S., Monroe-Ossi, H., McLemore, B., Maki, K., & Fountain, C. (2014, March). Assessing inservice teachers' perceptions of their TPACK development. In *Society for Information Technology & Teacher Education International Conference, 2014(1),* 2598-2603. Retrieved from http://site.aace.org

Oldfield, D., & Cochrane, T. (2011). Equipping lecturers for the iRevolution. *Changing Demands, Changing Directions. Proceedings Ascilite Hobart*, 919-929. Retrieved from http://www.ascilite.org/conferences/hobart11/downloads/papers/Oldfielf-full.pdf

O'Malley, P., Jenkins, S., Wesley, B., Donehower, C., Rabuck, D., & Lewis, M. E. B. (2013). Effectiveness of using iPads to build math fluency. *Online Submission*. Retrieved from http://eric.ed.gov/?id=ED541158

Ottenbreit-Leftwich, A. T., Glazewski, K. D., Newby, T. J., & Ertmer, P. A. (2010). Teacher value beliefs associated with using technology: Addressing professional and student needs. Computers & Education, 55(3), 1321–1335. http://dx.doi.org/10.1016/j.compedu.2010.06.002.

Overbaugh, R., & Lu, R. (2008). The impact of a federally funded grant on a professional development program: Teachers' stages of concern toward technology integration. *Journal of Computing in Teacher Education*, *25*(2), 45-55. Retrieved from http://www.tandfonline.com/loi/ujdl20#.VgdBcK-jl6c

Ozdamli, F. (2012). Pedagogical framework of m-learning. *Procedia - Social and Behavioral Sciences*, *31*, 927–931. doi:10.1016/j.sbspro.2011.12.171

Pegrum, M., Howitt, C., & Striepe, M. (2013). Learning to take the tablet: How pre-service teachers use iPads to facilitate their learning. *Australasian Journal of Educational Technology*, *29*(4). Retrieved from http://ajet.org.au/index.php/AJET

Pegrum, M., Oakley, G., & Faulkner, R. (2013). Schools going mobile: A study of the adoption of mobile handheld technologies in Western Australian independent schools. *Australasian Journal of Educational Technology*, *29*(1). Retrieved from http://www.ascilite.org.au/ajet/submission/index.php/AJET/article/view/64

Peng, H., Su, Y., Chou, C., & Tsai, C. (2009). Ubiquitous knowledge construction: Mobile learning re-defined and a conceptual framework. *Innovations in Education*

and Teaching International, 46(2), 171-183. Retrieved from http://search.proquest.com/docview/210676131?accountid=14872

Perez, L. (2012). Innovative professional development. *Knowledge Quest*, *40*(3), 20.

Pitts, M. J., & Miller-Day, M. (2007). Upward turning points and positive rapport-development across time in researcher—participant relationships. *Qualitative Research*, *7*(2), 177-201.

Postholm, M. B. (2012). Teachers' professional development: a theoretical review. Educational Research, 54(4), 405-429.

Potter, S. L., & Rockinson-Szapkiw, A. J. (2012). Technology integration for instructional improvement: The impact of professional development. *Performance Improvement*, *51*(2), 22–27. doi:10.1002/pfi.21246

Pruet, P., Ang, C. S., & Farzin, D. (2014). Understanding tablet computer usage among primary school students in underdeveloped areas: Students' technology experience, learning styles and attitudes. *Computers in Human Behavior*. doi:10.1016/j.chb.2014.09.063

Pugalee, D. (2012, October). NING: Extending professional development through online communities. In *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (Vol. 2012, No. 1, pp. 1246-1250).

PYP authorization process International Baccalaureate®. (n.d.). Retrieved from http://www.ibo.org/en/become-an-ib-school/how-to-become-an-ib-school/pyp-authori

Rashid, M., & Elahi, U. (2012). Use of educational technology in promoting distance education. *Turkish Online Journal of Distance Education*, *13*(1), 79–86. Retrieved from http://tojde.anadolu.edu.tr

Reis, S. M., McCoach, D. B., Little, C. A., Muller, L. M., & Kaniskan, R. B. (2010). The effects of differentiated instruction and enrichment pedagogy on reading achievement in five elementary schools. *American Educational Research Journal*, *48*(2), 462–501. doi:10.3102/0002831210382891

Reiser, R.A., & Dempsey, J.V. (Eds.) (2012). *Trends and issues in instructional design and technology* (3rd ed.). Saddle River, NJ: Pearson Education.

Roblyer, M.D., & Doering, A.H. (2013). Integrating educational technology into teaching. Boston, MA: Pearson Education.

Ronfeldt, M., Farmer, S. O., McQueen, K., & Grissom, J. A. (2015). Teacher collaboration in instructional teams and student achievement. *American Educational Research Journal*, 52(3), 475-514.

Ryan, T., & Bagley, G. (2015). Nurturing the integration of technology in education. *Journal of Theory and Practice in Education*, *11*(1), 33-50. Chicago IL: Retrieved from http://jml2012.indexcopernicus.com/Journal+of+Theory+and+Practice+in+Education,p10079,3.html

Sadaf, A., Newby, T. J., & Ertmer, P. A. (2012). Exploring pre-service teachers' beliefs about using Web 2.0 technologies in K-12 classroom. *Computers & Education*, *59*(3), 937–945. http://doi.org/10.1016/j.compedu.2012.04.001

Santamaria, L. J. (2009). Culturally responsive differentiated instruction: Narrowing gaps between best pedagogical practices benefiting all learners. *The Teachers College Record*, *111*(1), 214-247. Retrieved from http://www.tcrecord.org

Seo, K., & Han, Y.-K. (2013). Online teacher collaboration: a case study of voluntary collaboration in a teacher-created online community. KEDI Journal of Educational Policy, 10(2) (n/a).

Schrum, L., & Levin, B. B. (2013). Lessons learned from exemplary schools. *TechTrends*, *57*(1), 38-42. http://dx.doi.org/10.1080/13603124.2013.767380

Semiz, K., & Ince, M. L. (2012). Pre-service physical education teachers' technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations. *Australasian Journal of Educational Technology*, *28*(7), 1248–1265. Retrieved from http://ajet.org.au/index.php/AJET

Sharples, M. (2002). Disruptive devices: Mobile technology for conversational learning. *International Journal of Continuing Engineering Education and Lifelong Learning*, 12(5/6), 504. doi:10.1504/ijceell.2002.002148

Shin, W. S., Han, I., & Kim, I. (2014). Teachers' technology use and the change of their pedagogical beliefs in Korean educational context. *IES*, 7(8). doi:10.5539/ies.v7n8p11

Smith, C. (2010). The great dilemma of improving teacher quality in adult learning and literacy. *Adult Basic Education and Literacy Journal*, *4*(2), 67–74. Retrieved from http://www.editlib.org/j/ISSN-1934-2322/

Smith, G. E., & Throne, S. (2007). Differentiating instruction with technology in K-5 classrooms. *International Society for Technology in Education*. Retrieved from http://www.iste.org/docs/excerpts/DIFFK5-excerpt.pdf

Song, Y. (2014). "Bring your own device (BYOD)" for seamless science inquiry in a primary school. *Computers & Education*, *74*, 50–60. doi:10.1016/j.compedu.2014.01.005

Stake, R, E. *The art of case study research*. Sage Publications, Thousand Oaks, CA, 1995.

Stanford, P., Crowe, M. W., & Filce, H. (2010). Differentiating with technology. *Teaching Exceptional Children Plus*, *6*(4), 2. Retrieved from https://www.cec.sped.org/Publications/CEC-Journals/TEACHING-Exceptional-Children

Tamim, R. M., Bernard, R. M., Borokhovski, E., Abrami, P. C., & Schmid, R. F. (2011). What forty years of research says about the impact of technology on learning: A second-order Meta-analysis and validation study. *Review of Educational Research*, 81(1), 4–28. doi:10.3102/0034654310393361

Thomas, C. N., Hassaram, B., Rieth, H. J., Raghavan, N. S., Kinzer, C. K., & Mulloy, A. M. (2012). The integrated curriculum project: Teacher change and student outcomes within a university-school professional development collaboration. *Psychology in the Schools*, *49*(5), 444–464. doi:10.1002/pits.21612

Tohill, K. (2016, March). Online teacher communities for professional learning. In *Society for Information Technology & Teacher Education International*

Conference (Vol. 2016, No. 1, pp. 981-986).

Tomlinson, C. A. (2005). Grading and differentiation: Paradox or good practice? *Theory Into Practice*, 44(3), 262–269. doi:10.1207/s15430421tip4403_11

Tseng, F.-C., & Kuo, F.-Y. (2014). A study of social participation and knowledge sharing in the teachers' online professional community of practice. *Computers & Education*, 72, 37e47.

Uslu, O., & Bümen, N. T. (2012). Effects of the professional development program on 178 Turkish teachers: Technology integration along with attitude towards ICT in education. *Turkish Online Journal of Educational Technology*, *11*(3), 115-127. Retrieved from http://www.tojet.net

Wesely, P.M., 2013. Investigating the community of practice of world language educators on Twitter. Journal of teacher education, 64 (4), 305–318.

Wu, B., Hu, Y., Gu, X., & Lim, C. P. (2016). Professional development of new higher education teachers with information and communication technology in Shanghai a Kirkpatrick's evaluation approach. *Journal of Educational Computing Research*, *54*(4), 531-562.

Yin, R. K. (2009). Case study research: Design and methods *(Vol. 5)*. Thousand Oaks CA: Sage.

Yu, Chien (2013). "The integration of technology in the 21st century classroom: Teachers' attitudes and pedagogical beliefs toward emerging technologies". *Journal of Technology Integration in the Classroom*,5 (1), 6. Retrieved from http://www.joti.us

Appendix A: Professional Development Plan for the Development of PLNs

Introduction

This professional development plan is designed to assist primary teachers in acquiring the knowledge and skills to create individual professional learning networks to support the successful implementation of iPads in the primary classroom. The plan is based on data analyzed and an extensive literature review. The plan will encompass a 3-day workshop spread over the school year as well as teacher-centered symposiums held throughout the school year. This project can promote collaboration and teacher confidence in self professional development.

Purpose Goals and Objectives

The goal of this professional development plan is to aid teachers in the creation of PLNs so they can become more skilled and gain confidence in the integration of iPads in the primary classroom.

There are four objectives for the professional development plan. Objective 1: As a result of the workshop, primary teachers will be able to identify the benefits of PLNs and what makes a successful PLN; Objective 2: As a result of the workshop, primary teachers will be able to create and build their own PLNs; Objective 3: As a result of collaborating with colleagues, primary teachers will have the necessary knowledge and skills to work effectively with colleagues online; Objective 4: As a result of the workshop, primary teachers will understand their role in a PLN.

Intended Audience

The intended audience for the professional development plan are primary teachers working to integrate iPads into their classrooms. Effective collaboration leads to better student achievement and professional fulfilment by teachers (DuFour & Reason, 2015). The results of this professional development plan will inspire teachers to build partnerships with like-minded individuals, as well as experts to support professional growth and student achievement.

Project Design

The design of this project consists of a 3-day professional development workshop spread over the school year and follow up sessions to be held between the workshops. The timetable for the workshops is here:

Professional Development Workshop

Day 1 (August 8, 2016)

9-9:10	• Welcome • Establish expectations • Purpose of workshop • Learning outcomes
9:20-9:40	• What is a professional learning network? • Provide examples of popular learning networks • Teachers share experiences with PLNs
9:40-10-20	Twitter • Twitter as part of your PLN • Hashtags • Popular networks • Advantages of using Twitter
10:20-11:00	Sign-up (Breakout) • Teachers follow tutorial and create accounts • Follow each other

	• Setup hashtag #PYPEdtech
11:00-11:30	• Share experiences with Twitter • Troubleshoot • Reflect on goals for the day
Homework	• Teachers meet online throughout the month and will meet back in September to follow up.

Day 2 (December, 16, 2016)

9-9:30 am	Sharing Experiences • Teachers share their previous month's experience with Twitter • Discuss the benefits and drawbacks
10:30-11am	Edmodo • Introduce teachers to Edmodo • Share how to explore and how teachers around the world connect through Edmodo • Teachers sign-up and explore the site (Using Tutorial) • End with discussions about the possible uses of Edmodo
11-12	Edmodo (Breakout) • Using tutorials teachers work in pairs and post replies to popular posts related to their interests Homework: Teachers meet online over the holidays to tweet about experiences with Edmodo using the hashtag #Edmodo

Day 3 (March 9, 2017)

9:00-9:30	Sharing Experiences • Teachers share experiences using Edmodo and Twitter
9:30-10:00	Edmodo • Teachers will breakout and create a group or groups on Edmodo • Using Twitter they will promote their groups
10-11	Twitter Guest Chat (Breakout) • Teachers will participate in a guest moderated chat with an Edtech expert
11-12	Survey Monkey • Teachers will complete a short survey on their iPads notebooks through Survey Monkey

Slides for Workshop


Why would Educators use Twitter?
Share resources
Participate in real time PD


BREAKOUT
Follow the video tutorial and create an account
Follow each other
Send at least one tweet to me and everyone in the room
Use the #PYPedchat at the end of all your tweets!


Video Tutorial


Share your experiences!
What do you believe to be some benefits or drawbacks to using Twitter?
What did you find challenging about posting or tweeting?
Do you have any questions about how to use Twitter?

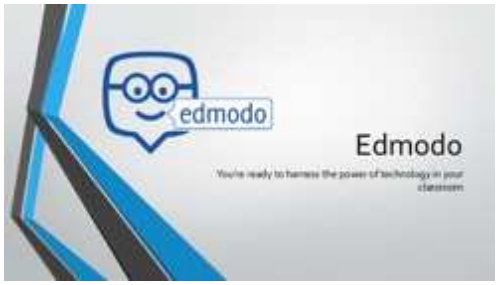

Goals for Today
REFLECTION
Did we meet all of our goals today?
Understand a PLN
Share experiences with PLNs
Sign up for Twitter
Follow and Tweet
Become familiar with Twitter as a PLN


HOMEWORK
* Participate in our #PYPedtech chat
* Make note of any problems to be addressed in the next session


#PYPEdtech
* How important is technology in your classroom?
* What prevents you from using tech in class?
* Who do you reach out to when you need help?
* Where do you get new information about tech?
* What are your goals for tech in your classroom?


Day 2
Goals
* Share our experiences with Twitter from last night's chat
* Resolve any technical issues with Twitter
* Use a new social networking site for PD
* Signup for Edmodo
* Navigate and become familiar with Edmodo and its features

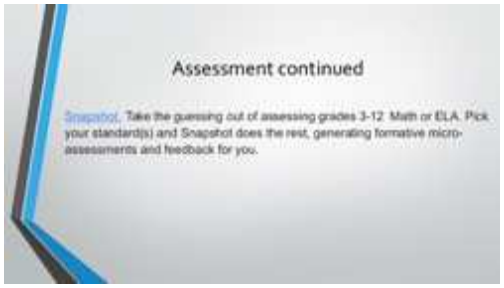

BREAKOUT
* Work in a group and share your experiences!
* Share your experiences

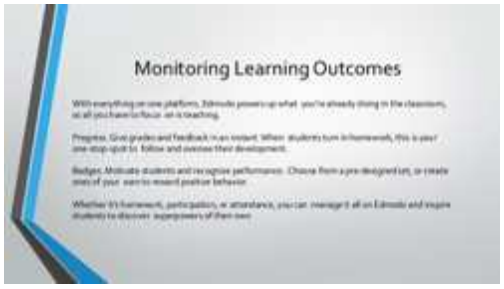

edmodo
Edmodo
You're ready to harness the power of technology in your classroom


Connect
Create Online Groups
To make the most of technology, you need an online command center. When you create a Group on Edmodo, it's easy to take learning beyond the classroom.
1. Click Create a Group in the Groups column on your Edmodo homepage.
2. Enter a Group name, grade level, and subject area.
3. Repeat for as many Groups as you'd like. There's no limit to the learning on Edmodo.
Groups are a great way to get your classroom connected, and increase sharing, engagement, participation, and self-expression—all in a private, closed setting.


Invite Group Members
* Invite Group Members
* Make everyone feel like they're part of your latest mission.
* Ask students and parents to join your Group—one so exclusive, only those who know the secret protocol can belong.
* Whichever way you decide to recruit, you can use each to help students sign up for Edmodo, have students join from an existing account, or invite families to download the Edmodo for Parents app for iPhone or Android.

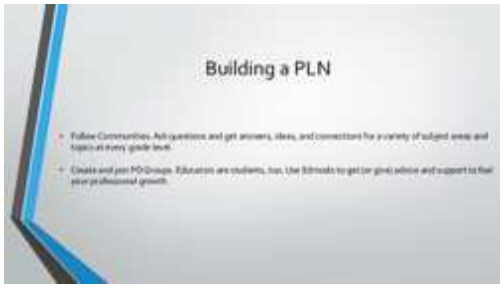

Assess
Gauge Student Growth
With paperless ways to manage homework, and see where students stand—all in one place—Edmodo will make you feel like you really do have superpowers.
Assignments. Say goodbye to that stack of papers on your desk. You can post lessons and have students turn them in—on Edmodo, all with a couple clicks of a button.
Quizzes. Create your own assessments in a variety of ways: multiple choice, true/false, fill in the blank, and more. Then, sit back while Edmodo does all the grading.


Assessment continued
Snapshot. Take the guessing out of assessing grades 3-12 Math or ELA. Pick your standard(s) and Snapshot does the rest, generating formative micro-assessments and feedback for you.


Monitoring Learning Outcomes
With everything on one platform, Edmodo powers up what you're already doing in the classroom, so all you have to focus on is teaching.
Progress. Give grades and feedback in an instant. When students turn in homework, this is your one-stop spot to follow and oversee their development.
Badges. Motivate students and recognize performance. Choose from a pre-designed set, or create ones of your own to reward positive behavior.
Whether it's homework, participation, or attendance, you can manage it all on Edmodo and inspire students to discover superpowers of their own.


Personalize


Edmodo
Professional Learning Networks


Building a PLN


Follow Communities


Breakout

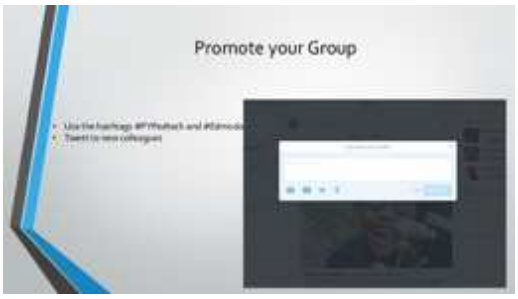

Homework


#PYPEdtech #Edmodo
How can you use Twitter to grow your PLN?
What obstacles may you face when using Twitter to develop PLN?
How can you use Edmodo to grow your PLN?
What advantages does using Edmodo have over Twitter?


Day 3
Goals
Share our experiences with Twitter and Edmodo from last night's chat
Resolve any technical issues with Edmodo
Create PD groups in Edmodo
Promote groups on Twitter
Participate in a guest moderated Twitter chat
Complete short survey


BREAKOUT
Work in a group and share your experiences!
Share your experiences


Create a Group


Promote your Group


Richard Wells
Guest Moderator


Evaluation Survey
SurveyMonkey

Project Evaluation

At the end of each workshop session, the coordinator will use a summative assessment survey based on Kirkpatrick's evaluation model (Kirkpatrick & Kirkpatrick, 2006). Information from the surveys will be analyzed to make adjusts to the workshop as needed. The participants will complete the surveys through Survey Monkey and online survey site.

Pre and Post Survey

Pre-Post Professional Plan

1. How often are you using iPads in your classroom?

- ○ Very frequently
- ○ Frequently
- ○ Occasionally
- ○ Rarely
- ○ Very rarely

2. How often do you collaborate with colleagues using iPads?

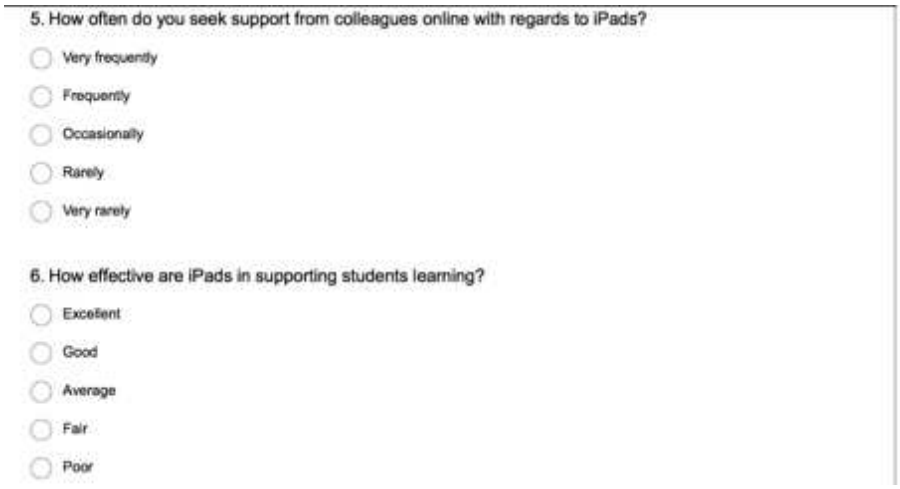
- ○ Very frequently
- ○ Frequently
- ○ Occasionally
- ○ Rarely
- ○ Very rarely

3. How would you rate your skill level in using iPads as part of your instruction?

- ○ Excellent
- ○ Good
- ○ Average
- ○ Fair
- ○ Poor

4. How often do you seek support from colleagues (in school) with regards to iPads?

- ○ Very frequently
- ○ Frequently
- ○ Occasionally
- ○ Rarely
- ○ Very rarely


5. How often do you seek support from colleagues online with regards to iPads?

- Very frequently
- Frequently
- Occasionally
- Rarely
- Very rarely

6. How effective are iPads in supporting students learning?

- Excellent
- Good
- Average
- Fair
- Poor

Post Workshop Session Questionnaire

Professional Learning Network Workshop

1. The goals for this session were clearly stated.

- ○ Strongly agree
- ○ Agree
- ○ Neither agree or disagree
- ○ Disagree
- ○ Strongly Disagree

2. Did you meet all your learning goals for the workshop?

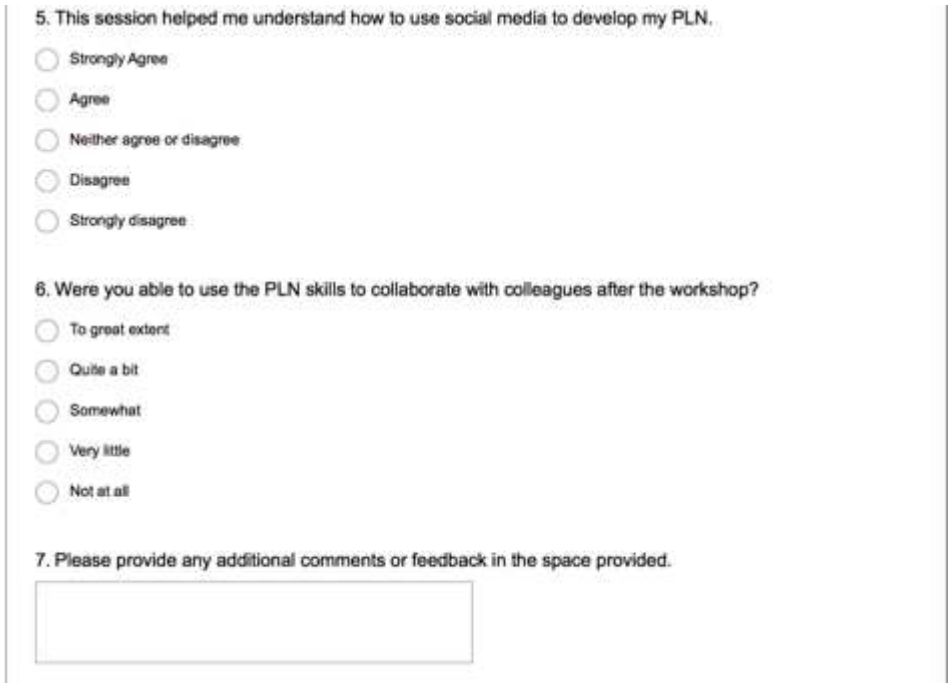
- ○ Strongly Agree
- ○ Agree
- ○ Neither Agree or disagree
- ○ Disagree
- ○ Strongly disagree

3. This professional development workshop helped me to better understand my role in a PLN.

- ○ Strongly Agree
- ○ Agree
- ○ Neither agree or disagree
- ○ Disagree
- ○ Strongly Disagree

4. This session helped me better understand how to collaborate in a PLN.

- ○ Strongly Agree
- ○ Agree
- ○ Neither Agree or disagree
- ○ Disagree
- ○ Strongly Disagree


5. This session helped me understand how to use social media to develop my PLN.

- Strongly Agree
- Agree
- Neither agree or disagree
- Disagree
- Strongly disagree

6. Were you able to use the PLN skills to collaborate with colleagues after the workshop?

- To great extent
- Quite a bit
- Somewhat
- Very little
- Not at all

7. Please provide any additional comments or feedback in the space provided.

Ongoing Support

Throughout the school year teacher-centered symposiums will be held to provide ongoing support to primary teachers. Sessions will be held during faculty professional development sessions. The coordinator will work with the IT facilitator to organize the symposiums. Sessions will include reflection sessions as well as further assistance where needed.

Timeline for professional development workshop and teacher-centered symposiums

Topics	Activities	Resources	Timeline
August	Professional Development	Classroom iPads/Notebooks	August 8 9am-12pm

	Workshop Day 1		
September	Follow up discussion	Classroom iPads/Notebooks	September 2 9-10am
December	Workshop Day 2 Strategies Guest Speaker	Classroom iPads/Notebooks	December 17 9-10am
January	Share experiences	Classroom iPads/Notebooks	January 9 9-10am
March	Workshop Day 3 Guest Twitter Chat	Classroom iPads/Notebooks	March 17 9-10am
May	Year Review	Classroom iPads/Notebooks	May 5 9-10am

Teacher-Centered Symposiums

Throughout the school year teacher-centered symposiums will be held to gage teachers' participation and skill development in regard to their professional learning networks. Beginning in September, a month after the professional development workshop the coordinator and IT facilitator will meet with teachers during faculty professional

development sessions. The goal of the first session is to measure how teachers have been using their PLN in the month before the school term begins. The IT facilitator and coordinator will meet with teachers again in January after the winter break to discuss strategies for expanding their PLNs. Also, in this session a guest speaker will be invited to discuss PLN strategies with teachers.

In the second half of the school year, teachers will meet with the coordinator January, and May. In January, teachers will meet to discuss the success or struggles in expanding their PLN over the winter break. In May, teachers will participate in a guest moderated Twitter chat to further develop skills and knowledge in building and expanding their PLNs. In this final session between the coordinator and teachers will meet to reflect on the year using a PLN.

Conclusion

This professional development plan was designed to aid teachers in developing the knowledge and skills to build an effective professional learning networks. The professional development plan consisted of a 3-day workshop and follow up sessions held throughout the school year. A coordinator will guide teachers in the creation of PLNs using Twitter and Edmodo. During the workshop teachers will receive training and have time for hands on experience using both applications. In addition, teachers will participate in live Twitter chats with educators from around the world as well as receive guidance from guest moderators. The goal of the workshop is for the teachers to develop the confidence, knowledge, and skills to create and expand a PLN.

During the school year, the coordinator will work with the IT facilitator to meet with teachers in follow up sessions. In the first half of the year teachers will meet to discuss their experiences of using PLNs. Also, a guest speaker will work with the teachers in developing PLN strategies for teachers to use over the winter break. In the second half of the school year teachers will meet to discuss their successes and struggles with PLNs. Teachers will participate in a guest moderated Twitter chat to work on strategies for the summer holidays.

In conclusion, PLNs offer teachers an online support system that can help teachers that may feel isolated or indifferent from their colleagues (Nussbaum, 2013). Moreover, PLNs connect teachers to more diverse groups and resources that aid teachers in personal and professional growth (Carpenter, Krutka, & Trust, 2016). Consequently, teachers will be able to take control of their own professional development.

References

Carpenter, J., Krutka, D., & Trust, T. (2016). *PK-12 Teachers' conceptualizations of professional learning networks.* Paper presented at the Society for Information Technology & Teacher Education International Conference.

DuFour, R., & Reason, C. S. (2015). *Professional learning communities at work and virtual collaboration: On the tipping point of transformation*. Bloomington IN: Solution Tree Press

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). Evaluating training programs: The four levels (3rd ed.). San Francisco, CA: Berrett-Koehler Publishers.

Nussbaum-Beach, S. (2013). Just the facts: Personal learning networks. *Educational horizons*, *91*(2), 26-27

Appendix B: Interview Protocol

Thank you for volunteering to participate in a research study of iPad integration in the classroom. The researcher is inviting primary elementary education teachers to be in the study. The purpose of this study is to examine the perceptions of primary teachers in regard to their perceived needs, successes, and barriers of implementing iPads in the primary classroom. The interview will take 30 to 45 minutes, and all information will remain confidential. The interviews will be held in a school meeting room during the first two weeks of school. I will be recording the interview and you will be asked to review the findings of the study for the purpose of member checking which will take 15-20 minutes.

Primary Research Questions to be addressed in the study:

1. What are the needs of primary teachers to effectively implement iPads in the classroom?
2. What are primary teachers' perception of the effectiveness of implementing iPads in the primary classroom?
3. What barriers do teachers face when implementing iPads in the primary classroom?
4. How do teachers demonstrate the implementation of iPads in the primary classroom?

Interview Questions

1. What are your experiences with technology in the classroom?
2. How are you currently using iPads in the classroom?
3. If you described your ideal classroom, what role would technology have in your classroom?

4. What would you need in order to better use iPads in the classroom?

5. What skills and knowledge do you lack that might be affecting your use of your iPads?

6. What prevents you from using iPads in your classroom?

7. Have you experienced technical problems with utilizing iPads? How did you address the problem?

8. What successes have you had with implementing iPads in the classroom?

Appendix C: Observation Protocol

1. Setting

Date: _____ School: _____

Project/Program: _____ Classroom _____

Observer: _____ Teacher: _____

Grade: _____ Subject: _____

#Students: _____ Observation Start time: _____End time: _____

2. Room description and student characteristics:

_____

_____

_____

_____

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

____ Individual student work
____ Student pairs
____ Other (please comment):

____Small groups
____Whole class

_____

_____

_____

_____

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

____ Lecturing
____ Interactive direction
____ Discussion
____ Other (please comment):

____ Facilitating/Coaching
____ Modeling

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

____ Creating presentations
____ Research
____ Information analysis
____ Writing
____ Other (please comment):

____ Test taking
____ Drill and practice
____ Simulations
____ Projects

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

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

Comment:

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

_____ Drill and Practice
_____ Drawing/Sketching
_____ Music Creation
_____ Video Creation
_____ Digital Story Telling
_____ Games
_____ EBooks
_____ Web Browser
_____ Word Processing
_____ Interactive Books
_____ Math
_____ Screen Casting
_____ Podcast
_____ Presentation Apps
_____ You Tube
_____ Google Docs
_____ Science
_____ Organizing/Planning
_____ Coding
_____ Puzzles
_____ Videoconferencing
_____ Blogging
_____ Geography
_____ Social Media
_____ Testing

_____ Other (please comment):

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

_____ Drill and Practice
_____ Drawing/Sketching
_____ Music Creation
_____ Video Creation
_____ Digital Story Telling
_____ Games
_____ EBooks
_____ Web Browser
_____ Word Processing
_____ Interactive Books
_____ Math
_____ Screen Casting
_____ Podcast
_____ Presentation Apps
_____ You Tube
_____ Google Docs
_____ Science
_____ Organizing/Planning
_____ Coding
_____ Puzzles
_____ Videoconferencing
_____ Blogging
_____ Geography
_____ Social Media
_____ Testing

_____ Other (please comment):

9. Research Questions (Note how questions are addressed in observations)

1. What barriers do teachers face when implementing iPads in the primary classroom?

2. How do teachers demonstrate the implementation of iPads in the classroom?