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Teacher Perceptions and Attitudes of Classroom Technology Integration Related to iPad Training

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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MA, University of Phoenix, 2002

BA, Dowling College, 1980

Dissertation Submitted in Partial Fulfillment

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Abstract

While professional development on the use of technology in the classroom aids educators to implement new teaching strategies, little is known about teachers' concerns with professional development specifically for adopting mobile technologies like iPads in their classrooms. The purpose of this study was to discover teachers' attitudes and perceptions toward teacher training for integration of the iPad into their classroom instruction. Using a case study approach and the concerns-based adoption model as a framework, this study examined teachers' concerns about their training for using the iPads in the classroom. Participants were 7 teachers from a small, suburban, Catholic K-8 school who rated their lowest and highest concerns about using iPads in the classroom. Data sources included the Stages of Concern Questionnaire, Levels of Use observation rubric, and one-on-one interviews. Data analysis included open and axial coding for identification of themes and patterns. Results indicated teachers had little concern with gaining extra training on classroom time and organization and with conflicts between their interests and teaching responsibilities when integrating iPads. Results also indicated they had high levels of concern regarding developing working relationships with fellow faculty members to maximize the benefits of iPad training, as well as about receiving additional iPad training. Finally, results indicated teachers' concerns with acquiring more iPads for students, as well as acquiring greater network connectivity within the school. These results will aid administrators and designers with making positive changes to professional development that both improve and increase teachers' successful integration of mobile technology in their classrooms.

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Dedication

I dedicate this dissertation to my loving family: my parents, Dorothy Theresa Pepe and Alfonso Michael Pepe, and my sister, Patricia Lynn Pepe. My dear late friends, Mary Nichols, Theresa Krasowsky, and Kristie SanHamel, will remain special in my heart as well my sweet pets, Sophie and Bella. I am certain they look down upon me with proud loving eyes. †

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Finally, I would like to acknowledge my family members for their support of my work, my two children, Valerie Patricia Kasper and Bradley James Kasper, my sister, MaryAnn Pepe, my nephew, Jon-Paul Vertuccio, my close cousin, Rosemarie Parascandola. A special acknowledgment goes to my colleague and friend, Veleta Gordon, who offered me strength and compassion in difficult times. I also would like to add I have had support from my Facebook friends, including Tim Miller and Kathy Adams-Avant, who stood by me at all times and kept me laughing. Though they did not understand fully what I have been studying for my research, I know that I could not have reached its completion without their full support and understanding. The remaining family members are my three dogs, Biscotti, Buddy, Chico, and my late father's dog, KoKo, who sat by my side, comfortably, throughout my entire writing process.

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Chapter 1: Introduction to the Study

Exploring specific teacher attitudes and beliefs is crucial to effective professional growth and development (Avalos, 2011; Guskey, 2002; Hall & Hord, 1987, 2006, 2014; Hord & Roussin, 2013). Moreover, understanding educators' experiences and the need for quality professional development will guide educational professionals in creating quality teacher training sessions (Vannatta & Nancy, 2004). Professional development programs offer an attempt to change teachers' attitudes and beliefs while also changing their classroom practices (Guskey, 1986). This study examined the attitudes and perceptions of educators after teacher training occurred.

There was a need for this study because it informs administrators and educators regarding the strengths and deficiencies of their technology integration training programs. A clearer understanding of how educators perceived technology integration training may improve teacher participation in technology workshops. Subsequently, each school system can create changes to enhance its faculty development programs (Hochberg & Desimone, 2010).

The process of change involves defining "what it is, whom it involves, what are its effects, and how might it be managed" (Hord, Rutherford, Huling, & Hall, 2006, p. 4). Individuals frequently accept or deny the process of change. It can be valued or dismissed. Personal experiences cannot be ignored; one's perceptions and attitudes in response to an innovation are of value (Hord et al., 2006). Within the change process, individuals can be measured at different stages based upon their skills, including their

strengths and weaknesses in reference to an innovation. The perceptions and attitudes change as their experiences increase and technology uses improve.

To understand change, one must consider change as an opportunity to discover where improvements are needed (Cade, 2013; Fullan, 2007). The potential for positive change increases when personal needs of the educator are studied and addressed. The process of professional development can improve when individuals in education have the opportunity to express their perceptions of the innovation. The results of this study can lead to improvements in professional development programs in school systems that need a better understanding of how to address the needs of the teachers participating in training opportunities.

In Chapter 1, I focus on the background of the study and explain the technology standards and guidelines for schools along with current research that has supported the need for this study. I address the problem statement, purpose of the study, research questions, conceptual-theoretical framework, and nature of the study. Further, I include the definition of terms by a reference to a previously published definition and state the assumptions, scope, and limitations. Finally, I explain the significance of the study, implications for social change, and the gap in literature that supported the needs for the study.

Background

Technological literacy is a necessary 21st-century skill for today's world. According to North Central Regional Educational Laboratory (2003), it is imperative that schools and school districts act specifically to provide learning experiences that enable

students to find success in a rapidly changing, knowledge-based, global society. Teachers are increasingly required to learn and use more computer technology in schools with students; yet training is inadequate in many school settings (Cuban, 2013). If educators continue teaching in the same traditional teaching styles, any use of technology/media will be largely ineffective (Cuban, 2013).

Because technology is constantly changing, the need for school systems to create effective technology integration into the classroom requires that teachers be adequately trained (Brooks-Young, 2007; ChanLin, 2005; Gordon, 2011). According to Daggett (2003), educators do not need to be at the same level as their students' technology skills; a teachers' role is to guide students to apply their knowledge for solving real world problems.

With continuously growing technologies, teachers and administrators must understand the need for improvements in the ways educators and students use technology in the classroom. Trends and challenges for the 21st century indicate that people will be "living in a new economy—powered by technology, fueled by information, and driven by knowledge" (U.S. Department of Labor, 1999, p. 1). In spite of this, teachers and administrators often lack the background necessary for systemic change and technological integration into long-term reform measures (Brooks-Young, 2007). Clearly, this is a need that must be addressed.

The United States Department of Education Institute of Education Sciences National Center for Education Statistics (2007) encouraged technology integration in schools in order to provide students at all academic levels opportunities to do "real work

as they study a particular subject" (para. 34). Learning Point Associates, an agency funded by the United States Department of Education, offered influential policy interpretation through its development of a program in 2006 called The Quick Key Series, in which the series was a finalist for the Distinguished Achievement Award in Excellence in Educational Publishing (Learning Point Associates, 2007). Learning Point was recognized for this program at the Association of Educational Publishers (Learning Point Associates, 2007). The Quick Key 3, "Understanding the No Child Left Behind [NCLB] Act: Technology Integration," explained technology integration as mandated by the NCLB Act. When addressing the issue of integrating technology into the curriculum, Learning Point Associates (2007) specified that the "NCLB Act emphasizes the effective integration of technology into the professional development of teachers, principals, and other school staff" (p. 4). Technology literacy is met when integration includes using technology efficiently by incorporating it into the curriculum and developing knowledge and skills (Learning Point Associates, 2007). Effective technology integration creates active learners rather than passive listeners (Vega, 2013).

The NCLB Act provided support for student achievement in academics using technology. If students are to meet the guidelines set by NCLB, teachers first must acquire knowledge of technology in order to prepare their students. Teachers are presented with recommendations set by NCLB as well as national standards set by the International Society for Technology in Education (ISTE). In the current educational climate, as schools and districts transition from NCLB standards to Common Core Standards, or an alternative set of standards designed to raise the expectations from those

of NCLB, there is no doubt that there is an expectation for using technology effectively on behalf of teaching and learning. The ISTE Standards support the development of technology skills for educators and students and are aligned with 21st-century Common Core State Standards (ISTE, 2014).

The ISTE Standards (formerly the National Education Technology Standards [NETS]) for Teachers (ISTE Standards•T) "are the standards for evaluating the skills and knowledge educators need to teach, work and learn in an increasingly connected global and digital society" (ISTE, 2014, para. 1). There are a separate set of standards for students (ISTE Standards•S) and administrators (ISTE Standards•A). These standards "help to measure proficiency and set aspirational goals for the knowledge, skills, and attitudes needed to succeed in today's Digital Age" (ISTE, 2008, para. 1). The ISTE Standards (2008), unfortunately, do not guarantee students and teachers progress in using technology in schools. Teacher training in effective use of that includes computer technology in the classroom is not included in the ISTE Standards guidelines. Standards without training and implementation guidelines are unlikely to be achieved by administrators and teachers and, consequently, may not be achieved by students. In spite of these standards, the need for teachers and administrators to be trained in effective use of technology in the classroom is still sadly missing.

Research has shown that teacher training in the use of technology in many schools has continued to be ineffective and that teachers lack follow-up support throughout the school year. Several studies have indicated that teachers who attempted to implement their training and use computers in their classrooms often requested additional support

later on (ChanLin, 2005; Hall & Hord, 2001; Hosman & Cvetanoska, 2010; Levin & Wadmany, 2008; Pavlova, 2005; Sugar, 2005; Tunks & Weller, 2009). Training without follow-up and support for teachers reduces the effectiveness of technology integration in their classrooms (Hall & Hord, 2001, 2006, 2014).

Technology integration in many schools has been inadequate even when educators are trained. According to Lawless and Pellegrino (2007), there are much-needed improvements for professional development in effective technology practices in order to positively impact teaching and learning. The lack of effective professional development in the use of technology affects teachers' ability to help students achieve required state standards. Teachers continue to fall behind in their technology needs including effective staff development, yet they are often expected to use new technological equipment purchased and installed in their classrooms without adequate training to use it. With the rapid advancement of technology each year, teachers must be ready for the 21st century (Learning Point Associates, 2007).

Recent studies have shown that individual needs of the faculty should be considered prior to teacher training. What teachers perceive as obstacles must be identified in order for technology integration to move past barriers so that effective technology integration can take place (Belland, 2009; Georgina & Hosford, 2009). It is important to study faculty perceptions and attitudes concerning computer use in the classroom and how those perceptions and attitudes impact successful technology integration. In addition to these issues, it is important to consider teachers' personal attitudes toward technology and subsequent training for classroom use. Vanetta and

Nancy (2204) asserted that teachers' personal attitudes and beliefs are a likely indicator of eventual success with technology integration. Furthermore, researchers have indicated that there are numerous obstacles that hinder technology integration in schools (Brooks-Young, 2007; Chow, Goodman, Rooney & Wyble, 2007; Erdogan, 2011; Gordon, 2011). Among these obstacles are teacher attitudes and perceptions.

Effective integration of technology in the classroom may be hampered by teachers' perceptions, particularly if those perceptions are negative (Hutchison & Reinking, 2011). Educators require consistent and continuous support and assistance if technology integration designed to improve teaching and learning is to succeed in the classroom. An examination of teacher training must be done to assure that the needs of the educators are met (Abuhmaid, 2011; Brzycki & Dudt, 2005; Hannon, 2008; Hew & Brush, 2007; Lim & Khine, 2006). Unless teacher training models are designed to meet the specific needs of classroom teachers, and to provide systematic follow-up and support, teachers' attitudes and perceptions regarding not only the use of technology in the classroom but also the training program itself will be negative. Despite support and an increase in using computers in classrooms, administrators may have expectations that were not reached for effective integration of technology in schools. According to Brzycki and Dudt (2005), it is "important to assess and reassess faculty needs in the ever-changing technology environment" (p. 619). Technology integration has a different meaning to each school system, as well as different procedures for teacher training sessions.

Problem Statement

Hannon (2008) asserted that there has been little research on how technology-training sessions aid educators in actual classroom settings, yet current research has described both positive and negative aspects of teacher training and technology integration. The concept of technology integration has a different meaning to educators and administrators in different school systems. There is no single definition of technology integration for all schools (Bebell, Russell, & O'Dwyer, 2004). Even though there are technology standards for educators that have been defined by national, state, and local governments, there are no set of standards where one program fits all (Brantley, 2011; Carlson, 2010; Levin & Wadmany, 2008; Li, 2007). The need for improvements in professional development to integrate technology into the classroom is a systemic problem. However, it is imperative to understand teachers' attitudes toward integrating technology and not assume that improving the training sessions they attend would result in effective technology integration in their classrooms.

The goal of professional development is to provide teacher training for integrating technology into the classroom. When professional development programs are implemented, the framework can stimulate reflection and refinement (Loucks-Horsley, Stiles, Mundry, Love, & Hewson, 2009). Designers of professional development generally understand that no plan is perfect and is subject to change (Loucks-Horsley et al., 2009). Professional development designers acknowledge that with learning, there is also change (Loucks-Horsley et al., 2009)—change in practice, but, perhaps more importantly, change in attitude. One model for understanding change in individuals is the

concerns-based adoption model (CBAM) developed by Hall and Hord (1987). The CBAM was designed to understand and facilitate how teachers adapt to change about an innovation (Hall & Hord, 1987). Through research, Hall and Hord developed a set of seven Stages of Concern (SoC): (1) unconcerned; (2) informational; (3) personal; (4) management; (5) consequence; (6) collaboration; and (7) refocusing. These stages are used to help professional developers address teachers' needs and concerns. In their model, the authors defined *concern* as follows:

> the composite representation of the feelings, the preoccupation, thought and consideration given to a particular issue or task. Depending on our personal make-up, knowledge, and experiences, each person perceives and mentally contends with a given issue differently; thus, there are different kinds of concerns. (Hall & Hord, 1987, p. 61)

Because the CBAM measures educators' perceptions of an innovation, the results of the Stages of Concern Questionnaire (SoCQ) can be used to guide how trainers adapt their teacher training programs for integrating technology into the classroom. Data gained from the SoCQ will give educational trainers the personal view of how teachers perceive change taking place in an organizational setting (Hall & Hord, 1987). In addition, the CBAM's Levels of Use (LoU) measures the extent teachers are using an innovation and whether the educator is at a beginning stage or moving toward a more advanced level (Southwest Educational Development Laboratory, 2015).

Examinations of the teachers' perceptions are relevant to technology integration because discovering teachers' needs relative to technology gives them a line of

communication that helps schools improve staff development procedures (Abuhmaid, 2011; Brzycki & Dudt, 2005; ChanLin, 2005; Lim & Khine, 2006). Similarly, Brooks-Young (2007) found that personal influences affect how educators use technology. Jakopovic (2010) found that successful technology integration into the classroom is dependent on teacher attitudes.

This study fills the gap in the literature by describing teachers' attitudes and perceptions for integrating technology through the use of iPads and computers into instruction. No previous study has been completed using the CBAM to understand the attitudes and perceptions of teachers regarding the use of iPads and computers in Catholic school classrooms. Specifically, professional development sessions have been reviewed for content and frequency, as well as for grade levels of the educators attending them.

Purpose of the Study

The purpose of this study was to discover teacher attitudes and perceptions toward technology integration in the classroom after teacher training in the use of iPads. Current professional development programs in school districts most certainly have had an effect on the participants' use of technology in the classroom. Consequently, teacher training, or professional development, must consider educators' attitudes about the preparation for technology integration in their classrooms because teachers have different perceptions, as well as different goals in mind. Knapper (2001) asserted that when teachers express their goals for learning, selecting approaches to meet these goal leads to better educational practices and to devise assessments methods to measure whether the training practices are attained.

This case study research project investigated and explored the effects of professional development for the integration of educational technology into the classroom. This case study examined individual teacher experiences after iPad training sessions. The social phenomena explored supplied answers to how teachers view professional development of integrating technology into the classroom and if any changes in practice took place. Another concept explored was to determine if, in fact, educators would change their levels of technology use in the classroom after training.

The intent of this study was to determine the concerns of educators, their levels of understanding technology integration, and whether personal attitudes affected iPad and computer integration in the classroom after professional development. Findings from this study can be used by technology coordinators and trainers who facilitate professional development to meet teachers' concerns when training them for advances with new technologies.

Research Questions

This study examined teachers' perceptions and attitudes regarding integrating technology into the classroom after professional development sessions in a parochial school. It further explored the degree to which teachers acted upon their training and successfully integrated technology into their classroom practice. The research questions were:

1. What are the teachers' most and least important SoC for integrating iPads after teacher training?

2. What are teachers' LoU for iPads in the classroom after technology professional development sessions for iPads?
3. What factors among educators account for high and low LoU of technology in the classroom?

Framework

This case study incorporated both quantitative and qualitative methods drawn from a mixed methods research design. Creswell (2003) asserted that to conduct a mixed method study, the researcher collects and analyzes quantitative and qualitative data in a single study. One way to achieve this is to "converge or confirm findings through different sources" (Creswell, 2003, p. 210). This study used the framework from CBAM developed by Hall and Hord (1987). The CBAM has remained constant, effective, and has been applied in educational research and the practitioner community for over 30 years (Hall & Hord, 2001), and it is integral to this study. The CBAM is relevant to understanding how individuals (teachers) undergo the process of change as they are presented with innovations and is most important to this study.

Learning leads to change, and change can lead to concern and uneasiness. Assumptions by school administrators were made that initial training for teachers along with new technology equipment being supplied meant that teachers used it (Hall & Hord, 2001). Ideally, educators who engage in learning through professional development experience change, which is vital to ensuring that teachers implement new practices into the classroom. Two essential components to the CBAM are SoC and LoU.

The first research question that addressed teachers' most and least important SoC for integrating iPads after teacher training was answered through the SoC; this component focuses on the understanding of seven feelings and perceptions about change (Hall & Hord, 2001) as presented in Figure 1. As the teacher shifts forward on the SoC scale, the focus is less on how the change influences the educator and focuses more on how the change influences the students and the learning environment.

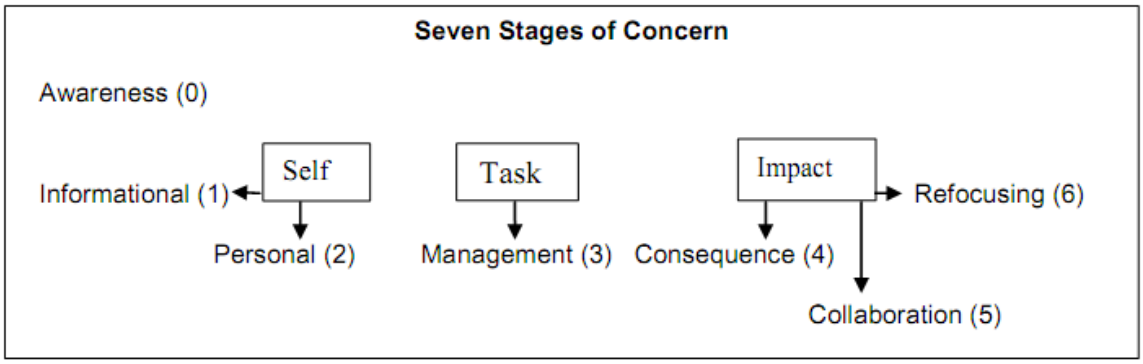

Figure 1. Seven SoC from CBAM. Adapted from *Implementing Change: Patterns, Principals, and Potholes* (2nd ed.), by G. E. Hall and S. M. Hord, 2006, Boston, MA: Pearson Education. Copyright 2006 by Pearson Education, Inc., Upper Saddle River, NJ. Reprinted with permission.

Techniques for measuring SoC and LoU include an interview, open-ended concern statements, and the SoCQ (see Appendix A). This study implemented the one-legged interview, which encourages the participant to describe what is being implemented and how he or she feels about the innovation (Hall & Hord, 2006).

The second and third research questions addressed teachers' LoU for iPads in the classroom after technology professional development sessions and factors accounting for their high and low LoU. These questions were answered by examining the LoU component of the CBAM and specifically exploring the following sub-questions: How

are teachers implementing new practices learned from professional development? What are teachers LoU after professional development? How have teachers LoU changed after teacher training of integrating technology into the classroom, if at all?

The LoU component focuses on if and how much individuals are implementing the change (Hall & Hord, 2006) as presented in Figure 2.

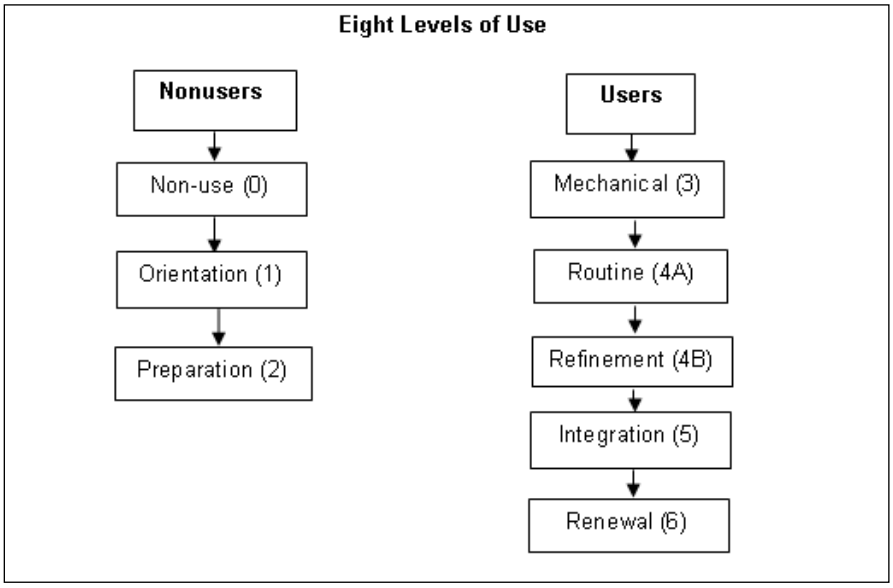

Figure 2. The eight LoU. Adapted from *Implementing Change: Patterns, Principals, and Potholes* (2nd ed.), by G. E. Hall and S. M. Hord, 2006, Boston, MA: Pearson Education. Copyright 2006 by Pearson Education, Inc., Upper Saddle River, NJ. Reprinted with permission.

The LoU concept focuses strictly on the behavior of the educator. It examines how the teacher incorporates new ideas learned in professional development sessions into classroom instruction. As teachers shift upward to level 3 (Mechanical) on the LoU scale, they are implementing the innovation into their classrooms. However, educators may progress, regress, or remain at one level. The evaluation of teacher performance will be

measured by the researcher using Appendix B: LoU of the Innovation (Hall & Hord, 2001).

Chapter 2 includes current literature that clarifies the need for the research and design of this study. Technology training and integrating technology into the classroom are explained in detail, as well as examples of professional development, technology uses, and the CBAM. The elements of this research design are addressed in more detail in Chapter 3. The setting, participants, research questions, and methodology are among the topics included.

Nature of the Study

The setting for this research study was a small, suburban, Catholic school in the southeastern United States. Within a diocese or parish, Catholic schools have decentralized governance where leadership decisions are made by the pastor and supervised by the bishop, but a school may have an advisory board which involves collaboration between the school and community (Foundations and Donors Interested in Catholic Activities, 2014). At the school where data collection took place, there were 19 teachers of kindergarten through grade 8 (K-8) included in the study; 13 academic and five enrichment teachers, and one computer teacher, as well as a principal. Though the teachers may have had different backgrounds and experiences for teaching, they all had equal availability of teacher training sessions that were offered by the school computer teacher.

The objective of this research study was to determine the impact of teachers' attitudes and perceptions regarding professional development, after integrating

technology into the classroom following the iPad training sessions. A mixed method approach was used to evaluate the teacher perceptions and attitudes about the integration of technology into the classroom. This approach was best suited for this study because it allowed for the examination of multiple data sources, which provided rich, in-depth descriptions of the educators' experiences. As a mixed-methods approach, data collection from multiple sources helped to explain one method to another, that is, quantitative and qualitative (Creswell, 2003). Qualitative data aids in explaining a quantitative study in a sequential, explanatory design (Creswell, Plano, Clark, Gutmann, & Hanson, 2003). In this study, a combination of LoU and SoC accurately depicted the situation for the need of both quantitative and qualitative measures. Therefore, a mixed methods approach was selected to examine the problem.

A case study approach was used for evaluating teacher training and the implementation of iPads into the classroom. All educators in the school were required to attend professional development for integrating technology into the classroom. General findings indicated that computer technology was not being utilized effectively and that educators had not been efficiently trained to integrate technology into their classrooms.

Data were collected, both quantitative and qualitative, and results analyzed to answer the research questions (Creswell, 2003). Qualitative data were collected from focus group (teacher) interviews, which aided in reviewing the quantitative findings from surveys, explaining and responding to the second research question. The one-on-one interviews explained if the educators' needs were being met from the technology training sessions that were offered to them. Qualitative data were analyzed sequentially to

determine any changes in attitudes and perceptions that might have occurred, after the quantitative data were collected. Creswell (2015) described this method as a sequential, explanatory design, one that begins with quantitative data collection and analysis, followed by a qualitative data collection and analysis that serves to support and explain the results suggested by the quantitative data. The sequential explanatory design was represented by "quantitative data collection and analysis, qualitative data collection and analysis and the two methods are integrated in the interpretation phase" (Creswell, 2003, p. 215).

The focus of the study was to explore the three research questions. The educators first responded to the SoCQ. After the results were reviewed, observations took place. Participants responded to the LoU questions during the interview. I developed interview questions that asked participants about their concerns and how these concerns affected their level of technology integration from the LoU; the interview questions also investigated how those concerns aligned and supported the quantitative findings from the SoCQ. As the researcher, I asked questions to the participants in personal interviews relating to their beliefs and concerns towards training to determine if training sessions influenced their teaching practices in their classroom settings.

Definitions

Attitude: "The way you feel about something or someone, or a particular feeling or opinion" (Cambridge University Press, 2015).

Concern: "The composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task is called *concern*" (Hall & Hord, 2006, p. 61).

Educational technology: "Technology as a tool to enhance the teaching and learning process" (International Technology Education Association, 2003, p. 3), including:

> (a) the development, prescription, and assessment of instruction; (b) effective uses of computers as an aid to problem solving; (c) school and classroom administration; (d) educational research; (e) electronic information access and exchange; (vi) personal and professional productivity; and (f) computer science education. (ISTE, 2002, p. 3)

Effective professional development: "That which results in improvements in teachers' knowledge and instructional practice, as well as improved student learning" (Wei, Darling-Hammond, & Adamson, 2010, p. 1).

Perception: "The way that someone thinks and feels about a company, product, service, etc." (Cambridge University Press, 2015).

Technology: "The branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science" (Dictionary.com, LLC, 2014).

> *Technology integration/computer use:* Technology integration is the incorporation of technology resources and technology-based practices into

> the daily routines, work, and management of schools. Technology resources are computers and specialized software, network-based communication systems, and other equipment and infrastructure. Practices include collaborative work and communication, Internet-based research, remote access to instrumentation, network-based transmission and retrieval of data, and other methods. (U.S. Department of Education Institute of Education Sciences National Center for Education Statistics, 2007, para. 3)

Technology literacy: "Knowledge about what technology is, how it works, what purposes it can serve, and how it can be used effectively to achieve specific goals" (North Central Regional Educational Laboratory, 2003, p. 22).

Technology training/Professional development: "Professional development generally refers to the acquisition or updating of knowledge and skills required for maintaining a particular career path and growing as a professional in a particular field" (Education Commission of the States, 2015, para. 1). Teacher training, staff development and professional development will be used interchangeably in this paper.

Value beliefs: A belief concerning the importance or worth of something pertaining to choices and goals (Anderson & Maninger, 2007).

Assumptions

This case study was conducted with three assumptions. First, I assumed all participants responded with honesty and accuracy to the questioning for the questionnaire and the interviews based on their personal knowledge and experiences and that each

participant responded truthfully with the best of their abilities. The second assumption was that teachers had some SoC and LoU. Finally, I assumed that professional development programs were designed to support technology integration in the classroom for the available technology in their classrooms. Having acknowledged these assumptions, I took care not to allow them to influence outcomes and conclusions drawn from the data.

Scope and Limitations

Eighteen teachers, from kindergarten through eighth grade, were the target population. The technology coordinator/computer teacher provided me with data regarding the number of teacher training sessions, the length and content of each training session, as well as any assistance she offers to educators other than technology training sessions. The study did not address high school secondary education teachers; elementary and middle school teachers from grades (K-8) were studied. The limitations to this study included three factors: there would not be a large sample of teachers in the study, the study was limited to one school, and the applications (apps) teachers used on their iPads were unknown or identified to me during observations. The study was not generalizable beyond this school because the teachers may not be representative of all teachers.

Another limitation to the study was the timeline for surveying, observing, and interviewing the participants. The data collection was held for three months after teacher training took place. The limited timeline was duly noted because effects might take longer to become apparent; immediate effects might be different from long-term effects. This study did not entail barriers that would interfere with integrating technology into the

classroom because all computers were updated and working. Many studies included these barriers. This study only focused on teachers' beliefs and concerns and what their use of technology was in the classroom.

Significance of the Study

This case study could advance the knowledge of technology integration in schools. The results may enlighten administrators and educators about their technology integration strengths and deficiencies. With a clearer understanding of technology integration practices, awareness of new strategies may increase teacher participation in technology workshops. Professional practices that focus on producing technology-literate teachers may be more effective at producing technology-literate students. The International Technology Education Association (203) asserts that "A massive, coordinated effort is needed in order to achieve a technologically literate populace" (p. 12). The problems that interfere with technology integration must continue to be studied.

In the 21st century, it remains a problem that many teachers do not incorporate the use of computers in the classroom when teacher training is available, which includes school districts with mandates. Teachers may have personal and outside issues and a diversity of obstacles that influence technology integration with their students. Each school setting requires an individualized study of the integration of technology practices in order to meet the needs its all teachers. Haertel and Means (2003) concluded that in order to measure the use of technology and its impact on learning, multiple studies are necessary. "No single study, genre of studies, or methodology is adequate to the task" (Haertel & Means, 2003, pp. 257–258).

Answers to teachers' concerns must be addressed so that they can be trained in a productive style to understand and increase the use of computer technology for their lessons and plans. When teachers have their own needs met and are prepared and comfortable with using technology, integration of computers is more likely to occur in the classroom (Brown & Warschauer, 2006). Recognition of teachers' perceptions of educational technology is necessary for understanding their willingness or reluctance to integrate technology into instructional practices. (ChanLin, 2005). Obstacles and negative attitudes could only be overcome when teachers were asked about their technology needs.

Implications for Social Change

The practical contributions of this study include helping school leaders to find ways to effectively integrate computers in their classrooms. Evaluation of professional development efforts for technology and instruction must carefully examine the focus of the content of the professional development (Lawless & Pellegrino, 2007). The measures used to determine what impact teacher training has on teacher knowledge and behaviors changing require further investigation.

Examinations of the practices in the field have provided evidence of successful use of computers, something educators should be reviewing in order to make positive changes in teaching and learning with technology. Defining computer training practices and policies for staff development could bring about social development and change as a part of the new age of technology. One important factor is being aware or informed of the content of professional development as it relates to technology integration into the classroom (Lawless & Pellegrino, 2007). This study is important to researchers in

education, specifically, on behalf of technology coordinators, faculty, and administrators. The results can bring awareness to other school settings.

Summary

This case study evaluated teachers' attitudes and concerns regarding technology training for iPads and computer implementation in the classroom. Professional development provides teachers with technological guidance, but it is not enough to bring about effective technology integration. Teacher trainers can focus on changes to their training sessions to enhance teachers integrating technology into the classroom by understanding the needs of the educator. Measuring these concerns using the CBAM provided valuable information for understanding and meeting the needs of the teachers. In this way, more efficient use of iPads and computers may be reached.

In Chapter 2, I review current literature relating to teachers' attitudes and perceptions after teacher training for integrating technology into the classroom. Included in this review are teachers' experiences with obstacles they perceive that hinder computer implementation. In Chapter 3, I describe the research methodology. Chapter 4 provides a comprehensive data analysis and the findings. Finally, Chapter 5 includes a summary and recommendations for future studies.

Chapter 2: Literature Review

Technology in schools brings about the need for teacher training. In today's classroom, it is common practice to incorporate computer use, peripherals, and software in daily work and communications since technology is a dependable part of activities (Groff & Mouza, 2008). Computers and technology are used in a great many ways; they have become an important element of educational needs (Erdogan, 2010; Gordon, 2011). It is imperative for researchers to study the process of professional development for its effectiveness for teachers integrating technology into the classroom, including training sessions, teachers' attitudes and perceptions, and analyzing the variables and constructs (Buabeng-Andoh, 2012).

In education, teachers are often required to incorporate technology with their students in their classrooms. Yet weak implementations of technological applications that are used in schools indicate that educators require effective training in technology-enhanced classroom practices. Presently, there is no one teacher training method for integrating technology to fit the needs of every teacher, student, or school. The extant literature covered current practices for incorporating technology in teacher training as well as how diverse styles of training are applied in different school settings, such as for teachers who work in the K-12 classrooms and for prospective teachers in preservice programs.

Literature Search

In order to locate suitable literature for Chapter 2, the online databases of Academic Search Premier, Education Research Complete, and ERIC (Educational

Researcher Information Center) were searched using the Walden Library databases and Google Scholar. Another method of searching for literature was my membership in Questia (2015), a professional online service of research articles and books. Searches were conducted on the following topics including a combination of search terms and key words: professional development, staff development, teacher training, integrating technology into the classroom, standards for technology use in the classroom, teachers' perceptions and attitudes, and the CBAM.

Articles were collected from peer-reviewed literature and journals from the noted databases. Qualifiers for the search results included full text, scholarly, peer-reviewed journals with publication dates of January 2004 through June 2014. Relevant articles were sorted by date and subject matter and saved under topics such as integrating technology into the classroom, standards, teacher training, and the CBAM.

This chapter reviews the literature that has defined technology integration and described educational technology standards in the United States, theories related to effective professional development, technology training for teachers, successful integrating technology into the classroom, and obstacles that interfere with teachers implementing technology. Further, it reviews the literature that described teachers' attitudes and perceptions toward integrating technology into the classroom, the CBAM, and educational studies in which researchers implemented the CBAM. Finally, recommendations for technology integration and the need for future research are addressed.

What is Technology Integration

Labbo and Place (2010) define technology integration as "curriculum integration with the use of technology involves the infusion of technology as a tool to enhance learning in a content area or a multidisciplinary setting" (p. 9). For instance, technology integration can be used for guided, virtual field trips, assigned web quests, and "should occur in ways that research shows make the learning process deeper and more enhancing" (Labbo & Place, 2010, p. 9). Other activities could include creating electronic journals and composing written assignments. Students conduct research on the Internet and use online software programs and applications as well as licensed proprietary software programs to accomplish various curriculum objectives (Labbo & Place, 2010). As a result, teachers must be ready to use a variety of applications of technology with their students.

Technology integration has different meanings to diverse school systems. Once defined by a particular school or curriculum, a thorough examination can take place. This literature review supports my decision as a researcher to study a limited form of technology integration: the use of the iPad in the classroom as a teaching tool. A review of educational technology standards explains this concept further.

Educational Technology Standards in the United States

In the United States of America, the ISTE Standards give teachers (ISTE Standards•T) and administrators (ISTE Standards•A) a set of guidelines to use in their schools; similarly, there are also standards for several other countries. The ISTE (2014) released new teacher standards, "which focus on using technology to learn and teach"

(para. 2). ISTE Standards•T (ISTE, 2014) require that they "facilitate and inspire student learning and creativity, design and develop digital-age learning experiences and assessment, model digital-age work and learning, promote and model digital citizenship and responsibility, and engage in professional growth and leadership" (para. 3). These standards are designed to increase educators' knowledge of technology and guide them on how to prepare their students for the technological workplace. Standards for students, teachers, and administrators "help to measure proficiency and set aspirational goals for the knowledge, skills, and attitudes needed to succeed in today's Digital Age" (ISTE, 2014, para. 1).

Even with the ISTE Standards•T and ISTE Standards•S (ISTE, 2008) in place, they do not guarantee student or teacher progress in using technology in schools. Finley and Hartman (2004) asserted that these standards were not enough to ensure the integration of computer technology in the classroom. They described barriers in their review that revealed what prevented schools from achieving institutional change. Teachers' perceptions of the integration of technology differed, and often teachers who did not have an interest in using technology resisted using technology with their students.

The NCLB Act made provisions for student achievement in academics when using technology. The act (as cited in Learning Point Associates, 2007) specified that staff development must include "scientifically-based research on instructional methods and must be a continuous nature with access to courses through electronic media" (p. 3). In order for educators and administrators to integrate technology successfully, teachers

need to be trained effectively (Brooks-Young, 2007; Erdogan, 2011; Finley & Hartman, 2004; Gordon, 2011; Learning Point Associates, 2007).

Research has indicated that although there are technology standards in place, technology practices proven useful in one school district do not indicate the same practices are effective in another school system. It is, then, important that teachers understand the meaning of technology integration and that school leaders and professional developers understand how educators perceive professional development. Because teachers have concerns about the technology they use with their students, teachers have an interest in participating in the creation of training programs that suit their needs, which directly relates to the purpose of this study: identifying teachers' perceptions and attitudes toward technology training. Feedback from educators can help to inform professional development designers to create meaningful training sessions.

Theories of Professional Development

Professional development has been studied for the purpose of understanding teachers' learning styles and how they incorporate new knowledge in practice in their classrooms. Educational school cultures provide environments that are appropriate to learning and include tools that offer educators formal workshops and courses (Avalos, 2011). Professional development that has had positive effects on teachers does not necessarily meet the needs of all teachers (Avalos, 2011). Thus, there is a need to research professional development and the impact it has on educators and their classroom practices.

Teachers have beliefs about how new strategies will be incorporated into their classrooms after professional development has taken place. During this process, teachers either confirm or challenge these beliefs (Guskey, 1986). In order to learn and incorporate change, teachers must be able to move out of their comfort zone and be willing to make a change in their teaching practices; such modifications can cause apprehension and intimidation. Guskey (1986, 2002) argued the premise that teachers altered their belief systems from the beginning; teacher beliefs changed when the professional development program was seen as effective. If students' achievement increased, teachers felt stronger about teacher learning innovations and continued new practices in their classrooms (Guskey, 1986).

Accountability is on the minds of teachers, and educational stakeholders often judge educators on their students' standardized test scores. If teachers choose to alter their instructional practices, there is a risk that the change may negatively affect student achievement if the modification does not work (Guskey, 1986, 2002). With their reputation as an educator and the responsibility of ensuring student success on the line, some teachers believe the risk is too high. Furthermore, many changes may be more than some teachers can handle. When administrators or professional development designers ask teachers to revamp their teaching styles and strategies completely, the teachers feel overwhelmed with the magnitude of the transformation (Guskey, 1986, 2002).

Contrary to Guskey's (1986, 2002) claims, Hochberg and Desimone (2010) argued that professional development provides educators with instructional changes in knowledge, beliefs, and practices, which then leads to change in their teaching practices.

In order for students to learn and be proficient in subject matter, teachers must be able to address specific content to meet their students' individual learning needs (Hochberg & Desimone, 2010). Professional development enhances teachers' knowledge (of both content and pedagogy) that fosters teacher beliefs. Teachers who have experienced effective professional development should, in theory, be able to improve their instructional practice, thereby improving student learning and achievement, which is an important objective of NCLB (Hochberg & Desimone, 2010). Furthermore, professional development must address individual district or school contexts to be accountable for meeting policies and improving student achievement. Hochberg and Desimone (2010) claimed that reform should target areas of need, such as improving math scores, because improvements on assessments motivate teachers and increase their interest in change.

Because professional development is required for teachers to integrate technology into the classroom, support is needed for effective integration involving the administration, technology professionals, and educators (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). The literature revealed that there are different approaches to training educators for integrating technology into the classroom; it was there imperative for me to review how technology is used in schools and what types of training educators find useful. In addition, research indicates that not all professional development sessions are relevant to all teachers, which relates to the core purpose of this study: to discover what educators are concerned about in order for the school system to provide effective training.

Training Educators to Integrate Technology into the Classroom

In order to have effective technology-enhanced instructional strategies, teachers need to understand new approaches for implementing technology (Brooks-Young, 2007; Buabeng-Andoh, 2012). Brooks-Young (2007) found that personal influences, such as how an educator feels about using technology innovations in schools, affect how technology is used by teachers and how it affects students' learning. Assessment for measuring how effectively educators use technology is often too late; consequently, restructuring of strategies for training may be necessary (Brooks-Young, 2007).

While changes and reform are needed in schools to effectively implement technology integration into the classroom, there is not sufficient training available for educators (Brooks-Young, 2007; Buabeng-Andoh, 2012; Finley & Hartman, 2004). The technology standards include expectations for educators to incorporate technology into the curriculum; the research (Brooks-Young, 2007; Buabeng-Andoh, 2012; Finley & Hartman, 2004) indicates that teachers are not prepared to do so. Furthermore, teacher training that supports integrating technology is not always successful (Brooks-Young, 2007; Buabeng-Andoh, 2012). It is good practice to keep educators informed on today's common implementation of technology so that they can be better prepared for using it with their students (Mosenson & Johnson, 2010).

Critical information from this literature search details the weaknesses in teacher training, which supports the need for this study. It is important to understanding what educators find successful as well as what is not successful. The literature addressing training for teachers to integrate technology into the classroom informed the design of

this study, suggesting that change and reform to programs can only occur after there is an assessment of the training programs. Examples of technology integration showed how schools made changes that work.

Successful Technology Implementation: What Works

Integrating technology into the classroom can be achieved by developing projects that help teachers meet curriculum standards, cover content, and implement school policies (Debele & Plevyak, 2012). To be successful, projects that use technology should have clear, targeted teaching and learning outcomes that are consistent with the technology in use (Debele & Plevyak, 2012); that is, the use of the technology aligns with, or is compatible with instructional practice. Examples of integrating technology into the curricula include teachers using software and devices. Debele and Plevyak (2012) argued that learning outcomes can be achieved with technological innovations, but educators should not try to achieve too much through a single technology-assisted project where quantity supersedes quality.

Campbell, Wang, Hsu, Duffy, and Wolf (2010) composed a study for the use of technology in the classroom for students learning in science. Because students used technologies out of school, and they were currently using technologies in schools, students were able to connect to Internet resources that enhance science concepts (Campbell et al., 2010). In a science lesson, for example, students observed an organism using a simulator in 3D for plant populations which allowed them to visualize the genetics of the organism in a virtual environment. The life cycle could be seen through the organism living, reproducing, and dying in the environment (Campbell et al., 2010).

Rather than learning *from technology*, as is often the term used when integrating technology, Campbell et al. offered learning *with technology* where "technology and pedagogy intersect to support science content, process, nature of science, and communication in science learning in meaningful and lasting ways" (p. 10).

In the case of the 3D simulator, the technology offered students experiences that they would not otherwise have. Such technologies can be used to support student inquiry projects. An example might be where a student introduces something foreign into the organism's environment, perhaps excessive levels of CO_2, speculates on how the organism will respond, observes what happens, and reports on the outcome of the experiment. This is an ideal way for teachers to integrate technology into their instructional practice to enhance students' learning (Campbell et al., 2010).

Another example of successful technology integration in schools is the use of software to enhance students' learning. Computer mathematics software is available in a variety of formats and operates through different cognitive instruments, that is, software that engages students to use mental processes, such as using judgment, memory, and reasoning. Such software provides students with practice that yields rapid feedback (Roschelle et al., 2010). Although it may be a significant tool for learning, using software warrants investigation. Roschelle et al. (2010) studied the use of SimCalc software to improve students' understanding of mathematics. Students learned the basics required by state and federal mandates while also learning advanced mathematics, bringing students to a policy goal for a deeper understanding of algebra. Although the findings were positive, the researchers acknowledge that technology by itself cannot be the only

measurement for success in that interventions also include the incorporation of professional development and curriculum materials (Roschelle et al., 2010). Indeed, many technological teaching aids, such as mathematics software and SimCalc, are often used to supplement instruction, and are focused on very specific learning outcomes. While the student engages with the software, the teacher acts as a facilitator.

Challenges for integrating technology into education need to be researched and analyzed in order to be aware of technology's role in schools. Effective use of technology needs to be continuously studied so that so that people can learn to engage in the technological world (ChanLin, 2005; Pavlova, 2005). With teachers using computers in their classrooms, students in computer labs, and students completing homework that requires word processors and data charts, there continues to be the need to study technology use in the classroom and the levels of teacher training available (ChanLin, 2005; Pavlova, 2005).

Research has shown that teachers not only require effective teacher training, they also need technology support throughout the school year. Sugar (2005) studied computer technology in the classroom when teachers were trained to incorporate it into instruction. He found that staff development was not enough to ensure that computer technology use occurs or is effective. With studies indicating that continuous support was needed for teachers, Sugar implemented a program where teachers had technology coaches to assist them with equipment and class lessons. Even so, teachers indicated that there was not enough immediate technical support when technology projects were required to be completed with their colleagues.

Even though additional support was requested from teachers, Sugar (2005) continued to study classroom teachers by investigating computer use after teachers were trained, as ChanLin (2005) and Pavlova (2005) suggested. With coaching in place, teachers were still in need of hands-on training. It is critical that computer equipment be in working order before any investigations can take place. It hampers a training session when equipment is not in working order. Furthermore, when the equipment is available and working, an investigation into what practices work and what do not is possible (Sugar, 2005).

Sugar (2005) measured the effectiveness of the teacher training with a six-page survey and 90-minute interviews. Participants' responses were focused on individual technology needs. Sugar found, with the assistance of technology coaches, local administration projects, such as creating web pages, e-mail, spreadsheets, online PowerPoint presentations, were evaluated 94% as *effective* or *very effective* by the teachers. The remaining 6% of these projects were ranked *undecided*. An important factor in this study showed what teachers were able to express regarding their experiences with technology. Sugar argued that teachers needed to state what is useful and effective; that what motivates one educator does not necessarily work for another. Teachers felt that their ideas, creativity, and necessary support were met with the guidance of the technology coaches (Brooks-Young, 2007).

To be effective, a continuous program for technology integration is needed throughout the school year. Similar to Sugar's conclusions, Brooks-Young (2007) found that teachers incorporated technology more efficiently when they had "technology-

supported professional development" (p. 84). Brooks-Young went on to help teachers and administrators understand the standards for Teachers for Educational Technology Standards and Performance Indicators for all Teachers (ISTE, 2007) by writing a book that addressed each standard and that included strategies for teachers and administrators to use in order to meet these standards. Although Brooks-Young's research has been published, the methodology for constructing her ideas is not known and may or may not be valid on a wide scale in school situations, nor is there an indication of what training preservice teachers may have had.

Brush and Saye (2009) asserted that preservice teachers should have quality technology courses to prepare them for technology use in their classrooms to enhance their teaching methods. In addition, teachers who understand the effectiveness of incorporating technology, strengthen the link between technology and pedagogy (Brush & Saye, 2009). When models are learned and later applied to their setting, teachers are more apt to introduce these activities with their students. Preservice teachers have experiences with technology, but, often in their preparation for teaching, their mentors have computers in classrooms that are never used (Brush & Saye, 2009). Ertmer et al., (2010) asserted that to impact the professional development of preservice teachers positively, their own learning context as well as their teaching context should be considered.

Modeling sets an example for preservice teachers that can leave a lasting effect so that future uses of technology can take place (Brush & Saye, 2009). Teacher education programs should be more specific as to the use of technology tools that make a difference

in the quality of instruction. There are a number of issues that can interfere with the effectiveness of field-based preservice education (Brush & Saye, 2009). One problem with the inclusion of technology in field-based experiences is that the mentor teachers feel they already have too many professional tasks to perform as an educator. Brush and Saye (2009) argued that there is a need to have "more authentic classroom experiences in which preservice teachers can explore the use of technology to promote pedagogical goals within our teacher education programs" (p. 56). Therefore, preservice teachers need to have the best available computer training courses that help them to incorporate technology use into the classroom. Brush and Saye (2009) include an abundance of information from their studies to create models for improving the preparation for preservice educators. The limitation of their study is that it cannot count on school systems incorporating these models by offering preservice teachers the computers and time needed to implement the program.

Research findings for technology integration aids in understanding what has generally occurred in education. One theory is that it is imperative for teachers to have continuous training, which, in my view, can be more easily determined when teachers' perceptions are explored. What seems to be missing from this research is a close examination and exploration of teachers' attitudes and perceptions about technology and its use as a teaching tool. In that respect, the literature guides and relates to the design of this study, which will include questions concerning any influences that affect technology use in the classroom, such as working equipment, attitudes about training, and concerns

teachers might have for changing their teaching practice. Careful consideration using open-ended questions are designed with this in mind.

Obstacles for Implementing Technology for Educators

Current researchers have found that the most common obstacles for integrating technology were lack of technology support, access, and lack of knowledge (Banas, 2010; Ertmer et al., 2010). Time remains an issue for teachers since there are so many responsibilities they already have to include on their planning (Banas, 2010; Bauer & Kenton, 2005; Brooks-Young, 2007; Lim & Kline, 2006; Liu, 2012; Tsai & Chai, 2012). Because new technology is frequently introduced in school classrooms, teachers require a better understanding for implementing computer use with their students.

Available and working equipment is also a concern to educators (Brzycki & Dudt, 2005; Finley & Hartman, 2004, Liu, 2010). When computers were not updated and repaired, it delays progress in their lessons. Brzycki and Dudt (2005) found that teachers complained that when they planned to use available computer technology with their students, but that equipment was not in working order. Furthermore, because teachers already have such demanding work expectations, it may be overwhelming for them to keep up with rapid advances in technology (Harris, Mishra, & Koehler, 2009). Using computers as a teaching and learning tool requires further preparation and time for incorporating computers on a consistent basis. Brooks-Young (2007) found that problems with the infrastructure, dealing with classroom management issues, and inconsistent technology skill levels are barriers that can lead to underuse of technology. An assessment of what teachers perceive as important in educational technology is essential

in exploring teachers' practices concerning integrating technology into teaching (Brooks-Young, 2007, Gordon 2011). Accordingly, technology professional development for educators must prioritize resources while taking into consideration costs, methodologies and purposes (Carlson, 2010).

Liu (2010) asserted that when barriers are identified and addressed, teachers will be more likely to integrate technology in instruction. When teachers were asked about their needs, it often resulted in better quality training sessions (ChanLin, 2005; Brooks-Young, 2007). Training and the obstacles that hinder integration of technology are not alone; a closer look at teachers' personal attitudes and feelings will enhance research for what is needed to motivate educators for integrating technology into the classroom. With sufficient facilities that have rich instructional resources, and strong beliefs toward technology integration, educators may continue to have problems with successful implementation of technology (Tsai & Chai, 2012). Teachers' use of technology is influenced by several factors including their demographics, access to technology, and their experiences of using instructional technology (Nawaz & Kundi, 2010b) as well as their perceptions about the ease and usefulness of technology (Nawaz & Kundi, 2010a). It is therefore necessary to investigate what educators' perceptions are concerning technology training and its integration into the classroom.

The literature suggests that in order to overcome obstacles for integrating technology, discovering teachers' perceptions and attitudes will enhance motivation for technology use. It relates to the design of this study in that it examines teachers' perceptions and attitudes so that recommendations for more efficient training sessions

can be developed. This researcher recognized that not every training session meets every teacher's desires and expectations.

Teachers' Attitudes and Perceptions Toward Technology Implementation

Teachers' personal beliefs about teaching, their experiences with technology and perceptions about using innovations, such as new and creative ideas and practices for integrating technology into the classroom, affected their willingness for technology integration (ChanLin, Hong, Horng, Chang & Chu, 2006). An investigation is both useful and relevant to technology integration because when criteria are identified, it gives teachers a line of communication that helps schools with new staff development procedures (Brzycki & Dudt, 2005; ChanLin, 2005; Erdogan, 2011; Gordon 2011; Lim & Khine, 2006). Teachers' perceptions about technology use in classroom instruction represent another potential barrier to integration. Hutchison and Reinking (2011) argued that teachers are far less likely to provide authentic use of technology in their classrooms if their perceptions related to such integration are superficial or negative.

ChanLin et al. (2006) studied eight teachers from different schools who were in the teaching profession from 2 to 23 years. Using data consisting of field notes, interviews, audio-tape recordings, and classroom observations (based on video-tape), they investigated those perceptions that influenced teachers to integrate technology as well as to include creative lessons in their teaching. Interviews provided data that described teachers' perceptions and experiences that were transcribed and coded. Field notes were taken during observations in order to record classroom details during lessons. Data coding and grouping, including re-coding and grouping, were ongoing processes

along with the data-collecting process. As part of this process, coding of teachers' perceptions emerged as implications. ChanLin et al. (2006) discovered that there were four categories that affected technology integration: environmental, personal, social, and curricular issues. ChanLin et al. (2006) discovered the following personal beliefs and experiences that impacted technology integration:

> (a) personal belief about teaching with technology, (b) personal experience in using technology and trying new things, (c) integration of computer technology with personal lifestyle, (d) interest in using computers, (e) interest in the teaching domain, and (f) support from family and the need for personal growth. (p. 63)

These findings suggest that educators have similar personal factors that affect technology integration.

The various sources of data helped the researchers to have a deeper understanding of the perceptions the educators had for computer use in the classroom. Teachers' computer uses varied in part due to the different subject matter that was taught such as science or history. This study has also shown that teachers' use of computers continued to be viewed as a tool for preparing exams, creating lesson plans and handouts rather than being used more often with students because it takes time to be creative in their lessons (ChanLin et al., 2006).

Similarly, Inan and Lowther (2010) examined the effects of teachers' beliefs, readiness, and computer proficiency on their use of technology in the classroom. There were 1382 participants in the study consisting of K-12 educators with 40.7% having more than 15 years of teaching experience. From the data collection, Inan and Lowther (2010)

identified five variables from a two-part questionnaire (see Table 1) for the teachers' perceptions of computers and technology integration.

Table 1

Teachers' Perceptions of Computers and Technology Integration

Variable	**Teachers' Perceptions of Computers and Technology Integration**
Teachers' Beliefs	Teachers' perception of technology's influence on student learning and achievement and impact on classroom instruction and learning activities
Teacher Readiness	Teachers' feeling and perception of their capabilities and skills required for technology integration
Overall Support	Teachers' perception of administrative, peer and community support for their technology integration
Technical Support	Teachers' perception on adequacy of technical support, availability of resources, and assistance with computer software and trouble-shooting
Technology Integration	Teachers' perception on the frequency of technology integration in their instruction

Note. Adapted from "Factors Affecting Technology Integration in K-12 Classrooms: A Path Model" by F.A. Inan and D. L. Lowther, 2010, *Education Technology Research and Development, 58,* 142-143.

Quantitative analysis was conducted in three phases: assumption checking, interaction analysis, and path analysis, all of which examined dependent and independent variables. Inan and Lowther (2010) found that teacher' readiness, overall support and computer proficiency (indirect effects) had significant positive effects on technology integration. In addition, the number of years teaching had a negative effect (lowest importance), while the availability of computers, teachers' beliefs, and technical support

had significant positive influences (highest importance) on integrating technology in the classroom. These findings indicate that importance of teachers' beliefs and readiness are key factors for teachers integrating technology.

Ottenbreit-Leftwich, Glazewski, Newby, and Ertmer (2010) argued that engaging personally relevant and timely teacher training would improve teachers' practices. A case study research design was used to understand individual teachers' perceptions for their values and beliefs for integrating technology. Data was collected through observations and a one-day visit for interviews with eight teachers who were conveniently and purposefully chosen because of their recognized use of successful technology integration experiences. Ottenbriet-Leftwich et al. (2010) asserted that the best way to understand teacher values and beliefs would be through interviews because educators would be able to reveal their internal beliefs.

In their study, all eight teachers used technology for facilitating classroom operations and organization, created customized classroom materials, was engaged in professional development, and had a goal to improve student learning or involvement. Teachers' values reflected their professional needs regarding how or why technology helped them to achieve those values. Throughout the study, researchers reviewed the data multiple times, recording recurring codes and themes, such as engaging students or addressing professional needs. Findings indicated that all teachers used computers mainly for preparation for teaching and to communicate with parents, but a significant finding was that all of the teachers frequently noted that the use of technology enhanced student motivation and engagement (Ottenbreit-Leftwich et al., 2010).

Based on the researchers' analyses of participants' responses, the value beliefs that influenced teachers' use of technology were motivated by teachers who were eager to improve technology integration practices in order to impact student learning. Because the teachers were selected due to their achievements in integrating technology in classroom, the data can only represent educators who had a positive outlook on using computers with their students. Yet, the participants did have professional development sessions that engaged teachers in technology practices. Ottenbreit-Leftwich et al. (2010) asserted that professional development and training initiatives for technology use is directly related to the support of teachers' needs and they are, therefore, more likely to integrate technology into the classroom.

Studies by Brzycki and Dudt (2005), ChanLin (2005), Inan and Lowther (2010), Lim and Khine (2006) and Ottenbreit-Leftwich et al. (2010) indicated that when teachers have a propensity to adopt technology there is more success in integrating it. However, teachers who were not as motivated to integrate technology into the classroom indicated that there is a need for studies concerning the attitudes and perceptions of educators (Erdogan, 2011; Gordon 2011; Hutchison & Reinking, 2011). While the studies did investigate teachers concerns about using technology in their classrooms, there are other research methods that can be used to measure educators' concerns. The CBAM of research recognizes individuals' perceptions and how those perceptions generate different responses to the prospect of change; the model directs change facilitators to address a wide range of concerns that teachers may have prior to professional development (Brzycki & Dudt, 2005; Hall & Hord, 2006). The CBAM of research explains the process

of implementing the instruments to better understand teachers' attitudes and perceptions toward an innovation.

As suggested by the literature, teachers' perceptions and attitudes concerning technology training and its integration in the classroom are not always positive. It is critical that staff developers and change agents understand those perceptions and attitudes and address them as part of the professional development they provide for the teachers. In designing this study, this researcher drew on the research of Hall and Hord (2006) and the CBAM in order to examine teachers 'concerns to determine how a school can enhance professional development procedures.

The CBAM

To understand facilitating change, the CBAM was developed in 1973 at the Research and Development Center for Teacher Education. The CBAM is grounded in theory and has been richly used in studies to measure the effects of an innovation. The CBAM (see Figure 3) describes, measures, and explains the change process for teachers when they must fulfill expectations for presenting new curriculum or modifying their teaching practices in some way (Hall & Hord, 2006).

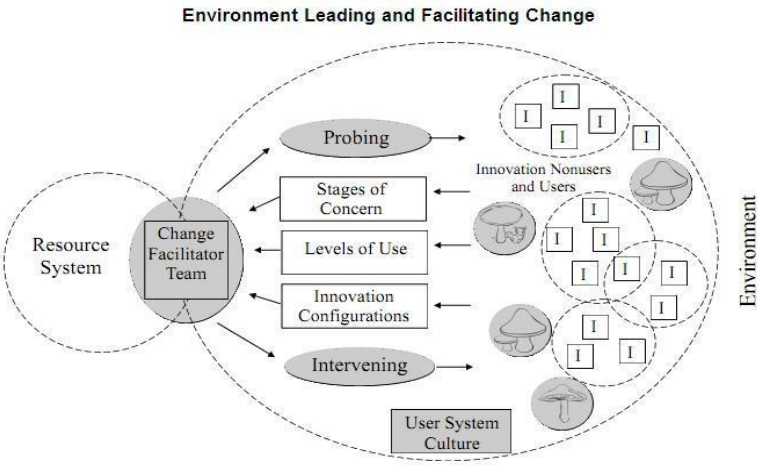

Figure 3. Facilitating change through CBAM. From *Implementing Change: Patterns, Principals, and Potholes* (2nd ed.), by G. E. Hall and S. M. Hord, 2006, Boston, MA: Pearson Education. Copyright 2006 by Pearson Education, Inc., Upper Saddle River, NJ. Reprinted with permission.

In the framework of the CBAM, the constructs measure, describe, explain, and predict the change process teachers experience when implementing an innovation in education. The process of change is affected by the interventions of change facilitators (Anderson, 1997). This system intersects the User System and Resource System as the change facilitator who represents a leader. "A change facilitator might also be a developer or trainer involved in introducing a particular educational innovation" (Bellah & Dyer, 2009, p. 14). Bellah and Dyer (2009) asserted that during the adoption process, the change facilitator is most effective when the three dimensions, Innovation Configurations (IC), SoC, and LoU of the CBAM are used to delve into the thinking and behaviors of the participants in an attempt to understand their perceptions and to guide them through the change process. Probing and Intervening represent the significance of facilitators offering a systemic approach to assisting in change.

The CBAM has been in use for over 30 years and thus far, the six personal principles (Hall & Hord, 2006) remain as:

> (a) change is a process, not an event; (b) understanding the change process in organization requires an understanding of what happens to individuals, as they are involved in changes; (c) for the individual, a change is a highly personal experience; (d) for the individual, change entails developmental growth in terms of feeling about and skill in using the innovation; (e) information about the change process collected on an ongoing basis can be used to facilitate the management and implementation of the change process; and (f) there will be no change in outcomes until new practices are implemented. (pp. 4-9)

The six principles do not cover all aspects of change; they are a summary of predictable aspects of change. Hall and Hord (2006) predict that by using these principles you will be able to identify change that has been unnoticed or not yet identified. People involved in change experience personal feelings and reactions concerning an innovation, as well as "their involvement in the change process" (Hall & Hord, 2006, p. 109). Moreover, the CBAM allows those who facilitate the adoption process to explore the innovation for users and non-users with three key diagnostic tools: SoC, LoU, and IC.

The SoC construct focuses on one's feelings and perceptions (concerns) in response to an innovation. Through research, Hall and Hord (2006) identified and confirmed seven categories of concerns that progress from "unconcerned, through self-focused concerns to focus on the task, and, finally, to improving the impact of the

innovation on clients/students" (p. 140). The levels of concern about the innovation are represented in Table 2.

Table 2

Typical Expressions of Concern About an Innovation

SoC	Expression of Concern
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?
3. Management	I seem to be spending all my time getting material ready.
4. Consequence	How is my use affecting clients (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 that would work even better.

Note. From *Implementing Change: Patterns, Principals, and Potholes* (2nd ed.), by G. E. Hall and S. M. Hord, 2006, Boston, MA: Pearson Education. Copyright by 2006 Pearson Education, Inc., Upper Saddle River, NJ. Reprinted with permission.

In addition to measuring the SoC, the LoU are used to assess a behavioral aspect of change in participants as they implement an innovation. LoU describe typical educators' experiences, that is, the theory of change in practice as they learn about an innovation; begin to use it, and gain increasing experiences in its use (Anderson, 1997). The LoU are assessed in eight levels, which range from a non-user, lower-level user, to a higher-level user, representing those that are more experienced. In addition, the LoU

framework includes key decision points describing educators' movements from one level to another, as shown in Table 3 (Hord & Hall, 2006).

Table 3

The LoU of an Innovation with Decision Points

	LoU	Behaviors Associated with LoU
Users	Level VI: Renewal	Explores major modifications or alternatives to current innovation
	Level V: Integration	Coordinates innovation with other users for increased client impact
	Level IVB: Refinement	Makes changes to increase client outcomes, based on assessment
	Level IVA: Routine	Makes few or no changes to an established pattern of use
	Level III: Mechanical	Makes changes to better organize use
Non-users	Level II: Preparation	Prepares to begin use of the innovation
	Level I: Orientation	Seeks information about the innovation
	Level 0: Non-use	Shows no interest in the innovation; takes no action

Note. From *Implementing Change: Patterns, Principals, and Potholes* (2nd ed.), by G. E. Hall and S. M. Hord, 2006, Boston, MA: Pearson Education. Copyright 2006 by Pearson Education, Inc., Upper Saddle River, NJ. Reprinted with permission.

Although the sequence of LoU is progressive, there is no guarantee all participants will follow identical paths through the change process (Hall & Hord, 2006). Consequently, change facilitators must implement different approaches to incorporating an innovation; most users remain in level III, the Mechanical Use, because users do not fully understand the innovation and refer back to manuals and do not plan ahead. Hall

and Hord (2006) referred to this as not passing through the Implementation Bridge (see Figure 4).

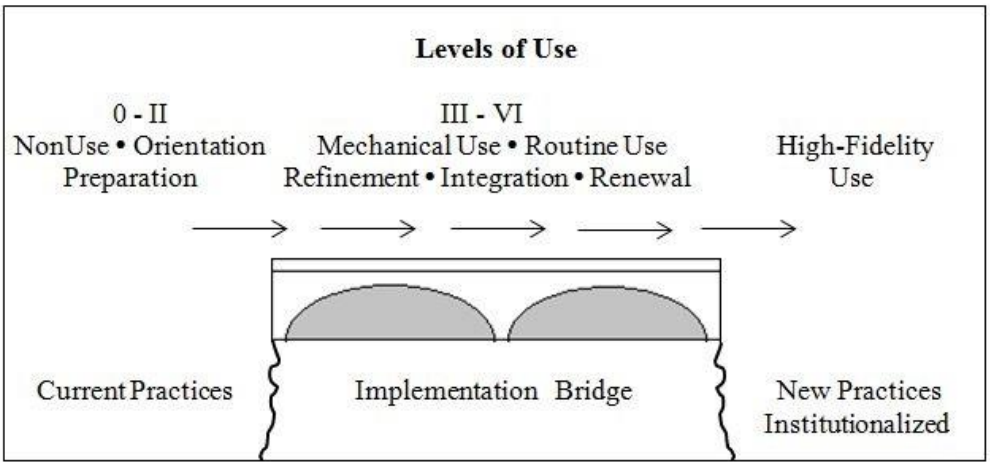

Figure 4. LoU implementation bridge.

For technology uses, levels 0-II represent practices such as email and preparing lessons; there are no new uses or implementation of technology. The Implementation Bridge represents passing through levels III-VII where educators change their practices, thereby changing their outcomes. In these levels patterns of use occur and can change; they use the innovation consistently and some educators reach collaboration with colleagues and finally exploration of new ideas. To fully cross the bridge, educators continue to learn and implement new practices. Finally, according to Hall and Hord (2006) and Hord and Roussin (2013), when teachers change by moving across the Implementation Bridge, student learning outcomes are met and they achieve higher test scores.

Without a process to meet outcomes, a giant leap through the process or bridge can bring about failure. Leadership is essential for long-term success with an innovation.

"Many leaders appear reluctant to consider the feelings and perceptions that people have as they approach the bridge and travel across it" (Hord & Roussin, 2013, p. 131). When educators' emotions are not examined, implementation fails (Hord & Roussin, 2013). Using the CBAM to evaluate professional development for the integration of technology training and classroom practices give leaders and administrators indicators for where there are improvements and successes.

The CBAM drove the research design of this study and aided in the formation of the research questions. Teachers' concerns for an innovation used in the classroom specifically relate to this investigation of educators' perceptions and attitudes toward professional development for using iPads in the classroom. Discovering the process of change, the concerns, and use of an innovation in the classroom form the basis for this study. CBAM is essential to answering the research questions presented in this paper as well as providing the tools to do so. Additional research provides insights into prior implementation of CBAM.

Educational Studies that Implemented the CBAM

Prekindergarten Through Grade 12 Technology Study

Giordano (2008) studied a professional development program that prepared prekindergarten through Grade 12 teachers to integrate Internet technologies into the curriculum considering teachers beliefs and behaviors in the classroom. A mixed methods approached was used by using various sources in order to confirm and triangulate data (reliability and validity). Data was collected from the SoCQ and interviews. The SoCQ pretest was administered to a participant group of 80 members before professional

development took place, then again immediately following professional development training and a third time as a follow-up survey three years later with 10 teachers who participated in the semi-structured interviews. The interviews revealed insights to better understand the quantitative data and to understand the educators' points of view. There were 19 educators who did not participate in professional development who completed the follow-up survey and who was referred to as the comparison group.

Three years after the professional development training was completed, the SoCQ posttest data revealed that there was a decrease in concerns in Awareness (stage 0), Information (stage 1), and Personal (stage 2). Further, after the posttest, the follow-up surveys showed a greater decrease in these stages (Giordano, 2008). Three remaining stages, Management (stage 3), Consequence (stage 4), and Refocusing (stage 6) remained stable but there was in increase in Collaboration (stage 5) throughout the three administrations of the survey. Although initially there was an increase in collaboration immediately after the posttest was administered, it later showed a decline to its original level at the follow-up. Conversely, the comparison group remained consistent with that of a non-user (stage 1), slightly concerned in gaining more information, having little concerns about management or use, and no indication for a competing innovation (Giordano, 2008).

The results of the third administration of the SoCQ (follow-up surveys) indicated that although educators' practices and concerns for Internet integration into their teaching practices did occur, only some of those changes had been sustained. Interviews corroborated these findings indicating that there were several similar factors that

contributed to the data analysis. These findings suggest that effective professional development can only occur when there is an effort to change teachers' beliefs in order to accommodate innovation in technology use in schools. Professional development that focuses on merely changing teachers' behaviors is superficial and changes will not be sustained (Giordano, 2008). Teachers' insights from diverse settings in multiple classrooms with individualized instruction strengthen the need for understanding how curricular innovations can occur and how they continue to be practiced.

Fifth Grade Mathematics Education Study

An intrinsic case study by Tunks and Weller (2009) evaluated ten fourth grade teachers' concerns after teacher training took place. Data was collected through observation, interviews, and document analyses by applying the CBAM's tools; SoC, LoU, and IC. Staff development training focused on new ideas or techniques for teaching algebraic thinking. The project was centered on algebra instruction and

> the concept of algebraic thinking as a way of reasoning about the notion of indeterminacy; the importance of continuous support rooted in the idea that change is a process; and the application of the CBAM to assess and guide the delivery of support mechanisms. (Tunks & Weller, 2009, p. 165)

Teachers were trained during a summer session for three weeks in activities that changed educators' understanding and perceptions about algebraic thinking and presented rich lesson plans. The data from observations, interviews, and document analyses provided the researchers insight into those factors that led mathematics teachers to more effectively incorporate algebraic thinking in instruction. The researchers found that

positive change came about as a result of support from personal contact with colleagues, lesson plans that were shared electronically, and teachers' observations of students demonstrating success with algebraic thinking. Tunks and Weller (2009) attribute these findings to the CBAM, which led to the conclusion that in order for professional development to be effective, continuous support was needed.

Although there were positive findings, Tunks and Weller (2009) claim those educators who attended staff development training sessions less frequently, did not implement program changes because there was no follow-up support. "In contrast, implementation of an innovation increases considerably when continued, regular support follows initial presentations during staff development training" (Tunks & Weller, 2009, p. 162). Accordingly, effective change requires ongoing support beyond professional development by understanding the participants' concerns (Hall & Hord, 2001; Tunks & Weller, 2009).

International Computer Use Study

A CBAM study by Hosman and Cvetanoska was conducted in Macedonia and was funded by a research grant in 2008, from the McDowell Center for Global IT Management at the University of North Carolina at Greensboro. Their study was used in the practice and development of technology by employing the process of change for an innovation, a procedure which must be understood and reviewed if comparable projects are to succeed (Hosman & Cvetanoska, 2013). The study consisted of 212 educators who were provided professional development in the use of computers and technology in their curriculum and teaching practices.

Although teachers had a positive outlook on receiving training and 86% were positive about integrating computers into the classroom, there were only 34% who used computers for instruction in the recent two months when the study concluded. This indicates that approximately half the educators who were trained and had access to using technology never reached any levels above the baseline of level 0 (Non-use) for the LoU, signifying that teachers' corresponding concerns for technology use have not been acknowledged (Hosman & Cvetanoska, 2013). In comparison, 75% of the same educators used technology in their personal lives and 72% used computers to prepare for class materials such as for tests, indicating that teachers reached the levels of 3 and 4 LoU for mechanical and routine use.

The significance of the findings is that although educators used computers for personal use and for preparation for class materials, they did not make the transition to incorporating technology into the classroom. Although the conclusion of the study showed that educators were not reaching higher levels of technology use, a high percentage of educators expressed interest in additional training in areas in which they teach (Hosman & Cvetanoska, 2013). In order for training sessions to be more productive, educators noted that their input needed to be considered when designing professional development courses. Hosman and Cvetanoska (2013) asserted that ongoing support is needed for teachers when incorporating change for technology use in the classroom.

Research that implemented the CBAM showed the need for additional case studies conducted in different school settings. Although some of the results may be

similar, there are also differences in the findings because each teacher's perception provides critical information for making individualized changes in schools and in their training practices. Teachers should have input that can help and improve professional development; the needs may not be the same. An exploration of these differences and similarities can offer insight into helping teachers implement effective and lasting changes in integrating technology into the classroom practices. Additionally, the research literature offers recommendations that affirm the purpose of this study.

Recommendations for Technology Integration

Hew and Brush (2007) argued that because technology has a positive effect on student learning, government programs were created to enhance the use of computers in the classroom. Programs included funding for more computer equipment and Internet access for more schools to decrease the ratio of students per computer. Integration of technology can only take place when barriers are identified and overcome. Hew and Brush (2007) researched barriers and categorized obstacles as to their frequency as "resources, knowledge and skills, institution, attitudes and beliefs, assessment, and subject culture" (p. 226). An important factor was to determine the relationship among barriers to discover how one obstacle influences the other (Hew & Brush, 2007), such as the lack of technical support. Hew and Brush (2007) identified integrating technology into the classroom barriers and recommendations for K-12 schools by examining numerous studies in the United States and other countries.

To overcome barriers for integrating technology, Hew and Brush (2007) created strategies categorized as "(a) having a shared vision and technology integration plan, (b)

overcoming the scarcity of resources, (c) changing attitudes and beliefs, (d) conducting professional development, and (e) reconsidering assessments" (p.223). Professional development was found to have interconnecting aspects. Specifically, professional development should fit the teachers' needs and classroom practices, as well as provide opportunities for teachers to engage in active learning (Hew & Brush, 2007). Furthermore, "it should focus on the technological knowledge/skills, technology-supported pedagogy knowledge/skills, and technology-related classroom management knowledge/skills" (Hew & Brush, 2007, p. 233). Goals for the school system should be set before a professional development plan can be made.

Hew and Brush (2007) recommended that once a school system has identified goals and has a vision, a technology plan should be designed. To implement the plan, once computer equipment is evaluated for its working order, the technology plan can be put into action. To overcome the lack of access to computers in their study, classrooms had two additional computers. School schedules were made into longer blocks by doubling the time spent in any one classroom in order to increase the time available to use computers in the classroom. Teachers collaborated to reduce the time for technology planning when integrating technology into the curriculum. One suggestion was that the lack of technical support could be addressed by training students to aid teachers with hardware and software problems. Expenses for repairs from professional technicians were reduced when support was given to teachers (Hew & Brush, 2007); this was in addition to staff development.

As suggested by previous studies, meaningful staff development relating to technology skills and technology-related classroom management must focus on hands-on training and addressing individual teacher needs in order to help teachers integrate technology successfully (Hew & Brush, 2007). Further, Hew and Brush (2007) have recommended that the more experienced teachers who are comfortable using technology could guide the less experienced teachers. Working together, teachers gain confidence and support from a colleague to increase technology integration in their classrooms.

Gillard and Baily (2008) designed strategies to motivate the integration of technology in the classroom. They found that, in general, members of the school system who already have an interest in the use of technology are first to support technology innovations. Some become leaders while others have visions of incorporating technology. Teachers can be made aware of the new teaching practices and gains in student learning. Understanding the accomplishments of others in using technology promotes a positive interest for faculty through peer pressure (Gillard & Baily, 2008). Giving teachers time to adjust to new ideas and practices creates greater participation when time for change is indicated in stages (Gillard & Baily, 2008). School policies that include realistic goals for integrating technology into the classroom promote the benefits and advantages for successful technology integration (Gillard & Baily, 2008). In turn, other schools will be able to share technology experiences for the implementation of technology that will enhance learning to motivate teachers (Gillard & Baily, 2008).

Gillard and Baily (2008) suggested that to motivate educators, technology integration should be compatible with their teaching practices and address their students'

needs as well as their faculty development interests. Problems that are addressed and resolved enhance teaching and should not alter the curriculum content. With the aid of technical support for faculty, along with peer support, teachers will be more comfortable, with fewer worries for handling technical problems (Gillard & Baily, 2008). Teachers should be recognized and rewarded for their efforts using innovative technology for their time and experiences. In agreement with other researchers' findings, Gillard and Baily (2008) caution that school leaders "should expect to provide the equipment, time, incentives, training, and other support services necessary to get the job done" (p. 90).

Overcoming obstacles is possible when support is available from the administration, from peers, students, and school technicians, and when that support is continuous (Brooks-Young, 2007; Carrillo-Hermosilla, & Unruh 2006; Hew & Brush, 2007; Hosman & Cvetanoska, 2013; Sugar, 2005). Without a technology plan that addresses a functional use of technology with a purpose, technology integration cannot be effective. Researchers have indicated the obstacles that hamper technology integration, but it is not determined what specific practices prove to be more effective in specific educational environments to overcome the obstacles.

Researching obstacles to integrating technology can help to overcome weaknesses in training teachers and what affects its use in the classroom. The literature offers suggestions to overcome some of the obstacles, but it also addresses the need for meeting educators' teaching practices and professional development interests. To accomplish the needs of educators in an individual school, research is essential, suggesting a case study be completed for each school. Therefore, this research study focuses on a single school.

The Need for Future Studies

Teachers, as well as school districts, have diverse needs for integrating technology. Though teacher beliefs differ, there are similarities including pedagogical beliefs and teachers' perceptions and attitudes toward integrating technology into the classroom (Hew & Brush, 2007). Within school systems that have widespread availability of computers, little research indicates how it is effectively integrated in specific subject areas. For example, math and science are not using computer technology as much as history and language arts courses (Hew & Brush, 2007). There are many unknown details for successful technology integration although it is occurring in many schools.

Teachers have schedules set in place in their daily routines as an educator, as well as meetings and other responsibilities. It remains unclear how teachers can set aside time for training and collaborating with colleagues. Teachers who have been successful with integrating technology into the classroom should be examined in order to share what helped them reach their potential. It is unknown what might have affected their education about technology only that it worked in some situations. Stages in staff development were not measured for their successes in teachers consistently using technology with their students. Hew and Brush (2007) asserted that for technology integration to be successful, a holistic approach is needed, which addresses a variety of learning styles through direct engagement. Useful professional development includes continuous technology education improvements that are made through evaluations for effectiveness of training programs.

An evaluation of a case study helps to discover what is working and what is not. Teachers in a single school are the only indicators for the perceptions and attitudes they have for the training they have attended. Effective professional development demands understanding teachers' personal experiences. A review of the research literature led me to the focus of this study, which is to discover teacher attitudes and perceptions toward technology integration in the classroom after teacher training.

Conclusion

The literature review has indicated that schools have similarities and differences for incorporating technology into the classroom. Technology standards offer educational administrators and educators' ways to meet technology integration, yet integrating technology into the classroom has different meanings in individual school settings. While there are professional development theories, such as from Guskey (1987, 2002) and Hochberg and Desimone (2010), integrating technology into the classroom continues to be researched for what it means for individuals and school systems. A shared plan for technology integration for any school system begins with understanding the personal and professional needs of the teacher and the student. To prepare faculty members for professional development, an understanding of their technology skill level and readiness is essential to determine the training sessions that meet teachers' needs.

The literature reveals that "educational development confirms the presence of an undercurrent of uncertainty" and indistinctness in the conditions of educational growth (Hannon, 2008, p. 16). Educational environments have both unique and common sets of obstacles. Common obstacles for integrating technology into the classroom include lack

of technology support, access to technology, and lack of knowledge for using technology (Banas, 2010; Ertmer et al., 2012). An understanding of technology use in the classroom requires that one look at all the hardware and software equipment, as well as the abilities of students and teachers for the available technology at each school (Hannon, 2008). Researchers ChanLin (2005), Brzycki and Dudt (2005), Erdogan, (2011), Gordon (2011), Lim and Khine (2006), have shown that there are areas of concern when evaluating technology integration. Teacher training should address more than what seems to be barriers to its implementation since personal issues and experiences also hinder technology use, in addition to a lack of technology support. There is a trend in education that teachers require consistent and continuous aid when using technology with their students.

Much of the literature regarding the integration of technology in the classroom points to the notion that effective training is a significant factor in generating positive attitudes toward the technology itself and its use in the classroom (Zhao & Bryant, 2006). The Partnership for 21st Century Skills (2011) noted that "there is a need for change because the economic, technological, informational, demographic and political forces have transformed the way people work and live" (p. 4). Schools must adapt to changing conditions to thrive just as businesses, communities and families. Lawless and Pellegrino (2007) found that in-depth evaluations of teacher training sessions are critical if the teaching practices for integrating technology are to be improved. The need for improvements in professional development to integrate technology into the classroom is a systemic problem.

Teachers with poor perceptions of integrating technology into instruction are not likely to integrate technology effectively (ChanLin et al., 2006, Hutchison & Reinking, 2011; Inan & Lowther, 2010; Ottenbreit-Leftwich et al., 2010). Ottenbreit-Leftwich et al., (2010) asserted that technology professional development that supports teachers' needs are more likely to result in successful integration of technology into the classroom. Research is needed when teachers are trained for integrating technology into the classroom to understand how educators relate to change and what their perceptions and attitudes are for the implementation of technology (Ottenbreit-Leftwich et al., 2010). Examining educators concerns allows designers of training to create meaningful professional development.

The CBAM is one tool for understanding teachers' perceptions and attitudes toward technology training and technology use in the classroom. The SoCQ and LoU offer professional developers the instruments to study how the change process affects teachers' experiences when they are introduced to an innovation for technology. Researcher Giordano (2008) used the CBAM instruments and found that effective professional development occurs when teachers' beliefs change to accommodate using technology innovations in schools, yet, only some of the changes to integrating technology into the classroom practices occurred. Similarly, using the CBAM, Tunks and Weller (2009) found that educators who attended professional development did not continue to implement program changes because there was no follow-up support. A third study using the CBAM by Hosman and Cvetanoska (2013), found that educators used computers for personal use and for preparation for class materials, yet they did not

incorporate the same practices for integrating technology into the classroom. Insights from these findings indicate the need for further research for teachers' perceptions of technology training and technology use in the classroom. Teachers' insights from diverse settings in multiple classrooms with individualized training programs strengthen the need for understanding how training for technology innovations can occur and how technology is put into classroom practices.

Recommendations by researchers include training that uses technology integration for content-specific purposes, a vision for its use in the future, literature to promote technology uses (including websites), and ongoing staff development courses (Keeler, 2008). Progress can only be made by paying attention to current trends in technology. In order for progress to move forward, these trends need to be studied and accessed (Mishra, & Koehler, 2006). Change can occur when teachers are part of the process to incorporate a change. "Since technology is continually changing; the nature of technology knowledge needs to shift with time as well" (Mishra, & Koehler, 2006, p. 1037).

Technology is rapidly changing and improving, yet, when a teacher becomes comfortable learning and using technology, there are innovative technologies that emerge (Lawless & Pellegrino, 2007). Hence, when new technology comes into the school system, there are greater demands on educators to train for its current use. In society, expectations of what educators should be learning and are capable of incorporating into their classroom, continue to rise annually (Carlson, 2010). Consequently, schools continue to struggle to develop high-quality professional development plans that are

focused on the effective integration of technology into teaching practices (Gaytan & McEwen, 2010).

Questions remain for school districts to investigate in order to incorporate technology training that meets the needs of the school systems as well as the individual educators. A case study provides this researcher with evidence for teacher training improvements as well as a closer look at teacher attitudes toward integrating technology into the classroom. The methodology in Chapter 3 explains the research procedure for this researcher's study of a private school and professional development for integrating technology into the classroom.

Chapter 3: Research Method

The purpose of this case study was to discover teacher attitudes and perceptions toward technology integration in the classroom after teacher training in the use of iPads. Professional development engages K-12 educators with strategies and training to incorporate new ideas into their teaching practices; participation in this practice confirms or challenges their beliefs (Guskey, 2002). A case study approach was used to investigate and explore the effects professional development integrating technology into the classroom sessions had on educators relative to their attitudes and perceptions. This case study used both quantitative and qualitative methods drawn from a mixed methods research approach. A mixed method study combines and integrates quantitative with qualitative data (Creswell, 2015). This study used the CBAM (Hall & Hord, 2001), which provides the tools to measure teacher concerns through stages and how teachers adopt an innovation (Mrazek & Orr, 2008).

In this chapter, I describe the setting of the study, the research and design method, the research questions, and my role as the researcher. Further, I explain the methodology and its components, both quantitative and qualitative, the data analysis plan, instrumentation, procedures for data collection, threats to validity, issues with trustworthiness, and the ethical procedures. In addition, I address how the participants were assured of their privacy. Implementation of this mixed methods study began with the relevance of the setting and key members of the organization who would have an impact on the study.

Setting of the Study

The school of study was a K-8 parochial school located in the suburbs of a city in the southeastern United States. In addition to the academic teachers and principal, there were enrichment teachers and a computer teacher. The school was relevant to the study because it had an individual training program not mandated by the diocese.

All teachers were provided iPads and they were trained twice a year to integrate computers and the iPad as an instructional tool in their classrooms. There was also summer training for other technology. The diocese set the objectives for meeting the standards of the curriculum. Classroom educators were required to have a valid state teaching certificate. Additionally, faculty and staff members were required to meet and maintain the requirements stated in the Standards of Accreditation from their state's Catholic Conference.

Research Design and Rationale

The research design for this case study was informed by reviewing research designs presented in books, theoretical and conceptual frameworks, and mixed methods approaches to studies. Mixed methods methodology developed as a research approach in the past 20 years (Creswell & Garrett, 2008). According to Yin (2006b), "the focus on a single study is critical to mixed methods research; a single study is the valuing of mixed methods in producing converging evidence, presumably more compelling than might have been produced by any single method alone" (p. 41). For my purposes, then, the mixed methods design was suitable for my research as I believed that both quantitative and qualitative methods would provide important "converging evidence." When

researchers integrate quantitative and qualitative research, the strengths of both approaches are cumulative, bringing to a study a richer understanding of the research questions than either one of the approaches would bring alone (Creswell & Garett, 2008). Creswell (2003) affirmed Jick's (1979) assertion that a mixed methods approach of study neutralizes the weaknesses from each form of data collection by providing for triangulation of the data.

Yin (2009) described an approach that entails quantitative data collection from a questionnaire followed by qualitative data collection from interviews and observations as *a case within a survey*. A case study relies on multiple sources of data such as surveys, observations, and interviews that are analyzed through triangulation to produce converging evidence (Creswell, 2003; Marshall & Rossman, 2010; Yin, 2009). The rationale for using a single, rather than a multiple case study is that "the single-case study is analogous to a single experiment and many of the same conditions that justify a single experiment also justify a single-case study" (Yin, 2006a, p. 39). In a single-case study, a researcher can determine if theories are correct or whether there is an alternative set of explanations that might be more relevant (Yin, 2006b).

There has been very little research using a small, single-case study for teachers' attitudes and perceptions concerning technology training. Yin (2013) asserts that a case study is the preferred method when the researcher has little control over the events. A school system in which teacher training is up to the individual school principal and computer teacher is unique. It was, therefore, appropriate to use a mixed methods approach within a case study in order to accurately represent the data with a small

population and sample size. Using the triangulation strategy provides cross validation of the data (Jick, 1979; Yin, 2013) as well as a more accurate analysis and explanation of different dimensions of the same phenomenon (Kohlbacher, 2006; May, 2010).

Quantitative studies include closed-ended responses in which the participants complete questionnaires, which provide information that may be presented in levels and ratings. A quantitative survey design provides a numeric description of trends, attitudes, or opinions of a sample taken from a population (Creswell, 2003). An explanatory sequential mixed methods approach was used to collect and analyze data. Qualitative studies collect and analyze information from the voices of the participants with meaningful information from personal experiences by using open-ended questions without predetermined responses (Creswell, 2008, 2015). Creswell (2015) described the explanatory sequential mixed methods study in which the researcher collects data from quantitative research first, analyzes the findings, and then uses qualitative research to explain and build on the quantitative data results. Creswell further explained ways to use sequential data collection as checking validity by integrating quantitative and qualitative data and having one database explain the other using different questions. Further, Yin (2009) asserted that explanatory case studies are limited in that they examine the *how* and *why,* both of which are largely outside the researcher's control.

Research Questions

As identified in Chapter 1, the focus of the research was to answer the following question: What are teachers' attitudes and perspectives for integrating technology into the

classroom after professional development? This study also seeks to gain an understanding of the following research questions:

1. What are the teachers' most and least important SoC for integrating iPads after teacher training?
2. What are teachers' LoU in the classroom after technology professional development sessions for iPads?
3. What factors among educators account for high and low LoU of technology in the classroom?

Role of the Researcher

My role as the researcher in this study was to direct participants to take the online SoCQ, observe classroom teaching practices, conduct teacher interviews, and collect and analyze data. Because I was the principal collector of data and data analysis, I considered various personal and professional experiences and beliefs that might bias the conduct of this research.

First, I am an advocate of professional development for educational technology in the classroom and have acted as a technology coordinator; consequently, I have ideas and opinions about what a technology coordinator does. I believe the primary goal of the technology coordinator is to prepare students for technology uses and to assist educators for integrating technology in classroom projects. I taught students to implement technology, trained faculty and staff members for using computers, designed and maintained webpages for the school, and worked with the network administrator. In addition, I facilitated online courses for integrating technology into the classroom for 12

years and was a technology coordinator for 4 years. However, for this research, I remained impartial because I shared no common interests within the school setting or with the staff members. Curry, Nembhard, and Bradley (2009) asserted that the researcher plays a passive and a neutral role in an investigation, and he or she does not intervene in the phenomenon of interest. Finally, I did not have any personal and professional relationships with the school and its participants that would indicate bias.

Professional experiences and my college education might have created bias because I have a master's degree in Curriculum and Technology and my previously noted position as technology coordinator for 4 years for K-8 teaching students and teacher training experiences. However, I had those experiences 8 years prior to this study and they had no influence on the study setting. The comprehensive scope of my education and professional experiences, in fact, facilitated considerations of the personal participants' experiences as well as their interpretations of those experiences.

Methodology

Participant Selection Logic

The target population was elementary educators in a parochial school in the southeastern United States. The school selection was a convenience sample that was made through a gatekeeper, a person who controls the research access on behalf of the person who will undertake the research (Creswell, 2008; Saunders, 2010). A gatekeeper can be a colleague, family member, or friend (Creswell, 2008; Patton, 2002; Saunders, 2010). The school was chosen through a network of resources including professional organization acquaintances, colleagues, and friends in the education profession. After

careful consideration, I contacted charter and parochial school principals looking for schools that offered unique technology integration such as the iPad. Because difficulties arose having one e-mail response and no returned phone calls, I contacted a friend in the Catholic diocese for assistance in finding a school compatible to the research study. The school selected was most significant in that it met the criteria for the research, meaning it offered teacher training in the near future for the iPad and had an interested principal eager to participate in the study. I later selected participants solely for their direct participation in the teacher training for the iPad for integrating technology into the classroom.

The educators were invited to participate in the study through a letter in which I described the study and the data collection process. The letter included the purpose of the study, study procedures, the voluntary nature of the study, risks and benefits of the study, confidentiality, information about me as the researcher, and contact information. The dates of the study were noted as well as possible times for meeting after the school day had ended. Responses were accepted by electronic mail including an electronic signature.

Electronic signatures are regulated by the Uniform Electronic Transactions Act and are legal in 46 states (National Conference of State Legislators, 2015). An electronic signature can be the person's typed name or his or her e-mail address. In order for an electronic signature to be valid, both parties have to agree to conduct the transaction electronically (National Conference of State Legislatures, 2015).

Instrumentation

The CBAM LoU and SoC documents, designed by Hall, Hord, and Roussin (2013), provide tools for educators to study schools. A request for permission to use the Southwest Educational Development Laboratory (SEDL) SoC and LoU was completed before the online survey was administered as well as the CBAM materials and results can be used (see Appendix C). The SoC addressed reactions to affective characteristics of change, such as their reactions, feelings, perceptions, and attitudes. The LoU considered behaviors and describe how people react to a specified change (Hall & Hord, 2006, 2014). To incorporate these instruments, documents included handouts for the participants, open-ended interview questions for me to ask, and an online survey for measuring educators' SoC. These tools accessed the implementation of integrating technology into the classroom after teacher training took place for the iPad.

Procedures for Participation and Quantitative and Qualitative Data Collection

A convenience sample was used for the quantitative data collection by sending teachers a letter asking each to participate voluntarily in this research study, upon IRB approval. Participation in the survey occurred in the second semester of the school calendar after teacher training took place in February 2015. All educators were required to participate in faculty development, but not all teachers attended. All teachers who attended the professional development session were asked to participate in the study. Data were collected from an online survey containing questions for teachers concern on the SoCQ (see Appendix A).

Participants completing the SoCQ online were given a group (school) ID and a password to access the survey developed solely for this study. The survey was adapted to reflect the innovation that was being studied: iPad training and its integration into the classroom. For the purpose of this study, the innovation was iPad training determined by the principal and technology teacher. The survey was available 24 hours each day for 5 days. Participants did not need to create a personal login using their name, but they did add their e-mail address once they entered the website using the group ID and group password. Each educator used this information to log in and complete the survey, which took approximately 15 to 20 minutes. The data from the 35 questions were collected and saved on the SEDL website; the data were sorted and displayed in the form of percentiles. The data were then recorded as raw scores for each participant and stored on the SEDL website secured by username and password for me, as administrator, to access.

In addition, descriptive statistics were used to evaluate and analyze the data. Creswell (2008) described the use of descriptive data analysis as measuring the central tendency (value or score that represents the entire distribution) and the following statistical measures: mean, median, mode, and the standard deviation. Microsoft Excel was used to calculate the statistics from the data that was collected from the SoCQ online data results from the SEDL website.

Maximum variation sampling includes a wide range of extremes (Patton, 2002) and was used in this study due to the small sample size and the unavailability of a random sample (List, 2004). In addition, educators had different levels of ability and different LoU for technology integration (Marshall & Rossman, 2010; Patton, 2002). This method

was appropriate for this study because I wanted to understand "how a phenomenon is seen and understood among different people, in different settings and at different times" (Cohen & Crabtree, 2006, para. 2). When a researcher deliberately interviews very different selections of people, their collective responses can be close to that of the entire population's (List, 2004).

Observation and interview participants had a purposeful selection after the quantitative data had been collected from the SoCQ (see Appendix A). Participants were selected by the SoC, comparing low levels of concern with high levels of concern for the innovation. Observations occurred before teachers were interviewed in order to compare or explain the observed behaviors with the interview data. A detailed LoU Rubric was used for the teacher observations (see Appendix F). Field notes were completed on a document that included the LoU Rubric categories. In addition to the LoU for technology, the criteria included categories such as knowledge, acquiring information, and sharing. The LoU of the innovation had scale point definitions measuring different types of behavior and patterns, such as, "Seeks information and resources specifically related to preparation for use of the innovation in own setting," and "Uses the innovation smoothly with minimal management problems."

The interview measured teachers' LoU for technology integration of the iPad (see Appendix B) and had additional questions related to the research questions (see Appendix G) such as, "How have your concerns about technology training affected your use in the classroom?" and "Are you comfortable using technology in the classroom? Why or why

not?" The interview questions included questions pertaining to the CBAM instruments (SoCQ and LoU), and the training for the use of the iPad to clarify any previous findings.

I interviewed the participants in their school settings in an effort to make sense of their experiences and surroundings (Hatch, 2002). The interview protocol showed respect and sensitivity for the participants. Teachers were asked open-ended questions as needed in order to fully explain each participant's LoU. I informed each participant that he or she did not have to participate in the interview and that they may state any time during the session when their participation for interview has ended. I informed the participants that the interview sessions were digitally recorded with his or her permission.

The interviews were transcribed into a Microsoft Word document and were read and reviewed several times before the data analysis began as suggested by several researchers (Creswell, 2006; Hatch, 2002; Patton, 2002; Rubin & Rubin, 2011). I then formulated codes to identity concepts and themes and marked passages in the data (Marshall & Rossman, 2010) using different colors and highlights to differentiate codes. Coding assisted me in finding patterns, themes, and meaning in the data. Charmaz (2002) recommended using action words for coding. Potential codes included: interested, prepared, organized, collaborated, and seeking new methods.

I used cross-comparisons that offered insight into emergent categories (Patton, 2002). In order to have valid qualitative analysis I had accurate coding. Code categories were used to represent the research study questions and included useful data segments to support the emerging story (Marshall & Rossman, 2010). After the transcripts were

coded, I analyzed the data by sorting and summarizing the data into separate Microsoft Word files for each code. The same process occurred to save all the codes.

After I sorted all the identical codes into one document, I reexamined and summarized the data. The categories were examined in an effort to capture the true essence of the meaning of the educators' experiences. Coding is neither a one-time nor a one code procedure; codes and categories can be revised as you proceed (Marshall & Rossman, 2010). I interpreted the data to bring together the themes, patterns, and categories in order to create a meaningful story from the data. Patton (2002) describes interpretation as drawing conclusions by making sense of the data, offering explanations, and making inferences while also considering meanings. I was engaged and precise in choosing words that summarize and reflect the complexity interpreting the data in order to give meaning to the data resources (Marshall & Rossman, 2010).

Quantitative Components

The CBAM SoC process includes a questionnaire and open-ended statements that enable leaders to identify staff members' attitudes and beliefs toward a new program or initiative. With this information, the researcher can take actions to address individuals' specific concerns (Hall & Hord, 2006; Hord & Roussin, 2013). The 35-question survey was employed through the SoCQ located online at the SEDL website. The survey was adapted to reflect an innovation of a professional development program for technology integration in the classroom as iPad use in the classroom. The type of innovation training was determined by the principal and the computer teacher.

Examples of concerns on the SoCQ are "I would like to know more about the innovation." and "I would like to know how others are using the innovation" (see Appendix A). Survey responders choose an answer based upon a Likert type scale; numerical ranging from 0 to 7. The number 0 represents a response as *irrelevant*; 1 and 2 represent a response of *Not true of me now*; 3, and 4, represents a response of *Somewhat true of me now*; and 5, 6 and 7 represent a response of *Very true of me now*. Two open – ended questions were added at the end of the survey as open-ended questions as recreated by Hall and Hord (2006), "What other concerns, if any do you have at this time?" and "Briefly describe your job function."

Qualitative Components

The CBAM LoU one-legged interview tool determines how well educators are using a program (Hall & Hord, 2006; Hall & Roussin, 2013). One-legged interviews assess concerns in an informal and non-intimidating manner after observations have taken place (Hall & Hord, 2001). I used Handout 5.1 (see Appendix D) noting the Typical Behaviors for LoU (SEDL, as cited by Hall & Roussin, 2013). Handout 5.3A (see Appendix D) was used to question and identify participants' LoU. Hall and Roussin (2013) referred to this process known as branching, when the first question is asked in the interview and the participant responds yes or no, indicating which branch the user follows. By a series of eliminations, the specific level was reached and the level identified.

Table 4 highlights and describes the instrument (data source), and the analysis that was used for each research question. Data from the three questions were triangulated and/or used in a complementary manner to assure reliability (Creswell, 2015).

Table 4

Data Source and Analysis

Research Question	**Data Source**	**Analysis**
1. What are the teachers' most and least important concerns for integrating iPads after teacher training?	SoCQ Online survey data (Quantitative)	Descriptive Statistics Means Medians Standard Deviation
2. What are teachers' LoU in the classroom after technology professional development sessions for iPads?	LoU Interviews and observations (Qualitative)	LoU Coding and observation rubric confirmatory (LoU)
3. What factors among educators account for high and low LoU of technology in the classroom?	Interviews (Qualitative)	Coding

Threats to Validity

Because the sample size was small and non-random there was no external validity. The sequential design requires determining what quantitative results need follow up, how the participants will be selected for the qualitative interviews, having reliable questions, and being able to insure that the qualitative results interpret or explain the quantitative results (Creswell, 2015). The CBAM has been in use for over 20 years; the methods of collecting and analyzing data in the CBAM were found to be both reliable and valid.

Issues of Trustworthiness

I addressed validity (quality/rigor/trustworthiness) and reliability (dependability), through the triangulation of data from three different sources of data and by member checking (Creswell, 2003; Hatch, 2002; Simon, 2011). Member checking is the process of verifying information which allows the participant the chance to correct errors of fact or errors of interpretation (Creswell, 2003; Hatch 2002; Simon, 2011). In addition, I conducted member checks to add to the validity of the observer's interpretation of qualitative observations. The results from the member checking are noted in the final analysis. I checked data analysis for accuracy and consistency while modifying the initial analysis (Rubin & Rubin, 2011). Hatch (2002) admonishes researchers to recognize the inferential nature of data and to go about making interpretations carefully.

Ethical Procedures

The participants in the study were volunteer teachers and the computer teacher in a parochial school in the Catholic diocese of a suburban city in the southeastern United States. No students were part of the study. Eighteen teachers were provided with the required consent forms prior to asking them to complete the questionnaire and participate in an interview (Appendix G). All participants were provided with information regarding their role in the study, the purpose of the study and the data collection methods (Creswell, 2008). Participants were informed that they have the right to withdraw from the study at any time during any of the procedures. All of the teachers' interviews and the results of the LoC and LoU questionnaires were held confidential and remain so. No names were noted on any of the transcripts from the teachers' interviews. If a direct quote is used, the

teacher was identified using pseudonyms, Mrs. F, Mrs. A, and Mrs. S. All of the data, including a backup flash drive, were locked in a drawer in my home office when not in use. All electronic data were kept on a password-protected laptop computer and cloud drive and will be stored for at minimum for five years as Walden University requires for the doctoral programs (Walden University, 2014). All the data files will be deleted at the end of the five-year period, leaving no trace in the memory of the devices it was stored on by using the Microsoft Disk Cleanup program. The study was approved by the Walden Institutional Review Board on April 21, 2015, case number 04-21-15-0093525.

Summary

Chapter 3 detailed the mixed methods approach that was used to study the effects of professional development for integrating technology into the classroom for educators. Quantitative with qualitative data were collected through the use of the CBAM. I described the setting of the study, the research and design method, the research questions, and my role as the researcher. The research plan described the data collection process and analysis, instrumentation, procedures of data collection, threats to validity, issues with trustworthiness, and the ethical procedures.

Educators continue to have concerns after professional development. By implementing the CBAM, administrators and technology trainers were made aware of the teachers' beliefs for programs designed to enhance technology understanding and integration in the classroom. Quantitative data from the SoCQ identified the teachers' greatest and least concerns for teacher training while the qualitative data helped to explain teachers' LoU in the classroom. Observations further explained how iPads were

being used in the classroom. Qualitative data from the LoU interviews with educators revealed the teachers' perceptions of their LoU of iPads after training took place. The interviews clarified some of the data. Combining data from quantitative and qualitative results using triangulation from this study offers technology designers ideas for creating new programs to improve training sessions that inspire teachers.

Currently there is no one training program that will support all educators in all settings. Research using the CBAM reveals the individual concerns of teachers and can lead to improved professional development practices for more effective integration of technology in the classroom. A school system can adapt new and improved training practices to meet the needs of educators as well as effectively implement technology with their students.

In Chapter 4, I explain the analysis of the data that was gathered from the SoCQ, observations and interviews as discussed in the methodology. The data is represented in the form of tables and charts along with the written analysis. The interpretations of the study results are be presented in Chapter 5.

Chapter 4: Results

The purpose of this study was to discover teacher attitudes and perceptions toward technology integration in the classroom after teacher training in the use of iPads. The CBAM is a conceptual framework that provides tools and techniques for assessing the concerns of educators (SEDL, 2015). By implementing the CBAM the following research questions were studied:

1. What are the teachers' most and least important SoC for integrating iPads after teacher training?
2. What are teachers' LoU for iPads in the classroom after technology professional development sessions for iPads?
3. What factors among educators account for high and low LoU of technology in the classroom?

This chapter includes the analysis of the data collected through the SoCQ and LoU observations, as well as through interviews with the participants. A summary of the findings associated with data analysis is presented. The tools used in the analysis of the data were (a) the SEDL charts for recording raw data from the SoCQ; (b) Microsoft Excel for storing the descriptive statistics generated from the surveys; (c) Microsoft Word for tracking participants' information using an encrypted ID, and for managing the schedule of appointments; (d) password-protected e-mail for communicating with participants; (e) a password-protected Kindle for recording interviews; and (f) field notes for documenting LoU during observations and interviews.

Chapter 4 describes the setting, demographics, data collection, and data analysis for the study. In addition, I address evidence of trustworthiness through credibility, transferability, dependability, and confirmability.

Setting

Prior to beginning my data collection at the Catholic school from which I had received a letter of cooperation, I discovered that the principal had rescinded her offer to participate in my study. She did not contact me in advance to inform me about changing her mind. Rather than the iPad training we had discussed, she and her staff decided to attend an educational conference. Suddenly, I was without a target school and population for my study. Fortunately, I had the assistance of a gatekeeper, a person I chose to help identify an alternate school that suited my research for teacher training for using the iPad as an instructional tool. The gatekeeper found a school and requested that the principal contact me before it closed for their 2-week Christmas break. In a telephone conversation, the principal agreed that her teachers would have iPad training when school resumed. Immediately, she digitally signed and returned via e-mail a letter of cooperation to me.

The school, a K-8 parochial school, was located in the suburbs of the southeastern United States and selected from a local Catholic diocese. The principal, computer teacher, the iPad teacher-trainer, and academic educators participated in the study. All of the teachers had been given iPads in the previous school year and were asked by the principal to attend the iPad professional development session to be held on February 6, 2015. Because it was a teacher workday, teachers could elect professional development

activities other than the iPad training for integrating technology into the classroom. Approximately half of the teachers attended the iPad training session. One factor that may have influenced the teachers' experiences in the study was that there was a new principal and she had not enforced attendance for the iPad training.

Demographics

The faculty consisted of 13 academic teachers, five enrichment teachers, and one principal. Of the 19 possible participants, 50% (N = 9) attended the iPad training session for integrating technology into the classroom. All nine were invited to participate in the research study, but only seven returned the letter of consent, which resulted in a participation rate of 77.8% (N = 7). All seven teachers completed the SoCQ.

All teachers involved in the study held a valid state teaching certificate. The participants completed demographic questions in the SoCQ, which indicated that three K-3 teachers had 5 to 10 years of teaching experience; one middle school teacher had 1 to 2 years, and the remaining K-8 teachers had 3 to 4, 11 to 20, and 21 to 30 years of teaching experience, respectively. The principal was one of the K-8 participants who participated in the SoCQ. The content areas taught by the teachers were academics such as language arts and science for the grades 1 through 3, one enrichment class for art, and an educational technology class in which students created a project. All of the participants were assigned an identification code to ensure anonymity. All participants were female.

In the qualitative data collection for the observation and interviews, two of the participants who completed the SoCQ dropped out of the study, one declined an observation, and another declined both the observation and interview. One participant

who dropped out of the study did so due to needing personal leave and ultimately left her employment with the school. In spite of this, she was not needed for the observation and interview sessions due to her survey scores, which will be discussed under data collection. The other participant who dropped out of the study asked me to observe her the following week when I was creating my schedule, but she later stated she was very busy and could no longer participate in the study. Although I was disappointed in participants dropping out, I respected their decisions because "Research participants have the right to withdraw at any time" (Seidman, 2015, p. 68). Fortunately, lack of participation did not affect the study because there were other teachers who met the criteria who were willing and eager to participate.

Data Collection

Prior to data collection through the SoCQ and LoU from the participants, I interviewed the teacher-trainer for the iPad professional development in an informal interview. We met on Friday, April 24, 2015, and she explained what was covered in the training session. It was held on February 5, 2015 during a teacher workday when the students were not in school. The goal for the iPad training was to have teachers learn how to search for apps and to incorporate them into their instruction. The apps the teachers located and learned to use were for integrating iPads into lessons with students as well as teacher uses for connecting with students and parents. All of the training was hands-on with the iPad; a few teachers took notes.

iPad Training for Teachers

Nine teachers attended the iPad training session that lasted for 90 minutes. The trainees included academic teachers, two enrichment teachers, an art teacher, and a computer teacher. The teachers first reviewed how to use the iPad. They were shown the App Store and learned how to search for apps using a hands-on approach. The trainer showed educators popular apps used in the classroom such as

- Educreations
- Google Drive App
- Quizlet
- Haikudeck: an alternative to PowerPoint
- iPad videos
- Apps that read books
- Rearpod
- Teacher Kit: Student info for parents, messages and photos
- PhotoMac
- PhotoMapo: mapping software, photos made into postcards
- Evernote
- Remind: Text messages to students and parents with blocked phone numbers
- Catholic apps: Bible apps, and a virtual tour of St. Peter's Square in Vatican City

The trainer stated the teachers were comfortable and participated with ease (personal communication, April 24, 2015). During the session, one teacher offered an

example of an app that read aloud a written story of Curious George. From the trainer's point of view, many of the teachers seemed interested in the iPad training and collaborated with each other during the lesson and demonstrations. The focus of the professional development was valuable for discovering teachers' attitudes and perceptions regarding the teacher training for the iPad and its use in the classroom.

Quantitative Data Collection

For this case study, the quantitative data were collected from the seven participants who volunteered. The CBAM SoCQ survey was delivered electronically on May 1, 2015, through the SEDL website where each participant was given a link and password specifically for this study. Participants accessed the survey at https://www.sedl.org/concerns using the following password: seas2015. The availability of the online SoCQ was for 5 days, not including weekends, but participants had access to the survey if they had not completed it in the time allotted. Only one teacher needed an additional day to complete the survey.

The SoCQ consisted of 35 statements (see Appendix A) for teachers to rate their levels of concern regarding their iPad training for integrating technology into the classroom. At the end of the survey there were two open-ended questions as created by Hall and Hord (2006): "What other concerns, if any do you have at this time?" and "Briefly describe your job function." Data from the final questions were reported in the qualitative analysis portion of this study. The responses ranged from 0 to 7, represented in the Figure 5:

Irrel-evant	Not true of me now	Somewhat true of me now			Very true of me now		
0	1	2	3	4	5	6	7

Figure 5. Likert Scale for the SoCQ. From CBAM: Stages of Concern Questionnaire, Southwest Educational Development Laboratory, http://www.sedl.org, 2015. Copyright 2015 by SEDL. Reprinted by permission of SEDL.

The survey data were recorded and saved electronically on the SEDL website. The raw data were downloaded, saved, and entered into an Excel document. The identity of the teachers was not disclosed in the archived data. At the end of the survey, teachers added their e-mail address, which indicated their first initial and last name. Once the data were downloaded, the participants' names (obtained from their e-mail addresses) were encrypted to avoid any identifiers.

There were no changes to the data collection process for the quantitative data procedures that were described in Chapter 3. One participant completed the survey a day late due to her personal leave from the school, but there were no unusual circumstances in the data collection for the SoCQ.

Qualitative Data Collection

There were two parts to the qualitative data collection, the observations and interviews. The observations were conducted prior to the interviews. Four teachers were purposely selected for the observations and interviews by using a maximum variation sampling method after the analysis of the SoC. Maximum variation selects a small number of diverse people to maximize relevance to the research question (Cohen & Crabtree, 2006; List, 2014). To select the best diversity of teachers from the sample,

teachers' scores were reviewed. For example, the first teacher selected had scores that indicated extremely low concerns; the second teacher's scores indicated low concerns; the third teacher's scores indicated average concerns; and the final teacher's scores suggested a high level of concern (see Table 6). In addition, the teachers who were selected taught different subjects including an academic class, an enrichment class, and a computer class. The teachers also had varied years of teaching experiences and had different abilities in iPad uses as evaluated from the SoCQ. This type of variation of the sample avoids a one-sided representation and gives strength by capturing core experiences (Patton, 2002).

Eligible participants were notified by e-mail about participation in the observation and interview portions of the study. After 2 days, two teachers responded, and within 7 days all teachers responded. One teacher noted she did not want to be observed using the iPad in her classroom but agreed to participate in an interview. Her input was valuable due to her low concerns, as noted in the SoCQ. Another teacher with high concerns dropped out of the study, as previously noted. There was one other teacher with high concerns who was chosen to replace this teacher and willingly agreed to participate in the observation and interview procedures. The location for all the observations was in each teacher's classroom. There were no variations in my data collection methods as described in Chapter 3.

Data Analysis

Quantitative Data Analysis

Data from the SoCQ were obtained from the SEDL website in the form of raw data and percentiles. For the purpose of this study, I downloaded the raw data from SEDL and manually entered them into a Microsoft Excel document in order to analyze the data using descriptive statistics. First, I calculated the mean, mode, median, and standard deviation (SD) for the 35 statements on the SoCQ. A Likert Scale was used to identify the levels of concern each teacher had for their training on the iPad and for its use in the classroom. Five questions related to each of the six SoC (see Table 5). For example, Questions 3, 12, 21, 23, and 30 related to the first stage, Stage 0, Awareness; Questions, 6, 14, 15, 26, and 35 related to stage 1: Informational.

Table 5

Question Numbers as Related to the SoC

Stage 0 Awareness	Stage 1 Informational	Stage 2 Personal	Stage 3 Management	Stage 4 Consequence	Stage 5 Collaboration	Stage 6 Refocusing
Q3	Q6	Q7	Q4	Q1	Q5	Q2
Q12	Q14	Q13	Q8	Q11	Q10	Q9
Q21	Q15	Q17	Q16	Q19	Q18	Q20
Q23	Q26	Q28	Q25	Q24	Q27	Q22
Q30	Q35	Q33	Q34	Q32	Q29	Q31

Note. Q = Question. Adapted from SEDL, CBAM: Stages of Concern Questionnaire, 2015. Reprinted by permission of SEDL.

To find the lowest and highest levels of concern for the teachers, the scores were summed from the responses to the SoCQ. Low scores indicated no or little concern, while high scores indicated great concerns relating to the iPad training for integrating technology into the classroom. These data were used to select the teachers for classroom observations using the iPad. To determine the overall lowest and highest concerns, the raw data were organized according to the SoC for each teacher who completed the survey. Because statistically, the mean and SD were too close in value (see Appendix M), as well as the SD sometimes being higher than the mean, these statistical measures could not be used. "Comparing the SD to the mean will tell you different things depending on the data you are working with" (Burger, 2013, para. 13). Because the SD was frequently large and sometimes greater than the mean, it indicated extreme ranges in the data. An SD can change the meaning of the results significantly. For example, if a measure was scored 2, indicating *Somewhat true for me now*, a SD of 3 could interpret the result with a range of *Irrelevant* to *Very true for me*. "The mode is best used when you want to indicate the most common response or item in a data set" (Ternes, 2010, para. 6). Therefore, the mode was the main statistic used due to the small range of values and the interpretation of their meanings. The mode indicated how most teachers rated each question giving more specific meaning to the results of the CBAM framework for the SoCQ. Similarly, the least concerns could be identified using the mode from the lowest scores.

Quantitative Components

As noted above, the central tendency was analyzed using the following statistical measures: mean, median, mode, and the SD (Creswell, 2008). The value or score that represents the entire distribution (central tendency) is the mean, as it is "the most commonly-used measure of central tendency" (Snyder & Dillow, 2012, p. 8). The sample size used for the quantitative component was seven educators from grades K, 1, 3, and 7, and three K-8. To find the teachers with the least and most concerns for iPad training for integrating technology into the classroom, the summation of SoC scores for *each stage* was calculated as well as total scores *for all* teachers (see Table 6). The data for each teacher's lowest and highest scores were used to select participants for observation and interview as detailed in the Qualitative Components section.

Table 6

Summation of Participants' Results From the SoCQ According to Stage and Individual Teacher Responses to all 35 Questions

Stage	P1	**P2**	P3	**P4**	**P5**	**P6**	P7
0: Awareness	19	18	25	15	13	18	18
1: Informational	24	12	18	14	15	15	10
2: Personal	10	10	15	15	13	18	14
3: Management	6	9	5	10	11	9	17
4: Consequence	18	9	20	15	17	10	23
5: Collaboration	23	9	23	25	28	20	13
6: Refocusing	20	9	13	15	23	8	12
Participant's Sum	120	**76**	119	**109**	**120**	**98**	107

Note. P= participant.

The survey results revealed collective concerns of the teachers as well as individual concerns. I reviewed and analyzed the data for the teachers' responses for a deeper understanding of the level of concerns for each stage. As previously noted, the mean and SD did not provide enough information as many of the scores were dissimilar and provided insignificant values. As with the SD analysis, the mean did not identify most teachers' concerns if one teacher used a score of 7, *Very true for me*, another of 3, *Somewhat true for me*, and yet another at 1, *Not true for me*. The mode, then, was used again for each stage to identify specifically what most teachers felt were the lowest and highest concerns. After the responses were reviewed, the scores were organized into

stages using the mode (see Table 7). Rich descriptions of the stages are presented in The SoC about an Innovation document (see Appendix N). Participants responded to five questions for each stage. The mode for each stage determined the lowest and highest concerns.

Table 7

Participants Results According to Stage for the SoCQ

Stage	Participant	Scores					Sum	Mode
0: Awareness		Q3	Q12	Q21	Q23	Q30		
	P1	3	0	2	7	7	19	7
	P2	1	5	6	5	1	18	5
	P3	4	6	6	3	6	25	6
	P4	1	6	6	1	1	15	6
	P5	5	6	6	2	4	24	6
	P6	1	6	6	2	3	18	6
	P7	4	1	7	5	1	18	1
1: Informational		Q6	Q14	Q15	Q26	Q35		
	P1	4	1	7	5	7	24	7
	P2	2	3	3	2	2	12	2
	P3	1	6	4	4	3	18	**4**
	P4	2	3	3	5	1	14	3
	P5	1	4	6	4	0	15	**4**
	P6	1	3	5	5	1	15	1
	P7	4	0	0	1	5	10	0
2: Personal		Q7	Q13	Q17	Q28	Q33		
	P1	1	4	1	3	1	10	**1**
	P2	1	2	3	2	2	10	2
	P3	0	7	3	2	3	15	3
	P4	2	2	3	5	3	15	2
	P5	3	1	1	2	6	13	**1**
	P6	1	5	3	5	4	18	**5**
	P7	5	2	1	5	1	14	**5**
3: Management		Q4	Q8	Q16	Q25	Q34		
	P1	1	1	1	3	0	6	**1**
	P2	2	1	3	2	1	9	2
	P3	1	1	1	1	1	5	**1**
	P4	2	1	3	3	1	10	**1**
	P5	4	0	2	3	2	11	2
	P6	1	1	3	3	1	9	**1**
	P7	5	5	1	5	1	17	5

(Table continues)

Stage	Participant	Scores					Sum	Mode
4: Consequence		Q1	Q11	Q19	Q24	Q32		
	P1	1	1	7	2	7	18	**1**
	P2	1	2	2	3	1	10	**1**
	P3	5	6	4	3	2	20	4
	P4	1	3	3	5	3	15	3
	P5	2	2	5	5	3	17	2
	P6	0	5	5	0	0	10	**0**
	P7	4	4	5	5	5	23	5
5: Collaboration		Q5	Q10	Q18	Q27	Q29		
	P1	1	7	1	7	7	23	7
	P2	2	2	1	2	2	9	2
	P3	6	5	4	4	4	24	**4**
	P4	5	5	5	5	5	25	**5**
	P5	7	6	5	5	5	28	**5**
	P6	4	5	1	4	5	19	**4**
	P7	0	5	1	7	0	13	0
6: Refocusing		Q2	Q9	Q20	Q22	Q21		
	P1	3	1	5	7	4	20	4
	P2	1	2	2	2	2	9	2
	P3	1	6	1	2	3	13	**1**
	P4	3	1	3	3	5	15	3
	P5	5	4	5	5	4	18	5
	P6	4	1	1	1	1	8	**1**
	P7	4	5	1	1	1	12	**1**

Note. Q = Question

The SoCQ results indicated that the participants' generally did not consider stage 3, Management, a high concern since four of the seven participants scored it as 1, that is, *Not true for me now*; this yielded a mode of 1. Two participants rated Management a score of 2, *Not true of me now*, which remains an indicator of low concerns (see Table 8). Only one participant rated Management a 5, *Very true of me now*. Therefore, stage 3, Management, was the lowest concern for teachers as compared to the remaining six stages. I calculated the mode for statements with the lowest concern that were rated as 1 for Questions 4, 8, 16, and 34, as shown in Table 7. Question 25 from this stage was omitted due to having a moderate concern rather than a low concern. This data answers the first research question in terms of teachers' lowest concerns.

Table 8

Mode for Stage 3: Management for Questions from the SoCQ

Participants		Scores					Participant's Mode
3: Management		Q4	Q8	Q16	Q25	Q34	
	P1	1	1	1	3	0	**1**
	P2	2	1	3	2	1	2
	P3	1	1	1	1	1	**1**
	P4	2	1	3	3	1	**1**
	P5	4	0	2	3	2	2
	P6	1	1	3	3	1	**1**
	P7	5	5	1	5	1	5
Questions Mode		**1**	**1**	**1**,3	3	**1**	

Note. Q = Question.

Stage 0 (Awareness) scores indicated that most of the teachers rated the statements 1, *not true of me now*. For example, rating Question 12, "I am not concerned

about iPad training for use in the classroom at this time" as 1, (*not true of me now*), which possibly translates as "I am concerned about iPad Training for use in the classroom". Similarly, Question 21, "I am completely occupied with things other than iPad training for use in the classroom" showed the teachers disagreed with the statement; consequently, their replies showed an indication of low concerns rather than high concerns. To validate the meaning of these two questions from the SoCQ I have used reverse coding because the questionnaire included *negatively-keyed* items (DeVaus, 2013). For stage 0; responses from Questions 12 and 21 must be *reverse-scored* before conducting the remainder of my analysis. Scores of 0, 1, 2, 3, 4, 5, 6, and 7 became new scores of 7, 6, 5, 4, 3, 2, 1, and 0. The reversed scores in stage 0 showed high concerns rather than low concerns. A new table was produced for stage 0 as shown below (see Table 9). The mode score of six indicates a high concern, *very true of me now*.

Table 9

SoC According to Stage 0 and Participants' Responses for New Scores

Stage	Participant	Scores	
0: Awareness		Question 12	Question 21
	P1	0	2
	P2	5	6
	P3	6	6
	P4	6	6
	P5	6	6
	P6	6	1
	P7	1	7
Mode		6	6

Using the data from Tables 8 and 9, I identified the questions from the SoCQ for the highest concerns for stage 0, (Awareness) in response to the first research question below. After reviewing stage 0, I reviewed the remaining six levels for the teachers' highest concerns. Using the mode, I found that stage 5, Collaboration, was the next highest concern for teachers as indicated by the mode for Questions 10, 27, and 29 (see Table 10). Questions 5 and 18 were omitted due to there being no mode present and because scores indicated a low concern. This data illustrates teachers' highest concerns and provides the statements from the SoCQ for the highest concerns for stage 5, Collaboration, in response to the first research question below.

Table 10

Mode for Stage 5: Concerns about Collaboration from the SoCQ

Participants		Scores					Mode
5: Collaboration		Q5	Q10	Q18	Q27	Q29	
	P1	1	7	1	7	7	**7**
	P2	2	2	1	2	2	2
	P3	6	5	4	4	4	4
	P4	5	5	5	5	5	**5**
	P5	7	6	5	5	5	**5**
	P6	4	5	1	4	5	4
	P7	0	5	1	7	0	0
Questions Mode		n/a	**5**	**1,5**	**7**	**5**	

The seven stages were analyzed through the previously defined strategies and indicated the highest and lowest concerns to answer the first research question. Tables 10

and 11 summarize the data according to the specific statements in the SoCQ that illustrate their lowest and highest concerns in answer to the first research question.

Research Question 1: What are the teachers' least and most important SoC for integrating iPads after teacher training?

The Management stage (3) was the least concern for educators. The SoCQ revealed that teachers were *not* concerned about having enough time to attend training for the iPad for use in the classroom and that it did not interfere with organizing themselves in preparation for their daily lessons. There were no conflicts between their interests and school responsibilities. Teachers' coordination of activities with students and colleagues did not take too much of their time.

Responses to Question 25 showed that there was a moderate concern for time spent working with nonacademic problems. The highest concerns for teachers were in the Awareness (0) stage and the Collaboration (5) stage. In the Awareness stage, the individual indicates *if* there is little concern about the innovation. Contrary to this statement, high scores indicated that most teachers were indeed concerned that the iPad training and its use in the classroom was of great concern to them. In addition, teachers were not completely occupied with other responsibilities that could interfere with the iPad training and its use. In addition, collaboration was the second highest concern for teachers; they indicated they would like to develop working relationships with colleagues and outside faculty who used the iPad in their classrooms. Teachers also indicated that they would like to know what other faculty are doing with the iPad, yet there were mixed feelings about helping other faculty members use the iPad in their classrooms. Teachers

also had mixed concerns (some very low and some high) for familiarizing other departments or persons with the progress of their iPad uses.

Qualitative Components

The qualitative components address Research Questions 2 and 3. Teachers' LoU were identified though analysis and examined as related both to the second and third research question; the interview also answered the third research question. The CBAM LoU Rubric (see Appendix F) was used for the classroom observations of teachers using the iPad in their classrooms. The LoU one-legged interview instrument determined how well teachers used the iPad after the teacher training (Hall & Hord, 2006; Hord & Roussin, 2013). I used the CBAM typical behaviors document for LoU of an Innovation (Hord & Roussin, 2013) to question and identify participants' levels of use of the iPad in the classroom (see Appendix D).

Teachers were selected for observations and interviews by examining the lowest and highest scores from the SoCQ. Data from the SoCQ is represented and explained in the Quantitative Component section and is shown in Appendix M. In addition, questions are organized according to stage in the Quantitative Analysis section (see Table 5). A low concern (or low score of 1) relates to irrelevant or not true to the participant versus a high concern (or high score of 7) that relates to being very true to the participant. Each stage had five questions with a possible total score of 35. The summation for each stage was calculated as well as the summation for each teacher's scores (see Table 6). An example of a low concern is in stage 5 (Collaboration), a score of 9 for Participant 2 (P2) would mean that the teacher rated herself an average score of 1.8 for all five questions indicating

somewhat true for me now according to the Likert Scale (see Figure 5), which indicates she had little or no interest in creating working relationships with faculty members inside or outside of school for iPad integration nor did she have interest in what other teachers were practicing in their classrooms. An example of a high concern would be in the stage 4, (Collaboration), a score of 28 for Participant 5 (P5) would mean that the teacher rated herself an average score of 5.6 for each of the five questions, indicating she felt it was *very true of me now* showing she placed high value and interest in what other faculty members were doing in their classrooms with the iPad and working with colleagues inside and outside of school to maximize the effects of the iPad training and its integration into the classroom. In addition to individual teacher's scores for stages, each participant's scores for all 35 questions were summed with a possible total score of 245 to calculate the lowest and highest scores for teachers. P2 had the lowest score of 72 and P1 and P5 had the highest total of 120. Although two teachers had a score of 120, P1 dropped out of the study and P5 was included. The remaining teachers had scores in-between these scores. The four teachers chosen for observations and interviews are shown in bold, P2, P4, P5 and P6.

During observations, I used the Field Notes document (see Appendix F) to record teacher behaviors associated with the use of the iPad in the classroom. These notes were used to determine each teacher's LoU. Based on the observation, teachers' LoU scores were labeled on the Field Notes document based on Hall and Hord's (2006) rubric of seven LoU of use: 0-Non-use, I-Orientation, II-Preparation, III-Mechanical Use, IVA-Routine Use, IVB-Refinement, V-Integration, and VI-Renewal (see Appendix F). I

completed each section of the field notes, noting my observations. Any information that I did not see as part of the LoU categories on the rubric I noted in the margins; for instance, I noted such information as the type of lesson taught and personal attention given to some students. Each of the lessons lasted for 45-50 minutes.

Interviews were held from May 11, 2015, through May 26, 2015. One interview was held face-to-face at the school and three by using Skype. Teachers selected their interview method. The teacher who met me face-to-face first requested to have the interview through Skype, but when she learned I was coming to the school, she invited me into her classroom. The remaining three teachers preferred to be interviewed electronically. One week into the study, one of the participants with high SoCQ concerns dropped out of the study after initially responding that she would participate in an observation. I selected another teacher who suited the requirements for her high concerns to replace the one who withdrew. I easily made up the time because the replacement teacher met with me briefly at the school within the same week and agreed to participate in an interview early the following week.

The instruments used in the interview were the CBAM: LoU of an Innovation document (see Appendix D), which was e-mailed to their school e-mail address, and Interview Questions (see Appendix G). The interviews were recorded using Super Voice Recorder, a software program on a Kindle HDX; the recorded interviews were then transferred to my computer. All data was encrypted by my own design and password protected. To additionally protect identities and to secure the data, I used the date of the interview, which had been automatically saved by the recording device, rather than the

interviewee's name in my data documents. Additionally, the date of the interview was synced with my calendar using the teacher's encrypted code name from their SoCQ so I could recall each teacher I interviewed. The name of the recorded file could not be manually changed nor could the participant be identified. I listened several times to the recordings to assure accuracy and transcribed the data verbatim to a Word document that was also encrypted, saved, and password protected. There was one interview session per teacher; with each session lasting between 8 to 22 minutes. Each interviewee was e-mailed a copy of her transcription and asked to clarify some information. For example, one teacher responded to some questions using "we;" I asked her to express the precise meaning of "we" or if she meant "I." All teachers responded within three days and the data was resaved.

Each day I recorded information in an e-journal created using Microsoft Word and saved on a password-protected flash drive. In addition, I kept a schedule in my e-journal with details of my data collection and travel plans since the school was not local. I created and printed a calendar that included a schedule for my days of travel as well as my data collection plans, such as conducting an observation or interview. Changes were made by hand-written messages since some of the teachers rescheduled with me. This document was used at home and secured in my desk. I employed the same encryption methods that I used for the observations and interviews so I would know who I was seeing and when. The only unusual circumstance in the data collection for the interviews was that one of the interview sessions was difficult to hear on playback. To correct this

problem, I connected a speaker to the headphone jack of the Kindle and I held it close to my ear. I was able to hear the conversation clearly and transcribed all the data.

Qualitative Data Analysis for Observations

The CBAM provided the conceptual framework for the observations by incorporating the rubric for the LoU (Hall & Hord, 2006) which includes seven categories to evaluate each teacher's LoU: Knowledge, Acquiring Information, Sharing, Assessing, Planning, Status Reporting, and Performing. These categories were the basis of the field notes for observations along with the LoU Rubric (see Appendix F). As the teacher taught the lesson using the iPad, the LoU Rubric was reviewed for a rating for each category. After reviewing my notes and scoring from my observations of the teachers, I carefully compared my evaluations to the rubric and made minor modifications to my initial evaluations to more accurately reflect the LoU as defined on the rubric. I made these modifications while each observation was fresh in my mind. These results were not shared with the teachers. The participants' labels P2, P4, P5 and P6 have been changed to pseudonyms: Mrs. A; Mrs. K; Mrs. S, and Mrs. F, respectively, to reflect a personal tone. Three teachers were observed in the classroom setting using the iPad with their students. The results of their LoU are presented in Table 11 and provide answers to Research Question 2.

Research Question 2: What are teachers' LoU in the classroom after technology professional development sessions for iPads?

Table 11

Observation Data for LoU Categories for iPad Integrating Technology into the Classroom

Categories	Mrs. A	Mrs. K	Mrs. S
Knowledge	III: Knows day-to-day use Short-term activities	IVB: Knows effects on students and ways to increase impact on students	V: Knows effects on students and ways to increase impact on students
Acquiring Information	II: Seeks information for own setting	IVA: Changes use to accommodate students	V: Seeks information and materials to change use for students
Sharing	III. Seeks others for resources and use	IVA: Current use not changing	VI: Seeks an increase in student impact through collaboration for personal use
Assessing	III. Examines own use General reactions from students	IVB: Changing current use practices to improve student outcomes	VI: Collaborative use in terms of student outcomes and understands strengths and weaknesses
Planning	III. Plans activities and resources for short-time use Seeks new apps	IVB: Seeks plans and resources Seek new apps	V: Coordinates own use with students to achieve increased impact
Status Reporting	III. Reports personal efforts Resource organization	IVB: Reports change for student outcomes	VI: Considering major modifications to present use
Performing	IVA: Little variation in pattern of use Minimal problems	III: Minimal management problems; smooth use	VI: Explores other innovations to be used in combination to enhance student outcomes

Note. One teacher, Mrs. F, did not participate in an observation.

Table 12 shows that all of the teachers' LoU were beyond levels 0-2 (initial use) after training of the iPad. Their responses indicated that they had knowledge of integrating the iPad in their classrooms and were prepared to incorporate apps into their lessons. Mrs. A demonstrated her own practices that did not change significantly from day-to-day and sought information on her own as well as from others. Similarly, Mrs. K did not change her current use of the iPad after training but she showed interest in making improvement in student outcomes and showed more interest in using resources. Mrs. S reached a higher level of her uses of the iPad because she knew how to increase the impact with her students and understood student strengths and weaknesses. During the observation, she was the only teacher who incorporated student use into her lesson plan.

Qualitative Data Analysis for Interviews: Teachers' LoU and Concerns

The CBAM provided the conceptual framework for the one-legged interviews. Interview sessions were held between May 11 and May 26, 2015 to assess concerns in an informal and non-intimidating manner (Hall & Hord, 2001). In an effort to answer research question three, the same open-ended questions were posed to each teacher, giving them the opportunity to investigate a deeper understanding of the previous results from the CBAM SoCQ and observations (see Appendix A). The atmosphere for the interview was relaxed and comfortable as suggested by Yin (2013).

Before the teachers were interviewed, each teacher completed a self-evaluation using the document the CBAM: LoU of an Innovation (see Appendix D). Two teachers, Mrs. F and Mrs. A, rated themselves at levels IVA and IVB, meaning *I feel comfortable using and integrating technology in education. However, I am putting forth little effort*

and thought to improve information technology in education or its consequences (IVA) and *I vary the use of integrating technology in education to increase the expected benefits within the classroom* (IVB*)*. Mrs. K rated herself as IVA (as stated above), and Mrs. S rated herself as VI, *I reevaluate the quality of use of integrating technology in education, seek major modifications of, or alternatives to, present innovation to achieve increased impact, examine new developments in the field, and explore new goals for myself and my school or district*.

After the initial rating, the branching interview took place (Hord & Roussin, 2013). During the interview, the participants were asked questions from the Format of the LoU of Use Branching Interview (see Appendix E), and as they responded yes or no, I could indicate the specific level a teacher reached, and her LoU was identified. The branching interview supported my observation rating for three of the four teachers. Mrs. F rated herself higher than the evaluation showed and higher than the results from SoCQ, in which she showed low concerns for many of the questions. This data appeared contradictory; reviewing the interview transcription explained why the levels were different. Mrs. F admitted in the interview, "This year I was kind of lazy and I want to use the iPad more next year." In addition, she indicated that she used her iPad frequently at home but "wanted to find more uses in the classroom." Her personal use of the iPad seemed to influence her self-rating for her classroom use because she stated, "The iPads are great; I mean I have my own iPad. We are always using it [at home]" She was only required to rate herself on her classroom uses of the iPad after the training took place, but she apparently included her home use in her self-evaluation.

Similarly, Mrs. A rated herself higher, but the scores in the observation did not portray an accurate LoU because she did not have a projector and could not use the iPad as she intended. In my observation of Mrs. A, she walked around the room with her iPad; she only showed her students a few photos during the lesson. Hence, the students did not interact with the iPad or the app in use. More of the teacher's apps could have benefited her students if her technical connections were improved and if her iPad was connected to her large screen in the classroom. Mrs. A stated that the iPad was used similarly day-to-day. Her use of the iPad remained routine (level III) after teacher training, yet she was eager to learn more uses. She stated that during the lesson she needed help in finding more instructional apps, indicating LoU III, *Seeks others for resources and use*. A student in her class had volunteered to help her.

Mrs. S had rated herself higher than I had during my observation. She used outside resources during class lessons and guided students indicating level IVB (Refinement). During the interview the teacher explained that outside of class she reached levels V (Integration) and VI (Renewal) because she worked with the iPad with other teachers and reevaluated integrating technology in addition to the iPad for richer technology in her classroom.

After I read the interview transcriptions, I coded the data from the responses of the teachers' concerns to the interview questions (see Appendix G) and then analyzed for the LoU for each teacher. I developed codes by reviewing the transcripts one question at a time and writing repetitive patterns of action, "a word or phrase that captures the action" (Saldana, 2008, p. 5). The four transcripts were printed and aligned on a table so I

could have access to all the data. To generate codes, I looked for words that were similar as well as opposing language. After reading and rereading the transcripts, I analyzed the descriptive codes for patterns, which I color-coordinated to find themes in the data. I printed and analyzed the transcription documents. Pattern coding reduced the amount of data into smaller, analytical units (Miles & Huberman, 2013). Codes were created from the responses to the seven interview questions. Pattern codes identify emergent themes, configurations or explanations (Miles & Huberman, 2013). By summarizing the data into categories from each question, meaningful data was incorporated into patterns. The results (see Table 12), answer Research Question 3.

Research Question 3: What factors among educators account for high and low LoU of technology in the classroom?

Table 12

Specific Codes used for Interview Analysis

Question	Teachers' Responses	Code and Definition
1. What is your greatest concern for teacher training for integrating technology into the classroom?	learning, potential, exposure, more use	Effective training: The code "effective training" relates to additional teachers concerns of professional development for the iPad use in the classroom.
2. What is your least concern for teacher training for integrating technology into the classroom?	don't know, none, not really	No least concerns.
3. How has your concerns about technology training affected your use in the classroom?	apps, ways, more use, user, training, resources, apps	Effective training: The code "effective training" relates to additional teachers concerns of professional development for the iPad use in the classroom.
4. Is there a different concern for the iPad training and its use than using a computer?	sometimes, yes, no, connection, server, problems	Connections: The code "connectivity" implied there were issues outside of the training that needed attention that influences iPad use in the classroom.
5. Are you comfortable using technology in the classroom? Why or why not?	comfortable, more, utilize, know, get around, search	Comfortable: The code "comfort" teachers had confidence using the iPad in their classrooms.
6. Are students receptive to your technology use in the classroom? Does it seem to matter to them?	love, like, expect, enjoy,	Enjoyment: The code "enjoyment" relates to the sense of self-confidence and pleasure that students felt when having the iPad used in class.
7. What is you ideal use of technology in the classroom? Why?	more, collaborate, apps, research, implement, more use	More iPads: The code "more iPads" implied the teachers had additional needs and assistance for the iPad in the classroom.

Emergent Themes

Through examination of the transcripts, the following qualitative themes emerged from the interview questions: *effective training*, *comfort*, *more iPads,* and *connectivity.*

Effective training. All four of the teachers indicated that although the recent iPad training was effective, more iPad training was needed. Three of the teachers were excited to learn how to search for more apps for classroom activities. Mrs. K stated, "The training made me more app aware." Teachers felt that the training offered websites, such as "Apps for Sale," with search engines that had a larger selection for educational apps. Mrs. A remarked, "Having the [iPad] technology training makes you want to use the [iPad] technology, so if you don't have the training you put it away and you don't think about it. Then you pull it out, and it's like, eureka, like, hey, we can do this; we can do that!"

The concerns teachers had for the iPad were *not having enough exposure to the possibilities, its potential,* and *utilizing the iPad to its fullest capabilities.* Two teachers indicated that too much of the iPad training concerned apps. Therefore, a deficiency in the training was identified by the computer teacher, "Teachers need to know more about how to use the iPad, not just the apps."

Comfort. All four of the teachers stated that they were comfortable using the iPad in their classroom and that students enjoyed iPad and computer integration. In addition, two teachers stated that they would like to be more comfortable. Mrs. F said, "Yes, I'd like to be more comfortable; though I am comfortable using it. That is just my own, getting myself more into it, diving into it. Getting more information, knowledge, more

background, how things work would make me more comfortable; just taking the time to do it. I consider myself old school sometimes. So, I love having technology in the classroom. The iPads are great; I mean I have my own iPad. We are always using it, but it's an easy thing to get to but just to do more in the classroom, get myself more involved."

More iPads. Two of the teachers stated that it would be ideal *to have a set of iPads* in the classroom. Teachers would like to have interactive lessons with their students or perhaps *have them work in groups.* The remaining two teachers stated they would like to show students videos that pertain to their lessons from YouTube, or by visiting a museum in real time. Mrs. A stated, "You can do a 360° tour of a museum. We can't go to France, but we can go to Le Louvre via the iPad!"

Connectivity. Teachers commented on connectivity issues. Three of the teachers noted that there were issues connecting with the server or online websites. One teacher noted that she did not have a projector to use when she used the iPad. Slow connections made integrating the iPad a problem at times. Mrs. F, stated, "The problem is that some of the books don't work or stop working on the iPad," and she added, "I guess when you are using the iPad that is what you are going to do more with, other than going to some websites, but then you cannot utilize it. You can't get the video; there is no flash and stuff; that's Apple."

After reviewing all the data available for the concerns of the teachers, I examined the data for themes about the teachers' attitudes.

Teacher Attitudes

Although the participants were not directly asked about their attitudes in reference to their iPad training and use in the classroom, my perceptions of teacher attitudes and beliefs have developed. I reviewed four teachers' responses from the interview sessions and one teacher's written response to question 36 on the SoCQ. While most of the nine teachers who participated in the training showed positive attitudes toward learning new uses of the iPad training and integrating technology into the classroom, a few comments revealed lower concerns for its use. There were three findings consistent with the qualitative data and one discrepant case.

First, one teacher exhibited some anxiety during the interview. As I entered the room, Ms. F said, "I have to admit I was a bit lazy this year" when referring to iPad use. Her SoCQ scores were low, which was why I asked to observe her classroom when she incorporated the iPad but she declined my observation request. She rated herself for the LoU much higher than expected. Contrary to her low scores, she then stated she wanted to learn more about the iPad and that she did want to have more uses with her students. Therefore, her attitude this year may have affected her scores and lack of use for the iPad.

Secondly, another teacher freely expressed in the interview her excitement over the iPad training and use, which was consistent with my observation notes concerning her performance in the classroom. Mrs. K stated, "No matter where I get my training, there is always something I have gained to help me use my iPad with my students." During an observation she said, "I was so excited to learn from the training where I can get my educational apps" and "I'd like to have an app for every lesson." Her attitude was

positive in that she showed enthusiasm for using the iPad with her students and was eager to gain new knowledge on a regular basis.

Thirdly, Mrs. S expressed to me her concerns about the iPad training she attended: "The training for the iPad went well and teachers collaborated and seemed to enjoy finding new apps together, but I felt the teachers needed more experiences to learn how to use the iPad, rather than most of the training being apps. Next year I will give each of the teachers a proficiency survey to see what their needs are so I can arrange training for individuals with the same concerns to be trained in a smaller group. Many of the teachers have the interest, but time is always an issue."

She exhibited a positive attitude and was eager to have teachers trained using the iPad, but she also had the most concerns for teachers and how they used it in the classroom with their students, yet her remark concerning time was inconsistent with the survey results and may have been her personal opinion rather than the opinion of others.

Evidence of Trustworthiness

Credibility

Analytical strategies were followed precisely as described in Chapter 3. The survey, observations, and interviews complemented each other to increase the credibility of the findings. The survey data revealed the best use of descriptive statistics to respond to research question one. The observations, field notes, and the rubric provided accurate scores for the LoU for each teacher. Prior to the interview sessions, the questions were predesigned and approved by the university. All data was recorded using digital recording software and transcribed verbatim. Member checking took place after all the

interviews via e-mail to verify and clarify the data. The member checks helped me to interpret the data by clarifying some of the statements that were vague. For example, one teacher stated that "We used the iPad…," but I could not interpret who "we" referred to in her statement. Once I knew she meant at home with her husband, I could accurately analyze her meaning. The data was re-examined and summarized. Emergent themes were derived from the interview data and checked to capture teachers' true meaning of their experiences. One adjustment to the study was to select an alternative teacher for an observation.

Transferability

This study and its results are not unique to any time period with the exception of using modern technology. The participants were all female teachers teaching academic and specialty classes in a private school. Transferability can be explored from the participants' responses to the CBAM survey, observations, and interviews. The CBAM framework is accessible in a variety of formats, including online tools for the SoCQ, as well as in several books, which include the tools for the LoU. Rich descriptors in this study provide the potential for transferability to another study.

Dependability/Reliability

The approved research plan was carefully followed during participant recruitment and data collection. The outcomes reflected the process described in Chapter 3, Methodology. Data collection from three sources, (a) the survey, (b) observations, and (c) interview results, contributed to the trustworthiness of the study. The data were triangulated by comparing results from each of the three sources. I used cross-

comparisons to offer insights into emergent categories of themes from the interview data. In addition, the interpretation of qualitative data from the teacher interviews provided reliable insight into teacher attitudes and perceptions.

Dependability, also denoted to as reliability, refers to the ability of other researchers to employ the same mixed methods case study and achieve similar results, findings, and conclusions (Miles & Huberman, 2013; Yin, 2009). The case study protocol explains the documentation of the databases. An investigator can apply the case study protocol used in this study from my sequence of procedures by, (a) giving a description of the research, (b) stating the research questions, (c) describing data collection instruments and procedures, (d) viewing the presentation and analysis of the data, and (e) reviewing the findings, discussion and conclusions (Yin, 2009). Appendix L offers a flow diagram of the sequential procedures on behalf of other researchers interested in pursuing a similar project. Dependability has been met by creating an audit trail of my methodological and analytic decisions. An investigator can clearly follow the research plan used in my study and arrive at the same or comparable results and conclusions.

The databases from this study can be followed from the charts, figures, and appendices, along with the detailed explanations in this paper. An investigator can also follow the documentation from observations and interviews. If researchers were to view my database and data analysis, they would find it is easy to understand my use of color codes for interpretation of the interview data, as well as observational notes that relate to the uses of the innovation (iPad). There is clear evidence of reliability and dependability.

Confirmability

Confirmability assures that the researcher is unbiased and remains objective when conducting a study (Shenton, 2004). Triangulation produces converging evidence to strengthen the findings from each source, the survey (SoCQ), observations, and interviews (Creswell, 2003; Marshall & Rossman, 2010; Yin, 2009). In this mixed methods study, I used triangulation to avoid any biases in the findings, using multiple sources of data collection and analysis.

The CBAM was used to examine teachers' iPad training and to track the progress of its implementation in the classroom. The data collection instruments for the CBAM, designed by Hall and Hord (2001, 2006, 2014), were existing data collection tools that were unbiased. For the quantitative data, the SoCQ offered the ability to report the findings objectively (SEDL, 2015). For qualitative data, the CBAM offered tools to measure teachers' use of the innovation through a predesigned rubric where LoU was measured.

During the dissertation process, communications with my committee members were held through e-mails and Skype. Additionally, telephone conversations were held with an expert in the field of educational technology, a mixed methods researcher, and a case study expert. I contacted the Walden Center for Research with Pre-IRB questions to prepare my letter of consent and to answer other questions when I needed clarification of requirements. Dissertation drafts were edited with track changes and feedback throughout the entire writing process. I was the sole analyst for the data, including raw data from the surveys, observations, and interviews. To minimize any personal biases, I had no

personal contact with the school prior to the study. All data analyses were reviewed and discussed with my committee members for objectivity and accuracy.

Summary

The answers to the three research questions provided information that will aid professional development sessions for the school in this study. Responses to Question 1 (What are the teachers' least and most important SoC for integrating technology after teacher training using iPads?), showed that teachers had low concerns about management issues, yet high concerns about iPad training and collaboration with colleagues. Question 2, (What are teachers' LoU in the classroom after technology professional development sessions for iPads?), revealed that teachers used the iPad in their classrooms at the following levels: level III, *Mechanical Use* in day-to-day instructional use and level IVB, *Refinement*; that is, they varied integration of the iPad to maximize the effects with students. Only one teacher reached the levels V and VI; *Integration* (sharing activities with other teachers) and *Renewal*, (reevaluates the quality of use of integrating technology in education). She also sought new and alternative uses of the iPad, new technology innovations, and explored new goals for herself and the school.

In examining Question 3, (What factors among educators account for high and low LoU of technology in the classroom?), the responses from teachers during the interviews showed that they had expressed what was important to them for the iPad training and its use in the classroom. Teachers specified a concern that although they felt the training was a positive experience, more training was needed for the iPad and its use in the classroom that included more effective uses in addition to the apps they learned.

All teachers were comfortable learning and using the iPad. They indicated that there was little difference between using it and using a computer because both were accessible in the classroom and each teacher had different ideas for incorporating them during lessons. In addition, during an interview, Mrs. F stated that teachers were not concerned about students using technology due to the fact that many students were technology savvy and used an iPad at home.

Chapter 5 offers the interpretations of the findings, limitations of the study, recommendations, and the implications to the study. The findings from the three research questions are compared and contrasted using triangulation to support or contradict the findings for the quantitative and qualitative data results. Additionally, positive social change and a conclusion that captures the key essence of the study are addressed.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this case study was to discover teachers' attitudes and perceptions regarding teacher training for iPad use in the classroom. The research framework was based on the CBAM, which was developed by Hall and Hord (1987) to provide data collection tools for understanding teachers' concerns and abilities of using the iPad. The quantitative data collected in this study offered clear insights into and understanding of teachers' attitudes and perceptions regarding their training and what followed that training; the qualitative data help inform the quantitative data.

In this study, a combination of LoU and SoC accurately represented both quantitative and qualitative methods. This study will inform and contribute to the body of knowledge related to professional development for the integration of the iPad in classroom instruction and will suggest the potential benefits of understanding teachers' concerns before the implementation of teacher training.

This chapter includes my findings, interpretation of the findings from my research, and a discussion of teachers' concerns for iPad training and its use in the classroom. My findings are offered to confirm, disconfirm, or extend knowledge by comparing them with the major themes and findings from the peer-reviewed literature identified in Chapter 2. In addition, the limitations of the study, methodological implications, implications for positive social change, and recommendations for practice are presented. Finally, I conclude with a summary that captures the key essence of my study.

Findings

Quantitative Findings

The results of the quantitative data from the SoCQ provided evidence that teachers had little concern for management issues such as time for preparing for using the iPad in their instructional practices. They felt that coworkers did not interfere with their time but there was a moderate concern for time in terms of working with nonacademic problems. What did concern teachers was that they were interested in additional iPad training, given that other responsibilities did not interfere with their training and iPad use.

Teachers were highly interested in richer professional development that included additional uses of the iPad, understanding more about how to use it personally as well as using it with their students. A key finding was that teachers wanted more collaboration with other teachers about their concerns with training for the iPad and integrating its use in the classroom. Teachers indicated that they wanted to develop working relationships with other faculty members, coordinate more with others to maximize the effects of iPad training and uses, and to help other teachers with iPad uses. Overall, teachers indicated they wanted more iPad training and collaboration with faculty members.

Qualitative Findings

The SoCQ provided data that identified teachers' lowest and highest concerns and served as the basis for my decision about which teachers I selected to observe and interview. The Results section in Chapter 3 included a description of the three teachers who were observed and interviewed. The findings from the observations revealed the

teachers' LoU for integration of the iPad in their classroom were rated as *beyond an initial use,* implying that they all had experience using the iPad with their students.

In my first observation, Mrs. K used the iPad with her students who were eagerly interacting with the lesson from an app on a large screen and responding to prompts verbally and on paper. She had a high rating of level V (Routine and Refinement) due to her frequent and diverse use of the iPad. Mrs. K's LoU rating was confirmed by both my evaluation and her self-evaluation. Apps were projected on a screen where she engaged her students in her classroom activities by having students interact with statements or questions on the iPad. She also explained the iPad activities she used in the classroom and that she used several apps and often searched for more. Mrs. K increased use of the iPad in the classroom by learning new apps to integrate into her lessons as she worked to maximize the effects with her students while she also varied the use of the iPad. Mrs. K was well motivated and well understood that there was more for her to learn about the iPad and wanted to use it in more ways with her students.

My second observation was with Mrs. A. She was comfortable integrating the iPad into classroom instruction, yet she gave little effort and thought to improve iPad use. Interactions with her students were minimal. The iPad was used primarily to show her students different examples such as photos or colors. Her daily use of the iPad did not change as she denoted this during her lesson. Students were eager to participate when Mrs. A asked them questions but they seemed anxious to want more uses of the iPad because students had to wait for a view of the iPad screen as Mrs. A had to walk around the classroom with it in her hands.

In contrast, my final observation with Mrs. S showed the greatest use of the iPad with her students; she used the iPad to maximize the effects of her lesson with her students and combined her own efforts to research ideas (on a computer during the lesson) to increase the impact of the iPad use in her classroom. Furthermore, she had students work hands-on with the iPad whereas the other teachers did not. Students were highly engaged in creating projects on the iPad as the teacher guided them through the process.

The qualitative data from the interviews aided in explaining the observations by including the teachers' self-evaluation of their LoU of the iPad in the classroom. One teacher's self-evaluation matched my rating from the observation. The remaining two teachers rated themselves one level higher than my observation rating. A finding from one of the interviews was that the teacher had conducted her own research for using the iPad, and she sought other technology innovations to supplement instruction and improve school use of technology. While this is a commendable behavior on the teacher's part, other data from the observation did not support this as an important finding. Further, a key finding related to teacher concerns as expressed in the interviews was that all teachers were eager to have training above and beyond simply finding apps that they could use with their students.

When asked what their lowest concerns were, none of the teachers responded swiftly. When asked about her lowest concern, Mrs. A indicated she was not concerned about her students because they were "tech savvy." Even though the SoCQ indicated teachers' interest in collaboration, the teachers did not bring up this point in the

interviews. However, the interview with the computer teacher suggested that teachers wanted more collaboration and sharing of information.

The results of my mixed methods case study demonstrated the importance of understanding teachers' concerns for meaningful professional development. The study of professional development for teachers integrating technology into the classroom, along with teachers' attitudes and perceptions, helps to understand its effectiveness (Buabeng-Andoh, 2012). In the interpretation of the findings, the results of this study are discussed in greater detail.

Interpretation of the Findings and Research Study Analogies

Proven professional development strategies may not be relevant to all teaching practices (Avalos, 2011). It is difficult to aid schools in evaluating teacher training programs without understanding the concerns of the teachers. The CBAM offered insight into teachers concerns toward their training and using an innovation (iPad) in their classrooms. This study found that although teachers valued training for the iPad and its use in the classroom, teachers indicated that they had deep concerns and a need for change in their training sessions, suggesting that their individual needs may not have been met. These findings were consistent with the findings of Brooks-Young (2007), Buabeng-Andoh (2012), and Finley and Hartman (2004), who found that reform is needed to effectively integrate technology into the classroom. The research from this study was also consistent with the findings from the literature review of Brooks-Young (2007), ChanLin (2005), Pavlova (2005), and Sugar (2005) that investigating computer use after teachers are trained is vital to understanding effective professional development

and should result in improvements in teachers' knowledge and instructional practices (Wei et al., 2010). The teachers interviewed in my study had positive feelings about the training they received for the iPad but they desired more training in addition to researching apps. The use of the CBAM was critical to understanding the teachers' concerns about iPad training. The data collected from the SoCQ and LoU observations and self-evaluations provided details regarding teachers' concerns for the iPad training, as well as their attitudes toward that training (SEDL, 2015).

Findings from the quantitative data gathered through the SoCQ confirmed teachers' concerns for iPad training and its use in the classroom. In general, 86.7% of the teachers reported low concerns for management practices; likewise, they reported that the iPad training did not interfere with other school responsibilities or conflicted with their own interests. Contrary to research findings by Banas (2010), Bauer and Kenton (2005), Brooks-Young (2007), Lim and Kline (2006), Liu (2012), and Tsai and Chai (2012), for the teachers involved in this study, time for iPad training and its use in the classroom was not an issue. Furthermore, the SoCQ revealed that, as a group, iPad training took no time away from their coordination of expected tasks and relationships with people. Teachers were also not concerned about students' instructional needs related to the iPad; this was confirmed in the interview sessions. Teachers stated that students were already using iPads and other technology regularly, including outside of school, and that their students were comfortable because they were tech savvy, as confirmed by the findings of Campbell et al. (2010).

Teachers' survey responses indicated that they had high concerns about the iPad training and that it was very important to them and, ideally, classroom management issues did not conflict with this concern. Interviews confirmed this finding where four teachers specifically stated that, although they were comfortable using the iPad, they were greatly interested in additional training, consistent with research from Hosman and Cvetanoska (2013). In the training sessions, teachers learned to use search engines to find iPad apps for use in the classroom, and they were eager to find additional useful apps to enhance classroom instruction. Teachers were concerned about how they could maximize the effects of future iPad training and further enhance student learning. The computer teacher affirmed these concerns and stressed that there were more instructional uses of the iPad than simply using search engines to find apps. She said that the following year she would conduct additional training on how to effectively use the iPad for instruction beyond focusing mainly on apps. The findings strongly confirmed those of Ottenbreit-Leftwich et al. (2010), who found that a benefit of professional development that supports teachers' needs is increased through the use of technology in the classroom.

Though the SoCQ survey data indicated teachers showed great interest in collaboration for sharing ideas for integrating the iPad in their classrooms, the qualitative research data did not completely confirm this finding. A possible reason is that there is no way to observe a desire for collaboration with colleagues during a classroom lesson. Furthermore, interview questions were predesigned and did not specifically include teacher collaboration. To clarify this information, the informal interview with Mrs. S helped me to understand why collaboration was a concern shown in the survey. Mrs. S

interacted with the entire faculty; she confirmed that the teachers wanted to know more about how their colleagues used the iPad in their classrooms. Sharing and collaborating was important to them. In addition, the following year the computer teacher planned to have her own survey to understand more of the teachers' concerns for learning iPad uses in the classroom. Ongoing training was identified as a significant need for the teachers as confirmed by the computer teacher and previously suggested by Hosman and Cvetanoska (2013) and Keeler (2008). Apps were fun and useful for students, but the training was not enough to strengthen teachers' understanding of how to use the iPad pedagogically. Half of the teachers remarked that the server would not connect to the iPad on some days while two others said it was reliable. Although the school intended to have all technology equipment in working order during the study's duration (school principal, personal communication, December 19, 2014), connectivity issues remained a problem throughout my study.

Observations and interviews to determine LoU helped me to confirm my findings because my observation and interview scores varied slightly from the teachers' self-evaluations. As noted above, using the LoU rating scale, two teachers rated themselves one level higher than the score I had assigned during the observation. In both instances, following their interviews, I concurred with their self-assessment because they explained their use of the iPad in their classrooms with greater detail than I had observed. For example, although Mrs. A had a low level for her observation rating, she had no wireless connection in her classroom to the large screen for her students to view. She walked around her room with the iPad in her hands to show students pictures during her lesson.

As an observer, I did not understand why she used the iPad this way. Although I could have made an assumption, during our interview Mrs. A explained why she had to use the iPad as she did.

From an interview with Mrs. S, a clear explanation was revealed as to her expertise in her use of the iPad and how she conducted her own research for using the iPad, as well as searching for other technology innovations for her class and for school improvement. Information from the observations could not confirm these findings because I could only record descriptions of her behaviors during the observation period. During the interview, however, Mrs. S explained her uses of the iPad that were not evident in my evaluation of her LoU in the classroom observation. Therefore, her self-evaluation during the interview clarified her classroom's high LoU for her understanding of how to use the iPad in her lessons.

In an observation of Mrs. K using the iPad, her students were interacting with the lesson from the app on a large screen and responding to prompts verbally and on paper. She had a high rating of level V (Routine and Refinement) due to her frequent and diverse use of the iPad. Mrs. K's LoU rating was confirmed by both my evaluation and her self-evaluation. She also explained the iPad activities she used in the classroom and that she used several apps and often searched for more. Mrs. K understood there was more for her to learn about the iPad and wanted to use it in more ways with her students.

Extending the knowledge to the literature, my study began by proposing that individual needs and concerns relating to professional development in a single school warranted investigation; *one size does not fit all* (Brantley, 2011; Carlson, 2010; Levin &

Wadmany, 2008; Li, 2007). Carlson (2010) noted that teachers concerns related to technology use and training continue to increase annually. In addition, Gaytan and McEwen (2010) asserted that school professional development planners continue to struggle to develop training sessions that are effective for integrating technology into classroom. Given teachers' increasing concerns about technology in the classroom and the challenge professional development planners face, for this study, I chose to use the resources from the CBAM to confirm the concerns of teachers regarding training for the use of technology in the classroom, specifically the iPad, and its integration into instructional practice in the classroom. There are a number of factors that make the CBAM an ideal vehicle for examining issues related to teacher professional development and how to identify and target teacher needs when instructional innovations are introduced.

> Because the CBAM is client-centered, it can identify the special needs of individual users and enable the change facilitator to provide vital assistance through appropriate actions. This approach helps to maximize the prospects for successful school improvement projects while minimizing the innovation-related frustrations of individuals. (Hord, Rutherford, Huling-Austin, Hall, 1987, p. 7)

According to Creswell (2003), a convergence of instruments is necessary to confirm research findings. The framework used by Hall and Hord (2001/2006) provides an opportunity for just such convergence. The CBAM offers effective tools that allow for customizing questions and observations to determine unique concerns for an individual school. The CBAM is relevant to understanding how teachers undergo the process of

change (Hall & Hord, 1987, 2006; SEDL, 2015). In my research, I used these tools to determine the levels of and degrees of concerns the teachers had three months after iPad training took place. Results from other studies may be similar or different, but the process of evaluating teacher training is beneficial to all school systems.

Insight from this study extends to the knowledge of how innovations affect individuals in a small setting with unique concerns rather than in a large setting, possibly an entire school district, with a much larger body of concerns. A small school can potentially illustrate how improvements might be made more quickly to meet more teachers' needs. Logically, working with a smaller population with a limited number of concerns allows for the change agent to identify and target those needs unique to that setting. This study resulted in findings that will inform educational researchers, specifically, technology coordinators, faculty members, and administrators when the need for technological innovation arises. The findings and results may offer insight into how to effect change by tackling it on a small scale with a small segment of the target population of teachers.

Limitations of the Study

Because this study was conducted at a small school with a small segment of their faculty and staff, it provides only a limited look at how to target teachers' needs and address their concerns regarding technological innovation in the classroom. This study is not generalizable beyond this school and these teachers because the teachers may not be representative of all teachers. The sample size of the group was reduced from 18 possible participants to eight teachers and the school principal, ranging from grades K-8. Because

the research design did not call for observations and interviews with all nine participants, but instead focused on a selective sample, there were only a small number of participants whose concerns, needs, and perceptions were included in the full study. Since this study involved educational technology, the computer teacher at the school was a valuable resource. She expressed me that there had been one iPad training session during the current school year and that there would be additional training during the following school year. In addition, she informed me that she did not lead the training session; an outside trainer was used. Fortunately, I was able to interview the outside trainer who described the content and duration of the training session. The computer teacher noted any assistance she offered to the educators in addition to the technology training sessions.

Another limitation was that no high school teachers were part of the study and only elementary and middle school teachers K-8 were involved. One male participated in the training but did not take part in the study, thus, limiting the study to all females. Marshall and Rossman (2015) and Yang, Morris, Teevan, Adamic, and Ackermann (2011) asserted that gender had little influence on research participants responses, but that culture and social identity had more of an effect on their participation and comfort levels. In light of their assertion that gender had little influence on research participants, I was confident that having all female participants would not negatively impact my research data and findings.

A final limitation to the study was the time allotted for surveying, observing, and interviewing the participants. The data collection for the quantitative and qualitative data was over a four-week period, held three months after teacher training took place. The

limited timeline was appropriately noted because the effects from the iPad training might have taken longer to become apparent; immediate effects from the training might be different from long-term effects. This study initially did not involve barriers that interfere with integrating technology into the classroom because all computers were updated and working, although access to the server was at times an issue. This study's main focus was on the teachers' beliefs and concerns and related to iPad training that affected their use of technology in the classroom. Finally, the training session involved a single professional development day and offered teachers little more than a tutorial in using the iPad to locate and download apps that could be used with students in their classrooms. As I noted earlier, the apps were fun and useful for students, but the training was not enough to strengthen teachers' understanding of how to use the iPad pedagogically. Minor changes in instructional practice do not always equate to changes in teachers' understanding of pedagogy.

Recommendations

This study revealed teachers' perceptions and attitudes toward the use of iPads in the classroom after teacher training took place. The data showed that there were both low and high concerns after the iPad training. When incorporating technology into the classroom, teachers indicated that although they generally felt comfortable using the iPad, there was much more they could learn to enjoy its full potential. It would be beneficial if all the teachers at this private school could have additional, focused professional development in both the practical and pedagogical uses of technology and be

included in a future study to determine the outcomes. Such professional development might go far to overcome some of the limitations.

Further research could identify additional concerns of teachers and provide a richer training session that is meaningful to more teachers. Including a small sample initially provides feedback for a school to incorporate new ideas and procedures for teacher training, but a larger sample may provide more concerns and more ideas for future teacher training.

School systems have diverse needs for technology training and integrating technology into instruction while also addressing educators' concerns. One aspect of professional development involves continuous technology education and improvements that are made in the effectiveness of training programs through the use of the CBAM (Hall & Hord, 1987, 2001). This study involved only a small fraction of what might be possible; the iPad is but one small fragment of a larger constellation of instructional possibilities for classroom teachers. If the goal of professional development for technological innovation is to successfully integrate the use of technology into all teachers' practice, it is critical, then, for teachers to have thorough training in both pedagogical and practical uses of the technology at hand, consistent and reliable access to that technology, and continuous feedback and support over time (Brooks-Young, 2007; Carrillo-Hermosilla & Unruh, 2006; Hew & Brush, 2007; Hosman & Cvetanoska, 2013; Sugar, 2005). Even then, improvements to such professional development must be made continually to assure its effectiveness, the CBAM can be a useful approach/tool for examining the impact of technology professional development.

Implications for Social Change

This study contributes to positive social change for teacher training and the integration of technology by educators. Professional development for technology requires understanding the needs and concerns of teachers (Lawless & Pellegrino, 2007). The impact of effective teacher training that addresses those needs and concerns leads to positive social change. Change not only occurs when teachers gain new knowledge through professional development; it occurs when teachers shift their attitudes and beliefs (Guskey, 1987; SEDL, 2015). When teachers value teacher training, it leads to positive changes in classroom instruction (Inan & Lowther, 2010).

Walden University defines positive social change as "as a deliberate process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals, communities, organizations, institutions, cultures, and societies. Positive social change results in the improvement of human and social conditions" (Walden University, 2015, para. 2). Teachers and students alike are eager to meet the needs of society by using technology to its fullest potential. My research showed the need for continuous investigations into the effectiveness of teacher training to meet new and changing technological innovations such as the iPad; which agrees with the findings of Tunks and Weller (2009) who employed the application of the CBAM to professional development. In addition, assessments of teachers' perceptions regarding technology training led to a better understanding of how teachers' integrated technology in their lessons (Brooks-Young, 2007; Gordon, 2011).

Understanding and responding to teacher concerns can, for example, lead to collaboration among teachers to make improvements in their teaching, as well as to resolving teacher training problems that would otherwise be overlooked. As illustrated in this study, teachers were highly concerned about having more collaboration. The computer teacher supported this finding. In addition, teachers were eager to have more iPad training and to find more uses in their classrooms as well as acquiring more iPads to work with their students. Recognizing and addressing teacher's concerns when offering training for technological innovation can bring about positive social change. When the instructional practice of every teacher improves, it has a widespread impact on students, other educators, and the school systems in which they work.

Methodological Implications

This case study implemented the explanatory, sequential design using quantitative and qualitative drawn from a mixed methods research methodology. The quantitative results were compared and enhanced by the qualitative results (Creswell, 2015). The combination of both research styles confirmed the findings by using triangulation to identify and compare results (Creswell, 2003; Marshall & Rossman, 2010; Yin, 2009).

Data from three separate sources, SoCQ, observations, and interviews, provided analytical triangulation, thereby increasing the reliability of the findings. Multiple sources of data aided in explaining the results using a sequential, exploratory design where quantitative data analysis was supported by qualitative data analysis (Creswell et al., 2003). Data analysis indicated that there were similarities, yet differences, represented in

quantitative results. The evidence from the qualitative analysis assisted me in explaining and clarifying these differences.

One aspect of my methodology required an understanding of descriptive statistics. I measured the central tendency: mean, median, mode, and the SD (Creswell, 2008), which was useful when I discovered that the mean and SD would not serve me in analysis. In addition, two questions in the survey required reverse coding, because the SoCQ included negatively-keyed items (DeVaus, 2013). These issues offer a challenge to researchers and emphasize the need for understanding statistics to obtain meaningful results.

Recommendations for Practice

Teachers participating in teacher training for technology may increase their repertoire of teaching strategies and support their implementation of new techniques and applications in their classrooms. It also may lead to more collaborative efforts in sharing information for using the iPad and how to incorporate new apps with students. Although Giordano (2008) asserted that teachers were more apt to collaborate after the initial training, this study showed teachers were interested in collaboration months after the training took place.

One might consider that collaboration requires cooperation (Hall & Hord, 2001). When training is put into practice, teachers could be encouraged to share experiences that could enhance their lessons. To build a collaborative culture, communication on ideas and practices could strengthen the use of the iPad and other technology. This may contribute to more meaningful teacher training sessions that meet the teachers' needs and

help them to become life-long learners (Hosman & Cvetanoska, 2013). Administrators and teachers must organize and maintain a continuous professional learning environment (Hall & Hord, 2006; Tunks & Weller, 2009) Professional development that supports teachers' needs is more likely to produce teachers that integrate technology into the classroom (Ottenbreit-Leftwich et al., 2010).

Conclusion

The purpose of this case study was to discover teachers' attitudes and perceptions regarding teacher training for iPad use in the classroom. It confirms that the *one size fits all* approach is not valid because not all professional development is relevant to all teachers' needs (Avalos, 2011). Although teachers in this study may have had similar concerns regarding integrating technology into the classroom, specifically as it related to using the iPad, educators as a whole undoubtedly have different needs and attitudes that affect the use of technology in the classroom. Strikingly, for example, one teacher participated in the technology training and acquired the ability to incorporate the iPad, yet the teacher admitted to being lazy and not following through during the school year. When educators' perceptions and attitudes are not examined, implementation may fail (Hord & Roussin, 2013). By using the strategies developed by Hord & Hord (2006), it is possible to evaluate the degree to which teachers are using the innovation in their classrooms. I believe that such evaluations should result in additional support for the teacher to help him or her implement the innovation more effectively.

Having researched teacher concerns though Hall and Hord's (2001, 2006) the CBAM, all the teachers who attended the iPad training provided insight into the needs of

the teachers regarding what they felt was most important and what was less important to them. Ironically, teachers who had either low concerns or high concerns expressed the need for future training sessions. They also had a variety of differences, but the essence of this study produced results that would enhance future technology training (Ottenbreit-Leftwich et al., 2010).

On another level, this study offers insights into the methods and practices associated with professional development and the degree to which professional development brings about change in teaching practice. How will school leaders design and bring about professional development that can result in change? How will they know whether or not teachers are implementing the innovations they have been trained to use in the classroom? The CBAM framework stresses the importance of recognizing and addressing teacher concerns and needs and offers tools and instruments to measure those concerns and to measure teachers' use of innovations in their classroom (Hall & Hord, 2001, 2006).

Further research into professional development practices and how school leaders follow up with teachers after training could provide a richer training session that is meaningful to more teachers. Reform should include areas of concerns for teachers needs because improved professional development assessments can motivate teachers and increase their ability to change (Hochberg & Desimone, 2010). It is critical, for teachers to have thorough training in both pedagogical and practical uses of the technology, consistent and reliable access to that technology, and continuous feedback and support over time. When teachers value teacher training, it leads to positive changes in classroom

instruction (Inan & Lowther, 2010). As the teachers in my study suggested, communication and collaboration, with teachers sharing ideas and practices, would support them as they work to implement technological innovations in their classrooms. This may contribute to more meaningful teacher training sessions that meet the teachers' needs and help them to become life-long learners, which is after all, what they really desire.

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Appendix A: SoCQ

0 Irrelevant	1	2 Not true of me now	3	4 Somewhat true of me now	5	6	7 Very true of me now
1. I am concerned about students' attitudes toward this innovation.	0	1	2	3	4	5	6 7
2. I now know of some other approaches that might work better.	0	1	2	3	4	5	6 7
3. I don't even know what the innovation is.	0	1	2	3	4	5	6 7
4. I am concerned about not having enough time to organize myself each day.	0	1	2	3	4	5	6 7
5. I would like to help other faculty in their use of the innovation.	0	1	2	3	4	5	6 7
6. I have a very limited knowledge about the innovation.	0	1	2	3	4	5	6 7
7. I would like to know the effect of this reorganization on my professional status.	0	1	2	3	4	5	6 7
8. I am concerned about conflict between my interests and my responsibilities.	0	1	2	3	4	5	6 7
9. I am concerned about revising my use of the innovation.	0	1	2	3	4	5	6 7
10. I would like to develop working relationships with both our faculty and outside faculty using this innovation.	0	1	2	3	4	5	6 7
11. I am concerned about how the innovation affects students.	0	1	2	3	4	5	6 7
12. I am not concerned about this innovation.	0	1	2	3	4	5	6 7
13. I would like to know who will make the decisions in the new system.	0	1	2	3	4	5	6 7
14. I would like to discuss the possibility of using the innovation.	0	1	2	3	4	5	6 7
15. I would like to know what resources are available if we decide to adopt this innovation.	0	1	2	3	4	5	6 7
16. I am concerned about my inability to manage all the innovation requires.	0	1	2	3	4	5	6 7
17. I would like to know how my teaching or administration is supposed to change.	0	1	2	3	4	5	6 7
18. I would like to familiarize other departments or persons with the progress of this new approach.	0	1	2	3	4	5	6 7

0 Irrelevant	1	2 Not true of me now	3	4 Somewhat true of me now	5	6	7 Very true of me now
19. I am concerned about evaluating my impact on students.	0	1	2	3	4	5	6 7
20. I would like to revise the innovation's instructional approach.	0	1	2	3	4	5	6 7
21. I am completely occupied with other things.	0	1	2	3	4	5	6 7
22. I would like to modify our use of the innovation based on the experiences of our students.	0	1	2	3	4	5	6 7
23. Although I don't know about this innovation, I am concerned about other things in the area.	0	1	2	3	4	5	6 7
24. I would like to excite my students about their part in this approach.	0	1	2	3	4	5	6 7
25. I am concerned about my time spent working with nonacademic problems related to this innovation.	0	1	2	3	4	5	6 7
26. I would like to know what the use of the innovation will require in the immediate future.	0	1	2	3	4	5	6 7
27. I would like to coordinate my efforts with others to maximize the innovation's effects.	0	1	2	3	4	5	6 7
28. I would like to have more information on time and energy commitments required by this innovation.	0	1	2	3	4	5	6 7
29. I would like to know what other faculty are doing in this area.	0	1	2	3	4	5	6 7
30. At this time, I am not interested in learning about the innovation.	0	1	2	3	4	5	6 7
31. I would like to determine how to supplement, enhance, or replace the innovation.	0	1	2	3	4	5	6 7
32. I would like to use feedback from students to change the program.	0	1	2	3	4	5	6 7
33. I would like to know how my role will change when I am using the innovation.	0	1	2	3	4	5	6 7
34. Coordination of tasks and people is taking too much of my time.	0	1	2	3	4	5	6 7
35. I would like to know how this innovation is better than what we have now.	0	1	2	3	4	5	6 7

PLEASE COMPLETE THE FOLLOWING:

36. What other concerns, if any, do you have at this time? (Please describe them using complete sentences.)

37. Briefly describe your job function.

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Appendix B: LoU Observation Rubric

Typical Behaviors, Levels of Use

	Levels of Use	*Behaviors Associated With the LoU*
USER	Level VI: Renewal	Explores major modifications or alternatives to current innovation
	Level V: Integration	Coordinates innovation with other users for increased client impact
	Level IVB: Refinement	Makes changes to increase client outcomes, based on assessment
	Level IVA: Routine	Makes few or no changes to an established pattern of use
	Level III: Mechanical	Makes changes to better organize use
NON-USER	Level II: Preparation	Prepares to begin use of the innovation
	Level I: Orientation	Seeks information about the innovation
	Level 0: Non-use	Shows no interest in the innovation; takes no action

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Appendix C: SEDL Copyright Permission Request

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To: Theresa Pepe (Licensee)

From: Nancy Reynolds
Information Associate
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Date: February 13, 2015

Thank you for your interest in using the ***Stages of Concern Questionnaire*** (SoCQ 075) published by SEDL and written by Archie A. George, Gene E. Hall, and Suzanne M. Stiegelbauer in 2006 as Appendix A, pages 79-82 in *Measuring Implementation in Schools: The Stages of Concern Questionnaire*, in *Taking Charge of Change*, on pages 48-49, and in electronic format as SEDL's *SoCQ Online* accessible on the SEDL website at http://www.sedl.org/pubs/catalog/items/cbam21.html.

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Appendix D: CBAM: LoU of an Innovation

ID:_____ Grade: _____ Date _____	Use the ID assigned to you by the researcher to keep information confidential.

Instructions: Please read the descriptions of each of the eight levels related to the Adoption of technology. Choose the level that best fits where you are in the adoption of technology.

①	**Level 0: Non-use** I have little or no knowledge of integrating technology in education, no involvement with it, and I am doing nothing toward becoming involved.
②	**Level I: Orientation** I am seeking or acquiring information about integrating technology in education.
③	**Level II: Preparation** I am preparing for the first use of integrating technology in education.
④	**Level III: Mechanical Use** I focus most effort on the short-term, day-to-day use of integrating technology with little time for reflection. My effort is primarily directed toward mastering tasks required to use the information technology.
⑤	**Level IVA: Routine** I feel comfortable using integrating technology in education. However, I am putting forth little effort and thought to improve information technology in education or its consequences.
⑥	**Level IVB: Refinement** I vary the use of integrating technology in education to increase the expected benefits within the classroom. I am working on using information technology to maximize the effects with my students.
⑦	**Level V: Integration** I am combining my own efforts with related activities of other teachers and colleagues to achieve impact in the classroom.
⑧	**Level VI: Renewal** I reevaluate the quality of use of integrating technology in education, seek major modifications of, or alternatives to, present innovation to achieve increased impact, examine new developments in the field, and explore new goals for myself and my school or district.

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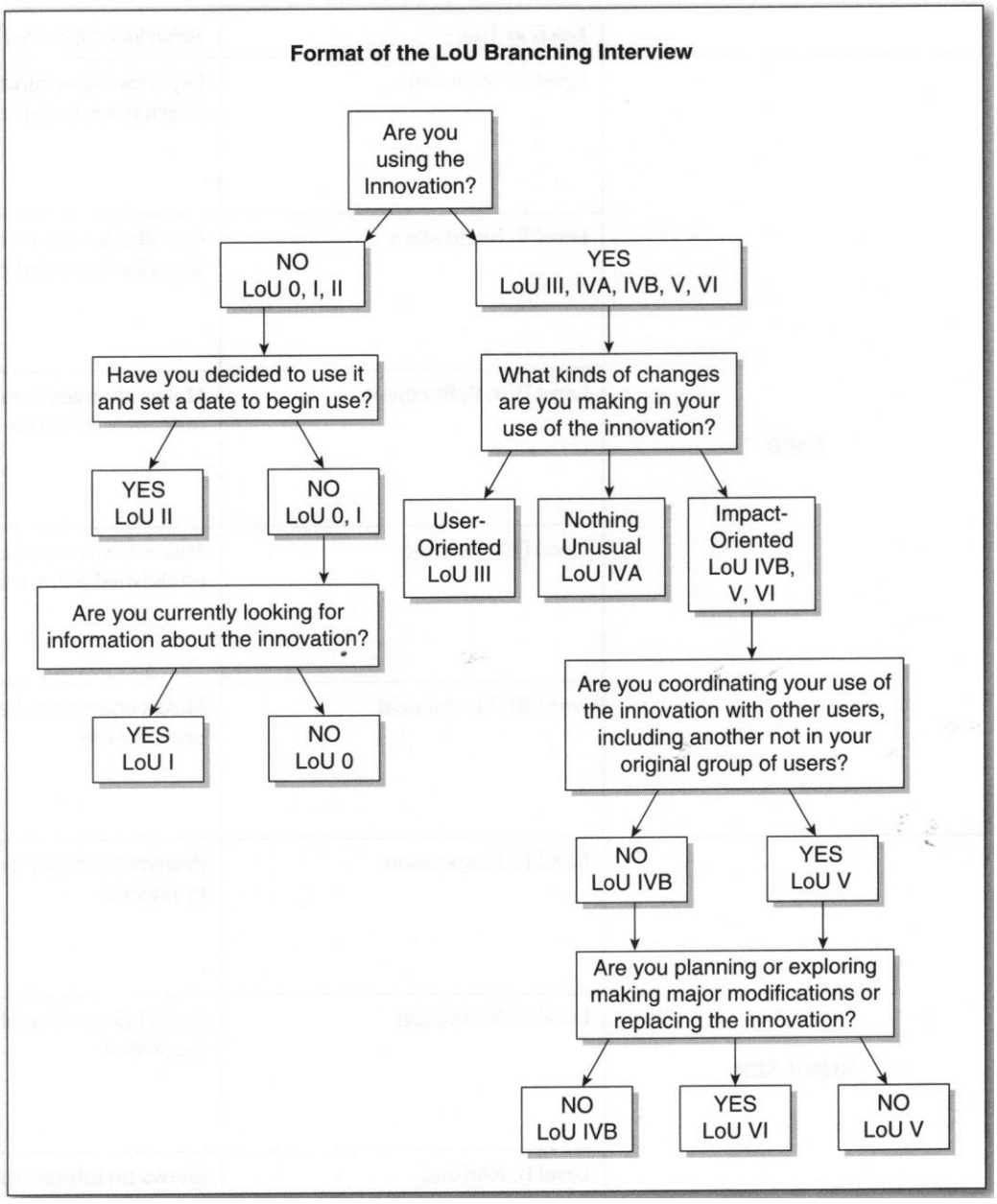
Appendix E: Format of the LoU Branching Interview



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Appendix F: LoU Rubric for Observations

	CATEGORIES		
SCALE POINT DEFINITIONS OF THE LEVELS OF USE OF THE INNOVATION Levels of Use are distinct states that represent observably different types of behavior and patterns of innovation use as exhibited by individuals and groups. These levels characterize a user's development in acquiring new skills and varying use of the innovation. Each level encompasses a range of behaviors, but is limited by a set of identifiable Decision Points. For descriptive purposes, each level is defined by seven categories.	**KNOWLEDGE** That which the user knows about characteristics of the innovation, how to use it, and consequences of its use. This is cognitive knowledge related to using an innovation, not feelings or attitudes.	**ACQUIRING INFORMATION** Solicits information about the innovation in a variety of ways, including questioning resources persons, corresponding with resources agencies, reviewing printed materials, and making visits.	**SHARING** Discusses the innovation with others. Shares plans, ideas, resources, outcomes, and problems related to use of the innovation.
LEVEL 0 NON-USE State in which the user has little or no knowledge of the innovation, no involvement with the innovation, and is doing nothing toward becoming involved.	Knows nothing about this or similar innovations or has only very limited general knowledge of efforts to develop innovations in the area. 0	Takes little or no action to solicit information beyond reviewing descriptive information about this or similar innovations when it happens to come to personal attention. 0	Is not communicating with others about innovation beyond possibly acknowledging that the innovation exists. 0
DECISION POINT A	*Takes action to learn more detailed information about the innovation.*		
LEVEL 1 ORIENTATION: State in which the user has acquired or is acquiring information about the innovation and/or has explored or is exploring its value orientation and its demands upon user and user system.	Knows general information about the innovation such as origin, characteristics, and, implementation requirements. I	Seeks descriptive material about the innovation. Seeks opinions and knowledge of others through discussions, visits or workshops. I	Discusses resources needed in general terms and/or exchanges descriptive information, materials, or ideas about the innovation and possible implications of its use. I
DECISION POINT B	*Makes a decision to use the innovation by establishing a time to begin.*		
LEVEL II PREPARATION State in which the user is preparing for first use of the innovation.	Knows logistical requirements, necessary resources and timing for initial use of the innovation, and details of initial experiences for clients. II	Seeks information and resources specifically related to preparation for use of the innovation in own setting. II	Discusses resources needed for initial use of the innovation. Joins others in pre-use training, and in planning for resources, logistics, schedules, etc., in preparation for first use. II
DECISION POINT C	*Changes, if any, and use are dominated by user needs. Clients may be valued, however management, time, or limited*		
LEVEL III MECHANICAL USE State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.	**KNOWLEDGE** Knows on a day-to-day basis the requirements for using the innovation, is more knowledgeable on short-term activities and effects than long-range activities and effects, of use of the innovation. III	**ACQUIRING INFORMATION** Solicits management information about such things as logistics, scheduling techniques, and ideas for reducing amount of time and work required of user. III	**SHARING** Discusses management and logistical issues related to use of the innovation. Resources and materials are shared for purposes of reducing management, flow and logistical problems related to use of the innovation. III
DECISION POINT D-1	*A routine pattern of use is established. Changes for clients may be made routinely, but there are no recent changes outside*		
LEVEL IV A ROUTINE Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.	Knows both short- and long-term requirements for use and how to use the innovation with minimum effort or stress. IVA	Makes no special efforts to seek information as a part of ongoing use of the innovation. IVA	Describes current use of the innovation with little or no reference to ways of changing use. IVA
DECISIONS POINT D-2	*Changes use of the innovation based on formal or informal evaluation in order to increase client outcomes. They must be recent*		
LEVEL IV B REFINEMENT State in which the user varies the use of the innovation to increase the impact on clients within his/her immediate sphere of influence. Variations are based on knowledge of both short- and long-term consequences of client.	Knows cognitive and affective effects of the innovation on clients and ways for increasing impact on clients. IVB	Solicits information and materials that focus specifically on changing use of the innovation to affect client outcomes. IVB	Discusses own methods of modifying use of the innovation to change client outcomes. IVB
DECISION POINT E	*Initiates changes in use of innovation based on input of and in coordination with what colleagues are doing.*		
LEVEL V INTEGRATION State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their sphere of influence.	Knows how to coordinate own use of the innovation with colleagues to provide a collective impact on clients. V	Solicits information and opinions for the purpose of collaborating with others in use of the innovation. V	Discusses efforts to increase client impact through collaboration with others on personal use of the innovation. V
DECISION POINT F	*Begins exploring alternatives to or major modifications of the innovation presently in use.*		
LEVEL VI RENEWAL State in which the user reevaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field, and explores new goals for self and the system.	Knows of alternatives that could be used to change or replace the present innovation that would improve the quality of outcomes of its use. VI	Seeks information and materials about others innovations as alternatives to the present innovation or for making major adaptations in the innovation. VI	Focuses discussions on identification of major alternatives or replacements for the current innovation. VI

CATEGORIES

ASSESSING Examines the potential or actual use of the innovation or some aspect of it. This can be a mental assessment or can involve actual collection and analysis of data.	**PLANNING** Designs and outlines short- and/or long-range steps to be taken during process of innovation adoption, i.e., aligns resources, schedules activities, meets with others to organize and/or coordinate use of the innovation.	**STATUS REPORTING** Describes personal stand at the present time in relation to use of the innovation.	**PERFORMING** Carries out the actions and activities entailed in operationalizing the innovation.
Takes no action to analyze the innovation, its characteristics, possible use, or consequences of use. 0	Schedules no time and specifies no steps for the study or use of the innovation. 0	Reports little or no personal involvement with the innovation. 0	Takes no discernible action toward learning about or using the innovation. The innovation and/or its accouterments are not present or in use. 0
Analyzes and compares materials, content, requirements for use, evaluation reports, potential outcomes, strengths and weaknesses for purpose of making a decision about use of the innovation. I	Plans to gather necessary information and resources as needed to make a decision for or against use of the innovation. I	Reports presently orienting self to what the innovation is and is not. I	Explores the innovation and requirements for its use by talking to others about it, reviewing descriptive information and sample materials, attending orientation sessions, and observing others using it. I
Analyzes detailed requirements and available resources for initial use of the innovation. II	Identifies steps and procedures entailed in obtaining resources and organizing activities and events or initial use of the innovation. II	Reports preparing self for initial use of the innovation. II	Studies reference materials in depth, organizes resources and logistics, schedules and receives skill training in preparation for initial use. II
experimental knowledge dictate what the user does.			
ASSESSING Examines own use of the innovation with respect to problems of logistics, management, time schedules, resources and general reactions of clients. III	**PLANNING** Plans for organizing and managing resources, activities, and events related primarily to immediate ongoing use of the innovation. Planned-for changes address managerial or logistical issues with a short-term perspective. III	**STATUS REPORTING** Reports that logistics, time, management, resource organizations, etc., are the focus of most personal efforts to use the innovation. III	**PERFORMING** Manages innovation with varying degrees of efficiency. Often lacks anticipation of immediate consequences. The flow of actions in the user and clients is often disjointed, uneven and uncertain. When changes are made, they are primarily in response to logistical and organizational problems. III
the pattern.			
Limits evaluation activities to those administratively required, with little attention paid to findings for the purpose of changing use. IVA	Plans intermediate and long-range actions with little projected variation in how the innovation will be used. Planning focuses on routine use of resources, personnel, etc. IVA	Reports that personal use of the innovation is going along satisfactorily with few if any problems. IVA	Uses the innovation smoothly with minimal management problems; over time, there is little variation in pattern of use. IVA
Assesses use of the innovation for the purpose of changing current practices to improve client outcomes. IVB	Develops intermediate and long-range plans that anticipate possible and needed steps, resources, and events designed to enhance client outcomes. IVB	Reports varying use of the innovation in order to change client outcomes. IVB	Explores and experiments with alternative combinations of the innovation with existing practices to maximize client involvement and to optimize client outcomes. IVB
Appraises collaborative use of the innovation in terms of client outcomes and strengths and weaknesses of the integrated effort. V	Plans specific actions to coordinate own use of the innovation with others to achieve increased impact on clients. V	Reports spending time and energy collaborating with others about integrating own use of the innovation. V	Collaborates with others in use of the innovation as a means of expanding the innovation's impact on clients. Changes in use are made in coordination with others. V
Analyzes advantages and disadvantages of major modifications or alternatives to the present innovation.	Plans activities that involve pursuit of alternatives to enhance or replace the innovation.	Reports considering major modifications to present use of the innovation.	Explores other innovations that could be used in combination with or in place of the present innovation in an attempt to develop more effective means of achieving client outcomes.

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Observation Field Notes

(To be used in conjunction with the LoC Rubric)

The observation field notes include the strategies listed on the Levels of Use rubric and will be used to identify an educator's performance using the iPad in the classroom.

_____ _____

Teacher's Name and Grade Level Date of Observation

Knowledge
Acquiring Information & Sharing
Assessing
Planning & Status Reporting
Performing

Appendix G: Interview Questions

Interview questions will include questions pertaining to the CBAM instruments (SoCQ) concerns, the LoU, and the training for the use of the iPad to clarify any previous data findings.

1. What is your greatest concern for teacher training for integrating technology into the classroom?
2. What is your least concern for teacher training for integrating technology into the classroom?
3. How has your concerns about technology training affected your use in the classroom?
4. Is there a different concern for the iPad training and its use than using a computer?
5. Are you comfortable using technology in the classroom? Why or why not?
6. Are students receptive to your technology use in the classroom? Does it seem to matter to them?
7. What is you ideal use of technology in the classroom? Why?

“Thank you for your participation in this study.”

Appendix H: Letter for Permission to use Hall and Hord Figure

August 25, 2014

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One Lake Street
Upper Saddle River, NJ 07458
Fax: 201-236-3290
Phone: 201-236-3263

Theresa Pepe

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Content to be included is:
P. 182 Extract- Environment for Facilitating Change

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Sincerely,

Mary Ann Vass, Permissions Specialist

Appendix I: Letter of Permission to use Hall and Hord Instruments

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Upper Saddle River, NJ 07458
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Phone: 201-236-3263

October 7, 2014 PE Ref # 187023

Theresa Pepe
Walden University Faculty and Doctoral Student
100 Washington Ave
South Suite 900
Minneapolis, MN 55401

Dear Theresa Pepe:

You have our permission to include content from our text, ***IMPLEMENTING CHANGE: PATTERNS, PRINCIPLES AND POTHOLES, 2nd Ed. by HALL, GENE E.; HORD, SHIRLEY M.,*** in your dissertation titled "Teacher Perceptions and Attitudes for the Integration of Classroom Technology in Relation to Computer Training" for your course : EDUC 8800-101 taught by Dr. Debra Piecka at WALDEN UNIVERSITY.

Content to be included is:
PP. 286, 287, 280-282 Categories (for Levels of Use) and Stages of Concern Questionnaire

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Mary Ann Vass, Permissions Specialist

Appendix J: Permission to Publish Material for Hord and Roussin

Confirmation Number: 11268837
Order Date: 10/03/2014

Theresa Pepe
Walden University

Order Details

Implementing change through learning: concerns-based concepts, tools, and strategies for guiding change

- **Order detail ID:** 65861570
- **Order License Id:** 3481470037422
- **ISBN:** 978-1-4522-3412-0
- **Publication Type:** Book
- **Author/Editor:** Hord, Shirley M.; Roussin, James L.

- **Permission Status: Granted**
- **Permission type:** Republish or display content
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Citation:

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Appendix K: Letter of Cooperation

December 19, 2014

Dear Theresa Pepe,

Based on my review of your research proposal, I give permission for you to conduct the study entitled Teacher Perceptions and Attitudes for the Integration of Classroom Technology in Relation to Computer Training within this Catholic school. As part of this study, I authorize you to deliver letters to educators to request participation in the study and to use data collection instruments, including two online surveys, classroom observations and teacher interviews. I understand the data dissemination will be completed by the researcher off campus with names or other identifiers securely stored. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: allowing contact with administrators, school staff members, and teachers in their classrooms as well as the computer resource room. This Catholic school's role is to sponsor and assume liability for the teacher training program for technology that will be evaluated by the researcher.

We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting and that this plan complies with the organization's policies.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University IRB.

Sincerely,

Mrs. P

Principal

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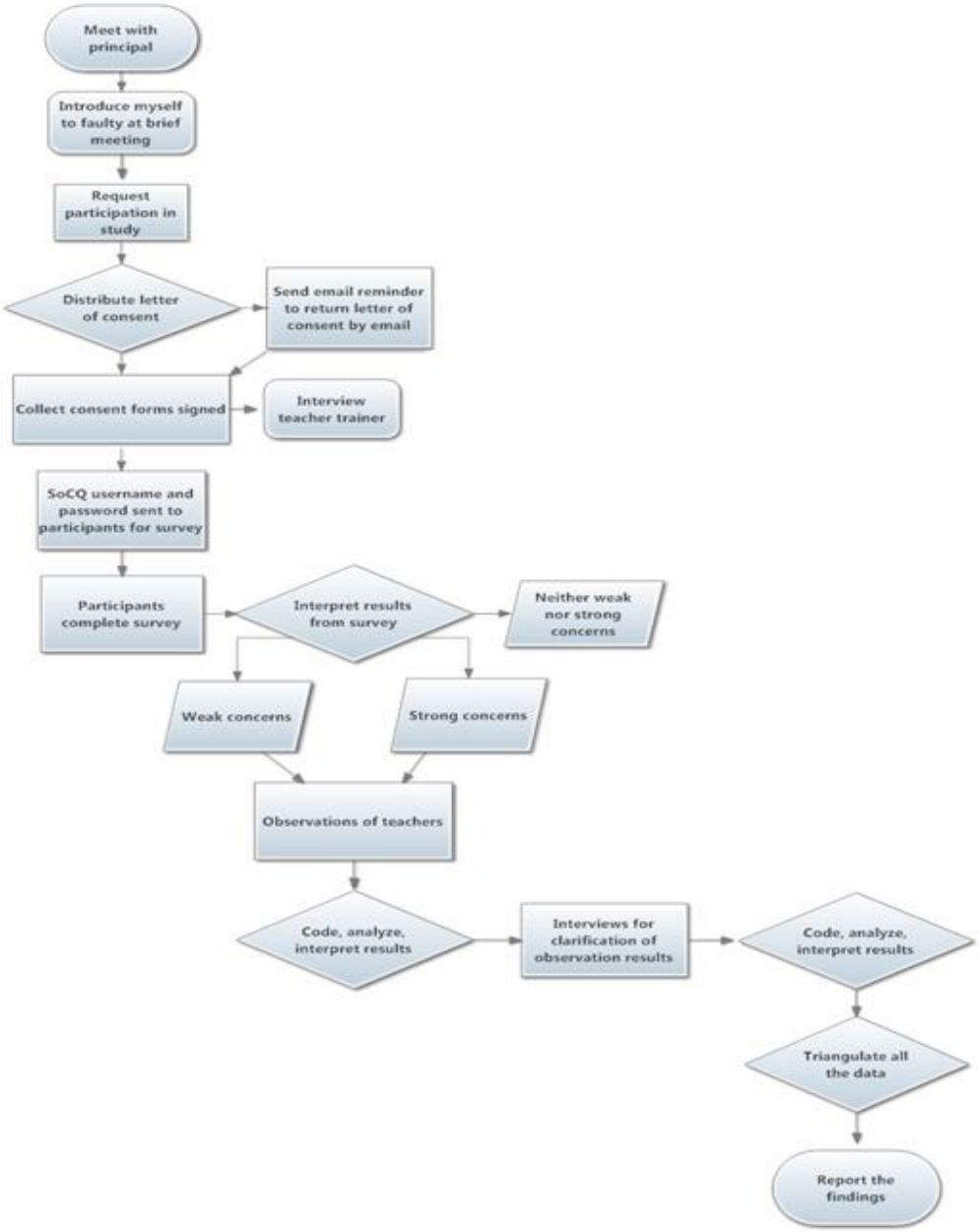
Appendix L: Entrance-Exit Plan



Appendix M: Descriptive Statistics for Raw Data of SoCQ

Question	P1	P2	P3	P4	P5	P6	P7	Mean	Median	Mode	SD
Q1	1	1	5	1	2	0	4	2.0	1.0	1	1.8
Q2	3	1	1	3	5	4	4	3.0	3.0	3	1.5
Q3	3	1	4	1	5	1	4	2.7	3.0	1	1.7
Q4	1	2	1	2	4	1	5	2.3	2.0	1	1.6
Q5	1	2	6	5	7	4	0	3.6	4.0	none	2.6
Q6	4	2	1	2	1	1	4	2.1	2.0	1	1.3
Q7	1	1	0	2	3	1	5	1.9	1.0	1	1.7
Q8	1	1	1	1	0	1	5	1.4	1.0	1	1.6
Q9	1	2	6	1	4	1	5	2.9	2.0	1	2.1
Q10	7	2	5	5	6	5	5	5.0	5.0	5	1.5
Q11	1	2	6	3	2	5	4	3.3	3.0	2	1.8
Q12	7	2	1	1	1	1	6	2.7	1.0	1	2.6
Q13	4	2	7	2	1	5	2	3.3	2.0	2	2.1
Q14	1	3	6	3	4	3	0	2.9	3.0	3	2.0
Q15	7	3	4	3	6	5	0	4.0	4.0	3	2.3
Q16	1	3	1	3	2	3	1	2.0	2.0	1	1.0
Q17	1	3	3	3	1	3	1	2.1	3.0	3	1.1
Q18	1	1	4	5	5	1	1	2.6	1.0	1	2.0
Q19	7	2	4	3	5	5	5	4.4	5.0	5	1.6
Q20	5	2	1	3	5	1	1	2.6	2.0	1	1.8
Q21	5	1	1	1	1	1	0	1.4	1.0	1	1.6
Q22	7	2	2	3	5	1	1	3.0	2.0	2	2.2
Q23	7	2	3	1	2	2	5	3.1	2.0	2	2.1
Q24	2	3	3	5	5	0	5	3.3	3.0	5	1.9
Q25	3	2	1	3	3	3	5	2.9	3.0	3	1.2
Q26	5	2	4	5	4	5	1	3.7	4.0	5	1.6
Q27	7	2	4	5	5	5	7	5.0	5.0	5	1.7
Q28	3	2	2	5	2	5	5	3.4	3.0	2	1.5
Q29	7	2	4	5	5	5	0	4.0	5.0	5	2.3
Q30	7	1	6	1	4	3	1	3.3	3.0	1	2.5
Q31	4	2	3	5	4	1	1	2.9	3.0	4	1.6
Q32	7	1	2	3	3	0	5	3.0	3.0	3	2.4
Q33	1	2	3	3	6	4	1	2.9	3.0	1	1.8
Q34	0	1	1	1	2	1	1	1.0	1.0	1	0.6
Q35	7	2	3	1	0	1	5	2.7	2.0	1	2.5

Appendix N: The SoC About an Innovation

Stages of Concern		**Description**
0	Unconcerned	The individual indicates little concern about or involvement with the innovation.
1	Informational	The individual indicates a general awareness of the innovation and interest in learning more details about it. The individual does not seem to be worried about him/herself in relation to the innovation. Any interest is in impersonal, substantive aspects of the innovation, such as its general characteristics, effects, and requirements for use.
2	Personal	The individual is uncertain about the demands of the innovation, his or her adequacy to meet those demands, and/or his or her role with the innovation. The individual is analyzing his or her relationship to the reward structure of the organization, determining his or her part in decision making, and considering potential conflicts with existing structures or personal commitment. Concerns also might involve the financial or status implications of the program for the individual and his or her colleagues.
3	Management	The individual focuses on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organization, managing, and scheduling dominate.
4	Consequence	The individual focuses on the innovation's impact on students in his or her immediate sphere of influence. Considerations include the relevance of the innovation for students; the evaluation of student outcomes, including performance and competencies; and the changes needed to improve student outcomes.
5	Collaboration	The individual focuses on coordinating and cooperating with others regarding use of the innovation.
6	Refocusing	The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making major changes to it or replacing it with a more powerful alternative.

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