COMPARISON OF PRE-SERVICE AND IN-SERVICE TEACHERS' ATTITUDES AND PERCEIVED ABILITIES TOWARD INTEGRATING DIGITAL TECHNOLOGIES INTO THE CLASSROOM

A Dissertation

by

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This dissertation meets the standards for scope and quality of
Texas A&M University-Corpus Christi and is hereby approved.

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ABSTRACT

It is important for both the current and future teachers to understand the best practices and strategies to integrate digital technologies in the classroom. Since our society is driven by technology, both current and future teachers need essential technological skills and enhanced abilities to facilitate learning.

The explanatory sequential mixed methods study was conducted to explore pre-service and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. The Digital Technology and Classroom Survey (DTCS) was used to measure attitudes and perceived abilities of both pre-service and in-service teachers. The study took place in South Texas. The sample consisted of 25 pre-service teachers enrolled in educational courses at a university and 25 elementary and secondary in-service teachers in a large urban school district. External validity was limited to study participants and no causal inferences were drawn due to the non-experimental nature of the study.

Analysis of the data showed that with respect to attitudes toward integrating digital technologies into the classrooms, it was concluded that there were no statistically significant differences between pre-service and in-service teachers. With respect to the perceived abilities of pre-service and in-service teachers regarding integration of digital technologies into their classroom, the difference on the basis of the school or district network was statistically significant, favoring the in-service teachers. The qualitative data resulted in three themes, namely, Affirmation of Technology, Barriers, and Educational Technology.

Based on the quantitative results, it was concluded that both pre-service and in-service teachers had the skills to integrate technology in an instructional setting. Based on the

qualitative results, which complemented the quantitative results, it was concluded that pre-service teachers needed more practice and experience with technology and in-service teachers reported insufficient access and a need for better training and ongoing staff resources. The results of this study can provide the classroom teachers with an awareness of the available technology available and be useful in identifying professional development topics for the integration of technology in the classroom. Some recommendations for future research include: a follow-up focus group with the pre-service participants once they have completed their first year of teaching, expanding the survey to include administrators in order to better understand their role in district and campus digital technology integration, and an examination of student skills and perspectives related to integrating technology in their instruction.

DEDICATION

I dedicate this dissertation to my husband Brian, and my daughters Brianna, Julianna, and Arianna. Without your support and encouragement, I would have never been able to achieve this dream. All of this is for you!

I also dedicate this dissertation to my parents, Johnny and Sylvia Lerma, who have supported and inspired me through this six-year journey. You have always been there with words of wisdom, you have pushed me when I thought it was too difficult, and you have helped me keep my dream alive. Mom and Dad, please know that I am eternally grateful for your encouragement, your guidance, and your love.

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CHAPTER I: INTRODUCTION

Background

The implementation of technology can be beneficial to all students. Technology affects every aspect of our lives and has the greatest potential to lay the world at our students' doors (Ferguson, 2001). Many of today's K-12 students have spent their entire lives surrounded by and using computers, video games, digital music players, video cams, cell phones, and all the other toys and tools of this digital age (Prensky, 2001). Therefore, these students may be motivated by the use of digital technologies in the classroom. Ertmer, Conklin, and Lewandowski (2003) stated that teachers need information about how, as well as why, to use technology in meaningful ways. According to Roblyer (2006), technology is us. Rather than seeing technology as some foreign invader here to confuse and complicate the simple life of the past, we can recognize that technology is very much our own response to overcoming obstacles that stand in the way of a better, more productive way of life.

Technology is now considered by most educators and parents to be "an integral part of providing a high-quality education" (U.S. Department of Education, 2003, p.3). The challenge for educators is to understand how best to teach with technology while developing the technological expertise of their students. These new technologies in the classroom continue to change at an ever-quickening pace (Wendt, 2013).

Research on the use of technological practices in the classroom has focused on whether students who use computers will read and write with more engagement and motivation (National Council of Teachers of English, 2008). With the advances in the electronic age, computer literacies are now pushing to the forefront of education, educational practice (Wendt, 2013). Making use of electronic technologies "includes learning how to read, write, and speak with

multiple modalities in ways that reflect social cultural nature of learning" (Carroll, 2011, p.28). Wendt (2013) stated that a working knowledge of electronic communication, such as text messaging, email, and mobile tweeting, is imperative for educators to positively affect student literacy in real and meaningful ways.

Learning can be enhanced through the use of technology (Davies, Sprague, & New, 2008). However, learning does not take place simply because technology is used. Instruction must be situated in an authentic context that resembles that of the classroom teacher to enrich the learning process by providing realistic experiences that more easily transfer (Willis & Cifuentes, 2005). Technology enhanced-instruction does tend to motivate students to participate in learning activities and learning is more likely to occur when the technology being used becomes a transparent tool in the learning process and not the main focus of the activity (Davies, Sprague, & New, 2008). Again, technology is us—our tools, our methods, and our own creative attempts to solve problems in our environment (Roblyer, 2006).

Rationale

The United States has a history of introducing technology into the schools to solve educational problems (Morrison & Lowther, 2010). The last four decades have seen technology evolve from programmed instruction and educational television in the classroom to microcomputers. Morrison and Lowther (2010) stated that federal and state initiatives were enacted to place more computer technology in K-12 classrooms in the hope that technology would again solve our educational problems.

Many of today's students are "living in a time when technological innovations are increasing at a pace never before seen" (Sternberg, Borck, & Kaplan, 2007, p. 416). Technology is everywhere. Schools are adding wireless connections, laptops, and a variety of

digital tools to the classroom (Morrison & Lowther, 2010). Furthermore, Sternberg, Borck, and Kaplan (2007) reported that when schools use technological resources like smartboards, IPads, and laptops, students become more engaged in their own writing. The teacher can electronically collect and organize information which can be useful for individualized instruction. According to the National Center for Education Statistics (Gray, Thomas, & Lewis, 2010), 99 percent of teachers either had one or more computers in their classroom or could bring personal computers to school, and 95 percent had daily Internet access in their classrooms.

Recent studies have shown that technologies that are considered leisure activities, such as video games, may increase reading and literacy (Marino & Beecher, 2010). Therefore, teachers need powerful innovative tools to help students communicate and think. The implementation of technology may lead to an increase in student interest, motivation and self-efficacy. Each teacher must help to articulate the vision for what the future of education should look like; each should acquire skills to help work toward realizing that vision (Roblyer, 2006).

Ertmer (2005) stated that although the conditions for successful integration finally appear to be in place, high level technology use was still surprisingly low. This suggests that there are influences like attitudes and beliefs that may predict a teacher's integration of digital technologies in the classroom. Reinking, McKenna, Labbo, and Kieffer (1998) stated that educating teachers through the use of technology in college classrooms should not only enhance teaching and learning for preservice teachers, but also should serve as models for our future teachers who will teach in the manner in which they themselves have been taught.

Theoretical Framework

The theoretical framework guiding this study is a framework for evaluating educational technology integration. The technological pedagogical content knowledge, or TPACK, builds on Shulman's (1986) descriptions of pedagogy, content, and knowledge (PCK) to explain how a teacher's understanding of educational technologies and PCK interact with one another to produce effective teaching with technology (Koehler, Mishra & Cain, 2013). Koehler, Mishra, and Cain (2013) stated that "at the heart of good teaching with technology are three core components: content, pedagogy, and technology, plus the relationships among and between them." The interactions between and among the three components play out differently across diverse contexts, and account for the wide variations in the extent and quality of educational technology integration.

Content Knowledge

Content knowledge (CK) is teachers' knowledge about the subject matter to be learned or taught (Koehler, Mishra & Cain, 2013). Knowledge of content is critical for teachers because it includes concepts, theories, ideas, organizational frameworks, and evidence of proof, as well as established practices and approaches toward developing such knowledge (Koehler, Mishra & Cain, 2013; Shulman, 1986).

Pedagogy Knowledge

Pedagogical knowledge (PK) is teachers' deep knowledge about the processes and practices or methods of teaching and learning (Koehler, Mishra & Cain, 2013). According to Koehler, Mishra, and Cain (2013), a teacher with deep pedagogical knowledge understands how students construct knowledge and acquire skills, and how they develop habits of mind and positive dispositions toward learning.

Technology Knowledge

Mishra and Koehler (2006) stated that technology knowledge is about standard technologies, such as books, e-chalk and blackboard, and more advanced technologies, such as the Internet and digital video.

Technological Pedagogical Content Knowledge (TPCK)

Technological Pedagogical Content Knowledge is an emergent form of knowledge that goes beyond all three "core" components (content, pedagogy, and technology). According to Koehler, Mishra, and Cain (2013), TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies, pedagogical techniques that use technologies in constructive ways to teach content, knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems students face, knowledge of students' prior knowledge and theories of epistemology, and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

Davies (2011) stated that the goal of technology integration in education is the wise and competent use of technology to facilitate learning. From the TPACK framework comes a framework for understanding and assessing the technology literacy of teachers and students (Davies, 2011). This framework is required for understanding and properly evaluating technology integration efforts in the teaching and learning process (Davies, 2011). The author found that understanding technological literacy involves three levels: (1) awareness, (2) praxis (i.e., training), and (3) phronesis (i.e., practical competence and practical wisdom).

Awareness Level

When teachers are aware of technology, they are able to answer the question "What can this technology do?" (Davies, 2011). Davies (2011) suggested that learners are more likely to successfully negotiate this level if they are actively seeking out opportunities to learn about new technologies. Moving through this level they become aware of the educational technologies available to them and the basic purposes and functions involved (Davies, 2011).

Praxis Level

Davies (2011) stated that at this level, learners engage in activities that help them become familiar with the customary uses and functionality of the technology. Someone at this level is able to answer the question, "How do you use this technology?" (Davies. 2011). Learners are most likely to succeed at this level when they are provided with expert guidance accompanied by practice involving simulated problem solving activities (Davies, 2011).

Phronesis Level

Davies (2011) stated that in order to attain a level of practical competence and practical wisdom, the learner must be able to apply technology to authentic situations. At this level of competency, the user must understand the learning task and recognize ways that technology will facilitate attainment of the learning goal and is able to answer the question, "How do you use this technology?" (Davies, 2011).

Davies and Linton (2008) used this conceptual framework to explore attitudinal differences in teaching candidates and classroom teachers towards integrating technology in teaching situations. Tables 1 and 2 show the levels and characteristics to understand teacher attitudes and perceived abilities in regard to integrating digital technologies in the classroom.

Table 1

Levels of Technology Literacy

Literacy Level	Type of User		Usage Level
Awareness	Functionally illiterate	Non user	None/resistant
	Limited literacy	Potential user	Limited
Praxis	Developing	Tentative user	Guided/directed
	Experienced	Capable user	Bring it on
Phonesis	Practical competence	Expert user	Power
	Practical wisdom	Discerning user	Selective

Table 2

Characteristics of Users at Various Levels of Technology Literacy

Literacy Level	Typical Activity	Literacy Question
Awareness	Hear about new technologies	What can I do?
	Learn of capabilities of new technologies	
Praxis	Practice customary implementation	How do you_____?
	Explore/attempt variety of applications	Do you? Are you?
Phonesis	Effective use of technologies capabilities	Why are you?
	Discerning/appropriate use of technologies	

Purpose of the Study

The purpose of the study was to explore pre-service and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. The study was guided by the following quantitative and qualitative research questions:

1. What differences exist between the perceived abilities of pre-service and in-service teachers with regard to integrating digital technologies into their classroom?
2. What differences exist between pre-service teachers' and in-service teachers' attitudes in integrating digital technologies into their classrooms?
3. What are the perspectives of pre-service and in-service teachers on integrating technology in the classroom?

Operational Definitions

For the purpose of the study, perceived abilities and attitudes regarding the integration of digital technologies into the classroom were measured by the respondents' responses to the Pre-Service and In-Service Teachers' Abilities Survey and the Computer Technology Integration Survey components of the Digital Technology and Classroom Survey (DTCS) instrument, respectively. Perspectives of teachers on integrating technology in the classroom were documented by analyzing the qualitative data obtained from the study's focus group participants.

Glossary of Terms

Pre-Service Teacher: a future teacher.

In-Service Teacher: a fully certified teacher who meets state mandated requirements to be a classroom teacher.

Teacher beliefs: attitudes about education, including teaching, learning, and students. (Pajares, 1992).

Integration: the process of blending technology into curricula disciplines (Pierson, 2001).

21st Century Skills: a term generally used to refer to certain core competencies such as collaboration, digital literacy, critical thinking, and problem-solving that advocates believe schools need to teach to help students thrive in today's world (Education Week, 2010).

Educational technology: any tool, piece of equipment or device—electronic or mechanical—that can be used to help students accomplish specified learning goals (Davies, Sprague, & New, 2008).

Professional Development: obtaining the skills, qualifications, and experience that allow one to make progress in his/her career (Macmillan Dictionary Online, 2015).

Technology: computers and devices that can be attached to computers (e.g., LCD projector, interactive whiteboard, digital camera), networks (e.g., Internet, local networks), and computer software (National Center for Education Statistics, 2010).

Technology Integration: incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools (National Center for Education Statistics, 2002).

Teacher Support for Technology Use: perception of a shared vision, access to technology, availability of technical assistance and support policies (Hastings, 2009).

Teacher Technology Use: administration, communication, and instructional purposes (Hastings, 2009).

Teacher Technology Proficiency: teacher's level of acquisition of technology skills, including basic operations, productivity, communication, Internet, and multimedia according to skill level (Hastings, 2009).

Delimitations, Limitations, and Assumptions

The study was delimited to pre-service and in-service teachers in a South Texas school district and university. Due to the non-experimental nature of the study, no causal inferences were drawn. Due to non-probability nature of sampling, external validity was limited to study participants. It was assumed that all participants provided accurate quantitative and qualitative data. It was also assumed that the researcher remained objective throughout the course of the study.

Significance of the Study

In order for pre-service teachers to effectively use technology in their future classrooms, they should experience effective uses of technology integrated into their pre-service curriculum. With regard to the in-service teacher, there is an apparent gap between the amount of technology available in today's classrooms and teachers' use of that technology for instructional purposes (Kopcha, 2012). One reason for this gap is that teachers are faced with significant barriers when integrating technology into their instruction.

This study may guide the efforts of teacher education programs in preparing prospective educators to integrate digital technologies effectively into their classrooms. In addition, it may guide the efforts of local school districts in providing appropriate professional development for teachers.

CHAPTER II: REVIEW OF THE LITERATURE

Introduction

The purpose of this chapter is to provide a review of selected literature relevant to this study. Areas of literature addressed include (a) technology integration, (b) preparation to integrate technology, (c) teacher attitudes on integrating technology, (d) technology skills, (e) digital natives and digital immigrants, and (f) barriers to integrating technology in the classroom.

Integrating technology into instruction can be an overwhelming task for classroom teachers (MacDonald, 2016). Technology integration is not an add on; it helps us achieve our goal of developing more strategic and effective learners (MacDonald, 2016). According to Keser, Yilmaz, and Yilmaz (2015), combining technology with education in an efficient way requires having strong technology, pedagogy, and content knowledge (TPACK). With the rise of new technologies and expansion of their use in teaching, the integration of technology, pedagogy, and content concepts has become important (Keser, Yilmaz, & Yilmaz, 2015). Mishra and Koehler (2006) provided an understanding of technology through the Technological Pedagogical Content Knowledge (TPACK) model. Keser, Yılmaz, and Yılmaz (2015) recommended that teachers offer an environment where students are able to learn effectively and efficiently and that teachers have field knowledge as well as pedagogical knowledge. With the inclusion of technology as a tool in the process of teaching, it has become necessary to consider the knowledge of technology along with field knowledge and pedagogical knowledge.

Technology Integration

Morrison and Lowther (2010) found that for most of the 20th century, schools in the United States operated on a factory model. Their goal was to create obedient and competent workers for the many factories and industries that were a part of the industrial revolution.

Similar to regimented factory workers, students sat individually in rows, completing their individual tasks, memorizing their work, and learning not to question but rather to obey authority. Times have changed. Educators, politicians, parents, and citizens began to look critically at the educational process, which resulted in the current educational reform movement (Morrison & Lowther, 2010). Morrison and Lowther (2010) stated that achieving educational reform involves multiple facets ranging from administrative support to parent and community involvement, as well as integrating 21st century knowledge and skills into the instruction.

In the early 1990s computers were rarely used in the classroom and the student-computer ration was about one student to 20 computers (Wenglinsky, 2005; Cook, 2015). According to Cook (2015), students usually went to a separate computer lab staffed with a technology teacher. Although the students had occasional access to computers, the regular classroom teachers did not. This was an issue for teacher professional development because teachers were not able to learn about how to use computers or to integrate them into their teaching.

By the fall of 2000, almost all public schools in the United States had access to the Internet and 98 percent were connected (National Center for Education Statistics, 2000). According to Leu, O'Byrne, Zawlinski, McVerry and Everette-Cacopardo (2009), the most profound influence in the 21st century may turn out to be the Internet. Weare and Lin (2000) suggested that the Internet links us to the greatest repository of information in the history of civilization. Technology integration without the Internet would be difficult as the Internet provides ways to communicate. This was a major contrast to the 35 percent of public schools that had access to the Internet in 1994.

The National Center for Education Statistics (2000) reported on teacher use of computers and the Internet in public schools that showed 39 percent of public school teachers with access to

computers or the Internet in their classroom or elsewhere indicated they used computers or the Internet "a lot" to create instructional materials, and 34 percent reported using computers "a lot" for administrative record keeping. Also, less than 10 percent of teachers reported using computers or the Internet to access model lesson plans, research, or best practices. In the same decade, using data from a study of 4000 teachers in 1100 schools across the U.S., Becker (2000) concluded that computers had not transformed the teaching practices of a majority of teachers but allowed teachers to have the necessary computing skills, some freedom in the curriculum, and convenient access to equipment. By the end of the 2000s, the National Center for Education Statistics (2010) found that 97 percent of teachers reported at least one computer in their classroom, with 54 percent stating that additional computers could be brought in when needed. Gradually, there was an increase in technology use (Cook, 2015).

A nationwide survey of teachers and superintendents by Earle (2002) indicated that the computer revolution had a tremendous impact in the classroom. The study found that the emphasis was on student access to information outside the classroom and improved student motivation, not on academic achievement. Earle (2002) stressed that driving forces for technology integration might include the power and potential of new developments, rapid availability, creativity, Internet access, ease of communication, or the promise of impact on learning.

Herold and Smith (2015) stated that Cuban, a Stanford University education professor, believed that the introduction of computers into schools was supposed to improve academic achievement and alter how teachers taught, but neither has occurred. Herold and Smith (2015) reported that a host of national and regional surveys suggest that teachers are far more likely to

use technology to make their own jobs easier and to supplement traditional instructional strategies than to put students in control of their own learning.

As technology has evolved, so has the ability to actively engage students inside and outside of the classroom (Thiele, Mai & Post, 2014). The authors stated that classrooms of today are no longer confined to a specific educational theory or style or even to the basic room with four walls, multiple rows of desks, and a number of chairs. Education today is about access to information, as teachers and students alike can be miles apart, across oceans and continents, and they can share, collaborate, and create information with the touch of a keyboard, click of a mouse, via video using their handheld mobile device (Thiele, Mai, & Post, 2014).

Preparation to Integrate Technology

Pre-Service Teachers.

Current teacher educators are being challenged to find opportunities for their pre-service teachers to develop competence in and confidence for, integrating technology into their curricula (Ertmer, Conklin, & Lewandowski, 2003). With the importance of technology in education, technology integration has been greatly emphasized in teacher training and professional development (Lawless & Pellegrino, 2007).

In the 1980s, the student teaching experience placed newcomers in classrooms where, for the most part, veteran teachers only occasionally used technology (Cuban, 1986). After serving the apprenticeship, it was the luck of the draw whether or not a teacher ended up in a school where media was encouraged. Cuban (1986) believed there was little in the formal training and early years of a teacher's career that nurtured the use of the newer forms of technology.

By the end of the 1990s, Falba, et al., (1997) reported that the outcomes of integrating technology into the education courses enabled the students to expand the use of email in

meaningful ways, to explore World Wide Web resources relevant to topics within classes, and to apply multimedia skills to create electronic presentations and portfolios. In a study conducted by Crowe (2004), prospective teachers began to use technology in their teaching both in microteaching settings and in their classrooms. As part of their education courses, the prospective teachers had several opportunities to teach within the university classroom as well design a twenty-minute lesson designed for a middle or high school classroom; they led twenty-minute issue-based discussions in the university classroom that were designed for their student teaching classroom.

Spaulding (2007) found that preparing high-quality, effective teachers to meaningfully integrate technology into their instruction is an integral part of teacher education preparation programs. Research and common knowledge indicate that to achieve effective technology integration in the K-12 classroom, one should begin with the preservice teacher and their preparation (Spaulding, 2007).

Muilenberg and Berge (2015) stated that learning how to integrate technology into instruction is a much more complex endeavor that involves not only technology skills, but also the knowledge of subject matter, pedagogical practices, and beliefs about teaching and learning. Teacher preparation programs need to implement strategies that are consistent with the developmental nature of TPACK and can help preservice teachers integrate their technological knowledge with their pedagogical content knowledge (Muilenberg & Berge 2015).

Lieu, Tsai and Huang (2015) found that although extremely familiar with related technologies, pre-service teachers tend to lack sufficient pedagogical skills. Although teacher education programs include various courses that provide pre-service teachers with technology integration-related knowledge, pre-service teachers lack opportunities to apply such knowledge.

The study demonstrated that both pre-service teachers and mentor teachers developed professionally in relation to technology integration through collaboration (Lieu, Tsai, & Huang, 2015).

In-Service Teachers

Integrating technology is not about technology—it is primarily about content and effective instruction, and it involves the tools used to deliver content and implement practices in better ways (Earle, 2002). The National Center for Education Statistics (2000) reported that technology usage was minimal: 39 percent of teachers indicated that they used computers or the Internet to create instructional materials, 34 percent for administrative record keeping, less than 10 percent reported to access model lesson plans or to access research and best practices. While today's teachers are expected to leverage the full potential of powerful conceptual technology tools to meet the changing needs of their students, they have been given few, if any, opportunities to develop their own visions for, or ideas about, meaningful technology use (Ertmer, Conklin, & Lewandowski, 2003).

Technology integration by individual teachers in their classrooms can be an isolating and challenging endeavor in which professional development in the form of mentoring can be invaluable. However, mentors who are experts in technology integration are not always available in every school or district where pre-service teachers complete their practica or where in-service teachers are employed (Dorner & Kumar, 2016).

Technology integration into classrooms is unlikely to be successful unless we understand how teachers' beliefs and attitudes influence the implementation of innovation (Czerniak & Lumpe, 1996). Abdurrahman & Farouq (2010) maintained that technology integration in the classroom has become an important aspect of successful teaching. Integration is defined not by

the amount or type of technology used, but by how and why it is used (Earle, 2002). According to the National Center for Education Statistics (2002), integrating technology is what comes next after making technology available and accessible.

The National Center for Education Statistics (2002) stated that the process of technology integration is one of continuous change, learning, and, it is hoped, improvement. It is commonly assumed that learning is enhanced through the use of the technology and that students need to develop technology skills in order to be productive members of society (Davies & Linton, 2008).

The most authoritative national survey on teacher technology use was conducted by the National Center for Education Statistics in 2010; it reported that a survey of 3,159 teachers found that when teachers did allow students to use technology, it was most often to prepare written text (61 percent of respondents reported that their students did so "sometimes" or "often"), conduct Internet research (66 percent), or learn/practice basic skills (69 percent).

The National Center for Education Statistics (2010) found through questionnaires mailed to 2005 public high schools in the 50 states and the District of Columbia that a shift occurred. The National Center for Education Statistics (2010) reported that schools were providing various technology devices for instruction, including LCD (liquid crystal display) and DLP (digital light processing) projectors (97 percent), digital cameras (93 percent), and interactive whiteboards (73 percent). The National Center for Education Statistics (2010) reported the extent to which various staff helped school staff integrate technology instruction; teachers were helped to a major extent in 20 percent of schools and to a moderate extent in 47 percent of the schools. Also, school-level technology staff helped integrate technology into instruction in 29 percent of schools to a major extent and in 34 percent to a moderate extent. District level technology staff provided technical support in 59 percent of schools to a major extent and in 27 percent to a

moderate extent. Furthermore, school-level technology staff provided technical support in 42 percent of schools to a major extent and in 30 percent to a moderate extent (National Center for Education Statistics, 2010).

Teaching itself nourishes a cautionary attitude toward change and an arms-length response to automated devices (Cuban, 1986). Cuban stated that from the very first day of being a solo practitioner, the teacher faces the complicated process of establishing routines that will permit a group of students to behave in an orderly way while the subject matter is taught. According to Cuban (1986), folklore, occupational wisdom, norms, and daily teaching practices reinforce what is, rather than nourish technological innovation.

Money spent on school technology could go to waste if teachers don't know how to use it and integrate it into the curriculum. But more often than not, adequate training is difficult to come by (Zehr, 1997). Zehr proposed that teachers who use technology also must learn how to manage their classrooms differently and need to be more comfortable with different students doing different activities at the same time, and they have to make sure all of their students—not just those who feel confident with technology—have a chance to use it. There are multiple factors that hamper technology integration in schools, including funding, access to technology, availability of support systems, ingrained pedagogical approaches, and attitudes toward the teaching and learning process (Muilenburg & Berge 2015). Muilenburg and Berge (2015) agree that one essential factor is the development of educators who are skilled in integrating technology in ways that improve teaching and learning.

Professional development is the essential ingredient to making the most of digital content in the classroom (Zehr, 1997). Zehr stated that a school can have the best software ever made and access to the Web on every computer, but it still may not see much difference in student

learning. Lawless and Pellegrino (2007) stated that the limited and mostly low-level (e.g., word processing, Internet) research uses of technology in teaching can be largely attributed to the shortage of high-quality professional development (PD) programs available to teachers. Evidence indicates that teachers' integration of digital tools into instruction remains sporadic and less than optimal (Ertmer & Ottenbreit-Leftwich, 2010). Envisioning a technology-infused classroom can help teachers transform their visions of themselves as lecturers to visons of themselves as facilitators (Cifuentes, 1997).

Even teachers who are enthusiastic about using technology can run into problems when it comes to balancing the time they spend teaching academic content with the time they and their students spend to learn the necessary technical skills (Zehr, 1997). Zehr stated that when teachers felt a conflict between the technical issues and the content, they reacted in one of three ways. Some backed off and pushed the technology to the sidelines, temporarily, to concentrate on content. Others simplified, paring away all the technology with the exception of a few activities they were comfortable with. A third group of teachers plunged even further into technology, in the hope that their students would learn the technology while mastering the content at the same time. (Zehr, 1997).

Teacher Attitudes in Integrating Technology

Pre-Service Teachers

Spaulding (2007) found that when student teachers are provided collaboration opportunities with other student teachers, as well as college faculty, they have a greater chance of integrating technology during student teaching than do those lacking these opportunities. Albion and Ertmer (2002) examined whether electronic models of exemplary technology-using teachers could provide a viable method for developing pre-service teachers' ideas about and self-

efficacy for technology integration. In their study, Albion and Ertmer (2002) found that electronic models can have a positive impact on the authentic nature of a course and simultaneously increase the confidence and integration beliefs of students. The results show that this type of modeling appears to help pre-service teachers develop a vision for what technology integration looks like in real classrooms, as well as strategies for implementing those visions (Albion & Ertmer, 2002).

In-Service Teachers

Earle (2002) found that teaching with technology causes teachers to confront their established beliefs about instruction and their traditional roles as classroom teachers. Although teachers are equipped with knowledge and skills in using computers, the success of implementing the new curriculum with information technology in education depends greatly upon the attitudes of the teachers and their willingness to embrace such technology (Sa'ari, Luan, & Roslan, 2005). According to Albion and Ertmer (2002), teachers' beliefs about teaching are likely formed through personal experience over many years, first as a student, and later as a teacher. They are also likely to be reinforced by consensus of their professional peers and by the expectations of learning in their classrooms.

Albirini (2006) found that teachers have positive attitudes toward technology in education. For instance, the majority of the participants in one study regarded computers as a strong educational tool that can bring about significant improvements to schools and classrooms. Liu (2011) stated that each teacher holds a set of beliefs that determine priorities for pedagogical knowledge and how students acquire knowledge. Recent studies determined that teacher beliefs were a critical indicator of technology use in the classroom (Becker & Ravitz, 2001; Ertmer, 2005).

Technology Skills

Pre-Service Teachers

Collier, Weinburgh, and Rivera (2004) surveyed 13 undergraduate faculty members to try to determine the key technology skills needed by preservice teachers in a teacher education program. The faculty responses indicated that preservice teachers should enter the program with the following skills: run preloaded software programs, communicate with email, create word processing documents, and properly use the Internet. The study also surveyed 43 elementary and early childhood education majors to examine student perceptions of changes that occurred in their personal technology skills from the beginning of the program until the student teaching term. The preservice teacher surveys revealed that their ability to use technology had improved during completion of the teacher preparation program (Collier, Weinburgh, & Rivera, 2004).

In-Service Teachers

Herold and Smith (2015) reported that many teachers lack an understanding of how educational technology works, so if they do not believe they can use technology to accomplish their classroom goals, they appear unlikely to attempt it. Herold and Smith (2015) shared what researchers at Michigan State University reported on the extensive use of the online word-processing tool Google Docs. The application's power to support collaborative writing and in-depth feedback, however, was not being realized.

Digital Natives, Digital Immigrants

One researcher, according to Susa (2014), established the terms digital natives, referring to students born in the environment full of technology, and *digital immigrants*, referring to those who learned how to use technology later in their lives. According to Prensky (2001), *digital immigrants* learn—like all immigrants—to adapt to their environment; however, they always

retain, to some degree, their "accent." So teachers who are *digital immigrants* are in the process of learning a new language. Prensky (2001) indicated that today's students are no longer the people our educational system was designed to teach but today's students K through college represent the first generations of *digital natives* to grow up with new technology. It is suggested that today's teachers have to learn to communicate in the language and style of their students (Prensky, 2001).

Smith (2012) noted that more than a decade after Prensky's influential articulation of *digital natives* and *immigrants*, disagreement exists around these characterizations of students and the impact of such assumptions within higher education. Critics of digital native discourse, like Bayne and Ross (2007), found that the term "*immigrant*" takes a subordinate position as being in the past and the term "*native*," which takes a more commanding position, as the future. In this case, the teacher is the "immigrant" and the students are the "natives." Bayne and Ross (2007) argued that an impossible barrier is constructed between teacher and students, which both cannot be, and must be, breached by the teacher through his or her responsibility to change.

Barriers to Integrate Technology in the Classroom

There is an apparent gap between the amount of technology available in today's classroom and teachers' use of that technology for instructional purposes (Kopcha, 2012). The gap is a result of the barriers that teachers face with technology integration. Classroom barriers to good technology are made worse by school-based factors and problematic policies (Herold & Smith, 2015). The authors reported that researchers found that even innovative teachers can be heavily affected by the pressure to conform to more traditional instructional styles, with a teacher as the focal point for the classroom. Newer teachers inclined to use technology in their classrooms can also be deterred by experienced teachers who feel differently.

A major barrier to technology integration is teachers not having access to technology (Kopcha, 2012). Teachers can feel as if they lack access to technology even when it is available because it does not work properly or because it is not useful for teaching (Clark, 2006; Lim & Khine, 2006; Zhao, Pugh, Sheldon, & Byers, 2002; Kopcha, 2012). Teacher beliefs can be a barrier because teacher's beliefs about the usefulness of and difficulty associated with integrating technology influence whether they use technology for instruction (Kopcha, 2012, Inan & Lowther, 2010; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; Vannatta & Fordham, 2004).

Another barrier to digital integration could be teachers' technology skill levels (Carver, 2016). Carver (2016) indicated that Moradi-Rekabdarkolaei (2011) found in a study that teachers were reluctant to use technology in their classrooms because they felt deficient in technology skills. Teachers' lack of proficiency could explain why educators are not yet integrating technology into their instruction (Carver, 2016). The Carver study indicated teacher skill was definitely a factor in whether or not technology was being implemented in the classroom, but equipment availability, more than any other factor, seemed to have the greatest impact on integration. Herold and Smith (2012) shared that perhaps the most obvious and overlooked barrier to effective ed-tech use is that totally changing the way teachers do their job takes an exorbitant amount of time and work.

Summary

The past three decades have brought an increased use of technology in many sectors of society (Pope, Hare, & Howard, 2002). Teachers want students responsible for their own learning, so creating a classroom that incorporates technology integration can develop a culture for autonomous learning. As Roblyer (2006) explains before integrating technology into their

teaching, educators must know a great deal. They must be able to use the technology before developing the capacity to use it as a learning tool. Certainly, teaching can be enhanced with the use of technology, but effective use of technology requires an understanding of the learning goals as well as the utility and function of the technology in accomplishing these goals (Davies, 2011). Teachers need to be strong advocates to integrate technology in their classroom. Technology gives opportunity for teachers to communicate, collaborate, and connect their classroom to the world.

CHAPTER III: METHOD

Introduction

This chapter describes the methods used to answer the study's research questions and understand how technology may be integrated into pre-service or in-service secondary teachers' classrooms. The study's research questions were:

1. What differences exist between the perceived abilities of pre-service and in-service teachers with regard to integrating digital technologies in the classroom?
2. What differences exist between pre-service and in-service teachers' attitudes with regard to integrating digital technologies in the classroom?
3. What are the perspectives of pre-service and in-service teachers on integrating technology in the classroom?

The chapter is presented in the following sections: (a) research design, (b) subject selection, (c) instrumentation, (d) data collection, and (e) data analysis.

Research Design

The study employed an explanatory sequential mixed methods design (Creswell & Plano-Clark, 2011) and was conducted in two distinct interactive phrases, beginning with the collection and analysis of quantitative data, which had the priority for addressing the study's research questions, followed by the collection and analysis of qualitative data. The quantitative and qualitative results were synthesized to answer the research questions, draw conclusions, discuss the findings, and offer theoretical and practical implications. The design is depicted in Figure 1.

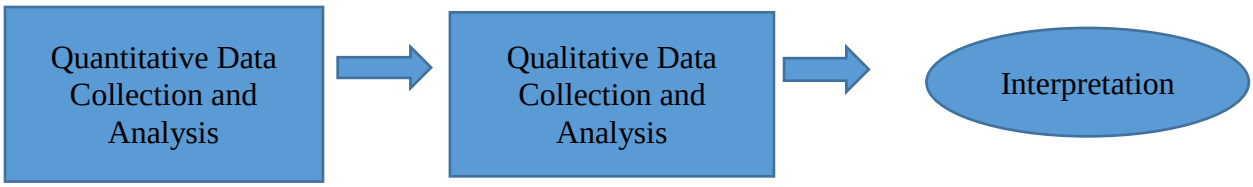

Figure 1: Explanatory Sequential Design

Quantitative

The quantitative component of the study was conducted to compare pre-service and in-service teachers on the basis of abilities and attitudes regarding the integration of digital technologies into the classroom. The study employed a causal-comparative design in which a comparison group is selected from a population which is similar to the characteristic-present group except for the variable(s)/characteristic(s) that are being investigated (Gall, Gall, & Borg, 2007). For the purpose of the study, pre-service and in-service teachers formed the characteristic-present and comparison groups, respectively. Due to the non-experimental nature of the study, no causal inferences were drawn.

Qualitative

The qualitative component of the study employed two focus groups. Creswell (2003) suggested that the focus group is designed to allow the researcher "control" over the line of questioning. Krueger and Casey (2000) pointed out that the focus group interview is intended to make a group of people with specific attributes provide qualitative data related to the research topic in a comfortable environment, under the guidance of a moderator, and through group discussions. Morgan (1997) suggested six to 10 as the suitable sample size for the focus group and noted that if it is less than six, it may be difficult to sustain a discussion; above 10, and it may be difficult to control the discussion. The qualitative component of the study was guided by interpretivism. According to Crotty (1998), interpretivism is an attempt to look at and

understand an individual or individuals' social reality of how they see the world and their meanings and experiences as individuals in this world. Using the lens of interpretivism, the researcher attempted to understand and explain pre-service and in-service teachers' perspectives of integrating digital technologies in the classroom.

Subject Selection

The study took place in South Texas. The in-service teacher respondents were from an urban school district, hereafter referred to as the District. At the time of conducting the study, the District served 38,614 students and employed 2,292 classroom teachers. Of the 2,292 teachers, 741 had master's degrees and 19 had doctoral degrees. The ethnic makeup of the district was 79.50% Hispanic, 3.90% African American, 13.80% white, and 2.80% other. There were 59.30% economically disadvantaged students and 45.50% at-risk students. The pre-service teacher respondents were from a public university, hereafter referred to as the University. At the time of conducting the study, the University had approximately 11,500 students pursuing bachelor's, master's, and doctoral degrees in five colleges, with a student-to-faculty ratio of 23-to-1, and 90.00% of the faculty holding the highest degree in their fields. The University is a Hispanic-serving institution that has long been committed to addressing the needs of all segments of the population of South Texas. Permission to conduct the study was obtained from the District's Office of External Research and the University's Institutional Review Board (IRB) (Appendix A).

Quantitative

To recruit the participants for the quantitative component of the study, the researcher contacted the potential pre-service and in-service teachers. To recruit the pre-service teachers, the researcher visited classrooms of reading (READ) courses at the University at the invitation of

the instructors of record. There were 71 pre-service teachers who voluntarily agreed to participate in the study. The in-service teachers were recruited from several elementary, middle, and high schools at the District. There were 25 in-service teachers who voluntarily agreed to participate in the study. Out of the 71 pre-service teachers, 25 were selected at random, resulting in two non-probability samples of 25 in-service and 25 pre-service teachers. Due to non-probability nature of sampling, external validity was limited to the study's participants.

Qualitative

The participants for the qualitative component of the study were pre-service and in-service teachers who agreed to participate in the focus group. Specifically, the participants of the quantitative component of the study were asked if they would be willing to take part in the focus group. Out of those who were willing to participate, 10 pre-service and 10 in-service teachers were selected at random and invited to take part in the focus group. There were four pre-service and three in-service teachers who reported to their respective focus groups, which represented a non-probability sample of the participants of the quantitative component of the study.

Instrumentation

Quantitative

A three-part survey instrument, Digital Technology and Classroom Survey (DTCS), was developed by the researcher (Appendix B).

Part one consisted of the Pre-Service and In-Service Teachers' Abilities Survey, which was used to measure perceived abilities regarding the integration of digital technologies into the classroom. The survey consisted of five parts: (1) availability of the device (5 items), (2) network (4 items), (3) classroom preparation, instruction, and administration (11 items), (4) communication with parents and students (6 items), and (5) integration (6 items). The items for

the various components were derived from published instruments (Gray, Thomas, & Lewis, 2010; Education Service Centers of Texas, n.d.; Norris & Soloway, 2000; Benjamin, 2003; Anderson, Groulx, & Maninger, 2011). A 4-point Likert-type scaling was used: 4 = a great deal, 3 = some, 2 = little, 1 = none

Part two included the Computer Technology Integration Survey (Wang, Ertmer & Newby 2004), which was used to measure the attitudes toward the integration of digital technologies into the classroom, employing 20 items. A 4-point Likert-type scaling (4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree) was employed.

Part three was designed to gather data on selected characteristics of the respondents. Specifically, they were asked to provide data on gender, level of education, years of teaching experience, pre-service or in-service status, digital identity, and willingness to participate in the focus group.

A panel of experts was formed to examine the content validity of the survey instrument. The panel of experts included a university director of distance education, a university statistician, and university professors of literacy classes. The feedback from the panel members was used to revise the instrument, which was then pilot-tested to examine its utility.

Qualitative

In alignment with the explanatory sequential mixed methods research model, the quantitative data were analyzed first and results were used to formulate the following lead questions for the focus group:

1. What is your perspective as a pre-service/in-service teacher on integrating technology in the classroom?
2. Do you have any experiences with integrating technology in the classroom?

3. Can you describe the current technological resources that you are prepared to use in your classroom?
4. Have you taken any courses that have prepared you to integrate technology? If yes, were they useful?
5. What, if any, would you change about your experience preparing to integrate technology in the classroom?
6. What type of technological resources are available to you now?
7. Where do you see yourself in using technology in the next couple of years?
8. Do you feel that integrating technology will help your students become successful in the classroom? How would you use it to improve literacy achievement in the classroom?
9. What are the negative aspects of integrating technology in the classroom?
10. What about the future use? What type of technological resources would you want to have to improve literacy?

Data Collection

Quantitative

Data were collected over a three-month period from December 2015 through February 2016 after approval was received from the researcher's dissertation committee, District's Office of External Research, and the University's IRB. To collect the data from the pre-service teachers, a paper version of the DTCS was used. Specifically, the researcher distributed surveys in person to students enrolled in READ courses within the teacher preparation program. Consent to participate in the study was obtained before students completed the survey (Appendix C). The completed surveys were returned to the researcher.

To collect the data from the in-service teachers, an on-line version of the DTCS was used. The researcher managed the survey process through Qualtrics, a web-based survey tool that was available to the University's faculty, staff, and students. Collecting data from the in-service teachers was difficult because 22 schools that were on the State of Texas' Public Education Grant (PEG) from the list could not be used for external research. Initially, an introductory email was sent to the principals of the schools which could participate in the study. Once the permission from the principal was received, all teachers were contacted by email and those who signed the consent form received the link to the on-line survey. The survey was open for data collection for three months because of the slow response rate and holidays; 25 in-service teachers who completed the survey instrument.

Qualitative

Qualitative data were collected from two focus groups. The pre-service teachers' focus group was held on May 10, 2016; the in-service group was held on June 28, 2016. Both focus groups met at the University. The researcher led both focus groups, which were voice-recorded, transcribed, and coded. All focus group participants signed a consent form (Appendix D).

Data Analysis

Quantitative

The raw data were coded and entered into the computer. The Statistical Package for the Social Sciences (SPSS) was used for the purpose of data entry, manipulation, and analysis. Descriptive statistics were used to summarize and organize the data. Specifically, appropriate measures of central tendency and variability as well as frequency and percentage tables were employed.

Cronbach's Coefficient Alpha was used to estimate the reliability (internal consistency) of the study's scale scores (Crocker & Algina, 1986). Specifically, $\alpha = [k/k-1][1-(\Sigma\sigma_i^2/\sigma_x^2)]$, where k is the number of items on the test, σ_i^2 is the variance of item i, and σ_x^2 is the total test variance (sum of the variances plus twice the sum of the co-variances of all possible pairs of its components, that is, $\sigma_x^2 = \Sigma\sigma_i^2 + 2\Sigma\sigma_{ij}$) determined the internal consistency of the various scales.

For the purpose of group comparisons, a series of t-test for independent samples (Field, 2013) was performed. Mean difference effect sizes (mean difference divided by the pooled standard deviation) were computed to examine the practical significance of the findings and were characterized as 0.20 = small effect, 0.50 = medium effect, and 0.80 = large effect (Cohen, 1988)

Qualitative

The transcript of the focus group interview was analyzed to document the perspectives of the participants regarding the integration of technology in the classroom. As recommended by Creswell and Plano Clark (2011), the following steps were performed in analyzing the transcripts: (1) the audio recorded interviews were transcribed and coded, (2) the codes were grouped into categories and the researcher worked the categories into themes, and (3) the themes were analyzed and excerpts from the interview were used to support the themes.

In accordance with the Sequential Explanatory Model, quantitative and qualitative results were synthesized to draw conclusions, discuss the findings, and propose practical and theoretical implications.

CHAPTER IV: RESULTS

Introduction

The purpose of the mixed methods study was to explore the pre-service education majors' and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. The study was guided by the following quantitative and qualitative research questions:

1. What differences exist between the perceived abilities of pre-service and in-service teachers with regard to integrating digital technologies in the classroom?
2. What differences exist between pre-service and in-service teachers' attitudes with regard to integrating digital technologies in the classroom?
3. What are the perspectives of pre-service and in-service teachers on integrating technology in the classroom?

Quantitative Results

Profile of the Subjects

The study took place in South Texas. The non-probability sample for the quantitative component of the study consisted of 25 pre-service education majors and 25 in-service elementary and secondary teachers. The in-service teachers were employed by an urban school district and the pre-service education majors were recruited from a state university. The overwhelming majority of the pre-service (92.00%) and in-service (83.30%) respondents were female. The respondents were asked to identify their digital identity. The majority of both groups, 91.70% of pre-service education majors and 52.20% of in-service teachers, reported being digital natives. For the in-service teacher respondents, 60.90% and 39.10% reported having a master's degree or a bachelor's degree, respectively. The overwhelming majority of in-

service teachers (73.90%) were secondary school teachers, followed by middle school (21.70%) and elementary school (4.30%). The years of teaching ranged from three to 33, with the median of 12.50 years.

Perceived Abilities – Devices

The respondents were provided with five available devices (Coefficient α=0.76) and asked to rate the degree to which they could operate them. The majority of the pre-service education majors (60.00%) and in-service teachers (68.00%) could do *a great deal* with the computer. The majority in both groups, 80.00% of pre-service education majors and 72.00% of in-service teachers, could also *do a great deal* with Internet. The majority of pre-service education majors (52.00%) could do *some* with the interactive white board. With respect to other devices, no systematic pattern was observed. Results are summarized in Table 3.

Table 3

Pre-Service and In-Service Teachers' Perceived Abilities Regarding Availability of Devices

		Pre-Service, n=25		In-Service, n=25	
		F	%	F	%
Computer					
	A great deal	15	60.00	17	68.00
	Some	7	28.00	9	36.00
	Very Little	1	4.00	1	4.00
	Nothing	0	0.00	0	0.00
Internet					
	A great deal	20	80.00	18	72.00
	Some	4	16.00	5	20.00
	Very Little	1	4.00	2	8.00
	Nothing	0	0.00	0	0.00
Video Conference Unit					
	A great deal	5	20.00	6	25.00
	Some	6	24.00	7	29.20
	Very Little	8	32.00	4	16.70
	Nothing	6	24.00	7	29.20
Interactive White Board					
	A great deal	6	24.00	10	40.00
	Some	13	52.00	8	32.00
	Very Little	2	8.00	3	12.00
	Nothing	4	16.00	4	16.00
Digital Camera					
	A great deal	8	32.00	10	40.00
	Some	11	44.00	8	32.00
	Very Little	2	8.00	3	12.00
	Nothing	4	16.00	4	16.00

The means of the respondents' responses were used to rank the use of the devices from the highest (*a great deal*) to the lowest (*nothing*). In both groups, computer and Internet were used the most, followed by digital camera, interactive whiteboard, and video conference unit. Results are summarized in Tables 4 and 5.

Table 4

Ranking of the Use of Available Devices by Pre-Service Education Majors, n=25

Device	Mean*
Internet	3.76
Computer	3.56
Digital Camera	2.92
Interactive Whiteboard	2.84
Video Conferencing Unit	2.40

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Table 5

Ranking of the Use of Available Devices by In-Service Teachers, n=25

Device	Mean*
Internet	3.64
Computer	3.64
Digital Camera	2.96
Interactive Whiteboard	2.96
Video Conferencing Unit	2.50

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Perceived Abilities – School/District Network

When examining the four abilities and integration skills with respect to the school or district network (Coefficient α=0.93), the results showed that the majority of in-service teachers could enter or view grades (88.00%), enter or view attendance records (84.00%), and view results of student assessments (80.00%) *a great deal*. More than half (52.00%) of the in-service

teachers reported that they could interact with IEP's. Pre-service education majors' responses were random. Results are summarized in Table 6.

Table 6

Pre-Service and In-Service Teachers' Perceived Abilities with Respect to School or District Network

		Pre-Service, n=25		In-Service, n=25	
		F	%	F	%
Enter or View Grades					
	A great deal	10	40.00	22	88.00
	Some	7	28.00	3	12.00
	Very Little	3	12.00	0	0.00
	Nothing	5	20.00	0	0.00
Enter or View Attendance Records					
	A great deal	8	32.00	21	84.00
	Some	4	16.00	3	12.00
	Very Little	3	12.00	1	4.00
	Nothing	10	40.00	0	0.00
Enter or View Results of Student Assessments					
	A great deal	9	36.00	20	80.00
	Some	5	20.00	4	16.00
	Very Little	3	12.00	1	4.00
	Nothing	8	32.00	0	0.00
Enter or View IEPs or parts of IEP relevant to your interactions with the student					
	A great deal	4	17.40	13	52.00
	Some	4	17.40	4	16.00
	Very Little	3	13.00	6	24.00
	Nothing	12	52.20	2	8.00

The means of the respondents' responses were used to rank the abilities from the highest (*a great deal*) to the lowest (*nothing*). For pre-service education majors, entering or viewing grades was ranked the highest, followed by entering or viewing results of student assessments, entering or viewing attendance records, and entering or viewing IEPs. For in-service teachers,

entering or viewing was ranked the highest, followed by entering or viewing attendance records, entering or viewing student assessments, and entering or viewing IEPs. Results are summarized in Tables 7 and 8.

Table 7

Ranking of the Abilities with Respect to School or District Network by Pre-Service Education Majors, n=25

Ability	Mean*
Enter or View Grades	2.88
Enter or View Results of Student Assessments	2.40
Enter or View Attendance Records	2.66
Enter or View IPEs or parts of IEP relevant to your interactions with the student.	2.00

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Table 8

Ranking of the Abilities with Respect to School or District Network by In-Service Teachers, n=25

Ability	Mean*
Enter or View Grades	3.88
Enter or View Attendance Records	3.80
Enter or View Results of Student Assessments	3.76
Enter or View IPEs or parts of IEP relevant to your interactions with the student.	3.12

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Perceived Abilities – Classroom Preparation and Instruction

When examining the 11 abilities and integration skills with respect to classroom preparation and instruction (Coefficient α=0.90), the majority of pre-service education majors (56.00%) and in-service teachers (58.80%) used the word processing software *a great deal*. The

majority of the respondents in both groups could do *a great deal* or *some* with spreadsheets and graphing programs, software programs in making publications, graphics and image-editing software programs, the Internet, social networking websites, Blogs and/or Wikis, and subject-specific programs. Results are summarized in Table 9.

Table 9

Pre-Service and In-Service Teachers' Perceived Abilities with Respect to Classroom Preparation, Instruction or Administrative Tasks

		Pre-Service, n=25		In-Service, n=25	
		F	%	F	%
Word Processing Software					
	A great deal	14	56.00	20	58.80
	Some	7	28.00	3	12.00
	Very Little	4	16.00	1	4.00
	Nothing	0	0	1	4.00
Spreadsheets and graphing programs					
	A great deal	2	28.00	14	56.00
	Some	13	52.00	5	20.00
	Very Little	3	12.00	6	24.00
	Nothing	2	8.00	0	0.00
Software for making publications (e.g. PowerPoint, Prezi)					
	A great deal	15	60.00	16	64.00
	Some	6	24.00	5	20.00
	Very Little	3	12.00	3	12.00
	Nothing	1	4.00	1	4.00
Graphics, image-editing software (e.g. Photoshop)					
	A great deal	6	24.00	10	40.00
	Some	10	40.00	5	20.00
	Very Little	7	28.00	8	32.00
	Nothing	2	8.00	2	8.00
Software for administering					
	A great deal	4	16.00	5	21.70
	Some	3	12.00	4	17.40
	Very Little	7	28.00	11	47.80
	Nothing	11	44.00	3	13.00

Table 9 Continued

Simulation and Visualization Programs					
	A great deal	4	16.00	8	33.33
	Some	6	24.00	3	12.50
	Very Little	7	28.00	8	33.33
	Nothing	8	32.00	5	20.80
Drill/Practice/Tutorials					
	A great deal	6	24.00	10	41.70
	Some	6	24.00	9	37.50
	Very Little	4	16.00	4	16.70
	Nothing	9	36.00	1	4.20
Subject-specific programs					
	A great deal	6	25.00	11	44.00
	Some	6	25.00	11	44.00
	Very Little	5	20.80	3	12.00
	Nothing	7	29.20	0	0.00
The Internet					
	A great deal	16	64.00	17	70.80
	Some	8	32.00	6	25.00
	Very Little	0	0	1	4.20
	Nothing	1	4.00	0	0.00
Blogs/and or Wikis					
	A great deal	5	20.80	7	28.00
	Some	9	37.50	9	36.00
	Very Little	4	16.70	8	32.00
	Nothing	6	25.00	1	4.00
Social Networking Websites					
	A great deal	16	64.00	10	40.00
	Some	5	20.00	11	44.00
	Very Little	2	8.00	2	8.00
	Nothing	2	8.00	2	8.00

The means of the respondents' responses were used to rank the abilities and integration skills with respect to classroom preparation and instruction from the highest (*a great deal*) to the lowest (*nothing*). For pre-service education majors, use of the internet and social networking websites was ranked the highest, followed by software for making publications (e.g. PowerPoint, Prezi), word processing software, spreadsheets and graphing programs, graphics, image-editing software (e.g. Photoshop), blogs/and or wikis, subject-specific programs, drill/practice/tutorials,

simulation and visualization programs, and software for administering. For in-service teachers, use of word processing software and the Internet was ranked the highest, followed by software for making publications (e.g. PowerPoint, Prezi), word Processing software, spreadsheets and graphing programs, graphics, image-editing software (e.g. Photoshop), blogs/and or wikis, subject-specific programs, drill/practice/tutorials, simulation and visualization programs, and software for administering. Results are summarized in Tables 10 and 11.

Table 10

Ranking of the Abilities and Integration Skills with Respect to Classroom Preparation and Instruction by Pre-Service Education Majors, n=25

Ability/Integration Skill	Mean*
The Internet	3.56
Social Networking Websites	3.40
Software for making publications (e.g. PowerPoint, Prezi)	3.40
Word Processing Software	3.40
Spreadsheets and graphing programs	3.00
Graphics, image-editing software (e.g. Photoshop)	2.80
Blogs/and or Wikis	2.54
Subject-specific programs	2.46
Drill/practice/tutorials	2.36
Simulation and Visualization Programs	2.24
Software for Administering	2.00

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Table 11

Ranking of the Abilities and Integration Skills with Respect to Classroom Preparation and Instruction by In-Service Teachers, n=25

Ability/Integration Skill	Mean*
Word Processing Software	3.68
The Internet	3.67
Software for making publications (e.g. PowerPoint, Prezi)	3.44
Subject Specific Programs	3.32
Spreadsheets and graphing programs	3.32
Drill/practice/tutorials	3.17
Social Networking Sites	3.16
Graphics, image-editing software (e.g. Photoshop)	2.92
Blogs/and or Wikis	2.88
Simulation and Visualization Programs	2.58
Software for Administering	2.48

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Perceived Abilities – Communication

The respondents were provided with six available ways to communicate with parents and students (Coefficient α=0.88). The majority of the pre-service education majors and in-service teachers could do *a great deal* or *some* with all. Results are summarized in Table 12.

Table 12

Pre-Service and In-Service Teachers' Perceived Abilities to Communicate with Parents and Students

		Pre-Service, n=25		In-Service, n=25	
		F	%	F	%
Email or list-serve to send out group updates or information					
	A great deal	12	50.00	14	56.00
	Some	8	33.33	6	24.00
	Very Little	1	4.20	5	20.00
	Nothing	3	12.50	0	0.00
Email to address individual concerns					
	A great deal	14	56.00	22	88.00
	Some	9	36.00	1	4.00
	Very Little	0	0.00	2	8.00
	Nothing	2	8.00	0	0.00
Online bulletin board for class distribution					
	A great deal	10	40.00	10	40.00
	Some	7	28.00	4	16.00
	Very Little	2	8.00	6	24.00
	Nothing	6	24.00	5	20.00
Course or teacher web page					
	A great deal	10	40.00	9	36.00
	Some	7	28.00	8	32.00
	Very Little	3	12.00	4	16.00
	Nothing	5	20.00	4	16.00
Course or teacher blog					
	A great deal	10	40.00	8	32.00
	Some	7	28.00	4	16.00
	Very Little	1	4.00	6	24.00
	Nothing	7	28.00	7	28.00
Text Messaging					
	A great deal	17	68.00	15	60.00
	Some	6	24.00	5	20.00
	Very Little	0	0.00	1	4.00
	Nothing	2	8.00	4	16.00

The means of the respondents' responses were used to rank the abilities with regard to communication with parents and students from the highest (*a great deal*) to the lowest (*nothing*). For pre-service education majors, using text messaging for communication was ranked the highest, followed by emailing to address concerns, emailing from a list serve, course or teacher web page, online bulletin board for class distribution and course or teacher blog. For in-service teachers, emailing to address individual concerns was ranked the highest, followed by email or list-serve to send out group updates or information, text messaging, course or teacher web page, online bulletin board for class distribution, and course or teacher blog. Results are summarized in Tables 13 and 14.

Table 13

Ranking of the Abilities with Regard to Communication with Parents and Students by Pre-Service Education Majors, n=25

Ability	Mean*
Text Messaging	3.52
Email to address individual concerns	3.40
Email or list-serve to send out group updates or information	3.21
Course or teacher web page	2.88
Online bulletin board for class distribution	2.84
Course or Teacher Blog	2.80

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Table 14

Ranking of the Abilities with Regard to Communication with Parents and Students by In-Service Teachers, n=25

Ability	Mean*
Email to address individual concerns	3.80
Email or list-serve to send out group updates or information	3.36
Text Messaging	3.24
Course or teacher web page	2.88
Online bulletin board for class distribution	2.76
Course or teacher blog	2.52

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Perceived Abilities – Preparation to Integrate Technology

The respondents were provided with six available ways which could have prepared them to integrate technology (Coefficient α=0.84). The majority of the pre-service education majors had used all *a great deal* or *some*. The majority of the in-service teachers had used the undergraduate teacher education preparation and graduate teacher education either *very little* or *none*. Results are summarized in Table 15.

Table 15

Pre-Service and In-Service Teachers' Perceived Abilities with Regard to Extent of Preparation to Integrate Technology

		Pre-Service, n=25		In-Service, n=25	
		F	%	F	%
Undergraduate teacher education preparation program					
	A great deal	7	28.00	2	8.00
	Some	12	48.00	5	20.00
	Very Little	2	8.00	12	48.00
	Nothing	4	16.00	6	24.00
Graduate Teacher Education					
	A great deal	4	18.20	1	4.50
	Some	5	22.70	7	31.80
	Very Little	1	4.50	6	27.30
	Nothing	12	54.50	8	36.40
Professional development activities					
	A great deal	5	20.80	6	24.00
	Some	8	33.33	14	56.00
	Very Little	3	12.50	5	20.00
	Nothing	8	33.33	0	0.00
Training provided by staff responsible for technology support and/or integration at your school.					
	A great deal	3	12.50	5	20.00
	Some	10	41.70	12	48.00
	Very Little	1	4.20	5	20.00
	Nothing	10	41.70	3	12.00
Independent Learning					
	A great deal	11	44.00	11	44.00
	Some	9	36.00	12	48.00
	Very Little	2	8.00	2	8.00
	Nothing	3	12.00	0	0.00
Workshops offered by Educational Service Center					
	A great deal	5	20.80	2	8.30
	Some	9	37.50	14	58.30
	Very Little	0	0.00	4	16.70
	Nothing	10	41.70	4	16.70

The means of the respondents' responses were used to rank the abilities to integrate technology from the highest (*a great deal*) to the lowest (*nothing*). In both groups, independent learning was used the most. For pre-service teachers, independent learning was followed by undergraduate teacher education preparation program, professional development activities, workshops offered by the Educational Service Center, training provided by staff responsible for technology support and/or integration at your school, and graduate teacher education. For in-service teachers, independent learning was followed by professional development activities, training provided by staff responsible for technology support and/or integration at your school, workshops offered by the Educational Service Center, undergraduate teacher education preparation program and graduate teacher education. Results are summarized in Tables 16 and 17.

Table 16

Ranking of the Abilities to Integrate Technology by Pre-Service Education Majors, n=25

Ability	Mean*
Independent Learning	3.12
Undergraduate Teacher Education Preparation Program	2.88
Professional Development Activities	2.42
Workshops offered by the Educational Service Center	2.38
Training provided by staff responsible for technology support and/or integration at your school	2.25
Graduate Teacher Education	2.05

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Table 17

Ranking of the Abilities to Integrate Technology by In-Service Teachers, n=25

Ability	Mean*
Independent Learning	3.36
Professional Development Activities	3.04
Training provided by staff responsible for technology support and/or integration at your school	2.76
Workshops offered by the Educational Service Center	2.58
Undergraduate Teacher Education Preparation Program	2.12
Graduate Teacher Education	2.05

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing

Perceived Attitudes towards Integrating Technology in the Classroom

The respondents were provided with 20 statements to measure their attitude toward integrating technology (Coefficient α=0.96). The majority of the pre-service education majors and in-service teachers either *strongly agreed* or *agreed* with all statements. Results are summarized in Table 18. The means of the respondents' responses were used to rank the attitudes toward integrating digital technology into the classroom the highest (Strongly Agree) to the lowest (Strongly Disagree) in both groups. Results are presented in Tables 19 and 20.

Table 18

Pre-Service Education Majors and In-Service Teacher Attitudes towards Integrating Digital Technology into the Classroom

		Pre-Service, n=25		In-Service, n=25	
		F	%	F	%
I feel confident that I understand computer capabilities well enough to maximize them in my classroom.					
	Strongly Agree	8	32.00	10	40.00
	Agree	14	56.00	10	40.00
	Disagree	2	8.00	4	16.00
	Strongly Disagree	1	4.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident that I have the skills necessary to use the computer for instruction.					
	Strongly Agree	12	48.00	10	40.00
	Agree	11	44.00	12	48.00
	Disagree	2	8.00	2	8.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident that I can successfully teach relevant subject content with appropriate use of technology.					
	Strongly Agree	12	48.00	9	36.00
	Agree	10	40.00	12	48.00
	Disagree	2	8.00	3	12.00
	Strongly Disagree				
	Missing	1	4.00	1	4.00

Table 18 Continued

I feel confident in my ability to evaluate software for teaching and learning.					
	Strongly Agree	9	36.00	7	24.00
	Agree	10	40.00	11	44.00
	Disagree	6	24.00	6	24.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident that I can use correct computer terminology when directing students' computer use.					
	Strongly Agree	9	36.00	9	36.00
	Agree	11	44.00	8	32.00
	Disagree	5	20.00	7	28.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident I can help students when they have difficulty with the computer.					
	Strongly Agree	9	36.00	7	28.00
	Agree	13	52.00	12	48.00
	Disagree	3	12.00	4	16.00
	Strongly Disagree	0	0.00	1	4.00
	Missing	0	0.00	1	4.00
I feel confident I can effectively monitor students' computer use for project development in my classroom.					
	Strongly Agree	12	48.00	5	20.00
	Agree	9	36.00	16	64.00
	Disagree	4	16.00	2	8.00
	Strongly Disagree	0	4.00	1	4.00
	Missing	0	0.00	1	4.00

Table 18 Continued

I feel confident that I can motivate my students to participate in technology-based projects.					
	Strongly Agree	12	48.00	6	24.00
	Agree	11	44.00	16	64.00
	Disagree	2	8.00	2	8.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident I can consistently use educational technology in effective ways.					
	Strongly Agree	11	44.00	6	24.00
	Agree	12	48.00	14	56.00
	Disagree	2	8.00	4	16.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident I can provide individual feedback to students during technology use.					
	Strongly Agree	11	44.00	7	28.00
	Agree	11	44.00	13	52.00
	Disagree	3	12.00	3	12.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	2	8.00
I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.					
	Strongly Agree	11	44.00	9	36.00
	Agree	10	40.00	12	48.00
	Disagree	4	16.00	3	12.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00

Table 18 Continued

I feel confident about selecting appropriate technology for instruction based on curriculum standards.					
	Strongly Agree	11	44.00	6	24.00
	Agree	9	36.00	16	64.00
	Disagree	5	20.00	2	8.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident about assigning and grading technology-based projects.					
	Strongly Agree	10	40.00	6	24.00
	Agree	11	44.00	13	52.00
	Disagree	4	16.00	3	12.00
	Strongly Disagree	0	0.00	1	4.00
	Missing	0	0.00	2	8.00
I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.					
	Strongly Agree	10	40.00	5	20.00
	Agree	11	44.00	16	64.00
	Disagree	4	16.00	2	8.00
	Strongly Disagree	0	0.00	1	4.00
	Missing	0	0.00	1	4.00

Table 18 Continued

I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.					
	Strongly Agree	10	40.00	7	28.00
	Agree	8	32.00	14	56.00
	Disagree	5	20.00	3	12.00
	Strongly Disagree	2	8.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident that I will be comfortable using technology in my teaching.					
	Strongly Agree	11	44.00	6	24.00
	Agree	10	40.00	15	60.00
	Disagree	3	12.00	2	8.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	1	4.00	2	8.00
I feel confident I can be responsive to students' needs during computer use.					
	Strongly Agree	11	44.00	7	28.00
	Agree	10	40.00	13	52.00
	Disagree	4	16.00	4	16.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00

Table 18 Continued

I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.					
	Strongly Agree	12	48.00	8	32.00
	Agree	11	44.00	14	56.00
	Disagree	2	8.00	2	8.00
	Strongly Disagree	0	0.00	0.00	
	Missing	0	0.00	1	4.00
I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively with technology.					
	Strongly Agree	10	40.00	7	28.00
	Agree	11	44.00	11	44.00
	Disagree	4	16.00	6	24.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00
I feel confident that I can carry out technology based projects even when I am opposed by skeptical colleagues.					
	Strongly Agree	10	40.00	7	28.00
	Agree	9	36.00	13	52.00
	Disagree	5	20.00	4	16.00
	Strongly Disagree	0	0.00	0	0.00
	Missing	0	0.00	1	4.00

Table 19

Ranking of the Attitudes towards Integrating Digital Technology into the Classroom for Pre-Service Education Majors, n=25

Attitude	Mean*
I feel confident that I can successfully teach relevant subject content with appropriate use of technology.	3.42
I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.	3.40
I feel confident that I can motivate my students to participate in technology-based projects.	3.40
I feel confident that I have the skills necessary to use the computer for instruction.	3.40
I feel confident I can consistently use educational technology in effective ways.	3.36
I feel confident that I will be comfortable using technology in my teaching.	3.33
I feel confident I can provide individual feedback to students during technology use.	3.32
I feel confident I can effectively monitor students' computer use for project development in my classroom.	3.32
I feel confident I can be responsive to students' needs during computer use.	3.28
I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.	3.28
I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.	3.24

Table 19 Continued

I feel confident about assigning and grading technology-based projects.	3.24
I feel confident I can help students when they have difficulty with the computer.	3.24
I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively with technology.	3.24
I feel confident about selecting appropriate technology for instruction based on curriculum standards.	3.24
I feel confident that I can carry out technology based projects even when I am opposed by skeptical colleagues.	3.21
I feel confident that I can use correct computer terminology when directing students' computer use.	3.16
I feel confident that I understand computer capabilities well enough to maximize them in my classroom.	3.16
I feel confident in my ability to evaluate software for teaching and learning.	3.12
I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.	3.04

*4=Strongly Agree, 3=Agree, 2=Disagree, 1=Strongly Disagree

Table 20

Ranking of the Attitudes towards Integrating Digital Technology into the Classroom for In-Service Teachers, n=25

Attitude	Mean*
I feel confident that I have the skills necessary to use the computer for instruction.	3.33
I feel confident that I can successfully teach relevant subject content with appropriate use of technology.	3.25
I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.	3.25
I feel confident that I understand computer capabilities well enough to maximize them in my classroom.	3.25
I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.	3.25
I feel confident that I will be comfortable using technology in my teaching.	3.17
I feel confident I can provide individual feedback to students during technology use.	3.17
I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.	3.17
I feel confident about selecting appropriate technology for instruction based on curriculum standards.	3.17
I feel confident that I can motivate my students to participate in technology-based projects.	3.17

Table 20 Continued

I feel confident that I can carry out technology based projects even when I am opposed by skeptical colleagues.	3.12
I feel confident I can be responsive to students' needs during computer use.	3.12
I feel confident I can consistently use educational technology in effective ways.	3.08
I feel confident that I can use correct computer terminology when directing students' computer use.	3.08
I feel confident about assigning and grading technology-based projects.	3.04
I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively with technology.	3.04
I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.	3.04
I feel confident I can effectively monitor students' computer use for project development in my classroom.	3.04
I feel confident I can help students when they have difficulty with the computer.	3.04
I feel confident in my ability to evaluate software for teaching and learning.	3.04

*4=Strongly Agree, 3=Agree, 2=Disagree, 1=Strongly Disagree

Group Comparisons

To answer the study's first research question, "What differences exist between the perceived abilities of pre-service and in-service teachers with regard to integrating digital technologies into their classrooms?", a mean score was computed for each of the five categories,

namely, (1) available devices, (2) school or district network, (3) classroom preparation, instruction, or administrative tasks, (4), communication, and (5) classroom integration of technology. The scale scores were not highly correlated with each other, ranging from 0.23 to 0.62. A series of t-test for independent samples was used to compare the two groups on the basis of the scale scores. Mean difference effect sizes were used to examine the practical significance of the findings. As can be seen in Table 21, other than the school or district network, none of the differences was statistically significant. The in-service teachers showed higher abilities and integration skills with respect to the school or district network than did the pre-service education majors. Although the difference was not statistically significant, the mean difference effect size suggested that the in-service teachers were more skilled in classroom operation than were the pre-service education majors.

Table 21

Comparison of Abilities to Integrate Digital Technologies between Pre-Service Education majors and In-Service Teachers

	Pre-Service, n=25		In-Service, n=25				
	M*	SD	M*	SD	t	p	ES**
Available Device	3.09	0.60	3.15	0.69	0.27	0.79	0.08
School or District Network	2.50	1.18	3.64	0.50	4.67	< 0.01	1.35
Classroom Operation	2.84	0.72	3.14	0.61	1.59	0.12	0.46
Communication	3.11	0.84	3.10	0.50	-0.06	0.96	0.02
Preparation	2.55	0.94	2.67	0.94	0.54	0.59	0.16

*4=A Great Deal, 3=Some, 2=Very Little, 1=Nothing
**ES is the mean difference effect size: 0.20=small, 0.50=medium, >0.80=large

To answer the study's second research question, "What differences exist between pre-service teachers' and in-service teachers' attitudes in integrating digital technologies into their classrooms?", the 20 attitudinal items were used to compute a mean score, representing the outcome measure of interest. A t-test for independent samples showed that the group differences were not statistically significant. The mean difference effect size was small, favoring the pre-service education majors. Results are summarized in Table 22.

Table 22

Comparison of Attitudes to Integrate Digital Technologies between Pre-Service Education majors and In-Service Teachers

	Pre-Service, n=25		In-Service, n=25				
	M*	SD	M*	SD	t	p	ES**
Tech Integration Agreement/Disagreement	3.27	0.66	3.14	0.50	0.75	0.46	0.22

*4=Strongly Agree, 3=Agree, 2=Disagree, 1=Strongly Disagree
**ES is the mean difference effect size: 0.20=small, 0.50=medium, >0.80=large

Qualitative Results

The qualitative element of the explanatory sequential mixed methods inquiry model addressed the study's third question (What are the perspectives of pre-service and in-service teachers on integrating technology in the classroom?). Two focus groups were conducted. The lead questions were:

1. What is your perspective as a pre-service teacher/in-service teacher on integrating technology in the classroom?
2. Do you have any experiences with integrating technology in the classroom?
3. Describe the current technological resources that you are prepared to use in your classroom?

4. Have you taken any courses that have prepared you to integrate technology? If yes, were they useful?

5. What, if any, would you change about your experience preparing to integrate technology in the classroom?

6. What type of technological resources are available to you now?

7. Where do you see yourself in using technology in the next couple of years?

8. Do you feel that integrating technology will help your students become successful in the classroom? How would you use it to improve literacy achievement in the classroom?

9. What are the negative aspects of integrating technology in the classroom?

10. What about the future use? What type of technological resources would you want to have to improve literacy?

Participants

There were four pre-service (all female; two Hispanic, one White, and one Asian) and three in-service (two females, one male; all Hispanic) teachers who voluntarily participated in the focus groups. All had participated in the quantitative component of the study.

Procedures

The pre-service and in-service focus groups were conducted on May 10, 2016, and June 28, 2016, respectively, at the University. The researcher moderated the focus group discussions, took notes, audio-recorded the conversations, and later transcribed them. Each participant signed a voluntary consent form. All participants were informed that individual identity would remain confidential. The researcher asked the study's leading questions and encouraged conversation among the participants.

Focus Group Results

The analysis of the data from both focus groups resulted in six (6) categories and three themes. The themes were *Affirmation of Technology, Barriers,* and *Educational Experiences.* Table 23 shows the three themes and each of their respective categories.

Table 23

Themes and Categories for Perspectives

Theme 1: Affirmation of Technology
• Reliability
• Availability
Theme 2: Barriers
• Exposure
• Change
Theme 3: Educational Experiences
• Practice
• Future Outlook

Pre-Service Focus Group Results

The first theme, *Affirmation of Technology,* emerged as the pre-service teachers discussed how they felt about technology. Reliability and availability were the driving factors in discussing the technology. In terms of reliability, one pre-service teacher discussed how educators "can't rely on technology." Another pre-service participant mentioned, "it doesn't always work, so it does have its downsides." Discussion also revolved around how technology should "not be the focal point." There has to be "balance."

With respect to availability, one pre-service participant mentioned that she had a computer and cell phone. Another pre-service participant commented that she had a tablet and an iPad. The pre-service participants discussed that "a lot of students use computers." Therefore, it should be "on display for everyone to see," and "you know all the technology." A "whole computer lab" should be available for student use. A pre-service participant, who did not

consider herself a native to technology, discussed how she had to "get updated" with the technology. A pre-service participant revealed that she was "all for it" and would "learn to do things." The pre-service teachers' responses to *Affirmation of Technology* are summarized in Table 24.

Table 24

Pre-Service Teachers' Perspectives, Theme 1: Affirmation of Technology, Selected Excerpts

Pre-Service Theme 1: Affirmation of Technology
Reliability: • "display for everyone to see" • "never actually taught with technology" • "haven't mastered it" • "Ms. this is how you do it, I'm like okay well teach me." • "that balance" • "didn't get one until 2011." • "did not know how to use it" • "aren't using it" • "can't rely on technology" • "it didn't work when he was too far away from the computer so it does have its downsides." • "not like the focal point" • "don't believe everything you see on that IPad." • "lose a little bit of control" • "you can't be everywhere" • "it would break down it would be the worst"
Availability: • "I got updated" • "a way to use technology" • "I am all for it" • "yeah let's do that" • "I'm like wait, how do you that" • "a lot of the students use computers" • "display for everyone to see" • "you know all the technology" • "using technology" • "learn to do things" • "a whole computer lab"

The second theme, *Barriers,* emerged as the pre-service teachers discussed how they felt about the difficulty with technology integration. One factor that emerged with the pre-service teachers was that "they haven't been exposed." Without exposure, integration is impossible. One pre-service participant discussed that the first time she was exposed to technology integration was "until I got to college." Another pre-service participant felt that "we are in the middle because we were never actually taught with technology."

With respect to exposure, one pre-service participant responded that "everyone just assumes you know to use technology" but that is not always the case. Another participant mentioned that there was a need for "open electives for teachers" to have that exposure to technology. Another pre-service teacher mentioned that she "wished there were more computer courses" available to take. "I am old school" was a response that a pre-service participant relayed as a barrier because she was not a "millennial" and "does not know the language." Discussion also included the limitations of being a "pre-service teacher" and "learning little by little."

The ability to change is a huge barrier because the "world now revolves around technology." One pre-service participant mentioned that technology was an "expectation." Another participant said that technology was "already in their world" and "you can move up to more because eventually it will get there." The pre-service participants discussed that technology "needs to be a foundation" but "you need backups." All agreed that "you have to learn and you have to adapt." The pre-service teachers' responses to *Barriers* are summarized in Table 25.

Table 25

Pre-Service Teachers" Perspectives, Theme 2: Barriers, Selected Excerpts

Theme 2: Barriers
Exposure: • "haven't really been exposed" • "learned how to integrate" • "was old school" • "never actually taught with technology" • "not exposed to technology in classroom" • "pre-service wise I have not been exposed to use it." • "always wanted to know how to use those." • "learning little by little" • "haven't mastered it" • "people aren't using it" • "That is why I don't use it" • "first time I was exposed" • "until I got to college." • "everyone just assumes you know how to use technology." • "We are in the middle?" • "wish there were more computer courses." • "need open electives for teachers" • "Just because the students have grown up around it, doesn't mean they know how to use it" • "we are millennials" • "They don't know the language."
Change: • "world revolves around technology." • "you're all about the computer" • "already in their world." • "an expectation" • "what the world is now." • "needs to be a foundation" • "You can move up to more because eventually it's going to get there" • "you need backups." • "it needs to be more" • "the world is changing" • "You have to learn." • "It's a must" • "you have to adapt." • "The world is changing with technology." • "We also need to change."

As the participants discussed current and future practice, the third them began to emerge. The theme of *Educational Experiences* surfaced as the pre-service teachers discussed how they felt about their experiences with technology integration. One pre-service participant mentioned that their "field base course focuses on integrating technology." Another participant reported that she "loved technology as long as she knows how to use it." Discussion between the pre-service teachers revealed that using technology was "interesting," "very interactive," and that "she is going to learn a lot about that technology."

With respect to future practices, the pre-service participants reported that they used the technology "at home and pretty much everywhere." They discussed how their students' future success revolved around "putting tablets out to motivate them" and "incorporating audio books and stuff so they can listen to the person read." One pre-service participant said, "I think laptops, and computers are very necessary when teaching literacy." Another pre-service participant revealed "when I picture my library, I can already see like computers there with the books." All agreed that "you just don't want to do technology" and "there should not be a reliance on it." Considering the future practices in their classrooms, the discussion focused on how "these kids really need to be taught that's not how you do it" and there "has to be a lot of discipline and a lot of expectation." The pre-service teachers' responses to *Educational Experiences* are summarized in Table 26.

Table 26

Pre-Service Teachers' Perspectives, Theme 3: Educational Experiences, Selected Excerpts

Theme 3: Educational Experiences
Current Practice: • "learned how to integrate" • "technology in the classroom" • "interesting" • "going to learn a lot about that (technology)." • "very interactive" • "display for everyone to see" • "It's interesting that they already know that" • "It was crazy to see how they were doing their group work on the board." • "They like that." • "They enjoy that." • "more engaged when they use technology" • "wanted us to use different types of digital media." • "field base that focuses on integrating technology." • "multiple people can work on it at one time" • "at home, pretty much everywhere." • "If they're going to be successful, they are going to have to be able to use the technology." • "teaching them how to use the internet appropriately" • "not just word processing but also learning ways to publish their work too." • "research." • "have to be engaged" • "I love technology as long as I know how to use it."
Future Practice: • "I think laptops, and the computers are very necessary when teaching literacy" • "when I picture my library, I can already see like computers there with the books." • "put tablets out to motivate them." • "introduce that two-year-old with IPads or E-Readers." • "you just don't want to just do technology" • "I would like my students to have personal laptops." • "I would like to have a classroom full of computers." • "Incorporating audio books and stuff so they can listen to the person read" • "know their fluency and using expressions and stuff." • "read their writing into the thing and the internet plays back" • "it's engaging and interesting." • "These kids really need to be taught that's not how you do it" • "has to be a lot of discipline and a lot of expectation."

In-Service Focus Group Results

The first theme, *Affirmation of Technology*, emerged as in-service teachers discussed the reliability and availability of the technology. In the context of reliability, for example, one in-service teacher said that "it's difficult to rely on technology because technology fails due to blocked websites." Another teacher mentioned that there are "computers from 2007 that have not been replaced" and "they are woefully slow." And there was one who felt that "it's so disheartening when you have the resource available but someone is not willing to do the extra step."

With respect to availability, there was a teacher who said, "labs are not available for standard teacher/student use because they are being used for dual credit courses or E-20-20 courses." Another teacher expressed that "it was a conflict with the lab actually being open, computers were broken, mice were missing, keyboards, etc." All reported that "we did receive the Smart TVs but we couldn't use them the way they should be used because we still haven't had any formal training." There was also a reference to "we are responsible for ourselves and the reality should be, someone should be responsible and looking out for us to make sure it's getting done and available." There was a teacher who noted that "some days there are not enough resources to go around and most of the technology does not work." The in-service teachers' responses to *Affirmation of Technology* are summarized in Table 27.

Table 27

In-Service Teachers' Perspectives, Theme 1: Affirmation of Technology, Selected Excerpts

Theme 1: Affirmation of Technology
Reliability: • "it's difficult to rely on technology because technology fails due to blocked websites." • "labs are not available for standard teacher/student use because they are being used for dual credit courses or E-20-20 courses." • "it's so disheartening when you have the resource available but someone is not willing to do the extra step." Availability: • "it was a conflict with the lab actually being open, computers were broken, mice were missing, keyboards, etc." • "we did receive the Smart T.V.'s" but we couldn't use them the way they should be used because "we still haven't had any formal training." • "some days there are not enough resources to go around and most of the technology does not work."

As the difficulty with technology integration was being discussed, the second theme, *Barriers,* emerged. For example, the participants said that "they got the TVs but didn't get the laptops for the TVs," and explained that the training was like "here take notes real quick" and "pretty fast paced." A participant pointed out "that's not what I need, I need the real stuff, the fancy stuff, the real hands on stuff," and the other participants agreed with him.

With respect to exposure, a participant said that "we have iPad Airs and one Computer on Wheels (cow) of Chromebooks." Another participant expressed that he had to "purchase my own 3D printer for my students to be exposed to the products they produced." All agreed that they were exposed to "document cameras in their classroom and that it gave them the opportunity to go through the thinking process of writing an essay with their students." There was a participant who said that "having exposure to Google classroom, Google drive, and

Google docs is amazing." And another one noted that "there are too many road blocks as to why we don't use technology."

Regarding the change, all agreed that "the district can be better if they provide the right professional development." One participant relayed that "change is necessary in providing access to training," while another one expressed that "there are two things you can give a teacher, time or pay them, and if you can't pay them, give them time." There was a teacher who agreed that they had to "do it during their planning time," and that "if it's not enforced from above, meaning administration, it's never consistent." An in-service teacher agreed that "change can happen if everyone is on board." The in-service teachers' responses to *Barriers* are summarized in Table 28.

Table 28

In-service Teachers" Perspectives, Theme 2: Barriers, Selected Excerpts

Theme 2: Barriers
Exposure: • "they got the TVs but didn't get the laptops for the TVs." • "here take notes real quick" and "pretty fast paced." • "that's not what I need" • "I need "the real stuff, the fancy stuff, the real hands on stuff." • "we have iPad Airs and one cow of Chromebooks." • "purchase my own 3D printer for my students to be exposed to the products they produced." • "document cameras in their classroom and that it gave them the opportunity to go through the thinking process of writing an essay with their students • "having exposure to google classroom, google drive, and google docs is amazing." • "there are too many road blocks as to why we don't use technology."
Change: • "the district can be better if they provide the right professional development." • "change is necessary in providing access to training • "there are two things you can give a teacher, time or pay them." • "if it's not enforced from above, meaning administration, it's never consistent." • "train on their own time." • "change can happen if everyone is on board."

As the participants discussed current and future practices, the third theme, *Educational Experiences*, surfaced, which focused on the participants' experiences with technology integration. For example, the participants said "that technology integration should be scaffolded for them, since it's the willingness that a teacher needs to embrace before any sort of technology." All communicated that "Tech to Teach is voluntary, and another training was mandatory but both were the same," and all agreed that it was "a waste of time."

With respect to future practices, the discussion centered on "needing more." A participant discussed her new position as a librarian and said that "librarians will be working on digital literacy curriculum." Another teacher mentioned that he would like to see "Rosetta Stone for ESL students and parents as availability for parents to communicate with us." The same participant was also in favor of a "paperless campus that looks like ……." The in-service teachers' responses to *Educational Experiences* are summarized in Table 29.

Table 29

In-Service Teachers' Perspectives, Theme 3: Educational Experiences, Selected Excerpts

Theme 3: Educational Experiences
Current Practice: • "that technology integration should be scaffolded for them, since it's the willingness that a teacher needs to embrace before any sort of technology." • "Tech to Teach is voluntary, and another training was mandatory but both were the same." • "a waste of time." • "don't focus on surface level technology" • "They (students) confuse ability to use social media with being able to use technology in the classroom and it's not the same"
Future Practice: • "don't take technology courses away" • "Rosetta Stone for ESL students and parents" • "Availability for parents to communicate with us" • "Paperless campus" • Implement to look like (high school)."

Summary of the Results

Analysis of quantitative data showed that with respect to the perceived abilities of pre-service and in-service teachers regarding the integration of digital technologies into their classroom, the difference on the basis of the school or district network was statistically significant, favoring the in-service teachers. With respect to the attitudes towards integrating digital technologies into the classrooms, there were no statistically significant differences between the pre-service and in-service teachers. Analysis of qualitative data for both the in-service and pre-service teachers resulted in three themes, namely, Affirmation of Technology, Barriers, and Educational Experiences.

CHAPTER V: SUMMARY, CONCLUSIONS, AND DISCUSSION

Introduction

The purpose of the study was to explore pre-service and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. The study was guided by the following quantitative and qualitative research questions:

1. What differences exist between the perceived abilities of pre-service and in-service teachers with regard to integrating digital technologies into their classroom?
2. What differences exist between pre-service teachers' and in-service teachers' attitudes in integrating digital technologies into their classrooms?
3. What are the perspectives of pre-service and in-service teachers on integrating technology in the classroom?

The study employed a sequential explanatory mixed-methods design (Creswell & Plano-Clark, 2011), and was conducted in two distinct interactive phrases, beginning with the collection and analysis of quantitative data, which had the priority for addressing the study's research questions, followed by the collection and analysis of qualitative data. For the purpose of the study, pre-service (n=25) and in-service teachers (n=25) formed the characteristic-present and comparison groups, respectively. The qualitative component of the study employed two focus groups (n=7).

The theoretical framework guiding this study was a framework for evaluating educational technology integration. The technological pedagogical content knowledge, or TPACK, builds on Shulman's descriptions of pedagogy, content, and knowledge (PCK) to explain how a teacher's understanding of educational technologies and PCK interact with one another to produce effective teaching with technology (Koehler, Mishra & Cain, 2013).

Summary of the Results

To answer the study's first research question, what differences exist between the perceived abilities of pre-service and in-service teachers with regard to integrating digital technologies into their classroom, the results showed that with respect to the perceived abilities of pre-service and in-service teachers regarding the integration of digital technologies into their classroom, the difference on the basis of the school or district network was statistically significant, favoring the in-service teachers. The difference can be attributed to the in-service teacher having the practice and experience using a district or school network. To answer the study's second research question, what differences exist between pre-service teachers' and in-service teachers' attitudes in integrating digital technologies into their classrooms, the results showed that with respect to attitudes toward integrating digital technologies into the classrooms, there were no statistically significant differences between the pre-service and in-service teachers. To answer the study's third research question, what are the perspectives of pre-service and in-service teachers on integrating technology in the classroom, the analysis of the qualitative data for both the in-service and pre-service teachers resulted in three themes, namely, Affirmation of Technology, Barriers, and Educational Experiences. For Affirmation of Technology, the results indicated that both pre-service and in-service teachers believed technology integration was important. With regard to Barriers, the results showed that lack of exposure and training, as well as a limited time and equipment reliability contributed to the barriers that both pre-service and in-service teachers are facing with integration of technology in the classroom. With respect to Educational Experiences, pre-service teachers would like more practice in their course work and in-service teachers would like to see more professional development that is aligned with their skill level.

Conclusions

The synthesis of quantitative and qualitative results showed that there were differences in the optimism and expectations of pre-service and in-service teachers regarding the integration of technology in classrooms. Pre-service teachers were optimistic about having a classroom full of computers and making their lessons interesting and engaging. On the other hand, the in-service teachers had experienced the lack of availability of technology, training, and support from their administrators. In-service teachers, therefore, reflected less optimism about integrating technology into their classrooms. Both groups reported that they had the skills to integrate technology in an instructional setting.

Discussion

It is not uncommon for university faculty and classroom teachers attending conference sessions on technology in education to hear the topic explained in the *digital native* versus *digital immigrant* framework (Prensky, 2001). University faculty and K-12 in-service teachers, generally older, are usually placed in the *digital immigrant* category. Their pre-service university students, and the K-12 children they teach, are identified as *digital natives.* The Prensky framework has been challenged by later researchers (e.g., Smith, 2012), but the *immigrant/native* model is still found in education circles. *Digital natives*, it is presumed, are more comfortable and fluent with a variety of digital media. There seems to be the implication that the university students, then, are more open to and familiar with instructional technology than are their in-service counterparts.

The review of the literature showed that both pre-service and in-service teachers tend to develop professionally, in relation to technology integration, through collaboration. The current study was not consistent with the previous research and revealed that overall, independent

learning was used the most frequently with regard to integrating technology. The responses from the in-service teachers indicated that school administrations could support teachers' professional development with education technology in two ways, namely through time and supplemental pay. Teachers reported a lack of support for their development in technology skills. They said they had to train on their own and on their own time. District-provided training was inconsistent and was not supplemented with a designated staff member to provide mentorship and assistance.

Previous research by Becker (2000) concluded that computers have not transformed the teaching practices of a majority of teachers but can be valuable tools. Fast forward, 16 years later, responses by both pre-service and in-service teachers were consistent with these findings. A teacher cannot rely on technology, and technology should not be the focal point of instruction. Technology integration is just beginning to transform the learning environment of the classroom. Teachers realize that they can transform delivery of the content and provide different learning opportunities for their students.

Both pre-service and in-service teachers' reporting of barriers with technology integration in the current study is consistent with Kopcha's (2012) research which revealed a gap between the amount of technology availability in today's classroom and teachers' use of that technology for instructional purposes. One participant in the in-service teacher focus group provided an example of how availability of technology was an issue when she tried to integrate it into her classroom. When technology was not available for classroom use, she was required to use a school computer lab. Trying to get in a lab that was actually open was difficult. Once the participant gained access, she found some computers were broken, mice and keyboards were missing, and some keyboards did not work properly. In contrast, the pre-service focus group was

optimistic about the technology in their future classroom, expecting access to technology and functioning computer labs.

Another potential barrier to the integration of technology into the classroom is the skill level of teachers. (Moradi-Rekabdarkolaei, 2011). A previous research study by Albion and Ertmer (2002) found that electronic modeling could have a positive impact on pre-service teachers and provide a viable method for developing their ideas about self-efficacy for technology integration. The findings of this study are consistent with that research. Pre-service teachers reported that they do take field base courses that allow them to learn and practice with technology integration. This learning and practice is helpful in shaping their confidence in integrating technology.

Research by Muilenberg and Berge (2015) indicated that teacher preparation programs need to implement strategies that are consistent with the developmental nature of TPACK and can help pre-service teachers integrate their technological knowledge with their pedagogical content knowledge. The findings of this study indicate that those strategies are being implemented. Pre-service teachers reported that they have been exposed to technology instruction and have had some experience with technology integration in their undergraduate courses.

Implications

The study was conducted to compare pre-service and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. While there has been a large amount of research citing the TPACK framework with regard to integrating technology in the classroom, there have not been studies that provided qualitative data that compare the perspectives of both pre-service and in-service teachers' to integrating technology in

the classroom. The results are useful to school districts and university faculty responsible for developing the technological skills of current and future teachers. The quantitative results revealed that both pre-service and in-service teachers have the knowledge and skills to integrate technology into their classrooms but need specific development and practice in design activities to make technology integration successful. This study intends to expand the field of research focusing on the attitudes that both pre-service and in-service teachers acquire as they participate in transforming learning experiences in their current classroom or plan for their future classroom to effectively integrate technology.

The results of this study provide implications for local school districts to provide appropriate professional development for their teachers regarding the use of technology for instructional purposes. The professional development that teachers are assigned or volunteer to take should be at a skill level that is aligned with abilities. Professional development for teachers can be ineffective if a teacher is bored and non-productive. Curriculum directors can advocate for creation of staff development at the university level, education service centers and district levels to create individualized, scaffolded professional development that is relevant to teacher ability level. In-service teachers would benefit from better planning efforts for rolling out technology where all technological resources arrive at the same time and can be implemented accordingly. The implications from this study suggest that personnel from different departments will have to work together to make technology happen in the classrooms and how money is spent on technology needs to align with training and availability of resources.

The results of this study may guide the efforts of teacher education programs in preparing prospective educators to integrate digital technologies effectively into their classrooms. The study provides to those going into the teaching field an awareness of technology available and

provides for transformation. The implications provide for pre-service teacher educators to create curriculum and classes at the university level in teacher prep programs to teach education technology integration effectively.

The focus groups conducted during the research revealed suggestions for improvement in both pre-service and in-service situations. Pre-service participants reported positive attitudes toward technology and their own abilities in the quantitative portion of the study; however, in the focus group, there were references to the need for more practice and experience with the use of technology, especially across devices such as tablets and laptops. Teacher preparation programs should examine the amount of time and emphasis placed on teaching future educators how to integrate technology in the classroom. In-service teachers' issues revolved around access to hardware, online resources, and training. In the focus group, in-service teachers reported insufficient access to technology in their classrooms and difficulty accessing online resources dues to blocked websites. The in-service teachers also expressed a need for better training and ongoing staff resources.

Recommendations for Further Research

While completing this study, the researcher noted several areas for future research:

- A larger group of both pre-service and in-service participants,
- Equal representation of elementary and secondary participation in both the quantitative survey and qualitative focus groups,
- A follow-up focus group with the pre-service participants once they have completed their first year of teaching,
- Expanding the survey to include administrators in order to better understand their role in district and campus digital technology integration.

- An examination of student skills and perspectives related to integrating technology in their instruction.

References

Albion, P. R., & Ertmer, P. A. (2002). Beyond the Foundations: The Role of Vision and Belief in Teachers' Preparation for Integration of Technology. Techtrends, 46(5), 34-38.

Albirini, A. (2006). Teachers' attitudes toward information and communication technologies: The case of Syrian EFL teachers. *Computers & Education, 47*(4), 373-398.

Abdurrahman G.A., & Farouq, A.A. (2010). Teachers' Perceptions of Technology Integration in the United Arab Emirates School Classrooms. Journal of Educational Technology & Society, (1). 165.

Anderson, S. E., Groulx, J. G., & Maninger, R. M. (2011). Relationships among Preservice Teachers' Technology-Related Abilities, Beliefs, and Intentions to Use Technology in Their Future Classrooms. Journal of Educational Computing Research,45(3). Retrieved from https://us.sagepub.com/en-us/nam/journal-of-educational-computing-research/journal202399

Bayne, S. & Ross, J. (2007). The 'digital native' and 'digital immigrant': A dangerous opposition. Paper presented at the Annual Conference of the Society for Research into Higher Education (SRHE).

Becker, H.J. (2000). *Findings from teaching, learning, and computing survey: Is Larry Cuban right?* [PDF File]. Center for Research on Information Technology and Organizations. Retrieved October 2, 2002, from http://www.critp.uci.edu/tlc.

Becker, H.J. & Ravitz, J.L. (2001). Computer use by teachers: Are Cuban's predictions correct? Paper presented at the 2001 annual meeting of the American Educational Research Association, Seattle, WA.

Benjamin, J. (2003). Revision and Validation of the Revised Teacher Beliefs Survey. Paper

presented at the Annual Meeting of the American Educational Research Association at Chicago, Il, April 21-25, 2003.

Carroll, J. (2011). From encyclopedias to search engine: Technological change and its impact on literacy learning. *Australian Journal of Language & Literacy, 34*(2), 27-34.

Carver, L. B. (2016). Teacher Perception of Barriers and Benefits in K-12 Technology Usage. Turkish Online Journal of Educational Technology - TOJET, 15(1), 110-116.

Cifuentes, L. (1997). From sages to guides: A professional development study. *Journal of Technology and Teacher Education, 5*(1), 67-77.

Collier, S., Weinburgh, M.H., & Rivera, M. (2004). Infusing technology skills into a teacher education program: Change in students' knowledge about and use of technology. *Journal of Technology and Teacher Education, 12*(3), 447-468.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* (2nd ed.). Hillsdate, NJ: Lawrence Erlbaum Associates, Inc., Publishers.

Cook, K. (2015). Computers in the Classroom. Research Starters: Education (Online Edition) eNotes.com.

Clark, K. (2006). Practices for the use of technology in high schools: A Delphi study. Journal of Technology and Teacher Education, 14(3), 481–499.

Creswell, J. W., & Plano Clark, V. L. (2011). Designing and conducting mixed methods research. Los Angeles, CA: SAGE Publications.

Creswell, J. (2003) Research Design: Qualitative, Quantitative and Mixed Methods Approaches, Thousand Oaks, CA: SAGE Publications.

Crocker, C. & Algina, J. (1986). *Introduction to classical and modern test theory.* New York, NY: Holt, Rinehart, & Winston.

Crotty, M. (1998). *The Foundations of Social Research*. Thousand Oaks, CA: Sage Publications Inc.

Crowe, A. R. (2004). Teaching by Example: Integrating Technology into Social Studies Education Courses. Journal Of Computing In Teacher Education, 20(4), 159-165.

Cuban, L. (1986). *Teachers and machines*. New York: Teachers College Press.

Czerniak, C.M., & Lumpe, A.T. (1996). Relationship between teacher beliefs and science education reform. *Journal of Science Teacher Education*. *7*, 247-266.

Davies, R., & Linton, J. (2008). Understanding Dispositional Dissonance. Paper presented at the Michigan Academy of Science, Arts & Letters Annual Meeting at Western Michigan University, Kalamazoo, M.I.

Davies, R. R. (2011). Understanding technology literacy: A framework for evaluating educational technology integration. *Techtrends: Linking research & Practice to Improve Learning*, 55(5), 45-52.

Davies, R., Sprague, C. & New, C. (2008). Integrating Technology into a Science Classroom: An evaluation of inquiry-based technology integration. In D.W. Sunnal, E.L. Wright, & C. Sundberg (Eds.), *The Impact of Technology and the Laboratory on K-16 Science Learning series: Research in Science Education* (pp. 207-237). Charlotte, NC: Information Age Publishing, Inc.

Davis, C. (2002). Programs and plans of the national center for education statistics. 2002 edition. (No. NCES-2003-040).ED Pubs, P.O. Box 1398, Jessup, MD 20794-1398. Retrieved from https://manowar.tamucc.edu/login?url=http://search.proquest.com/docview /62224488?accountid=7084

Dorner, H., & Kumar, S. (2016). Online Collaborative Mentoring for Technology Integration in

Pre-Service Teacher Education. Techtrends: Linking Research & Practice to Improve Learning, 60(1), 48-55.

Earle, R. S. (2002). The Integration of Instructional Technology into Public Education: Promises and Challenges. *Educational Technology, 42*(1), 5-13.

Education Service Centers of Texas. (n.d.). Texas teacher technology competencies certification checklist. Retrieved from http://www.texasttcc,net/teacherschecklist.html.

Education Week. (2001, May 10). *Technology counts 2001,* [Web page]. Education Week. Retreived October 2, 2001, from, *http://www.edweek.org/sreports/tc01*.

Ertmer, P.A., & Ottenbreit-Leftwich, A.T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education, 42*(3), 22-43.

Ertmer, P.A. (2005). Teacher pedagogical beliefs: the final frontier in our quest for technology integration? *Educational Technology Research and Development, 53*(4), 25-39.

Ertmer, P. A., Conklin, D., & Lewandowski, J. (2003). Increasing preservice teachers' capacity for technology integration through the use of electronic models. *Teacher Education Quarterly, 30*(1), 95-112.

Falba, C.J., Zehm, S.J., Bean, T., Markos, P.A., Dixon, J.K., & McKinney, M. (1997). Choreographing Change One Step at a Time: Integrating Technology in Teacher Education.

Ferguson, D. (2001). Technology in a Constructivist Classroom. Information Technology In Childhood Education, 45-55.

Field, A. (2013). *Discovering statistics using spss.* (4th ed.). Thousand Oaks, California: Sage Publications Inc.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). Educational research: an introduction. Boston, Mass: Pearson/Allyn & Bacon, c2007.

Gray, L., Thomas, N., Lewis, L. (2010). Teachers' Use of Educational Technology in U.S. Public Schools: 2009. First Look. NCES 2010-040. National Center For Education Statistics, Washington, DC : Institute of Education Sciences, U.S. Dept. of Education, 2010.

Hastings, T. A. (2009). Factors that predict quality classroom technology use (Order No. 3393088). Available from ProQuest Dissertations & Theses Global; Social Science Premium Collection. (304831376). Retrieved from https://manowar.tamucc.edu/login?url=http://search.proquest.com/docview/304831376?accountid=7084

Herold, B., & Smith, C. (2015). Why Ed Tech Is Not Transforming Teaching. Education Week, 34(35), 8.

Inan, F.A., & Lowther, D.L. (2010). Factors affecting technology integration in K-12 classrooms: A path model. *Educational Technology Research and Development, 58*(2), 137-154.

Keser, H., Yilmaz, F. G., & Yilmaz, R. (2015). TPACK Competencies and Technology Integration Self-Efficacy Perceptions of Pre-Service Teachers. Online Submission, *Elementary Education Online, 14(*4), 1193-1207.

Koehler, M. J., Mishra, P., & Cain, W. (2013). What is technological pedagogical content knowledge (TPACK)?. Journal of Education, (3), 13.

Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and

practices with technology under situated professional development. Computers & Education, 591109-1121. doi:10.1016/j.compedu.2012.05.014

Krueger, R. A., & Casey, M. A. (2000). Focus groups: a practical guide for applied research. Thousand Oaks, CA: Sage Publications, 2000.

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

Leu, D. J., O'Byrne, W. I., Zawilinski, L., McVerry, J. G., & Everett-Cacopardo, H. (2009). 'Comments on Greenhow, Robelia, and Hughes': Expanding the New Literacies Conversation. Educational Researcher, (3), 264.

Lim, C. P., & Khine, M. (2006). Managing teachers' barriers to ICT integration in Singapore schools. Journal of Technology and Teacher Education, 14(1), 97–125.

Liu, S. (2011). Factors related to pedagogical beliefs of teachers and technology integration. *Computers & Education, 56*(4), 1012-1022.

Lieu, S., Tsai, H. & Huang, Y. (2015). Collaborative professional development of mentor teachers and pre-service teachers in relation to technology integration. *Journal of Educational Technology & Society, 18*(3), 161-172.

Macdonald, E. (2016, May 20). A Framework for Technology Integration: One School's Approach? [Web log comment]. Retrieved from http://www.literacyworldwide.org/

Marino, M. T., & Beecher, C. C. (2010). Conceptualizing RTI in 21st century secondary science classrooms: video games' potential to provide tiered support and progress monitoring for students with learning disabilities. Learning Disability Quarterly, (4). 299.

Macmillan Dictionary Online. (n.d.). *Professional Development*. Retrieved from

http://www.macmillandictionary.com/dictionary/british/professional-development.

Mishra, P., & Koehler, M.J. (2006). Technological pedagogical content knowledge: A new framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

Moradi-Rekabdarkolaei, S. (2011). The comparison of ICT' literacy between teachers and students and presenting a model for development of ICT in schools. Journal of Turkish Science Education, 8(4) Retrieved from https://manowar.tamucc.edu/login?url=http://search.proquest.com/docview/1659749002?accountid=7084

Morgan D.L. (1997, 2nd Edition) Focus groups as qualitative research. London: Sage.

Morrison, G. & Lowther, D. (2010). *Integrating computer technology into the classroom.* New York: Pearson.

Muilenberg, L.V., & Berge, Z.L. (2015). Revisiting teacher preparation: responding to technology transience in the educational setting. *Quarterly Review of Distance Education*, (2), 93.

National Center for Education Statistics. (2000). *Teachers' tools for the 21st century: A report on teachers' use of technology.* Washington, D.C.: US Department of Education.

National Center for Education Statistics. (2002). *Technology in schools: suggestions, tools and guidelines for assessing technology in elementary and secondary education.* US Department of Education. Office of Educational Research and Improvement. Washington, D.C.: Author. Retrieved from http://nces.ed.gov/pubs2003/2003313.pdf

National Center for Education Statistics. (2010). *Fast Facts.* Retrieved from nces.ed.gov/fastfacts/display.asp?id=46.

National Council of Teachers of English (2008). The NCTE definition of 21st-Century

literacies. Retrieved from http://www.ncte.org/

Norris, C. & Soloway, E. (2000). *The snapshot survey service: A website for assessing teachers' and adminstrators' technology activities, beliefs, and needs.* Washington, DC.: Paper presented at the Secretary's Conference on Educational Technology, U.S. Department of Education.

Ottenbreit-Leftwich, A. T., Glazewski, K. D., Newby, T. J., & Ertmer, P. A. (2010). Teacher value beliefs associated with using technology: Addressing professional and student needs. Computers & Education, 55(3), 1321-1335.

Pajares, M.F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62*(3) 307-332.

Pierson, M. (2001). Technology integration practice as a function of pedagogical expertise. *Journal of Research on Computing Education.33*(4), 413-430.

Pope, M., Hare, D., & Howard, E. (2002). Technology integration: Closing the gap between what preservice instructors are taught to do and what they can do. *Journal of Technology and Teacher Education, 10*(2), 191-204.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon, 9*(5), 1-6.

Reinking, D., McKenna, M.C., Labbo, L.D., & Kieffer, R.F. (Eds.). (1998). Handbook of literacy and technology: Transformations in a post-typographic world. Mahwah, NJ: Erlbaum.

Roblyer, M. D. (2006). Integrating educational technology into teaching. Upper Saddle River, N.J. : Pearson/Merrill/Prentice Hall.

Rowand, C., & National Center for Education Statistics (ED), W. D. (2000). Teacher Use of Computers and the Internet in Public Schools. Stats in Brief.N.J. : Pearson/Merrill/Prentice Hall, [2004].

Sa'ari, J. R., Luan, W. S. & Roslan, S. (2005) Attitudes and perceived information technology competency among teachers. *Malaysian Online Journal of Instructional Technology. 2*(3), 70-77.

Shulman, L.S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.

Smith, E. E. (2012). The Digital Native Debate in Higher Education: A Comparative Analysis of Recent Literature. Canadian Journal Of Learning And Technology, 38(3),

Spaulding, M. W. (2007). Comparison of preservice and in-service teachers' attitudes and perceived abilities toward integrating technology into the classroom (Order No. 3293776). Available from ProQuest Dissertations & Theses Global. (304717245). Retrieved from http://search.proquest.com/docview/304717245?accountid=7084

Sternberg, B., Kaplan, K. & Borck, J. (2007). Enhancing adolescent literacy achievement through integration of technology in the classroom. Reading Research Quarterly. 42 (3), 416-420.

Suša, D. (2014). Digital Immigrants and Digital Natives: Learning Business Informatics at Higher Educational Level. Business Systems Research, 5(2), 84-96. doi:10.2478/bsrj-2014-0012

Thiele, A. K., Mai, J. A., & Post, S. (2014). The Student-centered classroom of the 21st century: Integrating web 2.0 applications and other technology to actively engage students. *Journal of Physical Therapy Education*, 28(1), 80-93.

U.S. Department of Education (ED) (2003). *Federal funding for educational technology and how it is used in the classroom: A summary of findings from the integrated studies of educational technology*. US Department of Education: Washington, D.C.

U.S. Department of Education (2010). *Transforming American education: Learning powered by technology*. National Education Technology Plan 2010. Office of Educational Technology: Washington, D.C.

Vannatta, R. A., & Fordham, N. (2004). Teacher dispositions as predictors of classroom technology use. Journal of Research on Technology in Education, 36(3), 252–271

Wang, L., Ertmer, P.A., & Newby, T.J. (2004). Increasing preservice teachers' self-efficacy beliefs for technology integration. Journal of Research on Technology in Education, 36(3), 231-252.

Wendt, J.L. (2013). Combating the crisis in adolescent literacy: Exploring literacy in the secondary classroom. American Secondary Education, 41 (2), 38-48.

Wenglinsky, H. (2005). Using Technology Wisely: The Keys to Success in Schools. New York: Teachers College Press.

Weare, C., & Lin, W.Y. (2000). Content analysis of the World Wide Web: Opportunities and challenges. *Social Science Computer Review, 18,* 272-292.

Willis, J., & Cifuentes, L. (2005). Training teachers to integrate technology into the classroom curriculum: online versus face-to-face course delivery. Journal Of Technology And Teacher Education, (1), 43.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. (2002). Conditions for classroom technology innovations. Teachers College Record, 104(3), 482–515.

Zehr, M. A. (1997). Teaching the teachers. Education Week, 17(11), 24.

Appendix A

Office of Information Systems

CORPUS CHRISTI INDEPENDENT SCHOOL DISTRICT

P. O. Box 110 Corpus Christi, Texas 78403-0110

2525 Belton Street

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November 19, 2015

Ms. Jeanette Gomez
Department of Curriculum and Instruction
Texas A&M University, Corpus Christi 3134
Elderberry
Corpus Christi, TX 78415

Dear Ms. Gomez:

The CCISD External Research Review Committee members granted you **Approval** to conduct your research entitled *Comparison of Pre-Service and In-Service Teacher's Attitudes and Perceived Abilities Toward Integrating Digital Technologies into the Classroom* in the Corpus Christi Independent School District.

Additionally, this **Approval** indicates that your request meets all research/evaluation and FERPA standards.

This **Approval** also allows the high school, middle school, and elementary campus principals and teachers identified in your *Application for External Research* the option of participating in your research. No campus principal or teacher is required to participate in external research in CCISD. Final permission is at the discretion of the principal and each teacher.

Please contact them in order to receive written permission to conduct your research on the *CCISD Principal Permission Form* and *CCISD Teacher Permission Form* that you submitted as part of your application. Thank you also for signing and dating the *CCISD Researcher/Investigator Confidentiality Agreement.*

When we receive the enclosed signed and dated permission forms prior to your conducting research, we can arrange to secure them in Google Cloud to protect the confidentiality of your data for you if you like.

It is a pleasure to welcome you to the District as a researcher, Ms. Gomez, knowing that you have taught at Ray High School in the past as well. We look forward to your sending us the pertinent documents to formally begin your research.

Should you need additional assistance during your research, please feel free to contact me anytime at Toni.Moynihan-McCoy@CCISD.US and (361) 878-3900, ext. 10161.

Personal Regards,

Toni Moynihan-McCoy, PhD
Toni Moynihan-McCoy, PhD
Administrative Officer Accountability Research
Office of Information Systems

cc: Roland Hernandez, Ph.D., Superintendent of Schools Maria Luisa Guerra, Ed.D., Deputy Superintendent James Rosebrock, Ed.D., Chief Academic Officer Sean Babcock, M.CS, Director, Information Systems
Sherrye Garrett, Faculty Advisor, Texas A&M University—Corpus Christi

OFFICE OF RESEARCH COMPLIANCE
Division of Research, Commercialization and Outreach

6300 Ocean Drive, Unit 5844 Corpus Christi, Texas 78412
O 361.825.2497 • F 361.825.2755

Human Subjects Protection Program | Institutional Review Board

APPROVAL DATE:	October 20, 2015
TO:	Ms. Jeannette Gomez
CC:	Dr. Sherrye Garrett
FROM:	Office of Research Compliance Institutional Review Board
SUBJECT:	Initial Approval

Protocol Number:	91-15
Title:	Comparison of Preservice and In-service Teachers' Attitudes and Perceived Abilities Toward Integrating Digital Technologies into the Classroom
Review Category:	Expedited
Expiration Date:	October 20, 2016

Approval determination was based on the following Code of Federal Regulations:

Eligible for Expedited Approval (45 CFR 46.110): Identification of the subjects or their responses (or the remaining procedures involving identification of subjects or their responses) will NOT reasonably place them at risk of criminal or civil liability or be damaging to the their financial standing, employability, insurability, reputation, or be stigmatizing, unless reasonable and appropriate protections will be implemented so that risks related to invasion of privacy and breach of confidentiality are no greater than minimal.

Criteria for Approval has been met (45 CFR 46.111) - The criteria for approval listed in 45 CFR 46.111 have been met (or if previously met, have not changed).

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)

Provisions:

Comments: The TAMUCC Human Subjects Protections Program has implemented a post-approval monitoring program. All protocols are subject to selection for post-approval monitoring.

This research project has been approved. As principal investigator, you assume the following responsibilities:

1. Informed Consent: Information must be presented to enable persons to voluntarily decide whether or not to participate in the research project unless otherwise waived.
2. Amendments: Changes to the protocol must be requested by submitting an Amendment Application to the Research Compliance Office for review. The Amendment must be approved by the IRB before being implemented.
3. Continuing Review: The protocol must be renewed each year in order to continue with the research project. A Continuing Review Application, along with required documents must be submitted 45 days before the end of the approval period, to the Research Compliance Office. Failure to do so may result in processing delays and/or non-renewal.
4. Completion Report: Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the Research Compliance Office.
5. Records Retention: All research related records must be retained for three years beyond the completion date of the study in a secure location. At a minimum these documents include: the research protocol, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to participants, all correspondence to or from the IRB or Office of Research Compliance, and any other pertinent documents.
6. Adverse Events: Adverse events must be reported to the Research Compliance Office immediately.
7. Post-approval monitoring: Requested materials for post-approval monitoring must be provided by dates requested.

Appendix B

Digital Technology and Classroom Survey (DTCS)

Part I: Pre-Service and In-Service Teachers' Abilities will be used to measure perceived abilities regarding the integration of digital technologies into the classroom. For each category, indicate your ability by marking one of the four scales.

With regard to devices available, how much can you do…

	Nothing	Very Little	Some	A Great Deal
Computer				
Internet				
Video Conference Unit				
Interactive Whiteboard				
Digital Camera				

With respect to your system on your school or district network, how much can you do...

	Nothing	Very Little	Some	A Great Deal
Enter or view grades				
Enter or view attendance records				
Enter or view results of student assessments				
Enter or view IEPs or parts of IEP relevant to your interactions with the student.				

With respect to classroom preparation, instruction, or administrative tasks, how much can you do...

	Nothing	Very Little	Some	A Great Deal
Word Processing Software				

	Nothing	Very Little	Some	A Great Deal
Spreadsheets and graphing programs				
Software for making publications (e.g. PowerPoint, Prezi)				
Graphics, image-editing software (e.g. Photoshop)				
Software for administering				
Simulation and Visualization Programs				
Drill/practice/tutorials				
Subject-specific programs				
The Internet				
Blogs/and or Wikis				
Social Networking Websites				

With regard to communication with parents and students, how much can you do...

	Nothing	Very Little	Some	A Great Deal
Email or list-serve to send out group updates or information				
Email to address individual concerns				
Online bulletin board for class distribution				
Course or teacher web page				
Course or teacher blog				

	Nothing	Very Little	Some	A Great Deal
Text Messaging				

To what extent has each of the following prepared you to integrate digital technology in your classroom?

	Nothing	Very Little	Some	A Great Deal
Undergraduate teacher education preparation program				
Graduate teacher education				
Professional development activities				
Training provided by staff responsible for technology support and/or integration at your school.				
Independent Learning				
Workshops offered by Educational Service Center				

Part II: Computer Technology Integration Survey (Pre-Service and In-Service Teacher Attitudes Towards Integrating Digital Technology Into the Classroom.

Below is a definition of technology integration with accompanying examples:

Technology Integration:
Using computers to support students as they construct their own knowledge through the completion of authentic, meaningful tasks.

For each statement, indicate the strength of your agreement or disagreement by marking one of the four scales.

	SD=Strongly Disagree	D=Disagree	A=Agree	SA=Strongly Agree
I feel confident that I understand computer capabilities well enough to				

	SD=Strongly Disagree	D=Disagree	A=Agree	SA=Strongly Agree
maximize them in my classroom.				
I feel confident that I have the skills necessary to use the computer for instruction.				
I feel confident that I can successfully teach relevant subject content with appropriate use of technology.				
I feel confident in my ability to evaluate software for teaching and learning.				
I feel confident that I can use correct computer terminology when directing students' computer use.				
I feel confident I can help students when they have difficulty with the computer.				
I feel confident I can effectively monitor students' computer use for project development in my classroom.				
I feel confident that I can motivate my students to participate in technology based projects.				
I feel confident I can consistently use educational technology in effective ways.				
I feel confident I can provide individual feedback to students during technology use.				
I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.				
I feel confident about selecting appropriate technology for instruction based on curriculum standards.				

	SD=Strongly Disagree	D=Disagree	A=Agree	SA=Strongly Agree
I feel confident about assigning and grading technology-based projects.				
I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.				
I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.				
I feel confident that I will be comfortable using technology in my teaching.				
I feel confident I can be responsive to students' needs during computer use.				
I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.				
I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively with technology.				
I feel confident that I can carry out technology based projects even when I am opposed by skeptical colleagues.				

Part III: Demographic Data

Please indicate your status.

- Preservice Teacher
- Inservice Teacher

What is your gender?

- ○ Male
- ○ Female
- ○ Prefer not to answer.

Do you identify as a digital native (the generation of people born during or after the rise of digital technologies) or digital immigrant (people born before the advent of digital technology).

- ○ Digital Native
- ○ Digital Immigrant

Would you be willing to participate in a focus group for this study?

- ○ Yes
- ○ No

Please provide your email address and phone number for future reference.

_____

****For In-Service Teachers Only****

How many years of teaching experience do you have?

What is your highest degree?

- ○ Bachelor's
- ○ Master's
- ○ Ed.D/Ph.D

What grade level do you presently teach?

- ○ Elementary
- ○ Middle
- ○ Secondary

What course do you teach(list all)?

How many computers are available in your classroom?

Appendix C

CONSENT FORM

COMPARISON OF PRESERVICE AND IN-SERVICE TEACHERS' ATTITUDES AND PERCEIVED ABILITIES TOWARD INTEGRATING DIGITAL TECHNOLOGIES INTO THE CLASSROOM

Introduction
The purpose of this form is to provide you information that may affect your decision as to whether or not to participate in this research study. If you decide to participate in this study, this form will also be used to record your consent.

You have been asked to participate in a research project studying pre-service and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. The purpose of this study is to understand the differences that exist between the perceived abilities of pre-service and in-service teachers with regard to integrating digital technologies into their classroom, the differences exist between pre-service teachers' and in-service teachers' attitudes in integrating digital technologies into their classrooms and the perspectives of pre-service and in-service teachers on integrating technology in the classroom? You were selected to be a possible participant because you are a pre-service teacher at Texas A&M University Corpus Christi or an In-Service Teacher with the Corpus Christi Independent School District.

What will I be asked to do?
If you agree to participate in this study, you will be asked to complete the Digital Technology and Classroom Survey (DTCS) and possibly participate in a focus group. This study will take approximately eight weeks.

What are the risks involved in this study?
The risks associated with this study are minimal, and are not greater than risks ordinarily encountered in daily life.

What are the possible benefits of this study?
You will receive no direct benefit from participating in this study; however, the benefits to society are to guide the efforts of teacher education programs in preparing prospective educators to integrate digital technologies effectively into their classrooms and guide the efforts of local school districts in providing appropriate professional development for their teachers.

Do I have to participate?
No. Your participation is voluntary. You may decide not to participate or to withdraw at any time without your current or future relations with Texas A&M University-Corpus Christi and the Corpus Christi Independent School district being affected.

Who will know about my participation in this research study?
This study is confidential and no identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only Jeannette R. Gomez and Dr. Sherrye. D. Garrett will have access to the records.

Whom do I contact with questions about the research?
If you have questions regarding this study, you may contact Jeannette R Gomez, 361-834-9064, Jeannette.Gomez@tamucc.edu or Dr. Sherrye D. Garrett, 361-825-3314, Sherrye.Garrett@tamucc.edu.

Whom do I contact about my rights as a research participant?
This research study has been reviewed by the Research Compliance Office and/or the Institutional Review Board at Texas A&M University-Corpus Christi. For research-related problems or questions regarding your rights as a research participant, you can contact Erin Sherman, Research Compliance Officer, at (361) 825-2497 or erin.sherman@tamucc.edu

Agreement to Participate

You agree to participate in the study by completing the following survey. Participants must be 18 years of age or older. Please do not complete the survey if you do not wish to participate in this study.

Office of Information Systems

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Website: www.ccisd.us

EXTERNAL RESEARCH
CAMPUS PRINCIPAL CONSENT FORM

My signature on this form indicates that I have read the information provided and have decided to participate in the project titled, Comparison of Preservice and In-Service Teachers' Attitudes and Perceived Abilities Toward Integrating Digital Technologies Into the Classroom to be conducted by Jeannette Gomez, Doctoral Candidate at Texas A&M University Corpus Christi.

The purpose of the study is to explore pre-service and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. "Preservice" teacher is defined as a student who is currently in a teacher education program. "In-service" teacher is defined as a fully certified teacher who meets state mandated requirements to be a classroom teacher. Digital technologies is defined as information technology such as computers, devices that can be attached to computers (e.g., LCD projector, interactive whiteboard, digital camera), networks (e.g., Internet, local networks), and computer software.

I agree to the conditions listed below with the understanding that I may withdraw my participation in the project at any time, and that I may choose not to answer any questions that that I not want to answer. I understand my participation is completely voluntary.

1. Pre-service and In-service teachers will be invited to be part of a research project to assess teacher beliefs and attitudes toward integrating technology in the classroom. The researcher will include her name, and university with IRB approval.

2. The participants will be asked to complete an online survey which should take approximately 20 minutes to complete. The survey will consists of a brief demographics section and technology questions pertaining to beliefs and attitudes. A link to an online survey will be sent via email within a few days after the recruitment email is sent out. It will be known on the recruitment email that participation is voluntary and will be confidential by the omission of names in the collection and presentation of data.

3. When the participants receive the email, they will follow the link to complete the survey.

   A 3-part survey instrument, Digital Technology and Classroom Survey (DTCS) has been developed by the researcher. Part one consists of the Pre-Service and In-Service Teachers' Abilities Survey, which will be used to measure perceived abilities regarding the integration of digital technologies into the classroom. The survey consists of five parts: (1) availability of the device, (2) network, (3) classroom preparation, instruction, and administration, (4) communication with parents and students, and (5) integration. The items for the various components were derived from published instruments (U.S Department of Education, 2010; Education Service Centers of Texas, 2014; Norris & Soloway, 2000; Benjamin, 2003; & Anderson, Groulx, & Maninger, 2011). A 4-point Likert-type scaling will be used: 4 = a great deal, 3 = some, 2 = little, 1 = none
   Part two includes the Computer Technology Integration Survey (Wang, Ertmer & Newby 2004), which will be used to measure attitudes towards the integration of digital technologies into the classroom. The instrument has 21 items. A 4-point Likert-type scaling (4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree) will be employed.
   Part three will be used to gather demographic data. Specifically, the participants will be asked to provide data on age, gender, ethnicity, level of education, years of teaching experience, pre-service or in-service status, and willingness to participate in the focus group.

4. A password-protected external hard drive, owned by the researcher, will be used to store the data. The password-protected external hard drive will be locked cabinet. The password-protected external hard drive will be stored in a locked cabinet in the researcher's locked office. Only the PI and dissertation chair will have access to the raw data. Only the PI will have access to the locked drive. The PI will use her personal password-protected laptop computer for data analysis. For Focus Group interviews, voice recordings of interviews will be conducted and then transcribed by the researcher. Following transcription, the voice recordings will be erased. All data will be retained for five (5) years in a locked filing cabinet. Only the PI (Jeannette Gomez) and Dr. Sherrye Garrett (dissertation chair) will have access to the information.

5. Research Design/Method

   Quantitative
   An on-line version of the Digital Technology and Classroom Survey (DTCS) will be used. E-mail addresses of the potential participants will be obtained from the school district and university in which the study will take place. An introductory email will be sent to all, followed by the second email a few days later which will

contain the link to the online survey questionnaire. Two follow-up emails will be sent. One month will be devoted to the collection of quantitative data.

Qualitative
Qualitative data will be collected from the focus groups. The researcher will lead the focus group, which will be voice-recorded, transcribed, and coded. All focus group participants will be asked to sign a consent form. In alignment with the explanatory sequential mixed methods research model, the quantitative data will be analyzed first and results will be used to formulate the lead questions for the focus group. The following are example questions that can be used:

1. What are your experiences in integrating technology in the classroom?
2. Can you describe the current technological resources used in your classroom?
3. Did you take any technology courses while in college? If yes, were they useful?

Data Analysis
Quantitative
The raw data will be coded and entered into the computer. The Statistical Package for the Social Sciences (SPSS) will be used for the purpose of data entry, manipulation, and analysis. Descriptive statistics will be used to summarize and organize the data. For the purpose of group comparisons, t-test for independent sample and multivariate analysis of variance (Field, 2011) will be employed. Mean difference effect sizes will be computed to examine the practical significance of the findings and will be characterized as .2 = small effect, .5 = medium effect, and .8 = large effect (Cohen, 1988)

Qualitative
The transcript of the focus group interview will be analyzed to document the perspectives of the participants regarding the integration of technology in the classroom.

6. Only the PI will have access to the returned survey data which includes the participant's name and teaching institution. Each survey name will be given a unique identifier and only the PI will have access to this information. The data will be stored on the password-protected hard drive (as mentioned above) and locked in a cabinet. There is a greater than minimal risk because of the risk of breach of confidentiality.

7. As part of the Texas Education Agency, Long-Range Plan for Technology 2006-2020, it would benefit CCISD to understand the current progress of integrating technology into curriculum and instruction by classroom teachers.

Office of Information Systems

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Website: www.ccisd.us

KEEP THIS PAGE FOR YOUR RECORDS

As a campus principal, you are making a decision about participating in this study. Your signature on this page indicates that you have read the information provided above on previous pages and have decided to participate in the study. If you later decide that you wish to withdraw consent to participate in the study, simply tell me. You may discontinue your participation at any time.

Jeannette Gomez, Doctoral Candidate
Texas A&M University Corpus Christi
Jeannette.Gomez@tamucc.edu
361-834-9064

STATEMENT OF CONSENT

_____

Campus Principal Signature Date

_____

Campus Name

_____

Researcher/Investigator Signature Date

Office of Information Systems

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EXTERNAL RESEARCH
TEACHER CONSENT FORM

My signature on this form indicates that I have read the information provided and have decided to participate in the project titled, Comparison of Preservice and In-Service Teacher's Attitudes and Perceived Abilitites Toward Integrating Digital Technologies Into the Classroom to be conducted by Jeannette Gomez, Doctoral Candidate at Texas A&M University Corpus Christi.

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I agree to the conditions listed below with the understanding that I may withdraw my participation in the project at any time, and that I may choose not to answer any questions that that I not want to answer. I understand my participation is completely voluntary.

1. Pre-service and In-service teachers will be invited to be part of a research project to assess teacher's beliefs and attitudes toward integrating technology in the classroom. The researcher will include her name, and university with IRB approval.
2. The participants will be asked to complete an online survey which should take approximately 20 minutes to complete. The survey will consists of a brief demographics section and technology questions pertaining to beliefs and attitudes. A link to an online survey will be sent via email within a few days after the recruitment email is sent out. It will be known on the recruitment email that participation is voluntary and will be confidential by the omission of names in the collection and presentation of data.
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Part two includes the Computer Technology Integration Survey (Wang, Ertmer & Newby 2004), which will be used to measure attitudes towards the integration of digital technologies into the classroom. The instrument has 21 items. A 4-point Likert-type scaling (4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree) will be employed.

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An on-line version of the Digital Technology and Classroom Survey (DTCS) will be used. E-mail addresses of the potential participants will be obtained from the school district and university in which the study will take place. An introductory email will be sent to all, followed by the second email a few days later which will contain the link to the online survey questionnaire. Two follow-up emails will be sent. One month will be devoted to the collection of quantitative data.

Qualitative

Qualitative data will be collected from the focus groups. The researcher will lead the focus group, which will be voice-recorded, transcribed, and coded. All focus

group participants will be asked to sign a consent form. In alignment with the explanatory sequential mixed methods research model, the quantitative data will be analyzed first and results will be used to formulate the lead questions for the focus group. The following are example questions that can be used:

1. What are your experiences in integrating technology in the classroom?
2. Can you describe the current technological resources used in your classroom?
3. Did you take any technology courses while in college? If yes, were they useful?

Data Analysis

Quantitative

The raw data will be coded and entered into the computer. The Statistical Package for the Social Sciences (SPSS) will be used for the purpose of data entry, manipulation, and analysis. Descriptive statistics will be used to summarize and organize the data. For the purpose of group comparisons, t-test for independent sample and multivariate analysis of variance (Field, 2011) will be employed. Mean difference effect sizes will be computed to examine the practical significance of the findings and will be characterized as .2 = small effect, .5 = medium effect, and .8 = large effect (Cohen, 1988)

Qualitative

The transcript of the focus group interview will be analyzed to document the perspectives of the participants regarding the integration of technology in the classroom. First, cycle coding, “in vivo coding” will be used. In Vivo Coding is also known as “literal coding” (Saldana, 2013). In vivo coding takes the actual language found in the qualitative data record (the terms used by the participants themselves) and creates categories (Saldana, 2013). For the second cycle coding, “process coding” will be used. Process coding will reveal the “ongoing action/interaction/emotion in response to situations, or problems” (Saldana 2013).

6. Only the PI will have access to the returned survey data which includes the participant's name and teaching institution. Each survey name will be given a unique identifier and only the PI will have access to this information. The data will be stored on the password-protected hard drive (as mentioned above) and locked in a cabinet. There is a greater than minimal risk because of the risk of breach of confidentiality.
7. As part of the Texas Education Agency, Long-Range Plan for Technology 2006-2020, it would benefit CCISD to understand the current progress of integrating technology into curriculum and instruction by classroom teachers.

Office of Information Systems

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Website: www.ccisd.us

KEEP THIS PAGE FOR YOUR RECORDS

As a teacher, you are making a decision about participating in this study. Your signature on this page indicates that you have read the information provided above on previous pages and have decided to participate in the study. If you later decide that you wish to withdraw consent to participate in the study, simply tell me. You may discontinue your participation at any time.

Jeannette Gomez, Doctoral Candidate
Texas A&M University Corpus Christi
Jeannette.Gomez@tamucc.edu
361-834-9064

STATEMENT OF CONSENT

_____

Teacher Signature Date

_____

Campus Name

_____

Researcher/Investigator Signature Date

Appendix D

CONSENT FORM

COMPARISON OF PRESERVICE AND IN-SERVICE TEACHERS' ATTITUDES AND PERCEIVED ABILITIES TOWARD INTEGRATING DIGITAL TECHNOLOGIES INTO THE CLASSROOM

Introduction
The purpose of this form is to provide you information that may affect your decision as to whether or not to participate in this research study. If you decide to participate in this study, this form will also be used to record your consent.

You have been asked to participate in a research project studying pre-service and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. The purpose of this study is to understand the differences that exist between the perceived abilities of pre-service and in-service teachers with regard to integrating digital technologies into their classroom, the differences exist between pre-service teachers' and in-service teachers' attitudes in integrating digital technologies into their classrooms and the perspectives of pre-service and in-service teachers on integrating technology in the classroom? You were selected to be a possible participant because you are a pre-service teacher at Texas A&M University Corpus Christi or an In-Service Teacher with the Corpus Christi Independent School District.

What will I be asked to do?
If you agree to participate in this study, you will be asked to complete the Digital Technology and Classroom Survey (DTCS) and possibly participate in a focus group. This study will take approximately eight weeks.

What are the risks involved in this study?
The risks associated with this study are minimal, and are not greater than risks ordinarily encountered in daily life.

What are the possible benefits of this study?
You will receive no direct benefit from participating in this study; however, the benefits to society are to guide the efforts of teacher education programs in preparing prospective educators to integrate digital technologies effectively into their classrooms and guide the efforts of local school districts in providing appropriate professional development for their teachers.

Do I have to participate?
No. Your participation is voluntary. You may decide not to participate or to withdraw at any time without your current or future relations with Texas A&M University-Corpus Christi and the Corpus Christi Independent School district being affected.

Who will know about my participation in this research study?
This study is confidential and no identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only Jeannette R. Gomez and Dr. Sherrye. D. Garrett will have access to the records.

Whom do I contact with questions about the research?
If you have questions regarding this study, you may contact Jeannette R Gomez, 361-834-9064, Jeannette.Gomez@tamucc.edu or Dr. Sherrye D. Garrett, 361-825-3314, Sherrye.Garrett@tamucc.edu.

Whom do I contact about my rights as a research participant?

This research study has been reviewed by the Research Compliance Office and/or the Institutional Review Board at Texas A&M University-Corpus Christi. For research-related problems or questions regarding your rights as a research participant, you can contact Erin Sherman, Research Compliance Officer, at (361) 825-2497 or erin.sherman@tamucc.edu

Agreement to Participate

Qualitative data will be collected from the focus groups. The researcher will lead the focus group, which will be voice-recorded, transcribed, and coded. All focus group participants will be asked to sign a consent form. In alignment with the explanatory sequential mixed methods research model, the quantitative data will be analyzed first and results will be used to formulate the lead questions for the focus group. The following are example questions that can be used:

1. What are your experiences in integrating technology in the classroom?
2. Can you describe the current technological resources used in your classroom?
3. Did you take any technology courses while in college? If yes, were they useful?

The transcript of the focus group interview will be analyzed to document the perspectives of the participants regarding the integration of technology in the classroom.

Audiotape Permission

I have been told that the discussion will be tape recorded only if all participants agree.

I have been told that I can state that I don't want the discussion to be taped and it will not be. I can ask that the tape be turned off at any time.

I agree to be audio taped ___Yes ___No

If I have any questions about my rights as a research subject, I may contact the Research and Compliance Office and/or the Institutional Review Board at Texas A&M University-Corpus Christi at (361) 825-2457 or erin.sherman@tamucc.edu. I have received (or will receive) a copy of this form.

Please write your name below and check yes or no. If you want to take part Sign your name at the bottom.

_____

NAME

_____ Yes, I would like to take part in the focus group.

_____ No, I would not like to participate in the focus group.

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EXTERNAL RESEARCH
TEACHER CONSENT FORM-FOCUS GROUP

My signature on this form indicates that I have read the information provided and have decided to participate in the project titled, Comparison of Preservice and In-Service Teachers' Attitudes and Perceived Abilities Toward Integrating Digital Technologies Into the Classroom to be conducted by Jeannette Gomez, Doctoral Candidate at Texas A&M University Corpus Christi.

The purpose of the study is to explore pre-service and in-service teachers' attitudes and perceived abilities toward integrating digital technologies into the classroom. "Preservice" teacher is defined as a student who is currently in a teacher education program. "In-service" teacher is defined as a fully certified teacher who meets state mandated requirements to be a classroom teacher. Digital technologies is defined as information technology such as computers, devices that can be attached to computers (e.g., LCD projector, interactive whiteboard, digital camera), networks (e.g., Internet, local networks), and computer software.

I agree to the conditions listed below with the understanding that I may withdraw my participation in the project at any time, and that I may choose not to answer any questions that that I not want to answer. I understand my participation is completely voluntary.

1. Pre-service and In-service teachers will be invited to be part of a research project to assess teacher beliefs and attitudes toward integrating technology in the classroom.

2. Qualitative data will be collected from the focus groups. The researcher will lead the focus group, which will be voice-recorded, transcribed, and coded. All focus group participants will be asked to sign a consent form. In alignment with the explanatory sequential mixed methods research model, the quantitative data will be analyzed first and results will be used to formulate the lead questions for the focus group. The following are example questions that can be used:

   1. What are your experiences in integrating technology in the classroom?
   2. Can you describe the current technological resources used in your classroom?
   3. Did you take any technology courses while in college? If yes, were they useful?

The transcript of the focus group interview will be analyzed to document the perspectives of the participants regarding the integration of technology in the classroom.

Audiotape Permission

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I have been told that I can state that I don't want the discussion to be taped and it will not be. I can ask that the tape be turned off at any time.

I agree to be audio taped ___Yes ___No

If I have any questions about my rights as a research subject, I may contact the Research and Compliance Office and/or the Institutional Review Board at Texas A&M University-Corpus Christi at (361) 825-2457 or erin.sherman@tamucc.edu. I have received (or will receive) a copy of this form.

Please write your name below and check yes or no. If you want to take part Sign your name at the bottom.

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NAME

_____ Yes, I would like to take part in the focus group.

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Jeannette Gomez, Doctoral Candidate
Texas A&M University Corpus Christi
Jeannette.Gomez@tamucc.edu
361-834-9064

STATEMENT OF CONSENT

_____

Teacher Signature Date

_____

Campus Name

_____

Researcher/Investigator Signature Date