A PHENOMENOLOGICAL STUDY OF THE IMPACT OF PRE-SERVICE AND IN-SERVICE TRAINING REGARDING THE INTEGRATION OF TWENTY-FIRST CENTURY TECHNOLOGIES INTO SELECTED TEACHERS' INSTRUCTION

by

Christopher Clark

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University

April, 2013

A PHENOMENOLOGICAL STUDY OF THE IMPACT OF PRE-SERVICE AND IN-SERVICE TRAINING REGARDING THE INTEGRATION OF TWENTY-FIRST CENTURY TECHNOLOGIES INTO SELECTED TEACHERS' INSTRUCTION

by

Christopher Clark

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University, Lynchburg, VA

April, 2013

APPROVED BY:

ELLEN LOWRIE BLACK, Ed.D., Committee Chair

ANDREW T. ALEXSON, Ed.D., Committee Member

MATTHEW DAVID TOWLES, Ph.D., Committee Member

SCOTT WATSON, Ph.D., Associate Dean, Advanced Programs

A PHENOMENOLOGICAL STUDY OF THE IMPACT OF PRE-SERVICE AND IN-SERVICE TRAINING REGARDING THE INTEGRATION OF TWENTY-FIRST CENTURY TECHNOLOGIES INTO SELECTED TEACHERS' INSTRUCTION

ABSTRACT

The purpose of this transcendental phenomenological study is to understand how in-service teachers with three to five years of experience perceive their pre-service and in-service training regarding the integration of twenty-first century technology into their instruction. Twenty participants from a rural public school system in southeast North Carolina participated. This study attempted to describe the following: (1) How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction? (2) How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction? (3) How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction? Through interviews, a focus group, and the use of the Computer User Self-Efficacy (CUSE) survey, themes were identified that described participant perceptions of the phenomena of twenty-first century technology integration training. Participant reported themes were: (a) high level of confidence and skill when selecting twenty-first century technologies, (b) integration must be planned for, (c) college professors rarely integrated technologies, (d) twenty-first century technology assignments were neither purposeful nor rigorous, (e) integration confidence/competence began during field placements, (f) staff development exposed participants to a wealth of technologies, and

(g) staff development lacked focus and purpose. In turn these themes were used in developing a list of best practices as articulated by the participants. The implications are discussed and further recommendations are made for college of education programs and staff development coordinators along with suggestions for future research.

Keywords: accredited institution of higher education, andragogy, best practices, CEU, efficacy, in-service, pre-service, staff development, technology integration, traditional licensure, twenty-first century technology

DEDICATION

It is with love and devotion I dedicate this dissertation to my wonderful and loving wife Celia who has supported me and put up with all the countless hours I have had to be away from her, either on the road, or in the next room. I thank you for the sacrifices you have made.

ACKNOWLEDGMENTS

There are many individuals to whom I owe a debt of gratitude for their constant support during this process. However, I want to thank the Lord for, (if I may borrow from a professor of mine), "blessing the work of my hands" as Dr. Ellen Lowrie Black used to say in our classes, for the Lord has truly been behind any and all successful ventures during my lifetime. His ever present grace and sustaining salvation continues to carry me each day as I attempt to become more like Him. Thank you God for adopting me as your son!

To my children, Hannah, Benjamin and Trey: thank you for your love, being quiet when I needed it, and for believing in me. I will always love you!

To my parents, Rev. Roy Clark and Dr. Juanita Clark, the best parents anyone could have. You two have been such an anchor in my life. Words will never describe how much I love and appreciate you both. Thank you most of all for introducing me to Jesus at the young age of five, those seeds continue on in my own children!

To my sister Kimberly, you have always been my greatest cheerleader. Your enthusiasm and constant encouragement mean the world to me.

To Dr. Ellen Lowrie Black, you have truly blessed me by providing the encouragement, and any assistance that I might have needed at a moment's notice.

To Dr. Andrew T. Alexson, and Dr. Matthew David Towles your work as committee members has made me a better researcher and writer.

Finally there are others who have helped me along this journey by offering guidance, council, and support through-out this process: Dr. Lucinda Spaulding, Mrs. Debbie K. Locklear, Dr. Brenda Dial-Deese, Dr. Sandra McCormick, Dr. Regionald Oxendine, Jr., and my Liberty University professors.

Table of Contents

List of Tables

List of Abbreviations

American Federation of Teachers (AFT)

Computer Self-Efficacy (CSE)

Computer User Self-Efficacy Scale (CUSE)

Content Knowledge (CK)

Continuing Education Credit (CEU)

Continuing Professional Development (CPD)

Family Educational Rights and Privacy Act (FERPA)

Global Positioning System (GPS)

Information and Communications Technologies (ICT)

International Society of Technology in Education (ISTE)

National Council for Accreditation of Teacher Education (NCATE)

National Education Association (NEA)

National Education Technology Plan (NETP)

National Educational Technology Standards (NETS-T)

National Staff Development Council (NSDC)

Partnership for twenty-first century Skills (P21)

Pedagogical Content Knowledge (PCK)

Pedagogical Knowledge (PK)

Personal Data Assistant (PDA)

President's Committee of Advisors on Science and Technology (PCAST)

Technological Content Knowledge (TCK)

Technological Knowledge (TK)

Technological Pedagogical Content Knowledge (TPCAK or TPCK)

Technological Pedagogical Knowledge (TPK)

Technology Proficiency Self-Assessment Instrument (TPSA)

Use, Support, & Effect of Instructional Technology (USEIT)

CHAPTER ONE: INTRODUCTION

For the past decade America has invested millions of dollars to ensure its schools have access to the latest twenty-first century technologies. In addition, America, through grants and other projects, has attempted to promote innovative teaching with twenty-first century technologies (U. S. Department of Education, n.d.). In their efforts to ensure teachers are prepared to employ twenty-first century technologies, The National Council for Accreditation of Teacher Education (NCATE) has developed the National Educational Standards for Teachers (2008). These standards seek to have teachers employ twenty-first century technologies in their classrooms which support teaching, learning and the curriculum while enriching the learning environment and experiences of the student (Liu, 2011). This study is focused on listening to the voices of practicing teachers with three to five years of experience in an effort to understand how they perceive their pre-service and in-service training regarding the integration of twenty-first century technology into their instruction. Training teachers how to integrate twenty-first century technologies is two-pronged. This training begins while a pre-service learner at the collegiate level and continues on through the in-service years as a licensed teacher.

The first chapter of this dissertation will examine the background of the study, the statement of the problem, and the purpose of the study. Three research questions will be shared along with an explanation of how the theoretical framework is related to the purpose of the study. In addition delimitations of the study will be addressed and a research plan will be proposed. Finally a justification for employing the transcendental phenomenological approach will be given.

Background

The use of twenty-first century technologies, defined as "digital technologies (computers, PDA's, media players, GPS, etc.), communication/networking tools, and social networks" (Partnership for twenty-first century Skills (P21) Framework Definitions, p. 5) does not seem too innovative to society as a whole, nor should they seem so, after all they are universally accepted as tools of the twenty-first century. In many professions today it is expected and often mandated individuals are to use twenty-first century technologies to perform their jobs effectively. For instance, auto mechanics use computers to run diagnostics on vehicles in order to determine any areas in need of repair very much the same way a physician uses an ultrasound machine to determine the health status of an unborn child. Twenty-first century technology skills are a prerequisite for global readiness.

Educators of today must not only prepare their educational charges academically but technologically as well. The "dotcom" era is newly birthed; most educators are not. Over fifty-six percent of today's educators are over the age of forty (National Center for Educational Statistics, 2011). Given this fact the question arises, "How does America's colleges of education and educational leaders prepare teachers for the integration of twenty-first century technology skills into their current teaching methodology?" It is incumbent upon America's schools of education and school level leadership to immerse themselves and their faculty and student body into an enriched supportive twenty-first century learning environment in order to ensure that, "no one is left behind."

According to a 1997 report by the President's Committee of Advisors on Science and Technology (PCAST) there are very few teachers who currently receive technical, pedagogical or administrative support in their acquisition or application of twenty-first

century technology skills. It is also reported many of America's colleges of education do not adequately prepare their graduates to use twenty-first century technologies in their classrooms. A survey of K-12 teachers by the National Center for Educational Statistics (2002) found only 22% of teachers felt they could successfully utilize technology to engage learners in the classroom.

Additionally, a 2005 National Teacher Survey commissioned by CDW-G found 80% of the teachers using technology were using it for routine administrative functions and only slightly more than half were using computers effectively in instruction (National Teacher Survey, 2005). A survey by the National Center for Educational Statistics (Gray, Thomas, & Lewis, 2010) found fewer than half of the 3000 teachers surveyed reported using technology often during instruction. Although state standards and the NCATE standards for accreditation require teachers incorporate technologies successfully, inadequate training in the use of technology as an instructional tool continues to be a barrier to successful integration of twenty-first century technologies (Zho, 2007).

Survey data suggested although teachers were employing technologies in their classroom practices (CDW-G, 2006; Project Tomorrow, 2008), many of these practices were for administrative and communicative tasks (Palak & Walls, 2009). While many state, NCATE, and ISTE standards prefer student-centered technology uses which support collaboration between the teacher and student while altering the traditional teacher-centered approach to teaching, very few teachers employ technology in this manner (Culp, Honey, & Mandinach, 2005). While teachers report they use "technology to facilitate student learning" (Ottenbriet-Leftwich, Glazewski, Newby, & Ertmer, 2010, p. 1321), only one third of survey participants in a 2008 National Education Association

survey (NEA-AFT) (NEA-AFT, 2008) stated they "required their students use computers more than a few times a week" (Ottenbriet-Leftwich et al., 2010, p. 1321).

In order for technology to be integrated teachers must possess the requisite skills, knowledge, abilities and attitudes (Reynolds & Morgan, 2001; Teclehaimanot, Mentzer, & Hickman 2011; U. S. Department of Education, 2005; Yildirim, 2000; Yildirim & Kiraz, 1999). While there is research which illustrates how often or what kinds of technology is employed in classrooms (Góktaş, Yildirim, & Yildirim, 2009; Hsu, 2011; Pitler, 2011; Shihkuan, 2010; Smarkola, 2008), there is very little research related to best practices in training pre-service and in-service teachers how to effectively integrate twenty-first century technologies into their instruction.

Today's teachers must employ twenty-first century technologies; it is not an option. It is imperative every child be afforded multiple opportunities to learn how to advance academically utilizing twenty-first century technologies in order to compete successfully in this rapidly changing complex global society. This study is aimed at determining how participants perceive their twenty-first century technology training at the university and pre-K – 12 school level, and what developmental practices serve to increase teacher twenty-first century technology integration efficacy.

Relationship between the Theoretical Framework and the Purpose of the Study

Andragogy. Andragogy, the theory of adult learning, as espoused by Knowles (1980) is a theoretical framework I will employ while analyzing the data and identifying themes. Andragogy was first articulated by Alexander Kapp, a German grammar teacher, (Reischmann, 2004; Taylor & Kroth, 2009). In 1921 a German Social Scientist, Eugene Rosenstock argued that "adult education required special teachers, special methods and a special philosophy" (Knowles, Holton, & Swanson 1998, p. 59). Jack Merzirow (1991)

has discussed andragogy and how adult learners need "reflective learning" opportunities (Merzirow, 1991, p. 6). Reflective learning situations assist the student in understanding their learning habits and helps move them toward new understandings of information which is taught.

Andragogy also argues adults need to know why they should learn something; the more standard pedagogical model assumes students simply learn what they are told. Helping adults see the value of learning objectives can be as easy as asking them to reflect on what they expect to learn, how they might use it or how the information will help them reach their educational goals. According to Patricia Lawler (1991) adult learning goals and expectations can be "used throughout the program to reinforce the importance of learning activities" (Lawler, 1991, p. 36)

There are five themes inherent in the andragogical model of adult learning. As adulthood is reached the learners: (a) self concept moves from one of being a dependant learner to a self-directed one, (b) experience level increases such that it becomes an invaluable resource for learning, (c) readiness to learn orients itself to developmental tasks related to his or her social roles, (d) time perspective related to application of knowledge moves from a postponed application to one of immediacy in application and his or her focus moves from a subject centered orientation to a problem centered one, and (e) motivation to learn becomes internally driven (Knowles 1984, p. 12). Understanding the interplay among these themes in improving adult learner ability to internalize new content is invaluable in creating both pre and in-service twenty-first century learning environments.

In determining when the learner is an adult Knowles in *The Modern Practice of Adult Education: From Pedagogy to Andragogy*, 1980 posed two questions. The first

concerned the psychological definition of the "image of an adult self" (Taylor & Kroth, 2009, p. 5) where Knowles indicated "a person is an adult to the extent that the individual perceives herself or himself to be essentially responsible for her or his own life" (Knowles, 1980, p. 24). Second is the "social definition" (Taylor & Kroth, 2009, p. 5) determined by persons who behaves as an adult and performs adult roles. According to Knowles "a person is adult to the extent that the individual is performing social roles typically assigned by our culture to those it considers to be adults—the role of worker, spouse, parent, responsible citizen, soldier, and the like" (Knowles, 1980, p. 24).

The Family Educational Rights and Privacy Act (FERPA) grants parents certain rights regarding their children's education records. However these rights transfer to the student at the age of 18 or upon enrollment in a school beyond the high school level. Students with these rights are known as "eligible students" (U. S. Department of Education, Family Educational Rights and Privacy Act (FERPA)). These "eligible students" as defined in FERPA would seem to indicate a post-secondary student would be "essentially responsible for his or her own life" (Knowles, 1980, p. 24) and would meet the psychological definition of adult as espoused by Knowles (1980). Most post-secondary students are considered responsible citizens as they have been granted the right to vote upon their 18th birthday and as such would meet the social definition of adult as articulated by Knowles (1980).

As participants describe how effective or ineffective they perceived their training to be regarding the integration of twenty-first century technologies, particular care will be taken to see how integral the andragogical model of adult learning has been throughout the process they will be describing. It is hoped through the rich descriptions of participant

experiences I will be able to describe what participants believe to be best practices related to twenty-first century technology integration training from an adult learner perspective.

Technological, Pedagogical, Content Knowledge (TPACK). Teachers need a "collection of competencies and knowledge of how to use … disciplinary knowledge, pedagogical techniques, and technological tools" (Kereluik, Mishra, & Koehler, 2011, p. 15) in their classrooms. The creative application of TPACK encourages the development of new pedagogical strategies which employ technologies across disciplines. This new paradigm "emphasizes the role of the teacher as a producer (as designer), away from the traditional conceptualization of teachers as consumers (users) of technology (Kereluik et al., 2011, p. 16). This new conceptualization of how teachers are to employ technology would serve to elevate the learning environment to one in which technology is not simply used as a tool to teach with but as a tool to facilitate teaching and learning.

Technologies are emerging constantly, many hold great potential for education. Technological content knowledge (TCK) is imperative for America's teachers in order to successfully integrate twenty-first century technology into instruction. However this technological content knowledge must be "flexible, creative, and adaptive" (Kereluik et al., 2011, p. 16) so teachers can manage, direct and employ technology in contextual specific ways. Technology integration training should be situated within a teacher's specific pedagogical content knowledge (PCK) so they can begin to understand how to employ twenty-first century technology for instructional purposes. Teachers need to be able to "borrow a concept…from one field of study [i.e. technology] and apply it to fill a need or solve a problem in another field [i.e. teaching science]" (Kereluik et al., 2011, p. 17). This transference requires teacher educators and school and or district level staff

development coordinators emphasize these skills in their twenty-first century technology integration training.

First, teacher learners need to acquire foundational technological knowledge and technical literacy. Second, teacher learners should be afforded opportunities to experiment with combining this technological specific knowledge with their knowledge of pedagogy. Third, teacher learners should be able to "repurpose technology" (Kereluik et al., 2011, p. 17) in their efforts to integrate twenty-first century technology into their specific instructional settings. This study will attempt to understand participants' perceptions regarding their twenty-first century technology integration training into their specific teaching contexts. TPACK attempts to shed light on how multifaceted technology integration is. Teachers need to understand technology, should be given time to connect the technology with pedagogic practice and finally should change their particular instructional practices by integrating twenty-first century technology.

Problem Statement

All too often twenty-first century technology integration training scenarios have not been rooted in the idea of best practices. Best practice: (1) is defined as "solid, reputable state of the art work in a field" (Zemelman, Daniels, & Hyde, 1998, p. viii), (2) is identified through research and can offer practitioners the "latest knowledge, technology, and procedures" (Chenoweth, Carr, & Ruhl, 2005, p. 2) and (3) can supply practitioners with "knowledge about how research and theory guide technology integration practices" (Schrier, 2010, p. 182). Providing twenty-first century technology training while disregarding identified best practices resembles a "collection of haphazard, random, and disconnected tool-book-type activities" (Schrier, 2010, p. 182). Very few

teachers currently receive technical, pedagogical or administrative support in their acquisition or application of twenty-first century technology skills (Llorens, Salanova, & Garu, 2002). This study will identify teacher perceptions of best practices related to twenty-first century technology training which may assist colleges of education, staff development coordinators and administrators in their efforts in training America's educators how to integrate twenty-first century technologies into their instruction.

As previously stated, technology is to be used as a means of performing one's job efficiently and effectively in nearly every vocation. However classroom teachers are rarely expected to do the same (Ertmer & Ottenbriet-Leftwich, 2010). Today many of America's classrooms are employing the same technology as in the past disregarding many twenty-first century technologies (Ertmer & Ottenbriet-Leftwich, 2010, p. 255). The idea of twenty-first century technology as simply a supplemental tool for teaching must be abandoned and replaced with the idea, as in other professions, that employing twenty-first century technology to teach is essential to effective teaching and learning (Ertmer & Ottenbriet-Leftwich, 2010).

There may be an assumption current and future education majors are more prepared to integrate technology than the current teaching force; but this is not the case (Russell, Bebell, O'Dwyer, & O'Conner, 2003). While it may be true newer teachers possess a higher level of personal proficiency with the use of technologies, they are not any better at employing them successfully in classroom practices (Rogers & Wallace, 2011; Russell, O'Dwyer, Bebell, & Tao, 2007). Exposure to technologies does not automatically translate into the ability to use them effectively for instructional purposes (Ertmer & Ottenbriet-Leftwich, 2010). A transfer of this magnitude requires the use of simulated lessons and the participation in relevant and engaging field experiences for pre-

service teachers and relevant and engaging staff development for in-service teachers (Baylor & Ritchie, 2002; Becker, 2001; Bennett, 2004; Reynolds & Morgan, 2001; Roberts, 2003; Vanfossen, 2001; Wenglinsky, 1998).

According to Hughes (2005) beginning teachers, who often have had less exposure to integrating technology, are often "more poised to integrate…simply because they possess more knowledge [technological] with which to connect" (p. 299). Subject matter expertise offers veteran teachers a "pedagogical-based focus" (Hughes, 2005, p. 299), on which to begin technology integration which many newer teachers may not possess. Therefore the importance of relevant and engaging content-specific ways to employ technologies should be modeled for pre-service teachers at the collegiate level and during field-placements in order for them to begin to understand how twenty-first century technologies can transform their teaching practices.

In a mixed-methods study by Russell et al. (2003) 22 school districts throughout Massachusetts participated in the Use, Support, and Effect of Instructional Technology (USEIT) study which was designed to understand what technologies were used by teachers, and what factors influenced their usage. Phase one of the three year study began by employing site visits, interviews, and surveys while phase two consisted of case studies where the focus was on technology support issues. The researchers found while it is clearly the case new teachers have had greater exposure to technology and to some extent have a greater sense of confidence using technology, this does not translate to "higher levels of use of technology in the classroom" (Russell et al., 2003, p. 308).

A concentrated emphasis on improving the pre-service education experience of teachers and the professional development exposure of practicing teachers is needed before twenty-first century technology can be integrated effectively. Some

recommendations for needed adaptations for pre-service programs according to Ertmer and Ottenbriet-Leftwich (2010) in *Teacher Technology Change: How Knowledge, Confidence, Beliefs, and Culture Intersect* are: (a) the need to provide more hands-on exposure to technology, (b) the need to provide opportunities for pre-service teachers to observe best practices related to technology usage, and (c) the need to provide multiple opportunities to practice using technologies to facilitate teaching and learning.

While several studies have shown stand-alone technology courses at the pre-service level do not successfully prepare pre-service teachers for the integration of twenty-first century technologies, these courses do develop basic computer skills proficiency within the learner (Bradshaw, 2002; Hinson, LaPrairie, & Heroman, 2006; Mouza, 2009; Wells, 2007). Rogers and Wallace (2011) found through the "infusion of technology throughout education courses and the provision of technology-rich field placements" (p. 34) pre-service teachers developed skills which helped them integrate technologies successfully in the K-12 setting. This movement to an integrated approach to teaching technology requires a lot of effort by America's colleges of education. Integration efforts can only be successful if and when administrators, faculty, support personnel and students understand how to "systemically integrate[d]" (Rogers & Wallace, 2011, p. 33) within their specific content. This type of "technology proficiency [should be] modeled, required, and assessed throughout the education curriculum" (Rogers & Wallace, 2011, p. 35) not just within stand-alone technology courses.

Researchers also provided recommendations for in-service professional development improvements. They argued practicing teachers "need exposure to and practice with technology which directly relates to existing pedagogical content knowledge" (Ertmer & Ottenbreit-Leftwich, 2010, p. 266). Additionally in-service

teachers need: (a) collaborative discussions regarding how twenty-first century technologies can be used in teaching, (b) professional development which is situational specific affording them opportunities to see how twenty-first century technology can be used in their own classrooms, (c) professional development followed by ongoing support and collaborative discussions, and (d) release time to allow teachers an opportunity to observe other teachers using technology (Ertmer & Ottenbreit-Lefwich, 2010).

Teachers will continue to employ technologies to assess students, enrich the learning environment and communicate with stakeholders (Navarro & Natalicio, 1999; Wade, Abrami & Sclater, 2005). For this reason future teacher education programs and school level staff development initiatives related to twenty-first century technology integration will continue to be an important requirement in the training of America's teachers.

In an effort to build upon best practices in training adults how to integrate twenty-first century technologies into their instruction, this transcendental phenomenological study examines the approaches to integrating twenty-first century technologies as a pre-service endeavor at the university level and as an in-service endeavor at the district and pre-K – 12 school level through professional development opportunities. Having participants reflect on what went right or wrong with their training is not enough, using this information to design optimum learning environments is the goal of this study.

Purpose Statement

The purpose of this transcendental phenomenological study is to understand how in-service teachers with three to five years of experience perceive their pre-service and in-service training regarding the integration of twenty-first century technology into their

instruction. Capturing the essence of how teachers view their pre-service and in-service training regarding the integration of twenty-first century technologies into their instruction using qualitative means is important in it adds to the body of existing quantitative knowledge related to twenty-first century technology's impact on pre-K - 12 teacher development. In this study the phenomena of twenty-first century technology integration practices while pre-service learners and a later as in-service learners is explored.

When speaking about the newly released U.S. Department of Education's National Education Technology Plan (NETP), Arne Ducan stated, "We have an unprecedented opportunity to reform our schools….We must dramatically improve teaching and learning, personalize instruction and ensure that the educational environments we offer to all students keep pace with the twenty-first century" (U.S. Department of Education, 2010). Systemic change requires much more than confidence; university level and school level leaders need to transform training; instead of focusing on teaching the twenty-first century technology the focus shifts to teaching with the twenty-first century technology. Instead of exposing pre-service and in-service teachers to twenty-first century technologies as tools these twenty-first century technologies should be seen as "integral tools with diverse uses and inherent potential to enhance teaching and learning" (Russell et al., 2003, p. 308).

Significance of the Study

The results of this study will identify best practices as perceived by the participants related to: (a) increasing teacher self-efficacy in integrating twenty-first century technologies into instruction and (b) twenty-first century technology integration

training at the pre-service and in-service levels. This data is essential in helping with school-wide twenty-first century technology staff development initiatives and with planning and implementation practices. Also, understanding how pre-service teachers decide to implement twenty-first century technology will aid in smoothing the transition from pre-service to in-service teacher.

This study builds on studies like those conducted by Bauer and Kenton, (2005) where it was found high levels of technology use still evades America's schools. Bauer and Kenton's mixed-methods study involved four schools in an urban area of a southern state. Survey data was collected in an attempt to understand the types of tasks computers were used for in classrooms. Observations and interviews were employed to accurately record which computer applications were being used, and the level of computer integration during the lesson.

Bauer and Kenton's research found integration of computing technology had not occurred. Integration was defined as "full-time, daily operation within lessons" (Bauer & Kenton, 2005, p. 535). Responses to survey questions indicated 80% of the teachers reported they used computing technologies less than 50% of the time. Teacher perceptions related to self-efficacy were strong. Although many of the participants viewed themselves as being confident about technology usage, they reported being more confident than skilled at employing technologies when teaching.

A survey commissioned by CDW-G found 80% of teachers using technology were using it solely for administrative functions. This same study indicated little more than half of the respondents were using technology effectively in instruction (National Teacher Survey, 2005). There is a large body of literature which supports the idea technology training is the single most important factor in integrating technology in the

curriculum (Reynolds & Morgan, 2001; Teclehaimanot et al., 2011; U. S. Department of Education, 2005; Yildirim, 2000; Yildirim & Kiraz, 1999).

Teaching a challenging curriculum to learners from various backgrounds and experiences in our globalized society necessitates teacher lessons employ emerging devices, tools, media, and virtual environments. The use of twenty-first century technologies serves to elevate the learning environment from its historical static state to one which is dynamic. In addition to the usage of twenty-first century technologies, schools and universities need to improve teacher knowledge and methods of understanding their pedagogy in twenty-first century technological specific ways (Kopcha, 2012). Staff development initiatives and university level teacher education programs should include the modeling of twenty-first century technology tools which serve to create these powerful learning environments (Meagher, Ozgun-Koca, & Edwards, 2011; Sutton, 2011; Teclehaimanot et al., 2011).

This study will extend these studies by determining which developmental practices serve to increase teacher twenty-first century technology integration efficacy and what specific characteristics improve participant perceptions regarding twenty-first century technology training at the university and the pre-K-12 school level. Focusing on training teachers to integrate twenty-first century technologies into instruction is foundational, there may be a myriad of technologies which have not been developed as of yet. Concentrating on how to integrate a particular twenty-first century technology would possibly mean this study will soon become outdated, but a focus on training adults how to integrate twenty-first century technology which is independent of the twenty-first century technology itself makes the study relevant far into the future.

Research Questions

The following questions will guide this study:

Research Question One

How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction? Computer self-efficacy has been shown to influence a person's willingness to use computers. Self-efficacy has also been shown to be "critical to the mastery of skills" (Smith, 2001, p. 28). Bandura (1986) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391).

Research Question Two

How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction? Teachers with three to five years of experience will facilitate a better understanding of current college of education practices related to twenty-first century technology integration training at the collegiate level.

Research Question Three

How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction? Teachers with three to five years of experience will facilitate a better understanding of current staff development practices related to technology integration training. In addition understanding how teachers view staff development efforts at the school level will assist in planning efforts.

This research study focuses on the subjective experiences of the teachers as their collective voices are heard through the research design. I will collect data directly from the phenomena under study (Creswell, 2007). In this study the phenomena of twenty-first century technology integration training while pre-service learners and later as in-service learners will be explored.

Delimitations

This study was delimited by site selection, participant selection, methodology and the survey selection. Site selection was restricted to schools with a ratio of 3:1 students per instructional computer. This ratio is slightly below the district ratio of 2.02:1 (Education First NC School Report Cards, 2011). This study is dependent on participants having access to twenty-first century technology in order to integrate. It can be supposed with a ratio of three students for every instructional computer, participants would have the resources to integrate.

I chose to include 20 participants since it is recommended by Polkinghorne, (1989) that 5 to 25 participants should be used when conducting phenomenological research. The selected participants had between three and five years of experience, had all been licensed to teach by completing an education program at an accredited institution of higher education and had participated in methods and technology courses as pre-service teachers. In addition these participants as in-service teachers had all participated in school or district level technology staff development initiatives. These selection criteria served to facilitate the understanding of current college of education practices relative to twenty-first century technology integration training and current staff development initiatives regarding twenty-first century technology integration.

Phenomenology as a methodology was designed specifically to describe experiences. According to Husserl, (1970a), phenomenology is the "study of *lifeworld* (lebenswelt), defined as 'what we know best, what is always taken for granted in all human life, always familiar to us in its typology through experience'" (p. 123-124). Technology is intertwined into the lifeworlds of teachers and the use of phenomenology to study these experiences is consistent with its use as a methodology.

Finally this study was delimited by the selection of the Computer User Self Efficacy Scale (CUSE) (Appendix E) as the third data collection instrument regarding participant computer use self-efficacy . This scale, developed by Dr. Simon Cassidy and Dr. Peter Eachus, has high test-re-test reliability over a one month period (r=0.86, N=74, p<0.0005, N=212); internal reliability using Cronbach's Alpha (alpha=0.97, N=184); construct validity by correlating self-efficacy scores with self-reported measures of computer experience (r=0.79, p<0.0005, N=212) and with software usage (r=0.75, p< 0.0005, N=210) (The Computer Self-Efficacy Website, n.d.).

Research Plan

This qualitative study employs the transcendental phenomenological method to describe teachers' perceptions of their pre-service and in-service training regarding the integration of twenty-first century technology. I will collect data on the shared experiences of teachers using interviews, a focus group and a survey. Twenty-first century technology integration training during the college of education program and later as school level staff development participants will be the phenomena under study. Since I am attempting to understand the phenomenon of integrating twenty-first century technology into instruction, the phenomenological approach will be utilized.

Rationale for Transcendental Phenomenology

The phenomenological approach is an effective tool for revealing the qualitative aspects of integrating twenty-first century technologies into one's instruction. According to Creswell (2007) "a phenomenological study describes the meaning for several individuals of their lived experiences of a concept or a phenomenon" (p. 57). The stated purpose of phenomenology is to "reduce individual experiences with a phenomenon to a description of the universal essence" (Creswell, 2007, p. 57). Understanding this "universal essence" can inform best practices related to improving teacher twenty-first century technology integration efficacy. Additionally this "universal essence" of how participants perceived their training regarding the integration of twenty-first century technologies as pre-service and later as in-service learners can assist me in describing what the participants perceived as best practices regarding this training.

Phenomenology was "designed to study the essence and meaning of experience" (Cilesiz, 2011, p. 493). Therefore methodologically, phenomenology is well suited to constructing a research agenda predicated on experience with twenty-first century technology. Because phenomenology was designed to describe experiences, experiences with integrating twenty-first century technology into one's teaching fits well within the phenomenologist domain. Finally phenomenology is the "study of *lifeworld* (lebenswelt), defined as 'what we know best, what is always taken for granted in all human life, always familiar to us in its typology through experience'" (Husserl, 1970a, p. 123). Twenty-first century technology has become integral to the lifeworlds of educators, both at the pre-service and in-service levels; investigating these experiences with twenty-first century technologies is consistent with the use of phenomenology (Cilesiz, 2011).

The qualitative researcher employs the following phenomenological methods: (a) identifies an "object of human experience" (van Manen, 1990, p. 163), (b) collects data from individuals who have all experienced the phenomenon, (c) and develops a "description of the essence of the experience for all of the individuals" (Creswell, 2007, p. 58) consisting of "what" was experienced and "how" it was experienced (Moustakas, 1994). Following Clark Moustakas's *Phenomenological Research Methods* (1994) allows me to study several individuals with a common experience and assists me in producing a report describing the essence of how pre-service efforts and in-service efforts have assisted practicing teachers with the integration of twenty-first century technology.

Transcendental phenomenology focuses on the completeness of experience and the search for the essence of experience. Thus the researcher views experience and the actual behavior related to the experience as an "integrated and inseparable relationship of subject/object (Moerer-Urdahl & Creswell, 2004, p. 6). The researcher engages in a process that is transcendental because the researcher sees the phenomenon "freshly, as for the first time" (Moustakas, 1994, p. 34) and is "open to its totality" (Moerer-Urdahl, & Creswell, 2004, p. 6).

This research study is aimed at understanding how participants feel about their ability to integrate twenty-first century technologies into their instruction. Participant perceptions related to self-efficacy to integrate can be vital in training efforts (Inan & Lowther, 2010; Vannetta & Fordham, 2004). Participant perceptions relative to twenty-first century technology integration training can also be invaluable in determining best practices related to training scenarios. The phenomena under study is how practicing teachers with three to five years of experience perceive the training they received as pre-

service learners and later as in-service learners regarding the integration of twenty-first century technologies.

Definition of Terms

An *accredited institution of higher education* characteristically (a) admits as regular students only persons having a certificate of graduation from a school providing secondary education; (b) is legally authorized within such State to provide a program of education beyond secondary education; (c) provides an educational program for which the institution awards a bachelor's degree; and (d) is accredited by a nationally recognized accrediting agency or association (U.S. Department of Education, 1998).

Best practices is defined as "solid, reputable state of the art work in a field" (Zemelman, Daniels, & Hyde, 1998, p. viii).

Basic uses of technology "include[s] the ability to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas…" (Inventory of Teachers Technology Skills, n.d.).

The *Continuing Education Unit* (CEU) is a nationally recognized method of quantifying the time spent in the classroom during professional development and training activities. Ten hours of instruction = 1.0 CEU. (American Public Works Association, 2013).

Digital native a term coined by Prensky (2001) is defined as those individuals who have grown up with digital technology from birth (Prensky, 2001).

In-service teacher is a teacher continuing their teacher specific training while employed; "of, relating to, or being one that is fully employed" (Merriam-Webster, n.d.,)

Pedagogy is defined as the art or science of teaching; education; instructional methods (Merriam-Webster, n.d.).

Pre-service teacher is a teacher who has declared an education major but has not completed training (Education.com, 2013).

Self-efficacy is "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391).

Staff development encompasses the procedures, platforms and tasks that organizations employ to improve the competencies of employees (eHow.com, 2013).

Technology integration means using technology to facilitate instruction and "adopt[ing] new and arguably better approaches to instruction and/or change[ing] the content or context of learning, instruction, and assessment" (Lawless & Pellegrino, 2007, p. 581).

Traditional licensure is when a teacher has completed the traditional route to obtaining a license to teach in any given state; may have a degree in education and a specialization in the grades or subjects to be taught (Norman, 2013).

Twenty-first century technology includes technologies such as: computers, PDA's, media players, GPS, etc., communication/networking tools, and social networks" (Partnership for twenty-first century skills, (P21) Framework Definitions, p. 5)

CHAPTER TWO: LITERATURE REVIEW

Introduction

Effective use of twenty-first century technologies is a prerequisite for global readiness. The National Educational Technology Plan (NETP) proposes five core areas which govern how twenty-first century technology should be used to transform America's educational system, they are:

(a) Learning-Change the learning process so it's more engaging and tailored to students' needs and interests.

(b) Assessment-Measure student progress on the full range of college and career ready standards and use real time data for continuous improvement.

(c) Teaching-Connect teachers to the tools, resources, experts and peers they need to be highly effective and supported.

(d) Infrastructure-Provide broadband connectivity for all students, everywhere-in schools, throughout communities and in students' homes.

(e) Productivity-Use technology to help schools become more productive and accelerate student achievement while managing costs. (U.S. Department of Education, 2010).

Arne Duncan, U. S. Education Secretary stated "Our nation's schools have yet to unleash technology's full potential to transform learning…We're at an important transition point. We need to leverage technology's promise to improve learning." (U. S. Department of Education, 2010) America's institutions of higher education and school/district level leadership need to adopt teaching and or training practices which utilize the potential of

twenty-first century technologies to enrich the learning experiences of all faculty and students.

Information and computing technologies have impacted our society for several decades however; America's educational system has largely remained unchanged (Levin & Wadmany, 2006). Technology integration efforts have not been realized, where technology has been integrated, desired changes to learning modalities have not followed. It is has also been noted teachers have only superficially incorporated technology into their work. Several studies indicate technology is most often used for routine tasks such as parental communications or preparing materials for lessons (Cuban, Kirkpatrick, & Peck, 2001; Kopcha, 2012; Russell, Bebell, O'Dower, & O'Connor, 2003; Zhao, Pugh, Sheldon, & Byers, 2002)

Many teachers continue to resist efforts to move away from teacher-centered approaches to teaching to "a more student-centered classroom" (Levin & Wadmany, 2006, p. 158). For these changes to occur there cannot simply be a reliance on technology. Training teachers to develop a skilled pedagogical and content application of educational uses of twenty-first century technology is paramount. Using a path model to explore technology usage between 379 teachers, Inan and Lowther (2010) found staff development, technical support and teacher efficacy were all indicators as to whether or not a teacher felt competent in employing technology.

Staff development ought to go beyond simply teaching basic skills in order to be successful. To infuse twenty-first century technology into instruction teachers need relevant curriculum-based technology training which teaches them activities for integration into the curriculum (Baylor & Ritchie, 2002; Becker, 2001; Bennett, 2004; Reynolds & Morgan, 2001; Roberts, 2003; Vanfossen, 2001; Wenglinsky, 1998). Using

mentors was found to be one means to situate training within the pedagogic and content contexts thereby helping teachers integrate technologies (Lowther, Inan, Strahl, & Ross, 2008; Smith & Smith, 2004; Swan & Dixon, 2006; Zho & Bryant, 2006). Mentor assisted teachers were more confident with technologies, and had fewer barriers related to the integration of technology (Kopcha, 2012). In addition, mentored teachers "more frequently employed student-centered uses of technology than non-mentored teachers" thereby allowing the use of technology to transform classroom dynamics (Kopcha, 2012, p. 1110).

This literature review examines teacher twenty-first century technology integration efficacy. In addition, research regarding the integration of twenty-first century technologies as a pre-service endeavor through colleges of education and as an in-service endeavor at the district and school level through professional development opportunities is also examined. In order for twenty-first century technology to be integrated teachers must possess the requisite skills, knowledge, abilities and attitudes (Reynolds & Morgan, 2001; Teclehaimanot et al., 2011; U. S. Department of Education, 2005; Yildirim, 2000; Yildirim & Kiraz, 1999).

Theoretical Framework

Society expects teachers to employ twenty-first century technologies in "ways that extend and increase their effectiveness" (Ertmer & Ottenbreit-Leftwich, 2010, p. 256) in meeting the needs of the twenty-first century learner by employing student-centered, constructivist practices which allow twenty-first century technology to facilitate meaningful learning. Students will then be able to "construct deep and connected knowledge, which can be applied to real situations" (Ertmer & Ottenbreit-Leftwich,

2010, p. 256). Most educational leaders either at the collegiate level or at the school or district level would agree teachers should be given the necessary training in an effort to increase their ability to successfully integrate twenty-first century technologies into their instruction. A theoretical basis is offered which specifically illustrates the importance of recognizing the impact of adult learner characteristics (Andragogy) on twenty-first century technology integration training and the complex interaction between technology, pedagogy, and content knowledge (TPACK) on the adoption of twenty-first century technology within one's instructional practices.

Andragogy

Malcolm S. Knowles, "the central figure in American adult education" (Smith, 2002, p. 1) espoused the original andragogical model of adult learning. Knowles defined andragogy as "the art and science of helping adults learn" (Knowles, 1980, p. 43). According to Swanson and Holton (2009) "andragogy has been called a theory of adult learning/education, a method or technique of adult education, and a set of assumptions about adult learners" (p. 204). As such, andragogy provides a rationale for a different approach to the methodology-centered process to teaching adults (Birzer, 2004; Cartor, 1990; Cross, 1981; Knowles 1975, 1980, 1984a, 1984b; Knowles, Holton, & Swanson, 1998).

The andragogical model is transactional in nature (Brookfield, 1986). Effective learning processes can be designed by following its core principles. These principles are:

- Adults need to know why they need to learn something before learning it.
- The self-concept of adults is heavily dependent upon a move toward self-direction.
- Prior experiences of the learner provide a rich resource for learning.

- Adults typically become ready to learn when they experience a need to cope with a life situation or perform a task.
- Adults' orientation to learning is life-centered, and they see education as a process of developing increased competency levels to achieve their full potential.
- The motivation for adult learners is internal rather than external (Holton, Swanson & Naquin, 2001, p. 120).

Androgogical teaching methods are not didactic but are collaborative and engaging, where adult learners are learning what they need to know with objectives organized around relevant application (Birzer, 2004; Conner, 2004; Holton et al., 2001). In addition, adults learn best in active, authentic real world situations in collaboration with their peers. Barriers to positive perceptions relative to twenty-first century technology integration training can be overcome when the training is directly related to actual classroom practice (Kopcha, 2012). This study is concerned with identifying participant reported best practices related to training them to integrate twenty-first century technology.

There is a heterogeneousness among learners and learner situations which requires all learning activities be approached from multiple perspectives (Holton et al., 2001). The adult learners' experiences provide a rich source for learning; therefore the teaching methods should include discussion and problem-solving activities (Lindeman, 1926). Teacher experiences with instructional goals dictate to a large degree the extent to which any new technological tool will be viewed as relevant to their goal (Ottenbreit-Leftwich et al., 2010). Therefore it is imperative to situate any twenty-first century technology training squarely within the framework of the adults' experiences with

instruction. Finally, rather than having a curriculum oriented to learning, adult learning situations require a more performance centered orientation to the curriculum (Jarvis, 1985).

Philosophically, andragogy's roots are in the humanistic and pragmatic traditions. From the humanistic perspective andragogy is "concerned with self-actualization of the individual" (Holton et al., 2001, p. 123). Andragogy's attention to the value associated with knowledge from experience at the expense of knowledge gained from formal authority places it squarely in the pragmatist's camp. The past experiences of teachers, their beliefs, and attitudes regarding instruction are likely to determine how useful a tool they perceive a particular twenty-first century technology tool to be (Ertmer, 2005; McGrail, 2005; Niederhauser & Stoddart, 2001; Windschitl & Sahl, 2002).

In practice, andragogy has three dimensions. First, there must be goals and purposes for learning. These goals and purposes may be for institutional growth, individual growth or societal growth (Holton et al., 2001). The learning experience for the adult learner must be predicated on one of these goals. Next individual differences and situational differences need to be taken into account. Individual differences range from prior exposure to the content being explored to the individual not having been exposed to necessary prerequisites for learning.

In conjunction with individual differences, situational differences necessitate changes to learning structures. These differences range from large group situations where learning scenarios are less tailored to prior needs or individual circumstances, to remote training sessions which necessitate greater self-direction on the part of the learner.

Finally, subject matter differences affect learner performance. More specifically, when introducing unfamiliar content the learner would require greater reliance on

pedagogy rather than on experience. All content cannot be presented the same way to all learners, nor should it be. Learning paths to new knowledge should be fashioned to the learners' specific needs, experiences, and situations. The material presented should be motivating and should challenge/extend the learners' existing knowledge base (Holton et al., 2001). It is without reservation understanding adult learner characteristics and utilizing this knowledge to train the adult learner how to integrate twenty-first century technology is imperative for the twenty-first century learner-teacher.

Technological, Pedagogical, Content Knowledge (TPACK)

Technological Pedagogical Content Knowledge (TPCK or TPACK) is a technology based theoretical framework regarding the relationship among a teacher's knowledge of technology, pedagogy and content. TPACK is derived from the work of Shulman (1986) where he argued teachers need a new specific knowledge, pedagogical content knowledge (PCK). PCK is defined as the knowledge of pedagogy which is specific to particular content areas; this knowledge goes beyond the subject matter to include the "dimension of subject matter knowledge for teaching" (Shulman, 1986, p. 9).

TPACK also provides an integrated framework for understanding how technology connects to "content knowledge and knowledge of teaching" (Kereluik, Mishra, & Koehler, 2011, p. 13). Content Knowledge (CK) is knowledge about subject matter that is to be learned. Pedagogical Knowledge (PK) is knowledge regarding the processes and methods of teaching. Technology Knowledge (TK) is knowledge about existing and emerging technologies. Interactions between these specific bodies of knowledge are also important. PCK or Pedagogical Content Knowledge is knowledge of pedagogy specific to a particular content. Technological Content Knowledge (TCK) is knowledge about how technology and content "influence or constrain one another" (Kereluik et al., 2011, p. 14).

Technological Pedagogical Knowledge (TPK) is knowledge regarding how technology changes the act of teaching and learning. Finally TPACK refers to the knowledge regarding the "complex interplays between…technology, pedagogy, and content [knowledge] and how they play out in different contexts" (Mishra & Koehler, 2006; Koehler & Mishra, 2008). Knowing how participants situate the new learning of twenty-first century technologies within their current knowledge of content and pedagogy will be an important step in identifying exemplar training sessions.

Understanding TPACK means understanding: (a) how a myriad of concepts may be represented by employing technologies, (b) how to create technological enriched pedagogy, (c) how to differentiate which concepts are difficult or easy for students to grasp, and (d) how technology can alleviate problems that students face in learning situations (Khan, 2011). TPACK is situated among the overlapping components of PCK, TCK, and TPK and is dependent upon the teacher possessing all three. Teachers need to be "explicitly [taught] how the unique affordances of technology can be used to enrich subject domains for specific learners and…about interactions among pedagogy, content, and technology to develop their TPCK" (Khan, 2011, p. 216).

Review of the Literature

Pre-Service Teacher Preparation

In a mixed-methods study by Teclehaimanot, et al. (2011) at a medium-sized Midwestern university, math and science pre-service teachers' competency, comfort with and use of technology was examined. The first method of examination involved examining grades from the required course *Technology & Multimedia in Educational Environments,* which provided training in computer skills. Grades from the 2007-2008

school year were examined for 180 students. In addition student developed portfolios were examined for evidence of technology integration. Finally a student teaching technology survey was conducted to provide data on student usage and student confidence in using technology.

This study also attempted to understand how the college of education faculty: (a) perceived technology integration efforts, (b) how they modeled technology integration as an instructional tool, and (c) how competent they were at implementing the International Society for Technology in Education National Educational Technology Standards for Teachers (ISTE NETS-T) (ISTE, 2008) (Teclehaimanot et al., 2011). These standards include requirements for the implementation and integration of instructional technology for the improvement of the teaching and learning process specifically to enhance student learning (ISTE, 2008).

The data collected from pre-service teachers included both positive and negative themes regarding technology integration. Grades from the technology course were high indicating pre-service teachers were competent in the use of technology. In addition, 75% of the pre-service teachers indicated they had utilized technology in at least one unit plan during their student teaching. Sixty-seven percent of respondents indicated they had planned at least one unit in which students used technology (Teclehaimanot et al., 2011).

Although students' grades were high indicating competence in using technologies, confidence to do so was unusually low. In addition when student teaching portfolios were investigated, there was very little evidence of technology integration. Within each portfolio were five lesson plans. These randomly selected portfolios did not support pre-service teacher self-reported success at integrating technology (Teclehaimanot et al., 2011).

When looking at faculty perceptions of technology integration, the researchers found many of the faculty felt integration efforts were to assist pre-service teachers in becoming competent with the technology as a tool (Teclehaimanot et al., 2011). Eight faculty members were interviewed. Half of them thought of integration efforts as enhancing instruction, while only two offered responses aligned with ISTE NETS-T standards. This seems to reinforce the notion while pre-service teachers are competent with using technologies, they are less adept at "improving learning through technology integration" (Teclehaimanot et al., 2011, p. 13).

Faculty views on when and where training to integrate technology occurs during a pre-service teachers' course of study was also mixed. Some faculty felt this training occurs in the required educational technology course, while other faculty felt some of this training occurred during pre-service teachers *Methods of Teaching* course. Because of this disconnect among faculty perceptions, it may be conjectured some students may receive "minimal training in technology integration as faculty members believe it is taking place in courses other than theirs" (Teclehaimanot et al., 2011, p. 13).

Finally, a majority of faculty reported they had modeled the use of technologies by utilizing technology during each lesson. Most faculty mentioned using a SMART Board or the course management system. However few faculty members trained their students on how to enhance learning with technologies. Four faculty members provided examples of how specific technological tools could be integrated, two others cited specific examples of how they were able to integrate technology yet none of the faculty reported how they had trained their students to integrate technology to enhance the learning process (Teclehaimanot et al., 2011). It appears since the faculty associated with this study did not address the benefits of technology integration with the pre-service

learners, the pre-service teachers' decisions to integrate technology into their own lessons during student teaching were negatively affected. Student perspectives relative to the importance of technology integration were low therefore there was a noted lack of technology integration within the pre-service teacher developed portfolios (Teclehaimanot et al., 2011).

Using recursive comparative analysis the perspectives of student teachers related to information and communications technologies (ICT) in schools were explored in a study by Sime and Priestley (2005). The views of 82 teachers were studied via an online discussion board. During their discussions, students were to reflect on observed practices of ICT in schools and were to evaluate the lessons they had observed. The data indicated pre-service teachers benefited from participation in the online forum due to the validation gained from sharing their ideas about what constituted effective ICT integration. Participants were able to move from "personal transitory experiences to shared and memorable events" (Sime & Priestley, 2005, p. 139) which through group reflection coalesced into a body of knowledge related to ICT.

The study also seemed to indicate student teachers' views about ICT integration were shaped by the practices they observed in their placement schools. These placements should offer opportunities for reflection on theory and should offer opportunities to contextualize pedagogic thinking while employing ICT. Additionally, the study showed by encouraging reflection (such as through online forums) schools of education could create environments where students "develop[ed] their practice and attitudes in a proactive manner" (Sime & Priestley, 2005, p. 140).

By creating a "community of practice" (Sime & Priestley, 2005, p. 141), the researchers were able to positively shape student attitudes related to the use of ICT.

Supports such as these served to improve pre-service teachers' attitudes and confidence in their ICT skill set. To successfully develop ICT pedagogies, the researchers suggested confidence in ICT use is important. Finally training programs should afford opportunities to use ICT in meaningful, content specific ways either through observations, simulated teaching exercises or through role playing.

Teachers should be confident in their ability to integrate twenty-first century technologies into their instruction. Several studies have shown that technology integration can be inhibited by "factors such as computer anxiety, cognitive ability and computer self-efficacy" (Rogers & Wallace, 2011, p. 31). Self-confidence to integrate begins within the teachers' pre-service exposure to technology and curriculum courses (Barak & Shakhman, 2008; Mistretta, 2005). Redman and Kotrlik (2009) found anxiety about the use of technology accounted for the greatest variance in teacher adoption of technology as a teaching tool. Wade, Abrami, and Sclater (2005) found increased familiarity with computers resulted in greater comfort with computers which in turn resulted in greater usage of computers in the classroom.

Rovi and Childress (2003) researched computer anxiety among pre-service teachers and found although teachers may believe computers will lead to improved teaching and learning, they may choose to not use technology if they have "low confidence in their abilities to use computers, or if they fear computers, or if they simply do not like computers" (p. 226). These results suggested efforts to improve pre-service feelings of self-efficacy relative to technology will produce greater adoption of technology integration practices on the part of pre-service teachers.

The impact of simulated teaching experiences on pre-service teacher self-efficacy related to technology integration was the focus of a study by Wang, Ertmer, and Newby

(2004). Participants were students who were enrolled in an *Introduction to Educational Technology* course in a large Midwestern university during the spring of 2000. VisionQuest, an instructional CD-ROM, featuring technology practices and beliefs of six K-12 teachers was used to provide "effective models of technology integration" (Ertmer, Conklin, Lewandowski, Osika, Selo, & Wignall, 2003, p. 100).

Pre-service teachers who were exposed to the VisionQuest software experienced significant increases in judgments of their self-efficacy for integration of technology. The study indicated providing pre-service teachers opportunities for observing technology integration practices via CD-ROM could alleviate the logistical problems associated with classroom observation. Although increasing self-efficacy beliefs related to technology integration does not necessarily translate into greater uses of technologies among teachers, it is a necessary first step (Wang et al., 2004).

While knowing how to use a computer does not necessarily mean a teacher will infuse technology into the curriculum (Carvin, 1999; Marcinkiewicz, 1994) using simulated teaching experiences may serve to translate technology skills into effective practice. For this transfer of skills knowledge into practice, teachers need specific ideas on how to use technology effectively in their classrooms (Ertmer et al., 2003). Traditionally, pre-service teachers technology training has been software, rather than curriculum based training (Gilmore, 1995), which meant teachers completed courses still not fully understanding how to implement small or whole group activities incorporating technology (Moersch, 1995).

Often pre-service technology training occurs during an isolated technology course since many of the teacher preparation programs across the United States require students take three or more credit hours of technology instruction (Rogers & Wallace, 2011).

Survey data indicates higher education faculty feel technology usage is not being effectively modeled for future teachers (Schrum, 1999). The lack of modeling perpetuates the idea few of America's current or future teachers have had opportunities to either observe or experience learning with or from computers. Although there is an expectation that today's teachers will possess an array of twenty-first century technology skills, it is evident they have been given few, if any, opportunities to "develop their own visions for, or ideas about, meaningful technology use" (Ertmer et al., 2003, p. 96).

Digital natives, a term coined by Prensky, 2001, is defined as "people born after 1984 who have grown up with digital technologies" (Kumar & Vigil, 2011, p. 144) are at ease in and around today's technology. These digital natives also expect to use these technologies in their education (Kumar & Vigil, 2011). Today's K-12 students and many students enrolled in America's pre-service teacher education programs are digital natives. These pre-service teachers enter their programs of study with a sophisticated level of twenty-first century technology understanding and should they be taught the connections between the integration of twenty-first century technology and their pedagogy, they possess the ability to quickly transform America's classrooms by infusing them with twenty-first century technology enriched activities.

Although current teacher education majors have grown up using technologies research does not indicate digital natives are successful in transferring their familiarity with technology into academic environments (Kumar & Virgil, 2011; Kvavik, 2005; Salaway, Caruso Newlson, & Ellison, 2008; Sandars & Schroter, 2007; Smith, Salaway, & Caruso, 2009).

Kumar and Vigil (2011) contacted via email all undergraduate students (n=320) enrolled in a college of education at a large private university and asked them to

participate in an online survey. Fifty-four students responded to the email and the results were analyzed to determine: (a) how students used Web 2.0 technologies (social networking sites, blogs, wikis, etc.); and (b) if the students had created online content. Participants responded that viewing online videos and sharing photos were their most common informal uses of technology (98% and 69% respectively), while the use of online forums (52.9%) and blogs (47.1%) were the third and fourth common informal activity (Kumar & Vigil, 2011, p. 147-148). A comparison of pre-service teachers use of technologies for informal rather than educational purposes indicated although pre-service teachers were adept at using these technologies they were not as adept at employing them in educational settings (Buckingham, 2007; Salaway, Caruso, Nelson, & Ellison, 2008).

Survey respondents were unable to see how to use a particular technology in pedagogic and content specific ways which reinforced the findings of others who have concluded undergraduates cannot independently transfer their informal use of technology to educational contexts (Caruso & Kvavik, 2005). Faculty should use and model technologies for educational purposes in order for pre-service teachers to see how to transfer their knowledge about technology to educational contexts, because pre-service teachers cannot independently connect technology, pedagogy, and their subject matter (Sutton, 2011; Teclehaimanot et al., 2011). Students who have grown up with technologies do not automatically transfer this knowledge to their future teaching assignments (Kumar & Vigil, 2011).

Dexter, Anderson, and Becker (1999) stated, "For teachers to implement any new instructional strategy, they must acquire new knowledge about it and then weave this together with the demands of the curriculum, classroom management, and existing instructional skills" (p. 223). Teachers need opportunities to learn firsthand why it is

important to use technology in meaningful ways. Pre-service teachers need to experience effective applications of technology if they are to use technology in their own classrooms (NCATE, 1997). Teacher educators need to employ strategies which take into account pre-service teachers skills with technology informally and create activities and projects which assist the transference of this knowledge in pedagogic and content specific ways (Kumar & Vigil, 2011). The weaving together of new and existing knowledge with curricular expectations creates powerful learning environments for pre-service teachers since pre-service teachers would be transformed from "passive users of new technologies to active creators of digital content for their curriculum" (Kumar & Vigil, 2011, p. 151).

In a case study by Koh and Frick (2009) 43 pre-service teachers enrolled in an educational technology course at a large Midwestern university were selected to determine what kinds of classroom interactions foster improved self-efficacy. From classroom observations, interviews and surveys which were administered four patterns which positively affect student self-efficacy began to emerge. First, instructor modeling and demonstration of lessons using technologies increased reported pre-service teacher self-efficacy. Second, the use of lab time allowed students opportunities to master their technology integration practices in conjunction with professor input. Third, having students share technology integration decisions during lab time facilitated collaborative conversations supported computer self-efficacy. Fourth, having instructors establish clear learning goals motivated students toward successful goal completion. The planned opportunities for complex interactions during lab time with colleagues and with the instructor lead to an increased sense of positive self-efficacy.

In a mixed-methods study by Cullen and Greene (2011) 114 pre-service teachers completed a questionnaire designed to assist the researchers in understanding the beliefs

and motivations about the integration of technology into future teaching assignments. Participants were students enrolled in an undergraduate technology integration course at a large Southwestern public research university. The data were collected over two semesters from the same course.

Results indicated pre-service teachers possessed "moderately positive attitudes toward technology" (Cullen & Greene, 2011, p. 37). Among the highest positive correlations were intrinsic and extrinsic motivation, self-efficacy and positive social norms. Negative attitudes and self-efficacy, intrinsic motivation and positive attitudes had the highest negative correlations (Cullen & Greene, 2011).

Pre-test post-test results showed pre-service teachers indicated a greater likelihood of integrating technology after the integration course. Lessons early in the course (pre-test) were dominated by PowerPoint and Word while later post-test lessons were dominated by SMART Boards, concept mapping and other tools which were taught during the class (Cullen & Greene, 2011). Additionally 61% of participants stated they were *very likely* or *likely* to use technology in teaching at pre-test compared to 74% at post–test. At the beginning of the course 66% of participants had positive attitudes regarding technology compared to 92% at post-test. Understanding that a group has positive feelings about technology may indicate their future intentions to use technology, in addition, this knowledge may suggest the participants may be a "receptive audience" (Cullen & Greene, 2011, p. 43) for further training and staff development.

According to Hasselbrig et al., (2000) schools will be equipped with the best hardware and software in the near future, but it is unlikely teachers and students will use them effectively, if teachers do not possess the necessary skills and dispositions to employ these technologies effectively. In order to develop the capacity to employ twenty-

first century technologies in content specific contexts, pre-service teachers need to practice incorporating twenty-first century technologies into the lessons they plan to teach (Parana, West, Johnson-Gentile, & Lonberger, 2000).

In a study of pre-service teachers' technology preparedness by Albee (2003) several surveys were administered around a Midwestern university's service area and results indicated the need for technology skill preparedness was still evident. These surveys included: (a) all elementary public school administrators, (b) all Fall 1996 elementary school student teachers, (c) all full-time university faculty in the curriculum and instruction department, and (d) all Fall 1998 and Spring 1999 elementary school student teachers (Albee, 2003).

According to the survey data administrators felt computer technology skills were needed most and should be emphasized more in preparing pre-service teachers. Student teachers felt there was a disconnect between skills which were necessary during student teaching and their proficiency levels with those skills (Albee, 2003). The education course surveys showed students were not required to use computer skills during most of the courses they were enrolled in. The need to adjust the curriculum to include the necessary skill sets was evident. Constant improvement of technology integration skill sets throughout the university level experience will facilitate the development of confidence in pre-service teachers' ideas about technology integration efforts.

Peer-mentoring has been shown to increase technology skill sets in pre-service teachers as well. In a study conducted by Ward, West, and Isaak (2002) peer-mentors were second and third year students enrolled in an instructional technology course and protégés were first year students enrolled in an *Introduction to Elementary Education* course. Peer-mentors learned Internet and technology integration skills by developing

WebQuests for use by K-6 students. The peer-mentors then coached their protégées in the development of web pages focused on Internet resources for teachers. Peer-mentoring took place over a five week period and proved to be beneficial to the peer-mentor and the protégé (Ward et al., 2002). Having pre-service teachers learn how to use the technology within context by designing content specific tasks provided rich contextual based learning opportunities which were relevant and engaging (Ward et al., 2002).

Meagher et al., (2011) conducted a study at a small Midwestern university, involving 20 pre-service teachers in a mathematics methods course. The study was designed to understand the "interplay between the effects of the methods class and of the field placement on the pre-service teachers' experiences of and attitudes to technology" (Meagher et al., 2011, p. 245) and how pre-service teachers' lesson plans evolved during the course.

Results from the open-ended exit survey indicated there was a correlation between field placement and pre-service teacher disposition to future technology use. It was found regardless of the technological emphasis in the mathematics methods class, half of the students who were exposed to little or no technology during their field placements did not develop positive attitudes toward the use of technology (Meagher et al., 2011). One teacher stated "I found that my field teachers did not use technology in their classroom. I found their teaching methods to be more practical, and I will probably lean more towards their style" (Meagher et al., 2011, p. 246).

Nearly all of the pre-service teachers were exposed to exemplary practice employing technology indicated they planned to employ technologies in their own classrooms, with one exception. One teacher noted "I am now more likely to use technology in my teaching. Technology offers so many advances for students and can

relate to many different learning styles" (Meagher et al., 2011, p. 246). The correlation between the positive dispositions toward technology integration for pre-service teachers who were exposed to technology-rich environments shed light on the need for greater school-university level alignment regarding the creation of field placements which connect methods classes and the reality of classrooms. While pre-service teachers may be cognizant of the interconnectedness of technology, pedagogy and content knowledge (TPCK) (Mishra & Koeler, 2006) during their methods courses, their ability to fully implement these practices are dependent upon technology-rich field placements.

Lesson plans were written five times, two before field placement, one between the first and second placement and one during the second placement. Analysis of the plans indicated the first two sets were poor and were characteristic of the novice planner. Lesson plans from the second set showed improvement yet were still "teacher-centered" (Meagher et al., 2011, p. 247). Additionally analysis showed when technology was employed it was not being used as an effective tool for teaching and learning.

Lesson plan analysis indicated participants in this study were slow to develop skills at integrating technology. It was also noted when given a choice in the lesson plan to use technology many students chose not to use it at all. Further, it was noted some pre-service teachers suggested the technology should be used by "high level kids only" (Meagher et al., 2011, p. 247). When technology was used it was not used in ways which allowed students to discover a deeper understanding about mathematics.

Most notable in this study is how different the fifth set of plans were between the technology rich field placed teachers and those whose field placement involved little or no technology. While it is true the pre-service teachers in technology-rich placements scored higher in the implementation of technology in their lessons, most notably, they

also scored higher when using inquiry based methods and problem solving. It would appear exposure to the technology-rich placement assisted these pre-service teachers in developing "more pedagogically sound activities and their TPK and TPCK skills were clearly developing" (Meagher et al., 2011, p. 248).

Lesson plans from technology-rich environments were designed with the use of technology as an essential component of the lesson. These teachers were able to extend the mathematical concepts being studied by employing technology through inquiry based learning. It can be argued the proper field placement in technology-rich environments in conjunction with the modeling of technology integration practices during methods courses and modeling through mentorships can have lasting effects on developing positive attitudes regarding the future use of technology in the minds of pre-service teachers (Meagher et al., 2011).

Dexter and Riedel (2003) employed an Ed-U-Tech project, implemented within the content area, which sought to create a seamless preparation focused on technology integration. The preparation began with the required technology course and continued on into the methods courses and ended during the clinical experiences. During their student teaching experiences 30% of pre-service teachers said they were neither required nor expected to use technology, 39.5% said they were encouraged to use technology while 28.5% said they were required to use technology.

The Ed-U-Tech project also demonstrated strong evidence pre-service teachers had greater access to and support with technology than their students did. Nearly twice as many pre-service teachers, 34.7% said computers were available for them to use during class as compared to only 14.4% reporting computers were available for students use. For example, 84.6% of pre-service teachers had used word processors almost daily while only

32.7% of their students had. It was also important 74.2% of pre-service teachers indicated they had used the Internet either daily or frequently compared to only 33.6% of their students (Dexter & Riedel, 2003).

Nearly three quarters of student teachers reported their supervising teacher was available to assist them with technology use and 71.8% reported they had used the support. Other on site staff members were noted as having been accessible to the student teacher as well. A little more than half (53%) of student teachers reported college staff as being available to support them in using technology, and 24.3% responded they had used the support (Dexter & Riedel, 2003).

Three factors were identified which could improve the likelihood a pre-service teacher would incorporate technology more effectively. First, setting expectations for student teachers to use technology should become a goal for all teacher education programs. Second, teacher education programs should ensure students have ample opportunity to learn to integrate technology through their courses. Third, cooperating teachers and supervisors from the university level should cooperate more while interacting with pre-service teachers (Dexter & Reidel, 2003). Since the preparation of new teachers is such a valuable task, it must extend beyond the college's methods courses. Field experiences need be relevant, they should incorporate the latest technologies and provide opportunities for pre-service teachers to develop skills for their future students.

Pre-service technology training relevance was the focus of a instrumental case study conducted by Sutton (2011) in a post-baccalaureate, fifth-year teacher preparation program at a research university/very high (RU/VH) in the Southeastern United States. One purpose of this study was to determine which pre-service technology experiences

novice teachers found “relevant and useful” or “not relevant and not useful” (Sutton, 2011, p. 39) once they began managing their own classrooms. The researcher also wanted to understand how the teacher preparation program had prepared the selected teachers in fulfilling the National Educational Technology Standards for Teachers (NETS-T). Another purpose for the study was to uncover themes which “constitute relevant and useful technology training experiences for pre-service teachers” (Sutton, 2011, p. 39).

Selected teachers were graduates from 2005 through 2007 and who had been teaching for one to three years. Twenty participants volunteered for this study. Data from the study was derived from three sources: (a) semi structured interviews; (b) documents that illustrated evaluations, the Professional Year Survey, the Teacher Education Follow-Up Survey; and (c) reflective field notes written after interviews (Sutton, 2011).

Interview data indicated participants felt there was a disconnect “between their technology training and the rest of their teacher preparation program” (Sutton, 2011, p. 43). Repeatedly, participants remarked they had been required to incorporate technology into their classroom presentations, lesson plans and field placements yet “paradoxically they perceived a lack of emphasis on technology training outside the one required technology course” (Sutton, 2011, p. 43). These novice teachers indicated they knew they were expected to create technology rich learning environments which were student centered but were not able to do so because they lacked the confidence due to the lack of exposure to “authentic experiences using technology in their own professional education” (Sutton, 2011, p. 43).

These participants were not able to make the connections between the one required technology course and the courses related to teaching theories and methods. In addition, participants noted the “contradiction between the ways they were asked to use

technology within their teaching and the ways their own teachers—the faculty of their teacher education program—integrated technology into their classes" (Sutton, 2011, p. 43).

Regarding relevance, participants reported the software packages they were exposed to during the technology course were not relevant to their content areas. The participants noted further as pre-service learners; they were rarely exposed to meaningful ways in which to incorporate technology into their own content areas. A recurring theme regarding the relevance of the technology course was learning technology in isolation did not prepare participants to retain nor transfer the technologically specific knowledge into their classrooms (Sutton, 2011).

Understanding how relevant and engaging training impacts feelings of efficacy, a study by Whitacre and Pena (2011) used the Technology Proficiency Self-Assessment Instrument (TPSA) published by the International Society for Technology in Education (ISTE) **(**ISTE, 2003) to assess participants perceived self-efficacy in using technology. The purpose of this study was to understand how pre-service teachers' knowledge of technology translated into actual integration of technology during field placements. The 65 participants were enrolled in an elementary education program at the University of Texas-Pan American during the fall of 2008.

Survey data revealed most of the participants were confident they could employ productivity software with a majority (98%) of participants indicating they were proficient in desktop publishing, spreadsheet and presentation software. In addition, 90% of the respondents said they could diagnose and correct minor computer malfunctions. Ninety percent of the participants responded they could teach students how to search for

and evaluate web-based material with 94% indicating they could teach students how to develop web pages (Whitacre & Pena, 2011).

Regarding teaching with technology, 90% of participants felt confident in teaching a lesson addressing either their state or ISTE technology standards. Each participant stated they could use technology to demonstrate evidence of student mastery of objectives and 96% of participants felt confident in evaluating technology-based products developed by their students (Whitacre & Pena, 2011).

The researchers analyzed 80 lesson plans and found only 17 included the use of some form of technology. Efforts at integration ranged from teacher usage of an overhead document camera to allowing students time to search the Internet. Although the survey data indicated an overwhelming number of participants felt confident in their knowledge of technology and felt confident in their ability to teach others how to employ these technologies, very few participants incorporated technology into their lessons (Whitacre & Pena, 2011).

Participants mentioned several reasons for this disconnect. Difficulty in assessing or securing the usage of technologies was mentioned most frequently. Teachers had to overcome several logistical hurdles while attempting to reserve lab time. Also mentioned was the incorporation of technology was not being monitored in their lesson design, therefore the participants did not feel the need to employ technology. Finally the participants stated their mentor teacher did not use technology, so participants did not feel the need to use it either.

Review of the data illustrated the need for schools to "provide easy and ready access to technology" (Whitacre & Pena, 2011, p. 243) if pre-service teachers are to integrate technologies into their lessons. During field observations and student teaching,

pre-service teachers may be too overwhelmed to manage the logistics of garnering technology to be used in their classrooms. If teacher education departments want pre-service teachers to employ technologies during their placements, the requirement to do so should be explicit (Whitacre & Pena, 2011). Finally, mentor teachers should be master teachers who are able to model the integration of technology (Whitacre & Pena, 2011).

In-Service Teacher Preparation

Thirty elementary school teachers from an upper middle-class neighborhood in a major city in the Southwest participated in a case study conducted by Kopcha (2012) designed to understand teachers' perceptions concerning barriers to technology integration and instructional practices associated with technology. Using a situated professional development design which supported teachers and individualized training contextually for teachers over a two year period, researchers hoped to "promote long-term changes in teachers' attitudes toward and practices with technology in the classroom" (Kopcha, 2012, p. 1110).

During the first year teachers had a full time mentor teacher to assist them with all issues related to technology. During the second year training transitioned into teacher led "communities of practice" (Kopcha, 2012, p. 1118) where teachers supported each other in their efforts at overcoming known barriers to successful technology integration.

The researchers found situated professional development played a positive role in teachers' perceptions regarding barriers at integrating technology. Teachers reported they experienced fewer barriers due to the fact the mentor "communicated the vision for using technology and helped them keep the technology working on a consistent basis" (Kopcha, 2012, p. 1118). Participants reported their positive beliefs regarding technology had increased. The highest rating on the entire survey was from beliefs.

Teachers reported collaboration with the mentor positively impacted their feelings about planning technology infused lessons and implementing technology-infused lessons (Kopcha, 2012).

Teachers consistently reported negatively regarding the barrier associated with their perception of time. Although reporting about access to technology and training improved over time as teachers learned how to teach with technology, participants still listed planning, teaching and classroom management practices when employing technologies as time intensive. Other studies have also shown that successful technology integration efforts are perceived "as a burden on their [teachers'] time because it interrupts instruction, requires additional training, and takes time to plan" (Kopcha, 2012, p. 1118).

Participating teachers developed several desirable practices during this situated professional development. For instance, a year after the staff development, teachers were observed using "technology in student-centered ways to support learning subject-matter content" (Kopcha, 2012, p. 1118). A comparison of teacher reported barriers to technology integration efforts remained consistent over the two year study. One reason for this may have been the fact developing communities of practice during the second year continued the supports which the mentor had established during year one (Kopcha, 2012). Cifuentes, Maxwell, and Bulu (2011) have also reported integration efforts are sustained over time when teachers participate in learning communities as follow up to technology staff development.

Teachers' decisions to integrate technology are contingent upon the support they receive and are dependent on their own beliefs about how technology can be used in instruction (Ertmer & Ottenbreit-Leftwich, 2010; Inan & Lowther, 2010; Mueller, Wood,

Willoughby, Ross, & Specht, 2008). Workshops, follow-up and mentoring during Year 1 of the study improved teacher beliefs, skills and instructional practices regarding technology. During Year 2 teacher support decreased and technology issues increased, however participants continued to exhibit similar beliefs and practices regarding technology integration (Kopcha, 2012).

A case study by Tearle (2003) conducted in the United Kingdom was concerned with teachers' experiences with continuing professional development (CPD) related to information communications technology (ICT) integration practices. The selected case study schools were participants in the Intel® Teach to the Future professional development program which is based on a Train the Trainer model. More specifically the program employed an experienced ICT user within the school as a "key trainer" (Tearle, 2003, p. 459), providing face-to-face 30 hour contact courses for other teachers.

Following the training, 72% of the participants reported an increase in "confidence and competence" (Tearle, 2003, p. 463). Teachers stated the opportunity to collaborate with colleagues helped increase their confidence; they also reported the training was more relevant because of the role of the lead trainer. Noted weaknesses were the training was not directly relevant to participant subject specific assignments. It was also noted the training did not take into account participant needs or prior experience with ICT. Finally participants did not like the fact the training had been held after school and during weekends which led to scheduling problems for some participants and to outright resentment from others (Tearle, 2003).

There is an absence of adequate collaborative and supportive environments for teachers in the use of Information and Communication Technologies (ICT) according to a report by Teaching, Learning, and Computing: 1998 National Survey (Becker & Riel,

2000). Whether teachers were at schools with part-time or full-time technology coordinators, they received little assistance integrating technology in the curriculum. Full time coordinators spent approximately two hours per week assisting teachers while part-time facilitators spent even less, roughly one hour per week. When receiving assistance teachers reported receiving more technical than instructional help. Technology coordinators also reported only having spent approximately two to three hours per week in helping teachers integrate computers into instruction. The average school presented workshops to teachers only about twice per year while district workshops were offered three times over the academic year (Becker & Riel, 2000).

Most teachers have access to computers, printers and faxes. Most schools have technology personnel. Technology coordinators tend to provide one-to-one support with staff, but teachers' access to this method of service delivery varies depending on the number of staff the facilitator must serve. The overall amount of time spent on staff development activities is small, and technology topics are only one part of staff development. Becker and Riel (2000) strongly recommended technology leaders plan carefully in order to provide a complete set of technology support services. These services should include all facilities, staffing, personal assistance, and professional development. The data from the Teaching, Learning and Computing survey (1998) indicated that teachers' usage of technology is positively related to the support they receive (Becker & Riel, 2000).

Harris and Hofer (2011) conducted an interpretivist study of seven experienced social studies teachers in an effort to understand the development of technology, pedagogy, content, (TPACK) and context knowledge. Successful technology integration

is dependent on the teacher's ability to balance the needs of the curriculum, learner characteristics, barriers to technologies, school and classroom contexts.

The seven participants were from six different U. S. states and participated in a university-funded, Web based staff development. In addition, participants were asked to participate in a TPACK staff development initiative. Pre and post data relative to participant TPACK skills were collected using interviews, analyzing lesson plans, and from teacher reflections (Harris & Hofer, 2011).

Findings demonstrated teacher selected activities were primarily selected based on the nature of the content and not on learner characteristics. Activity alignment to content goal was the primary selection criteria (Harris & Hofer, 2011). After the study, staff development participants emphasized the use of technology in their efforts to "intellectually, rather than affectively, engage their students" (Harris & Hofer, 2011, p 222).

Participants reported very little technological content knowledge used during planning. Koehler and Mishra (2008) argued that teachers need a deeper "understanding of the manner in which the subject matter (or kinds of representations that can be constructed) can be changed by the application of technology" (p. 16). Participants in this study employed technological resources in ways that extended students' learning instead of changing the way students learned.

When planning, participants first decided on the content to be taught then selected activities they thought would engage students in the deepest way. "Available time, resources, as well as other contextual constraints" (Harris & Hofer, 2011, p. 225) were steps used to plan for instruction were noted before the staff development. Upon completion of the staff development teachers began "thinking more consciously and

strategically" about the selection of learning activities and technologies to support them (Harris & Hofer, 2011, p. 225).

In addition, teachers reported after the training they each had a greater range of learning activities from which to choose. Participants also commented on how their ideas about technology integration had changed, describing how technologies could be used to "enhance student learning and their own teaching" (Harris & Hofer, 2011, p. 225). Participants also reported they had become more student-centered in their design of instruction (Harris & Hofer, 2011).

Content-based approaches to technology training provided a more "pervasive and sustainable technology integration, than an activities-based approach" according to Harris and Hofer 2011 (p. 226). The key is to shift the focus away from the specific technologies and toward how technology can be interwoven in the teachers' quest to understand content, pedagogy and the context of the classroom.

An action research project by Swan and Dixon (2006) determined when math teachers were supported by content area mentors in staff development initiatives, the amount and the level of technology integration increased substantially. When mentor support was tied to staff development teachers experienced the support they needed to change over a long period of time. Finally, it was found math teachers need "continuous and relevant training and support, especially when teachers are teaching out-of-field or are new to the profession" (Swan & Dixon, 2006, p. 79).

Schaverien and Cosgrove (1997) concluded the teachers need an extended period of support following training; they need the time to develop a deep understanding of what they have learned in order to change their practice. Hosack-Curlin (1988) demonstrated

as well in-service “peer coaching” maximizes participant learning, and Showers (1984) concluded mentoring after training resulted in greater transfer than did training alone.

The use of mentoring and support during and after professional development can equip teachers with new and exciting modes of incorporating technology into their pedagogy. Teachers must see technology as useful and easy to use in order to attempt incorporation of it (Davis, 1989). Effective mentor-supported professional development can be successful in increasing the usage of technologies in classrooms when the training is relevant and encourages the integration of technology into the curriculum.

The benefit of ongoing staff development for teachers was the focus of the Technology Academy Model, a two-year professional development academy involving 25 teachers, conducted at a large Southwestern university from June 2003 to May 2005 (Brinkerhoff, 2006). A mixed-methods approach was employed to evaluate the effectiveness of staff development over the long term. The stated purpose of the academy was to limit the negative effects of barriers to technology integration. For example, in relation to insufficient time to support skill development, the academy’s duration covered two years. Participants met for 15 days each June and met for five in-service days during both academic years (Brinkerhoff, 2006).

Participants were paid a stipend to attend and were given a per diem for meals. The focus of the academy was on skills development as a means of generating new ideas for further exploration. In addition, instructional activities required participants share ideas on how to use specific technologies, and provide examples for how technology could be used in their own classrooms (Brinkerhoff, 2006).

There were three themes which emerged from the qualitative data. First, the participants felt their technology skill level had improved. Initially most of the

participants had either described their initial skills level as minimal or had overstated their preparedness (Brinkerhoff, 2006). Contributing to the perceived increase in skill level was the various software and hardware projects which participants had to complete. In addition, respondents stated collaboration with their peers also facilitated their learning these new skills (Brinkerhoff, 2006).

Second, participants' responses coalesced around the idea they were less fearful and had increased confidence due to their participation in the academy (Brinkerhoff, 2006). The mere fact they were immersed in technology so much assisted in their being comfortable interacting with each other using it. This facilitated their willingness to try new things with the technologies and assisted them in developing the confidence to contribute when discussing technology related topics. They began to see themselves as competent consumers of technology (Brinkerhoff, 2006).

Third, the participants reported the academy had "altered their teaching" (Brinkerhoff, 2006, p. 36). These changes were varied; with some participants stating that technology integration had become a "standard component of their instructional planning" (Brinkerhoff, 2006, p. 36). Others reported they were using project-based learning more frequently, and were becoming more of a facilitator rather than relying on historical lecture based methods. Still other participants reported they were beginning to place the technology into the hands of the students rather than controlling the use of it themselves.

These results suggest the academy was successful in increasing participant technology skill levels. Offering the professional development over an extended time was viewed as successful since it afforded participants ample time to internalize expectations related to technology integration. The first summer session of the academy had

participants engaged in the design of technology infused lessons and projects for 90 hours. These same skills were reinforced the second summer as well. Another factor contributing to the success of the academy was the technology professional development was geared to teachers' specific needs. Finally, teacher self-efficacy showed no significant increase after the first year but showed significant increase at the end of the academy (Brinkerhoff, 2006). These finding suggest the extended time contributed to teacher feelings of success related to technology usage.

In a study by Gess-Newsome, Blocher, Clark, Menasco, and Willis (2003) principles for professional development were identified which were sensitive to teacher's incoming conceptions. These principles began with the idea staff development was not about training but about teacher preparation and development. Professional development should be grounded in the context of the teacher's classroom and must start with where the teachers are now and move them along a continuum predicated on their own goals and concept of teaching and learning (Gess-Newsome, 2001; Hall & Hord 2001; Loucks-Horsley et al., 1998). Teacher professional development is a process and not an event (Hall & Hord, 2001); there must be a commitment of time, and enough support to alter thinking about teaching and learning.

Content specific technology staff development targets teachers' "subject matter knowledge and pedagogical content knowledge" (Hughes, 2005, p. 280) allowing them to understand explicitly how to incorporate technology successfully. Teachers who learn technology from a content perspective are more likely to use technology to support learning (Kopcha, 2012). Skill based technology training inhibits the transference from informal to formal uses of technologies (Kopcha, 2012).

Summary

The need to transform teacher education and professional development activity for teachers which leads to the empowerment of the learner, rather than developing new forms of control and the narrowing of experience in the classroom is paramount (Luke, 2005). Pre-service and in-service teachers need to be knowledgeable about technological changes and need to develop skills for learning which serve to enrich their pedagogies and transform their classrooms.

Educational uses of twenty-first century technology has the potential to fundamentally change America's classrooms as in the transformative sense, yet the potential for its use to maintain the status quo and or sustain current practice as in replacement and or amplifying usage remains a very real possibility (Hughes, 2005). Technology training must be approached from a content perspective in order for teachers to inherently understand how to employ it successfully in transformative ways (Polly, Mims, Shepherd, & Inan, 2010). Additionally, creating opportunities for teachers to share ideas with each other regarding the use of technologies will create sustaining professional development in technology integration (Kopcha, 2012).

Professional development activities should go beyond learning specific technology skills (TK) and should instead assist teachers in garnering a deeper understanding of how their particular pedagogy (PCK) can be informed through the use of technology (Kim, Kim, Lee, Spector, & DeMeester, 2013). Technological pedagogical content knowledge (TPACK) has been used as a framework for understanding what knowledge and skills teachers lack and what staff development they need to improve efforts at integrating twenty-first century technology (Koehler & Mishra, 2008; Mishra & Koehler, 2006). This framework argues successful integration of twenty-first century

technology requires staff development occur in teacher specific instructional contexts. Teachers need to interweave their existing knowledge about their curriculum and instruction with their new knowledge of technology. This process goes beyond teaching technology skills (Niess, 2005; Polly, McGee, & Sullivan, 2010).

Fullan (1993) in *Change Forces, Probing the Depths of Educational Reform*, wrote "You can't mandate what matters," and "the more complex the change the less you can force it" (p. 22). It is evident teachers are not being given enough release time nor support to integrate twenty-first century technologies. U.S. teachers spend 80% of their time engaged in classroom instruction as compared to about 60% for other member nations from the Organization for Economic Co-operation and Development (National Staff Development Council (NSDC), 2009). American teachers are at a disadvantage in they have fewer hours to collaboratively develop high-quality technology infused curriculum and instruction (NSDC, 2009).

The literature demonstrates educational practice remains more focused on computer literacy for teachers rather than on effective uses of technology for teaching and learning (Laferriere, Lamon, & Chan 2006). Technology integration simply meant certain technological practices were observed in classrooms (i.e., word processing usage, drill and practice software usage rates and computer assisted instruction). Currently little research documents best practices which serve to facilitate training regarding twenty-first century technology integration from the adult learner perspective either at the pre-service collegiate level or the in-service school/district staff development level.

CHAPER THREE: METHODOLOGY

Introduction

The purpose of this transcendental phenomenological study is to understand how in-service teachers with three to five years of experience perceive their pre-service and in-service training regarding the integration of twenty-first century technology into their instruction. Without the necessary training teachers will not be able to connect the technology to their content specific setting (Teclehaimanot et al., 2011).

The andragogical approach to training adults requires the training be aligned with the learners: (a) goals and purposes for learning, (b) individual and situational differences, and (c) the core adult learning principles as articulated by Knowles et al., (1998). These principles argue that adults need to know why they need to learn something; afterwards their self-concept can guide them to incorporating the new knowledge using their prior experiences as a rich resource for incorporating this new knowledge. Understanding participant perceptions regarding their twenty-first century technology training will assist me in describing participant views regarding best practices in training the adult learner to integrate twenty-first century technology into their instruction.

In addition, adults are driven to learn when there is a need to "cope with a life situation or to perform a task" (Holton et al., 2001, p. 120). When the learning situation is oriented to a life-centered objective, adults tend to see the learning experience as one in which they will develop increased competency. This in turn produces an internal rather than an external motivation to learn on the part of the adult learner. Understanding adult learner characteristics and utilizing this knowledge to train the adult learner how to

integrate twenty-first century technologies is imperative for America's schools of education and school and district level staff development coordinators.

To successfully integrate twenty-first century technology into instruction, TPACK argues training should build on the learners: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), and Technological Pedagogical Knowledge (TPK) (Kereluik, Mishra, & Koehler, 2011). This synthesis, on the part of the learner, is necessary in order to develop an understanding of the technology tools themselves, and how to use the technology as a tool to facilitate instruction, informing content and helping students learn content more easily (Angeli & Valanies, 2009).

Understanding participant perceptions of their training regarding the integration of twenty-first century technologies into their instruction will help me describe how successful they view their training when aligned with the TPACK model. Participant responses should shed light on what they view as best practices in training them to: (a) teach their subject matter while integrating technology, (b) develop instructional practices for teaching with technology, (c) reflect on how students understand, think and learn with technology, and (d) employ curriculum and curriculum materials that integrate technology (Niess, 2005, p. 197).

Twenty-first century technology based demonstrations and illustrations are recommended to be utilized to enhance the material and the learning experience for the educator and more importantly, the learner. A transcendental phenomenological research design was chosen in order to better understand the attitudes and perceptions of teachers with three to five years of experience related to technology preparedness. The purpose of this transcendental phenomenological study is to understand how in-service teachers with three to five years of experience perceive their pre-service and in-service training

regarding the integration of twenty-first century technology into their instruction. Additionally participant perceptions will inform developmental practices which serve to increase teacher twenty-first century technology integration efficacy. In order to capture the essence of these attitudes and perceptions, the transcendental phenomenological research design was used. Individual interviews, a focus group, and a survey were used to gather data.

The information in this chapter provides an overview of the district and school demographics, participants of the study, data sources, collection methods, and the rationale for the qualitative transcendental phenomenological research design. In addition, concerns over the trustworthiness of the research design and methods will be addressed, along with potential research bias and study limitations.

Research Design

The purpose of this transcendental phenomenological study was to understand how in-service teachers with three to five years of experience perceived their pre-service and in-service training regarding the integration of twenty-first century technology into their instruction. This study endeavored to inform best practices related to training adults in integrating twenty-first century technologies into their instruction by listening to the voices of the participants. I attempted to develop a better understanding of how teachers think and feel relative to the phenomena of twenty-first century technology integration training, and I provided clear descriptions of the essence of their experiences.

Unlike quantitative research, which involves the identification of variables and their measurement, where a hypothesis is tested, and where the use of statistics provides insight to collected data, qualitative research is the "study [of] things in their natural

settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 2005, p. 3). I endeavored to bring meaning to the perceptions of the participants regarding efforts to train them to integrate twenty-first century technologies into their instruction. Participant perceptions guided me in the identification of best practices in: (a) improving computer efficacy and (b) training participants to integrate twenty-first century technologies while pre-service and in-service learners.

Qualitative researchers tend to collect data by "talking directly to people and seeing them behave and act within their context" (Creswell, 2007, p. 37). Qualitative research is employed to uncover a rich detailed understanding of a particular issue. This attention to detail is accomplished by talking with groups of people, and allowing them to tell their stories. Additionally qualitative research is used to build an understanding of the "contexts or settings in which participants in a study address a problem or issue" (Creswell, 2007, p. 40). Employing this approach supported me in developing an understanding of trends, associations, and relationships related to training the adult learner to integrate twenty-first century technology. Finally, this process helped me understand how participants viewed the connections between their twenty-first century technology integration training and the interplay between TCK, PCK and TPK in developing their TPACK.

Statistical measures do not provide a suitable fit for understanding lived experiences of particular phenomena. Emerging themes are difficult to capture using traditional quantitative measures; therefore a qualitative transcendental phenomenological approach was employed in this research design seeking to understand

how twenty-first century technology training at the pre-service and in-service levels was perceived by the participants.

Transcendental Phenomenological Research

According to Moustakas (1994), "Phenomenology is concerned with wholeness, with examining entities from many sides, angles, and perspectives until a unified vision of the essences of a phenomenon or experience is achieved" (p. 58); the phenomenologist's focus is on what participants have in common as they experience a phenomenon. The researchers' "aim is to determine what an experience means…and to provide a comprehensive description of it" (Moustakas, 1994, p 13).

The transcendental phenomenological approach was used to study participants who had all experienced the pre-service college of education experience of methods and technology courses and the in-service school and or district level technology staff development experience. Capturing the essence of how teachers viewed their pre-service and in-service training regarding the integration of twenty-first century technologies into their instruction was the phenomena under study.

The transcendental phenomenological approach is an effective tool for revealing the qualitative aspects of incorporating twenty-first century technologies into ones instruction. Following Clark Moustakas's *Phenomenological Research Methods* (1994) this research method assisted me in: (a) studying several individuals with a common experience, and (b) producing a report describing the essence of how in-service teachers with three to five years of experience perceived their pre-service and in-service training regarding the integration of twenty-first century technology into their instruction.

The transcendental phenomenological approach endeavored to answer the following:

Research Question One. How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction?

Research Question Two. How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction?

Research Question Three. How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction?

The research was focused on the subjective experiences of the participants as their collective voices were examined through the research design. I was concerned with "the appearance of things…and [sought] meanings from appearances and arrive[d] at essences through intuition and reflection" (Moustakas, 1994, p. 58). These essences were then used to construct an understanding of the lived experience of the observed. In this study the lived experiences of teachers as pre-service and in-service twenty-first century technology integration learners was explored.

Question one sought to understand teacher feelings of self-efficacy related to twenty-first century technology integration. The integration of twenty-first century technology requires teachers receive the necessary training which provides them with the skills, knowledge and ability to integrate (Reynolds & Morgan, 2001; U. S. Department of Education, 2005; Yildirim, 2000). TPACK training recognizes the need to weave the technology into existing pedagogic and content specific knowledge/requirements. Andragogical practices also articulate the need to situate the training within the adult's prior knowledge. Pedagogy creates a dependency between the learner and the teacher

whereas andragogy attempts to free the learner from these restraints by encouraging the learner to take the "initiative in the process of further inquiry" (Holton et al., 2001, p. 127). Self-directed learners are learners who are competent and empowered. These characteristics would indicate that the learner has more self-confidence in their abilities and would therefore have a greater sense of self efficacy.

Andragogy attempts to offer a "framework for thinking about what and how adults learn" (Smith, 1999, p. 2). The principles of adult learning as articulated in andragogy "speaks to the characteristics of the learning transaction" (Holton et. al. 2001, p. 119). The TPACK framework looks at the interplay between technology, content and pedagogy and how teachers employ technology as a tool to facilitate teaching and learning. Research questions two and three supported me in understanding how participants perceived the learning transaction related to pre-service and in-service twenty-first century technology integration training. These perceptions were foundational in the identification of participant reported best practices in training them how to integrate twenty-first century technologies into their instruction.

Site

The study was conducted within a rural public school system in Southeastern North Carolina using snowball sampling methods during site selection. There are a total of 43 schools within the district which can be classified as either rural (n = 19) or small city (n = 24) schools. The majority (81%, n = 35) of these schools are designated as Title I school-wide schools according to district publications.

According to Creswell (2007) the purpose of snowball sampling is to identify "cases of interest from people who know people who know what cases are information-

rich" (p. 127). Snowball sampling also uses recommendations to find something which has been determined as being useful. First, in conducting snowball sampling of sites to study, I emailed participatory consent forms for principals (see Appendix C) to principals whose schools had at least a 3:1 ratio of students to computers assuring reasonable computer access for teachers and students existed. Second, I arranged appointments with principals who responded to my emails and asked: (a) principals to sign the consent form if they were willing to grant me permission to interview their teachers, and (b) for their ideas about other schools to contact which may be integrating twenty-first century technologies. The script used when meeting the principal is included in Appendix K. Third, I contacted these contacts and asked them to participate, and continued snowballing with contacts until the required number of participants was selected.

Criteria for site selection was predicated on a 3:1 ratio of students per computer, for each school selected, which is slightly below the district average of 2.02:1 (Education First NC School Report Cards, 2011). According the Education First NC Schools Reports Cards for this district 38 (88%) schools have a ratio of 3:1 students per computer or better. Schools with the required ratio of computers per student were contacted and asked to participate. District level consent to conduct this study had been approved prior to site and participant selection (Appendix B).

Participants

Intensity sampling was employed in the selection of participants. Intensity sampling means participants are not be the ones most likely or least likely to integrate twenty-first century technology but are more or less likely. This type of participant

sampling provided "information-rich cases that manifests the phenomenon intensely but not extremely" (Creswell, 2007, p. 127).

Participants of interest would were those which were relatively proficient at employing technologies as: (a) communicative tools, (b) tools to facilitate learning (not as the object of the lesson), (c) tools for assessment, and (d) as tools for engaging the learner. I did not want potential participants to be individuals who never used technology in the aforementioned ways nor did I want to select participants who were viewed as technology savvy as these individuals would be considered as extreme cases, albeit at differing ends of the spectrum.

Intensity sampling allowed me to select a relatively small number of rich cases which provided a depth of knowledge regarding the phenomena under study. Essential to the selection of participants was their ability to reflect on, and provide true accounts of their lived experiences related to the phenomena (Cilesiz, 2011; Creswell, 2007; Polkinghorne, 1989). While employing intensity sampling I emailed participatory consent forms to principals (see Appendix C) whose schools have a least a 3:1 ratio of students to computers assuring that reasonable computer access for teachers and students exist as previously mentioned. I scheduled appointments with principals who were willing to participate and had them sign the consent form so we could begin discussions regarding the selection of possible participants within their respective schools.

Together we selected possible participants based on years of experience, certification method and level of technology usage. It was at this point I met with potential participants and explained the study to them and asked them to participate. If they agreed they too were asked to sign a participant consent form (Appendix D). A

scheduled time for the individual interview was then determined. The script used when meeting with participants is included in Appendix K.

Polkinghorne (1989) recommends researchers interview 5 to 25 participants when conducting research employing interviews. I interviewed 20 classroom teachers with three to five years of experience who had been licensed to teach by completing an education program at an accredited institution of higher education. Participant demographics can be found in Table 1. Traditional licensure ensured the teacher had completed a regular teacher education program at the university level and had therefore participated in methods and technology courses.

Selecting third through fifth year teachers facilitated the understanding of: (a) participant perceptions of current pre-service preparedness at the university level, and (b) participant perceptions of their twenty-first century technology staff development at the school and or district level. These selection criteria assisted me in selecting individuals who had experienced the phenomena of pre-service and in-service training regarding the integration of twenty-first century technologies into their instruction.

Table 1

Participant Demographics

Participant	Gender	Ethnicity	Certification	Years of Experience
Abbey	Female	Native American	K – 6	3
Amber	Female	Native American	K – 6	5
Beth	Female	Caucasian	K – 6	3
Billy	Male	Caucasian	History (9-12)	4
Cindy	Female	Native American	K – 6	4
Debbie	Female	Native American	K – 6	5
Heather	Female	Caucasian	K – 6	4
Jamie	Female	Caucasian	K – 6	3
Jill	Female	Native American	K – 6	3
Johnny	Male	Native American	Math (9-12)	4
Kathy	Female	Caucasian	K – 6	3
Kimberly	Female	Native American	K- 6	3
Larry	Male	African American	K – 6	3
Linda	Female	Caucasian	History (9-12)	5
Luke	Male	Caucasian	K – 6	3
Ruth	Female	Native American	K – 6	5
Sally	Female	Caucasian	K – 6	3
Samantha	Female	Native American	Math (9-12)	4
Susan	Female	Native American	K – 6	5
William	Male	Caucasian	K – 6	4

Personal Biography

As a phenomenologist conducting research from an ontological stance, and serving as the human instrument (Lincoln & Guba, 1985) in the data collection, I endeavored to define the nature of reality. Understanding the essence of pre-service and in-service efforts at twenty-first century technology integration training on the part of participants was that reality. In addition, this subjective reality was multi-faceted when observed within the participants. Epoche according to Moustakas (1994) is when as researchers "we set aside our prejudgments, biases, and preconceived ideas about things" (p. 85). It was necessary I separate myself from my own assumptions so a clear description of participant experiences could be written.

I employed a reflective journal (Appendix H) in my efforts to remain transparent towards any research bias. This step required an acute awareness of my self-awareness and exposure related to the phenomena under study. I had to hold myself "accountable to the standards of knowing and telling" (Creswell, 2007, p. 213) the participants I had studied. This awareness helped lessen the impact of personal "biases, values, and experiences" (Creswell, 2007, p. 243) which I brought to the qualitative research study. As recommended by Lincoln and Guba (1985) the reflective journal included: (a) a daily schedule with logistics of the study, (b) a methods log where decisions and rationale were discussed, and (c) reflections of my thoughts, feelings, ideas, and frustrations regarding the process (p. 218).

I am a principal in the district where the study was conducted and did not select participants I directly supervised. I was not certified to teach by completing a traditional education program having majored in Mathematics and Computer Science and not in Education. Therefore I did not experience methods nor twenty-first century technology

integration courses while in college which is part of the phenomena under study. The absence of this experience helped epoche the school of education training aspect of the study.

Having an undergraduate degree in Mathematics and Computer Science I had to be careful when epoche[ing] my ideas about the use of twenty-first century technologies in instruction. The computer science background had to be brought forth through epoche by using the reflective journal in order for me to refrain from making personal judgments when interacting with participants who did not use twenty-first century technologies as a tool to facilitate teaching and learning. The emphasis had to be on how the college experience and school and or district level staff development initiatives had shaped the participants perceptions regarding the integration of twenty-first century technology in their instruction.

Data Collection

This study was qualitative in nature using transcendental phenomenological methods to describe pre-service and in-service teacher's perceptions of preparedness to integrate twenty-first century technology. As the human instrument (Lincoln & Guba, 1985), I collected data on the shared experiences of participants using interviews, a focus group and a survey. Twenty-first century technology integration training during the college of education program and later as staff development participants was the phenomena under study.

Multiple data sources were used in an attempt to ensure credibility and trustworthiness of the study. Interviews and the focus group session were employed in an effort to determine how participants, who are practicing teachers with three to five years

of experience and were licensed to teach by completing an education program at an accredited institution of higher education, perceived efforts to train them to integrate twenty-first century technologies into instruction. Appendix M includes a table indicating the time and duration of each interview session. In addition each interview video recording is time and date stamped. Finally a survey which measures computer user efficacy was administered. The data gleaned from these results were used in triangulating self-efficacy findings.

Triangulation is a necessary component in qualitative research because it "increases the likelihood that the phenomenon under study is being understood from various points of view" (Ary, Jacobs, Razavieh, & Sorenson, 2006, p. 505). Therefore the interviews, focus group session and the survey data were used in triangulation offering either (a) mutual confirmation of findings and/or (b) verifying "completeness with which the phenomenon of interest was addressed" (Krefting, 1990, p. 219). Since the focus of the study was to understand perceptions on the part of the participants regarding training them how to integrate twenty-first century technologies and their feelings of computer self-efficacy; the interviews, focus group and Computer User Self Efficacy Scale (CUSE) (Appendix E) were used in an effort to amplify participant voices regarding those perceptions. Detailed descriptions of the data sources follow along with an explanation of how the data was collected.

Interviews

In transcendental phenomenological research, the long interview method is employed. This method "involves an informal, interactive process and utilizes open-ended comments and questions" (Moustakas, 1994, p. 114). Ohman (2005) further declares that qualitative questions are open-ended and allows "informants to tell their

story" (p. 275). In transcendental phenomenology, employing interviews is the most common method in capturing the essence of personal experiences (Kvale, 1996).

All interviews were audio and video recorded to provide a record for transcription later. The audio and video records did suffice in documenting what was actually spoken and provided a record for detailed transcriptions (Appendix J).

One-on-one interviews were conducted in the participant's respective schools, either in their own classrooms or in the schools conference room. Participants chose this location. Individual interview sessions were scheduled for 15 to 20 minutes. See Appendix K for the script used during the individual interview sessions.

The interview questions (see Tables 2, 3 & 4 in Appendix F) were designed to understand how participants felt about their ability to integrate twenty-first century technologies. In addition, some of the interview questions were designed to elicit information regarding participants' feelings about the training they had received as pre-service and in-service twenty-first century technology integration learners.

First, each of the interview questions were generated from and grounded within the existing research literature. Second, the interview questions were reviewed by content experts within the field of technology education training or staff development training examining content validity of the questions. Third, the interview questions were piloted with a non-participant in order to ensure the questions were clear. For more information regarding the face and content validity of the interview questions see Appendix F.

Focus Group

The focus group was employed in order to gain more verifiable data. Where interviews are individual discussions which are utilized to gather knowledge from individuals, focus groups are dynamic group interactions. The focus group was

maintained by me serving as the moderator allowing the participants to dynamically interact with each other in finding an answer to questions (Creswell, 2007). Focus groups generally allow for richer discussions about the phenomenon under study since it is believed the interaction between participants may create richer memories. For as Creswell (2007) noted "Focus groups are advantageous when the interaction among interviewees will likely yield the best information, when interviewees are similar and cooperate with each other, when time to collect information is limited…" (p. 133). The focus group session was audio and video recorded and provided a record for transcription (Appendix J). The script used during the focus group session can be found in Appendix K.

The focus group session assisted me in understanding the phenomena under study by allowing participants opportunities to share with one another and possibly assist one another in unearthing memories about the phenomena. These interactions between participants became an important source of information since the focus group "elicit[s] information that paints a portrait of combined local perspectives" (Grudens-Schuck, Allen, & Larson, 2004, p. 2). A good focus group design allows for "synergy to occur, which produces greater insight due to the fact that participants work together during the session" (Grudens-Schuck et al., 2004, p. 3). In working together participants were able to reconstruct their experiences and were encouraged to reflect deeply on the meaning of those experiences (Cilesiz, 2011).

As with the interview questions, the focus group questions (see Table 5 in Appendix G) were subjected to a three step process in establishing face and content validity. First, each of the six focus group questions were generated from and grounded within the existing research literature. Second, the focus group questions were reviewed

by content experts within the field of technology education training or staff development training. Third, the focus group questions were piloted with a non-participant in order to ensure the questions were clear. For more information regarding the face and content validity of the focus group questions see Appendix G.

There was one focus group session held. All participants were invited to attend this session, however only six participants attended. There were an additional six questions asked during this session which attempted to delve deeper into participant perceptions regarding computer self-efficacy, and participant pre-service and in-service twenty-first century technology integration training. This session occurred on the evening of day three after all the interviews were completed, and was held at a local restaurant.

Documents

As part of the selection process, I asked participants for documentation of their staff development activities and for documentation related to their years of teaching experience. Access to this information is available from the district to all staff members via download from the district's web site. These documents were used to verify participants had exposure to staff development activities related to technology integration, had the necessary level of experience teaching and were licensed to teach by completing an education program at an accredited institution of higher education.

In addition to staff development documentation, I collected self-reported data on the certifications of each of the participants. This Participant Information Form (Appendix I) documented: (a) years of service, (b) name of the institution of higher education where participants had completed their education degree, (c) submission of a copy of their CEU's indicating participation in technology staff development and (d)

verification they had submitted their survey. This served to authenticate the participants had met the selection criteria.

Survey

All participants were administered the Computer User Self-Efficacy Scale (CUSE) (Appendix E) developed by Dr. Simon Cassidy and Dr. Peter Eachus (Cassidy & Eachus, 2002). The CUSE was administered to each participant immediately after their interview session that was held either in their classroom or in the schools conference room. This instrument did yield a computer user efficacy score. Self-efficacy as defined by Bandura (1986) is "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391).

The CUSE scale was found to have high and statistically significant test-re-test reliability over a one month period (r=0.86, N=74, p<0.0005). Internal reliability measured using Cronbach's Alpha was high (alpha=0.97, N=184). Construct validity was assessed by correlating the self-efficacy scores with a self-reported measure of computer experience and with number of computer packages used with each of the correlations showing significance; experience correlated at r=0.79, p<0.0005, N=212 and familiarity correlated at r=0.75, p<0.0005, N=210. (The Computer Self-Efficacy Website, n.d.)

The CUSE scale has also shown positive correlations between computer self-efficacy (CSE) and computer experience, usage levels of software packages (which were significant predictors of CSE) and that owning a computer and technology training increased CSE (Cassidy & Eachus, 2002). Dr. Cassidy and Dr. Eachus offer the survey and scoring scheme to researchers and I did not need permission to use this instrument.

Data Analysis

Qualitative Data

Epoche/Bracketing. Epoche or bracketing is a "systematic effort[s] to set aside prejudgments regarding the phenomenon being investigated" (Moustakas, 1994, p. 22). This was necessary so I could be as bias free as possible. As the researcher, I had to be completely "open, receptive, and naïve in listening to and hearing research participants describe their experience of the phenomenon being investigated" (Moustakas, 1994, p. 22). As mentioned previously I maintained a reflective journal (Appendix H) in my efforts to epoche my personal opinions related to the phenomena of interest.

I did not have any personal experiences with the phenomenon of in-service training at the University of North Carolina at Pembroke, Fayetteville State University and Liberty University. The certification requirements for me consisted of passing the Praxis Test for Mathematics and successfully teaching for three years. However, my experiences with the school and district level staff development initiatives in integrating twenty-first century technology into teaching practices are many.

In the past I have directed many staff development activities on a school by school basis within the district and within my own school. It is not difficult to epoche my opinions about the college of education experience, but I had to set aside my staff development experiences in order to approach this study with an open mind focused on the participants' interpretations of their experiences. The reflective journal assisted me in these efforts.

Phenomenological Reduction. (Appendix N). This stage of data analysis required I describe "in textural language just what one sees, not only in terms of the external object but also the internal act of consciousness, the experience as such, the

rhythm and relationship between phenomenon and self" (Moustakas, 1994, p. 90). Multiple "angles of perception" (Moustakas, 1994, p. 91) continue to add to the researchers' understanding of the phenomenon.

Horizonalization. The listing of statements having "equal value" (Moustakas, 1994, p. 180) was the first phase of data mining, in the selected statements were viewed as unique statements made by participants and were seen to illustrate the researched phenomenon (Moustakas, 1994). This step required I observe and describe what was seen from the "vantage point of self-awareness, self-reflection, and self-knowledge (Moustakas, 1994, p. 95).

Delimited horizons or meanings. These are horizons that stand out and do not change when viewed from multiple sources. These horizons can be classified as qualities of the experience or phenomenon; they are "words or phrases that represent only one meaning" (Cilesiz, 2011, p. 499).

Invariant qualities and themes. This step in the phenomenological data analysis process required I group significant statements into larger units of similar meaning or themes Repeated and overlapping statements were deleted thereby producing a list of all "meaning units across participants" (Cilesiz, 2011, p. 500). Clusters of themes were created by grouping units of meaning together (Moustakas, 1994) which helped me identify significant topics.

For example, when asked about feelings of self-efficacy regarding the use of twenty-first century technology, participants employed the following statements, "I feel I'm comfortable," "I know what I'm looking for," "I know what I'm doing," "I can handle the technology," and " [I am] able to manipulate and use it [technology] to the

best of my ability for it to be effective in my classroom." These clusters of themes were grouped together in creating the "High level of confidence and skill" unit of meaning.

Individual textural description. This stage required I write a narrative representing the participants experience with the phenomenon. This "what happened" section is a compilation of "invariant textural constituents and themes of each research participant" (Moustakas, 1994, p. 180).

Composite textural description. At this stage, as researcher I integrated all individual descriptions into a "group or universal textural description" (Moustakas, 1994, p. 180).

Imaginative Variation. This stage of the research is aimed at determining possible meanings of themes through the use of "imagination, varying the frames of reference, employing polarities, and reversals, and approaching the phenomenon from divergent perspectives, different positions, roles or functions" (Moustakas, 1994, p. 98). These strategies assisted me in describing the crucial structures of the phenomena.

Vary possible meanings. The possible structural meanings associated with identified textural meanings were then re-conceptualized from multiple perspectives (Moustakas, 1994). A deeper knowing of what happened was necessary at this stage of the research. This deeper knowing began by re-reading the textural descriptions representing the experience from different points of view.

List structural qualities. A list of structural qualities related to the experience was written at this stage (Appendix O). Structural qualities are invariant textural descriptions representing the phenomena.

Develop structural themes. Structural qualities related to the phenomena under study were then clustered into themes. These themes are common invariant meanings across individual manifestations of the experience.

Composite structural description. This stage of research required an integration of all structural themes that have emerged into a "universal structural description of the experience" (Moustakas, 1994, p. 181). The structural description is an accounting of "how" the experience happened (Creswell, 2007, p. 159). I also strived to give meaning to the setting and context in which the phenomena were experienced (Moustakas, 1994).

Synthesis of Composite Textural and Composite Structural Descriptions. At this stage in the research I "intuitive-reflectively" (Moustakas, 1994, p. 181) combined the textural and structural descriptions to synthesize the meaning of the experience by the participants. This combining created the essence of the experience and was the culminating aspect of the phenomenological study which typically tells the reader what the participants experienced with the phenomena and how they experienced it.

Quantitative Data

Survey. The CUSE (Appendix E) scale was be administered immediately after each interview using paper and pencil and was completed within 15 minutes. After reading the question participants were then asked to rate how confident they felt at accomplishing the task presented to them. Responses ranged from "Strongly Agree" to "Strongly Disagree". Each of these categories was then assigned a numerical value of one through six.

Thirteen of the 30 CUSE statements were positively worded and the participant's selected value represented their score for that item, e.g. a positively worded question response of four was scored as a four. The remaining 17 statements were negatively

worded which required I subtract the participants response from seven to obtain their score, e.g. a negatively worded question response of five resulted in a score of two. The value for each question was then tallied yielding a scale score for each participant. Participants with higher scores indicated a higher level of self-efficacy and thusly greater confidence with computer use.

Linking of the Qualitative and Quantitative Data

Triangulation, a "strategy for enhancing the quality of the research" (Krefting, 1990, p. 219), is when researchers synthesize multiple sources of data in their efforts to ensure the phenomenon has been investigated fully (Knafl & Breitmaye, 1989). In triangulating I used the multiple data sources, interviews, the focus group and the survey in a cross-checking of the data interpretation. This process lessened the "distortion from a single data source or from a biased researcher" (Krefting, 1990, p. 219).

This process of linking also served to strengthen both the qualitative and quantitative data (Henderson & Bedini, 1995). The attempt was not the proliferation of data as increased data alone is useless unless the data are "used and discussed together" (Henderson & Bedini, 1995, p. 127). When identifying themes and in discussing results I was constantly mindful of participant perceptions during the interviews and focus group sessions. I then looked to see if those findings regarding participant perceptions could be observed in all the collected data.

Trustworthiness

Phenomenological research is oriented to the nature of lived experiences. Therefore it is necessary to employ special methods to ensure trustworthiness. I followed Guba's (1981) model in attempting to ensure trustworthiness during this research study.

His four strategies for ensuring trustworthiness are: (a) credibility, (b) transferability, (c) dependability, and (d) confirmability. Following these strategies provided readers of my research with a means of assessing the value of the findings.

Credibility

Credibility was maintained in this research design by employing reflexivity, triangulation, member checking and peer examination of the findings. Reflexivity required I remain acutely aware of my self-awareness and exposure related to the phenomena. Similar to epoche where I must remain continually engaged in disciplined efforts to ignore my prejudgments about the phenomenon (Husserl, 1969, 1970b; Moustakas, 1994) in an effort to produce a unprejudiced description of the essence of an experience (Ashworth, 1999; Husserl 1969, 1970b; Kvale, 1996). I continued to hold myself "accountable to the standards of knowing and telling" (Creswell, 2007, p. 213) the participants I had studied by employing a reflective journal (Appendix H) as previously discussed. This awareness helped lessen the impact of personal biases, values, and experiences which I brought to the qualitative research study (Creswell, 2007, p. 243).

In addition to reflexivity, I used triangulation to strengthen the credibility of my research project. Triangulation is when the researcher employs multiple data collection sources when merged offer mutual confirmation of certain results and/or verify "completeness with which the phenomenon of interest was addressed" (Krefting, 1990, p. 219).

Member checking was also employed in establishing credibility of this research project. When securing participants' views concerning the credibility of the findings (Ely, Anzul, Friedman, & Gardner, 1991; Glesne & Peshkin, 1992; Lincoln & Guba, 1985; Merriam, 1988; Miles & Huberman, 1994) while employing member checking, I shared

with the participants the "data, analyses, interpretations, and conclusions" (Creswell, 2007, p. 208) so they could judge the credibility of the textural-structural description of the experience or the essence of the phenomena. I had participants review the interview and focus group data asking for feedback concerning my findings. In addition participants were asked to comment on the findings contained in the final report. Each participant was asked to participate in this process and was asked to offer suggestions for improvement (Moustakas, 1994). See Appendix L for a copy of the email to participants.

Peer examination was the final activity I employed in ensuring credibility. I utilized two individuals who had completed a qualitative dissertation project, having them check the veracity of themes and the interpretation of statements in interviews (Lincoln & Guba, 1985). This step served to keep me honest about "methods, the meaning, and interpretations" (Creswell, 2007, p. 208) and helped to ensure my subjectivity did not cloud the findings of the study (Cilesiz, 2011). For a copy of the email to peers see Appendix L.

Transferability

This is a transcendental phenomenology, this means I was attempting to document the experiences of participants related to the phenomena under study. It is with this in mind particular care should be employed when attempting transference of findings. According to Lincoln and Guba (1985) when attempting transference of qualitative findings, the responsibility lies mainly with the individual attempting transference. While other researchers bear the responsibility relative to transferability, I had to provide "sufficient descriptive data for comparison" (Krefting, 1991) when satisfying the issue of transferability.

The majority of this descriptive data is found in the *Findings, Discussion and in the Interview/Focus Group transcription sections* (Appendix J) of this dissertation. Providing rich detailed descriptions in these sections provided other researchers with the information they needed to determine the transferability of results.

Finally, reflexivity and the peer-review process both did lend credence to the transferability of this research. As discussed in detail previously reflexivity and the peer-review process both assisted me in maintaining honesty in the reporting of the results.

Dependability

Dependability is utilized when addressing the uniformity of the findings. In phenomenological research, dependability can be achieved by providing readers with an explanation of the "exact methods of data gathering, analysis, and interpretation" (Krefting, 1991, p. 221). Rather than being concerned with the replication of findings as in quantitative research, dependability in qualitative research is concerned with whether or not another researcher can employ a similar rationale when making decisions "researcher can clearly follow the decision trail used by the investigator in the study" (Krefting, 1991, p. 221).

While seeking to enhance dependability, I employed a "code-recode" (Krefting, 1991, p. 221) procedure on the data during the analysis phase of the study. This simply meant after identifying themes, I left the analysis for three days, then returned and recoded the data and compared the two sets of themes. Finally, dependability was strengthened by employing triangulation as previously discussed and by following Moustakas' (1994) phenomenological methods.

Confirmability

Confirmability in qualitative research is similar to objectivity in quantitative research. The difference here, according to Guba (1981), "involves an external auditor attempting to follow through the natural history or progression of events in a project to try to understand how and why decisions were made" (p. 221). The auditor would consider the process of the research, data, findings, interpretations and recommendations. The purpose would be to see if another researcher, given the same data and similar research contexts would arrive at an analogous conclusion.

For auditing purposes I employed an individual who had completed a grounded theory dissertation. She had conducted interviews and identified themes during her research study. She was an excellent candidate in offering feedback to me. I sent her a copy of the themes which were identified for each research question along with the charts containing the list of invariant participant statements. The only feedback she offered was the identified theme should succinctly represent the clustered themes. I re-read my themes and the theme "Assignments were neither purposeful nor rigorous" adopted based on this audit.

Other strategies for increasing confirmability include peer review and reflexivity, both of which have been discussed previously. Member checks demonstrate as well how the participants arrive at similar conclusions regarding the researcher's findings thereby improving confirmability. Member checking took place at two different times during my research. The first time I asked participants to check the transcription of their individual interviews. I wanted to make sure I had accurately documented what they had stated. This was accomplished by emailing the transcriptions to each participant. Two participants

responded that the transcriptions were fine, while one responded she had no idea she had used so many “umms.”

The second time member checking was employed was after the themes had been identified. Each participant was sent copies of the invariant statements along with the themes that had been mined from them. Four participants responded they agreed with the findings noted in the selected themes.

Summary

This methodology chapter illustrated how this transcendental phenomenological study was conducted following accepted practices in qualitative research. The phenomena of study were plainly articulated and the data collection process and analysis are in line with Clark Moustakas’ (1994) phenomenological research methods. Extensive preparation was taken to ensure the research and its findings were trustworthy and credible, thereby lending credence to the future application of findings.

CHAPTER FOUR: FINDINGS

The purpose of this transcendental phenomenological study was to examine practices related to teaching pre-service and in-service teachers how to integrate twenty-first century technologies into their instruction. According to Moustakas (1994), "Phenomenology is concerned with wholeness, with examining entities from many sides, angles, and perspectives until a unified vision of the essences of a phenomenon or experience is achieved." (p. 58); the phenomenologist's focus is on what participants have in common as they experience a phenomenon. The researchers' "aim is to determine what an experience means…and to provide a comprehensive description of it" (Moustakas, 1994, p 13).

The transcendental phenomenological approach was used to study participants who all experienced the pre-service college of education experience of methods and technology courses and the in-service school and or district level technology staff development experience. Capturing the essence of how teachers viewed their pre-service and in-service training regarding the integration of twenty-first century technologies into their instruction was the phenomena under study.

In this chapter I will report the findings from the interviews, focus group session and from The Computer User Self Efficacy Scale (CUSE) (Appendix E).

Research Questions

This study was designed to inform best practices related to integrating twenty-first centrury technologies into teachers' instruction by listening to the voices of the participants. Three specific research questions were used to guide this study:

1. How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction?
2. How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction?
3. How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction?

This research study was concerned with the subjective experiences of the participants as their collective voices were heard. For purposes of this study, the phenomena under study was twenty-first century technology integration training practices while the participants were pre-service learners and later as in-service learners.

Participant Summary

Twenty participants each: (a) with three to five years of experience and, (b) who had been licensed to teach by completing an educaton program at an accredited institution of higher education agreed to the conditions of this research. In addition, all participants had participated in either school level or district level staff development initiatives in twenty-first century technology integration.

Traditional licensure ensured the teacher had enrolled in a regular education program and had therefore participated in methods and technology courses at the university level. Selecting third through fifth year teachers facilitated the understanding of current pre-service preparedness at the university level. Technology staff development

participation ensured all participants had experienced in-service twenty-first century technology integration training.

I met with each participant individually and explained the study and answered any questions they had related to the study. After answering their questions, participants were then asked if they were willing to participate. A total of 20 participants agreed to participate from six schools; five elementary schools and one high school. Four participants (20%) were high school teachers and 16 (80%) were elementary school teachers. Each participant agreed to participate and signed a consent form (Appendix D) and was assigned a psudeonym for reporting purposes.

Participant Profiles

Abbey was an elementary education graduate with three years of experience. She was assigned as a kindergarten teacher in a local elementary school.

Amber had five years of experience teaching in an elementary setting. She was assgned as a third grade teacher.

Beth, an elementary education major, had three years of experience and was teaching first grade in a local elementary school.

Billy, also a four year veteran, taught U. S. History at a local high school.

Cindy had four years of experience and taught fifth grade at a local elementary school.

Debbie, an elementary education major, had five years of experience and was a first grade teacher.

Heather had four years of experience. She was a second grade teacher.

Jamie, a three year veteran in this system, was awarded an undergraduate degree in education and was assigned as a fourth grade teacher in her elementary school.

Jill was an elementary education graduate. She had three years experience and was teaching third grade in a local elementary school.

Johnny was a four year veteran teacher at a local high school and had completed an undergraduate mathematics education program. He taught Integrated Mathematics I and II.

Kathy had three years experience teaching at a local elementary school. She was assigned as an Art teacher responsible for teaching all grade levels.

Kimberly had three years of experience and was teaching first grade in a local elementary school.

Larry was a fifth grade teacher at a local elementary school with three years of experience. He was pursuing a Masters Degree in School Administration.

Linda, an undergraduate education major taught AP Honors and U. S. History courses at a local high school.

Luke was an elementary teacher with three years of service. He had recently completed a Masters Degree in Counseling and was about to begin his doctorial studies in School Administration. He had an undergraduate degree in education.

Ruth, a five year veteran, was assigned as a kindergarten teacher in a local elementary school.

Samantha was a graduate of an elementary education program. She had three years of experience and was teaching second grade in a local elementary school.

Sally, a mathmatics education major had four years of experience and was teaching Integrated Mathematics I and II at a local high school. She had recently received her Masters Degree in Mathematics Education.

Susan, another elelmentary education graduate, taught third grade in a local elementary school. Susan had five years of experience in education.

William, a third grade teacher in a local elementary school had four years of experience.

Interviews and Focus Group

Participants participated in individual interviews either during their planning or after school at their respective schools. The interviews were conducted in the office conference room or in the teachers' individual classroom. Each participant was asked the same 17 questions designed to understand the phenomena of twenty-first century technology integration training and feelings of computer self-efficacy. All interviews lasted approximately 15 to 20 minutes depending on participant responses. Interview questions are listed in Tables 2, 3 and 4 in Appendix F. All interviews were audio recorded, video recorded and transcribed exactly as they were recorded. Sample transcriptions appear in Appendix J.

Member checking was employed after the transcription process in order to ensure the validity of the interview information. Member checking was accomplished by emailing each participant copies of their transcribed interview for them to review (Appendix L). Participants were encouraged to offer feedback concerning data contained within the interview four participants did so. Regarding the content of their interviews, the four participants all agreed that the transcriptions represented what they had to say

regarding the phenomena under study. Additionally each respondent agreed with the selection of themes.

The focus group session was held at a restaurant selected by the participants. I paid for the participants' meals. Six of the original 20 participants attended the session. Each participant was emailed an invitation to attend and a ballot for the selection of the restaurant (Appendix L). The session was held in a private dining room and was conducted immediately after the meal. Many of the same themes garnered from the interviews were found during the focus group session as well. See Appendix J for the transcription of the focus group discussion.

The data was then analyzed using phenomenological reduction and imaginative variation which required I describe in words what I saw including the relationship between the phenomena and participants. This synthesis of the composite textural and composite structural descriptions described the essence of the experience for the participants.

Themes

When referencing participant statements in backing up the selected themes, I will be utilizing a representative sample of responses.

Research Question One

Research question one was designed to solicit information regarding how participants felt about their technological awareness and ability to integrate twenty-first century technologies into their instruction. Responses coalesced around two themes.

- Participants report a high level of confidence and skill when selecting twenty-first century technologies to employ in their classrooms.

- Twenty first century technology integration must be planned and must be purposeful in order to build integration confidence.

Participant confidence and skill

Participants spoke of an abundance of resources from which to choose. One participant noted too many resources as well as the push to incorporate brand new technologies can serve as a hindrance to selecting which twenty-first century technology to use in instruction. Participants noted the repeated staff development, learning time with their peers and "playing with the technology" served to build their confidence. For example Beth stated:

> …I feel like there's lots to choose from. Because I feel like I'm comfortable with it enough that I know what I'm looking for and I know what I'm doing and I can handle the technology enough to be able to manipulate and use it to the best of my ability for it to be effective in my classroom…But when it comes to a lot of information at once, or websites that I've not ever heard of, or that I'm not particularly familiar with, it makes me more apprehensive to go to them because I know what I know and I'm comfortable with that.

Although regarding herself as not a digital native (Prensky, 2001) Cindy spoke of her confidence with technology thusly:

> …I'm very comfortable with technology…I'm not a digital native. So at first I was a little bit hesitant but as far as time goes along my confidence is built up and I'm not scared anymore. Nothing's gonna blow up just because I didn't press the right button.

Kimberly mentioned how she simply "plays with the technology until she develops confidence when she stated, "for implementing technology, I'm very

comfortable with technology. I'll find something and just go at it by myself and figure it out 'til I got it and I usually share with my colleagues. So, [I am] pretty comfortable."

Jamie spoke of his abilities in finding the appropriate technologies to use in creating an engaging classroom when he stated:

> …I feel that I'm pretty good at finding the programs I need to help my kids become more critical thinkers. There's a lot of programs again online that we can pull from especially with math, with science and social studies, where they can do different games; they can do different activities; they can do WebQuests. I feel that I have the ability, but that goes back again to not having the time I need to really get the most out of it.

Results from the CUSE seemed to corroborate the results from the interviews and focus group sessions where participants indicated they felt competent about selecting and utilizing twenty-first century technologies in their classrooms. For example in response to survey question two "I find working with computers very easy" 100% of participants indicated they either "Agree" or "Strongly Agree." When responding to statement twelve "I am confident with my abilities to use computers," again 100% of participants indicated they "Agree" or "Strongly Agree." In addition when asked to respond to the statement "I consider myself a skilled computer user" in question 29, 95% of the participants selected either "Agree" or "Strongly Agree." Again, this would seem to indicate when participants spoke of themselves as being confident about employing twenty-first century technologies, they were giving an honest assessment of their abilities during the interview and focus group sessions.

Participants noted exposure to technology does not automatically translate to the ability to integrate. Many participants were left to figure out how to employ the twenty-

first century technologies own their own. According to participants spending time working with the twenty-first century technology in conjunction with their peers served to build integration confidence.

Integration requirements must be planned and purposeful.

According to participants, twenty-first century technology should not be employed simply to meet a mandate to use it. Participants also argued for time to research and plan for the integration of twenty-first century technology into their lessons. Finally, participants stated the teaching and learning process must be positively affected by the use of twenty-first century technology, as articulated by Beth:

> …if it [technology] could be, …shown to teachers in a way that was easily integrated to where it's just another tool that you can use that would be ideal for me. But as far as me venturing out looking for things like that, there's not enough hours in the day.

Ruth indicated the act of integrating technology was time dependent. She felt strongly that classroom teachers did not have enough time to research all the technologies available to them. This sometimes meant although the use of technology was important, the technology may not be integrated due to time constraints. This can be seen in the following statement by her:

> And as a real classroom teacher you don't have that much time to go and create all that stuff like you would want to, or even like you need to. So, it's kind of like you gotta pick and you gotta choose, am I going to do it the old-school way, or when I've got time and I can do this just to make sure that my kids are getting it, or can I go in and create this technology that I know will be more interesting to

my students but at the same time I'm losing valuable time that could be spent elsewhere.

Larry stated "I feel comfortable if I have the opportunity to do it [select the technology] ahead of time." When given enough time to plan for technology integration Larry's competence at employing the technology successfully increased.

Billy did not want to employ technology simply because there was a requirement to do so. He remarked:

> I mean, I feel good about it. I mean, I'm comfortable with technology. Anything I do as far as technology goes, I mean, it has a purpose. I'm not going to just throw something out there just for no reason.

To build twenty-first century technology integration confidence, according to the participants, one needs time to learn how to use the technology and time to figure out how it supports pedagogy and content.

Most participants had reported during the interview sessions twenty-first century technology integration should be planned for and must have a purpose. Many felt the purpose should be related to improving the teacher's ability to meet existing content standards. When the requirement to integrate the twenty-first century technology was not tied to one of these requirements confidence at employing the technology decreased. This can be seen in the focus group response by Beth:

> …because all the professional development…it's talking about programs that I'm not even gonna click on…it's not even relevant…if they have professional development, and I speak generally…they pull in everybody, and you may have components that are just for ELA [English/language arts]. So, if you teach kindergarten and they're talking about how to have a novel displayed on your

board…and manipulate that novel and take and list of features and all that stuff, that's not doing you any good, you don't need to know that. So, you've got to go back to the basics and figure it out for yourself.

Larry spoke of how one session was not enough to build integration confidence and competence. Twenty-first century technology trainers must plan for extended training sessions which build on each other. Integration efforts require time and effort. This can be seen in the focus group response by Larry:

> …we have that one training session and never again do we have anything else the entire school year. So, I say, you know, hold multiple sessions, have focuses, you know, start here and then maybe monthly, bi-monthly, have a different focus- we're gonna learn this, we're going to do this, and actually go in depth with that and utilize it to its fullest potential.

Research Question Two

Research question two was aimed at discovering how the college of education experience of twenty-first century technology integration training was perceived by the participants. Three themes were identified succinctly representing participant perceptions. These themes were:

- When technology was used by college professors, it was mainly basic uses of technology.
- Assignments involving the use of technology were neither purposeful nor rigorous.
- Participants did not really begin to understand how to integrate technology until they began their field experiences and internship.

There were a few notable exceptions to theme one and two findings; however the majority of participants agreed these themes illustrated their exposure to technology at the collegiate level.

Basic uses of technology.

When participants discussed how their professors used technology most of them mentioned professors simply did not use much technology. According to Debbie, "They [professors] just used … the computer and they used PowerPoint as far SMART… lessons or anything like that, that engaged us we didn't ever have any. It was more or less just PowerPoint."

Similarly Amber noted "I honestly don't recall any of my instructors using a lot of technology to, to teach… it was usually just mostly lecture. There might have been some using the overhead projectors or something like that…"

Linda's perceptions regarding professor uses of twenty-first century technologies were in line with the other participants. She spoke of her pre-service classroom exposure to twenty-first century technologies thusly:

> Again, I mean, it was just PowerPoint and projector, not really anything else…lecture. ..we had a class… dealing with school-based things like… how to make flyers and stuff on Microsoft Word like that. I kind of already knew how to do that that stuff. …from what I saw professor-wise, most of them used, like, PowerPoint, projectors that was pretty much it.

Billy echoed much of the same sentiments as did Linda when he stated, "It was mostly like a retraining on Word and stuff like that but as far as incorporating technology into an everyday classroom: our professors… we talked about it and we went over PowerPoints and stuff like that…"

Again many of the focus group participants noted their training as pre-service learners did not provide them with the integration skills they needed. Heather indicated how technology was not employed by her professors when she stated:

> …in college, we only had one SMART Board in the whole college. I still remember I had one class in that classroom and the chalk board was around it, and he [the professor] just wrote and wrote over the SMART Board and then kept going, never touching the SMART Board, so I was like, oh that thing's really cool, what is that?

Larry, spoke of how he was exposed to more technology integration efforts since his professors used Geometer Sketchpad during his methods classes. He stated:

> …I have a mathematics concentration, so, in that area we had the math-teaching and technology-integrated course…and from that I was able to utilize a lot of different math technology... Things that I could do with technology…like, Geometer's Sketchpad, which was software all about geometry, and you were able to put formulas in and…build geometric shapes and test the angles, and rotate and flip, and slide and do all of those different things there.

Focus group participants felt they were not exposed to exemplary modeling of twenty-first century technology integration techniques while a pre-service learner. The most notable exception to this was Larry who had a mathematics concentration. Interview Participants also reported it was only after visiting classrooms and observing in-service teachers did they develop a sense of how to integrate twenty-first century technologies into their instruction.

There were a few notable exceptions regarding this theme. According to Jamie, "We used a lot of the document cameras…the professors used those. The professors also…used PowerPoint and we would do…WebQuests online."

Johnny, who had majored in mathematics, spoke of using computer software while a pre-service twenty-first century technology learner when he stated, "…we used Geometer's Sketchpad sparingly and that was about the only technology that was incorporated."

While William, who seemed to be the most prepared to employ technologies after college, noted:

> So what he [professor] did was…our computers were somehow linked to his SMART Board, so that we had the technology on the computers and he created a lesson that showed us the tools to use. And we created a mock lesson on our computers.

The teachers who had experienced some degree of modeling of technologies had had options of taking other coursework that used technologies. Johnny was mathematics major and his methods teacher used Geometer Sketchpad when teaching geometry units. Johnny was exposed to many lessons employing this software package.

William seemed to be the most prepared to employ technologies upon garnering his teaching assignment. William spoke about the preparation he received:

> I went to a private liberal arts college that required us to take two semesters of technology classes specifically geared towards educational technology. The first one was a SMART Board course and the second one was integrating technology into… my lesson plans.

Of all the participants, William was exposed to more modeling of technologies while a pre-service learner and was expected to create more technology infused lesson plans.

Assignments neither purposeful nor rigorous.

When participants spoke of technology related assignments as pre-service learners they indicated these assignments were basic in nature and did not serve to build twenty-first century technology integration competence. Participants did mention working with groups created by convenience (neighbor in next seat), but most often participants spoke of having to work alone on projects. Assignments consisted mainly of PowerPoint presentations for classmates. Rarely were participants as pre-service teachers asked to integrate existing knowledge of technology with instruction in significant ways.

Heather spoke of how her exposure to technology while a pre-service teacher did not prepare her to integrate in her future teaching assignment. When speaking about a typical assignment she stated:

> I had one technology course in college where we had to create a PowerPoint about a vocabulary word of our choice. And we had to make it so the kids had to interact with it so there would be sounds on there and there were images on there. I can't remember what else but that was just the one class and then we had to present it to the professors…we never actually got to use it in a classroom which was too bad.

Sally indicated many of her assignments utilizing technologies were not related to her future teaching assignment either. On one occasion she did use the math software program to design worksheets for her future classroom. Sally had this to say regarding her twenty-first century technology integration assignments:

> We had to design a lesson plan based upon just technology using the computer, you know, different activities-different programs on the computer or the Internet or whatever to make our lesson plans. Um, we used Microsoft to type it, to type the lesson plans up. We used Excel to make a graph, a spreadsheet and then we used it to make a graph and then we had to use Geometer's Sketchpad to make our handout, worksheets.

There were a couple of notable exceptions to these findings. Two participants did engage in activities designed so technology could begin to facilitate the teaching and learning process. Johnny was engaged with specialized software while in his pre-service mathematics courses. He stated, "We had 20 activities to perform on Geometer's Sketchpad, we had to list the sequence of steps…had to construct some polygons…and we had to…bisect some angles."

Larry also spoke of using Geometer Sketchpad while in his pre-service program. He noted:

> …one assignment that I know that I did was like classifying different…angles using the different shapes and objects and things. And in Geometer's Sketchpad, you were able to pull those objects up, you were able to expand those objects, you were able to turn those objects around…you can implant the degrees and the angles in there…you could show how this angle was perpendicular to another angle, how it was parallel to another angle…so that was one assignment that I really enjoyed doing because it made geometry real life.

As a general rule when participants were asked to employ technologies the requirement to do so did not rise to the standard of true integration. Twenty first century technology integration means using technology to facilitate instruction and "adopt new

and arguably better approaches to instruction and/or change the content or context of learning, instruction, and assessment" (Lawless & Pellegrino, 2007, p. 581). Utilizing technology simply to satisfy a requirement to do so characterized participant twenty-first century technology related assignments.

Importance of field experiences and internships.

Participants did not have the integration of twenty-first century technology modeled for them during their methods and technology courses. They created lesson plans that included technology standards and designed PowerPoint presentations. All the participants stated once they began to visit classrooms their knowledge about how to integrate twenty-first century technology began to increase. This theme is illustrated in Amber's response:

> …when I did my student teaching…they had SMART Boards and I had never seen those until I went into the classroom. And she [teacher] was really good at it so I came really well rehearsed in SMART Board through field experience and my student teaching.

Cindy acknowledged how her filed experiences had assisted her in developing twenty-first century technology integration confidence and competence when she said:

> …the field experiences are really what helped me. I got to use the document camera, because it was hands on, I mean instead of just somebody telling me what I needed to do about technology I was able to use it. When I used the document cam I knew exactly how to do it and, umm, like I said how to make it interactive with the SMART Board…

Jamie also reported how his internship exposure to classroom uses of twenty-first century technologies had helped him understand how to employ technologies in his future teaching assignment. According to Jamie:

> …that [field experience and internship] probably helped [me] more than anything else, because I was able to go into the different classrooms, different grade levels. I was able to see how they incorporated twenty-first century technology. …I found lots of wonderful resources as far as websites…different programs for the SMART Board…that helped more than anything else, actually getting into the classrooms and seeing how technology was used.

The focus group participants indicated they did not really begin to understand how to connect the twenty-first century technology to pedagogy and their content specific teaching assignments until they began their field placements and internships as well. This can be seen in this statement by Beth:

> As far as formal training, unless you want to include internship that was what opened the door for me. Because my internship…teacher was all into the SMART Board; she knew it front and back. They had had really good training on it [SMART Board] at their school…that got me familiar with it [SMART Board] so when I got my own, then I, it just kinda was easy.

Participants had not been exposed to the kinds of lessons in their methods and or technology classes which enabled them to see how twenty-first century technologies could be employed as a tool to teach. This point was echoed by Susan when she responded "…it was mostly…just lecture; except for the online classes with Blackboard was really the only technology that I had was during taking online classes with Blackboard."

This finding was evident in the focus group discussion as well. Five of the participants noted it was only during their filed placement and internship when they began to understand how to integrate the twenty-first century technology into their content area. This can be summed up in the responses by Larry, "I'd have to say my student teaching experience was the most beneficial to me." and by Linda, "…most of the stuff that I learned about technology was through my student teaching."

Larry participated in the focus group session and was the only participant that had been exposed to modeling of technology software during his pre-service training. Larry had gotten a minor in mathematics and spoke of his methods teacher using Geometer Sketchpad often.

All too often participants were exposed to twenty-first century technology being used to display notes, or being employed as an assist to a presentation. This can be seen in the statement by Linda "Again, I mean, it was just PowerPoint and projector, not really anything else…lecture..." when she spoke about how technology was used in her pre-service training. Finally, participant's assignments involving twenty-first century technology did not serve the purpose of helping them understand how to employ twenty-first century technologies in their future classrooms. This can be seen from the statement made by Amber, "…I know we were trained on teacher websites …on how to do a teacher website but other than that I can't recall any other ways we were taught to incorporate twenty-first century technology into our classroom."

Research Question Three

Research question three was concerned with how participants perceived their school level and or district level staff development efforts at assisting them with twenty-first century technology integration into their instruction. Two themes emerged from the

qualitative data that illustrated the answer to this question. Again there were a few notable exceptions to the identified themes, however most of the participants agreed with the identification of the following themes.

- Through staff development participants were exposed to a myriad of twenty-first century technologies designed to make them more effective teachers.
- Staff development seemed to lack focus and purpose.

More effective teachers due to staff development.

When participants spoke of how twenty-first century technology staff development had made them more effective, they spoke of how the technology assisted them in managing assessment data, designing lessons, differentiating in the classroom and assessing. Participants also spoke of how the use of twenty-first century technology served to peek students' interests and engage them in the learning process where the act of learning itself became secondary. According to Jamie:

> …My first year we did a lot of SMART Board activities and those really helped me understand SMART Board how to use it specifically for my grade level and for the subjects that I was teaching. I really have been able to see through these technology workshops and training how it really gets the students attention; how to become more engaged in activities that are aligned with technology.

Heather noted how much of the twenty-first century staff development had served to increase her efficiency and productivity. In addition, the abundance of resources she had at her exposure assisted her in utilizing data for instructional purposes this can be seen in the following response:

> …there are also things that are on the computer, things like A.R. and Star Reader that keep track of the kids progress without you having to do all the math and then

you can just print out and that's great because you can use it for data really quickly you can pull it up…

William indicated his staff development focus had been on using technology to increase communication between him and his student's guardians. William had expressed his ability to employ technologies to teach and indicated his weakest area was utilizing technologies as communicative tools. He stated:

> …the majority of the staff development that I've received…has been more or less for webpage and communications, because that was something that I lagged as a beginning teacher was online communications with parents and things like that, so we do a lot of professional development on webpage training...But really just communicating more with parents and allowing them to electronically communicate with me either through webpage or e-mail, and then this year I've actually moved to an online grade book where we both can see that and interact with those grades and things like that.

Johnny had recently participated in a staff development session regarding an online grade book called Engrade. This software program allows students and their guardians immediate access to grades and communicative portals with the teacher. Johnny spoke of his exposure to this staff development thusly:

> I've learned how to use Engrade, which is instantaneous access for them [students] in terms of my grade book. I message all my kids on Engrade. So, instead of texting my kids, it's a whole lot safer if I can message my whole class on Engrade. Whenever they had issues with their grades or they have questions that they don't want to address in class, they can always message me on Engrade. It's brought us closer together; it's closed that communication gap.

All the participants in this study spoke of how their respective schools had a large selection of computers and other technologies to use in their classrooms. When participating in the focus group session, Susan spoke of how as a Reading First school, her school got lots of hardware and software when she said, "we were a Reading First school and the first year I got there, just getting SMART Boards and document cameras, everything, and we had training …on how to use it. So, we became very familiar with it."

During the focus group session, Kathy spoke of how the twenty-first century technology had helped her transform her lessons in ways which peeked student interests. She stated, "I found that underground railroad [website]… the best field trip ever. And they [students] got to choose, you know, are we going to knock on this person's door or not, and you know they all want to knock."

Generally participants responded positively regarding how staff development had made them more efficient and productive. In addition, participants reported by integrating twenty-first century technologies they had received training in, they were able to differentiate their classrooms and make learning more meaningful and exciting for the student.

Staff development seems to lack focus and purpose.

While participants had been exposed to an abundance of twenty-first century technology and felt relatively good about being able to employ what they had been exposed to, they felt too often the training being offered was not based in their context of teaching. It was presented as such but most participants, in schools were there was not a curricular focus such as reading, struggled to identify their staff development as instructionally grounded. Many participants stated they were left to determine how to

integrate on their own. Finally participants noted a lack of follow up to the training they received. This can be seen in Amber's response:

> …I think it's [staff development] more or less teaching us how to use the technology…the integration part is been more on us. How much we are willing to sit down with it. Just like when we got the iPads. I mean they showed us…how to go on apps and get them. But actually finding the best way to integrate it…that was kinda on, on our own.

Heather spoke of how the staff development she had been exposed to was for basic uses of the technology when she stated:

> …there hasn't been anything specific about here's how you integrate technology into your lesson plans it's more "This is how you turn it on."…"Here's how you write on it.", "Here's how you erase on it." …things like that. [When speaking about the SMART Board.]

Johnny felt most of the staff development at his school was circular. He had this to say regarding most of the staff development he had been exposed to:

> But as far as like follow-up pieces, it seems like it's circular. They'll present technology and show you the basics and then a few months later it circles back around. They'll introduce the same technologies, and give us another rundown of how you use it, and tell us that we need to be incorporating it.

There were a few participants who had experienced staff development with a purpose. Those participants were teaching in schools were the curricular focus was on literacy and had a staff development focus tied to improving literacy. This can be seen in the statement made by Linda, "Most of the staff development that we've done I don't think really has been technology-centered. I think it's been mostly…literacy honestly".

The school in which Cindy taught was also using literacy as a whole school improvement focus. All the staff development, including technology staff development was tied to improving literacy. Cindy had this to say about her exposure to twenty-first century technology staff development:

> Everything that we do with technology is bringing in literacy just like with Success Maker we're bringing that in. Waterford does different programs; Myon Reading it's all…a lot of its software, but it's teaching us how to run more reports and keep up with data on our students. It helps us learn which areas we are weak in and which ones we are strong. But it's literacy.

This sentiment can be seen in focus group responses as well. Although participants had a host of twenty-first century technologies from which to choose, they felt the training being offered was not content based. Many participants noted they were left to figure out how to connect the twenty-first century technology to their curriculum on their own. Kathy indicated just how basic some of her training had been when she stated, "We've had workshops where they teach you where to put your cords into the computer."

Linda indicated how the lack of a clear curricular connection put more responsibility on her regarding how to employ the technologies when she said, "They're not really differentiated…at all [workshops]…I like to play with things myself and figure it out myself, that's how I learn technology. And that's pretty much how I've learned what I know other than going to workshops." Participants repeatedly noted the abundance of resources they had at their exposure to assist them in their daily tasks. However they also indicated there was a lack of curricular focus to the training they had received. The majority of the participants spoke of having to "learn on their own how to incorporate

technology" into their instruction. The absence of follow-up was evident in nearly all responses.

Focus group participants repeatedly spoke of the need to differentiate the twenty-first century technology staff development process. They argued staff development should be grounded in ones' content. Individuals who may need basic twenty-first century technology integration training should be taught separately. Finally, participants noted a haphazard approach to twenty-first century technology staff development training does not build confidence in employing twenty-first century technology.

Composite Textural Description

Regarding participant feelings of self-efficacy at integrating twenty-first century technologies, most felt "confident" in their ability to "figure out" the technology. Many participants reported that there was a "lot [of technology] to choose from" in their respective schools and that they were "comfortable in handling the technology." While nearly every participant spoke highly of their self-efficacy regarding twenty-first century technologies, many reported issues related to not having enough "time" to learn the technology. Participants stated that the requirement to employ twenty-first century technology should be planned for and purposeful. These sentiments are illustrated in the following statements, "as far as venturing out looking for things like that [technologies] there's not enough hours in the day," "I feel comfortable if I [can select the technology] ahead of time," and "I'm not going to just throw something out there just for no reason."

Participants indicated that modeling is a powerful tool when training them to integrate twenty-first century technologies. However most participants were not exposed to this during their college of education experience as can be seen in the following

statements, “they used PowerPoint,” “mostly lecture,” and “making flyers…on Microsoft Word.” A few participants, who were either mathematics majors or minors had been exposed to modeling of other software.

When reflecting upon the assignments they were expected to complete, most participants noted the assignments lacked a training purpose and rigor. For instance participants employed the following statements “we had to create a PowerPoint,” “it didn’t really help me,” and “we never actually got to use it in a classroom.” As before there were a few notable exceptions. Some participants had use geometry software to “make geometry come to life.”

Finally, participants spoke of how their field placements and internships had assisted them, “I came well-rehearsed in SMART Board through field experience,” “I was able to use it [technology],” and “that [field experience] probably helped [me] more than anything.”

Participants noted the following when asked how they had perceived their twenty-first century technology integration training, “through these technology workshops and training…[I can] really get the students attention,” “you can use it for data really quickly,” and “[now] I can find things out there that I know would be interesting.” Yet many participants noted the staff development lacked focus and purpose when they responded, “the integration has been more on us,” and “there hasn’t been anything specific about here’s how you integrate technology.”

Synthesis of the Composite Textural and Composite Structural Descriptions

Participants felt quite confident in their ability to select and employ twenty-first century technologies in their teaching context. When newer technologies were introduced

into their respective schools many of the participants noted reluctance in adopting them due to time constraints. Many noted they needed time to collaborate with their peers and time to "play with the technology" before developing competence and confidence at employing twenty-first century technology.

Finally participants felt the requirement to integrate twenty-first century technology must be planned for and must be purposeful in order to build confidence. Repeatedly participants noted twenty-first century technology usage must be connected to the standards, must have a purpose, and must positively impact teaching and learning. Participants agreed twenty-first century technology was important and should be integrated into instruction. Many of the participants noted twenty-first century technologies "fit" within curricular contexts should determine if the twenty-first century technology is employed at any given time, not some requirement to do so.

When describing their training regarding twenty-first century technology integration as pre-service teachers, nearly all the participants in this study reported they were not trained how to integrate twenty-first century technology into their instruction. They repeatedly spoke of how their college instructors rarely employed technologies to teach them. Usually when professors used the technology it was for basic uses such as employing PowerPoint to display notes, using email and or Blackboard systems to communicate with the class. One participant in particular was trained how to use the SMART Board and was provided a series of lessons to use once he began teaching. He had options when selecting technology courses during his course of study. Four other participants used Geometer Sketchpad quite a bit during their coursework, each of whom were either mathematics majors or minors.

In addition participants as pre-service learners were not required to utilize twenty-first century technologies in authentic ways. Their assignments involving twenty-first century technology were not easily transferrable to classroom settings that require the integration of twenty-first century technologies. For example, most assignments involved the participants creating a PowerPoint for a classroom presentation, or mentioning how twenty-first century technology would be used in a lesson plan. Rarely did participants have to employ the twenty-first century technology as a tool to facilitate teaching and learning while transforming classroom dynamics.

Notable exceptions do exist within the participant responses. For instance, two participants had to create WebPages. One participant had to create a WebQuest, and two others created virtual fieldtrips. In particular, one participant spoke of the virtual field trip regarding the Underground Railroad which allowed students the choice of "knocking" on a particular door and asking for safe harbor. She reported student engagement increased by employing this twenty-first century technology in her classroom.

Finally participants as pre-service learners began to understand how to employ twenty-first century technologies when they began their field placements and internships. The overwhelming refrain was the participants were exposed to modeling by practicing teachers. This modeling of the twenty-first century technology situated the use of twenty-first century technology squarely within the participant's instructional context.

Participants reported staff development activities had exposed them to a variety of twenty-first century technologies designed to make them more effective teachers. For example, they were exposed to software packages which assisted them in teaching reading, packages which helped them illustrate geometric concepts and twenty-first century technologies which assisted them in differentiating the classroom based on

assessment data. However these staff development sessions lacked follow up and relevance to instructional practice.

In addition participants spoke of the lack of focus and purpose related to the staff development they received. Participants did note when the twenty-first century technology staff development was part of a whole school focus such as in Reading Across the Curriculum, there was more of a focus to the twenty-first century technology staff development. Many participants continued to report most of the time devoted to staff development was wasted due to the focus on the basic uses of the twenty-first century technology. The participants argued for a more differentiated approach to twenty-first century technology staff development training. Participants also spoke about the need for additional time so they could develop an understanding of how the twenty-first century technology could be placed within the context of their particular teaching assignment.

Survey

The CUSE is comprised of 30 items employing a Likert scale with values from one to six, with one being assigned a value of "Strongly Disagree" and six the value of "Strongly Agree." Thirteen of the items are positively worded and the participants selected value served as the actual scale score for these items, e.g. a response of four to item one will be scored as four. The remaining 17 items are negatively worded and were scored in reverse; a scale score for these items is obtained by subtracting the participants' selection from seven e.g. a response of four to item three was scored as a three. The self-efficacy score for the participant was calculated by summing all the scores from each

question. The higher the participants scale score, the greater the confidence using a computer (Cassidy & Eachus, 2002). Table 6 contains participant CUSE scale scores. Participant scale scores ranged from 132 to 176 with the highest possible score being 180. The mean scale score was 158.6 and the standard deviation was 12.45. A group mean of 158.6 indicated as a group the participants felt rather competent utilizing computers. In addition, a standard deviation of 12.45 indicated as a whole, the reported scale scores did not deviate much across participants with 60% of participants falling within one standard deviation from the mean and 95% of participants falling within two standard deviations from the mean.

Table 6

Participant Scale Scores from the Computer User Self-Efficacy Scale

Participant	Scale Score	Difference from the mean
Abbey	161	+2.4
Amber	160	+1.4
Beth	165	+6.4
Billy	132	-26.6
Cindy	157	-1.6
Debbie	175	+16.4
Heather	154	-4.6
Jamie	163	+4.4
Jill	160	+1.4
Johnny	161	+2.4
Kathy	135	-23.6
Kimberly	161	+2.4
Larry	174	+15.4
Linda	156	-2.6
Luke	152	-6.6
Ruth	170	+11.4
Sally	140	-18.6
Samantha	146	-12.6
Susan	174	+15.4
William	176	+17.4

Summary

This chapter reported the results form 20 participants who as pre-service learners and later as in-service learners were expected to learn how to integrate twenty-first century technologies into their instruction. Each participant participated in individual interviews which were then exposed to the phenomenological reduction process in order to identify themes. A focus group session was held in order to collect further data regarding this training process and to supplement data regarding the already identified themes. A total of six participants participated in the focus group session.

There were two themes identified which were related to participant feelings of self-efficacy regarding twenty-first century technology integration. The first revealed participants had a high level of self-efficacy when selecting twenty-first century technologies to employ. Many participants noted the abundance of resources at their respective schools and repeated exposure to staff development, collaboration with peers, and time to learn the technology all served to build confidence within them. The second theme noted participants felt, in order to build confidence, staff development should illustrate how a particular technology can positively impact learning and the standards. They also felt a hurried approach to including some sort of technology impedes confidence, therefore participants needed time to internalize how to integrate twenty-first century technology within their particular instructional context.

Three themes emerged regarding pre-service training. First, participants noted when twenty-first century technology was employed by their professors it was mainly basic uses of the technology. Most participants stated professors used PowerPoint to display notes or email to communicate with them. When participants were given assignments to use twenty-first century technology by their college professors those

assignments were neither purposeful nor rigorous which was denoted within the second identified theme. Participants either had to: (a) mention a technology standard in their lesson plan, or (b) create a PowerPoint for a classroom presentation. There were a few notable exceptions to this theme. Two participants created WebPages geared toward parental communication; one participant created a WebQuest; and two other participants created virtual field trips.

The third and final theme was related to how field placements and internships assisted participants in understanding how to employ twenty-first century technologies into their instruction. These authentic placements helped the participants situate the twenty-first century technology into their knowledge about curriculum. It was only at this point when many of the participants were exposed to twenty-first century technology in content specific ways. Most of participants had used laptops, and desktops in designing lessons, however the vast majority of them had never used a SMART Board, an iPad or other twenty-first century technological tools in the context of their instructional content until these placements.

Two themes emerged regarding staff development training the participants were exposed to. Many participants said they had been exposed to a myriad of technologies designed to make their jobs easier. They spoke of how the technology could assist them in making their classrooms more engaging as well. However the participants did note, within the second theme their staff development lacked focus and purpose. Often the staff development was structured so only the basic uses of the technology were taught. Additionally participants stated the connection between the technology and their content was left to them to figure out. And finally the absence of follow-up activities impeded participant ability to integrate.

The final data collection activity required participants complete the CUSE survey (Appendix E). This instrument was employed to gather more data in addition to the data garnered from the interviews and focus group sessions regarding participant reports of feelings regarding efficacy to use computers. Survey results, as previously noted, corroborated participant statements regarding their confidence to use computers.

Research Questions Answered

Research Question One. How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction? Participants reported a high level of confidence and skill when selecting technologies to use. Linda spoke of her confidence thusly:

> …I am willing to go out and try new things…I am the kind of person I'll just jump in and play with it and figure it out…my newest project has been Prezi; trying to learn the world of Prezi, so that's been really fun.

Nearly every participant spoke of the abundance of twenty-first century technologies available at their respective schools. One participant noted the abundance of technological resources sometimes created a selection problem.

Participants noted engaging them as pre-service learners and later as in-service staff development participants with pedagogic and content specific uses of twenty-first century technologies served to strengthen confidence related to integration. Participants also reported they should have gotten hands-on practice with computer technology in their teaching context. This can be seen in Abbey's response:

> …I have to see it…to be hands-on with it. I can't …watch somebody stand up and just tell me…I want to be able to be a hands-on learner so once I get the hang of it

being able to use it myself…I'll feel more confident in showing my students how to use it.

Participants reported in order to build integration confidence, the act of integrating twenty-first century technology must be planned for and must be purposeful. They argued the use of twenty-first century technology must have a purpose and should be rooted in the standards they teach. This can be seen in Johnny's response when he stated, "How's this going to help my kids? …if I incorporate it, is it going to free them [kids] up to delve into the content deeper?" Heather seemed to illustrate this view as well when she stated, "…I hesitate at first with the iPad…it's very fun to use but I don't feel comfortable…integrating it into the lessons because …I did not know how to make it effective…"

Finally participants stated when given enough time to research and plan for the integration of twenty-first century technology, they felt far more confident in their integration efforts. Participants noted first it takes time to learn any new twenty-first century technology and even more time to learn how to connect the technology to pedagogy and content. Participants were willing to, and felt confident in, integrating twenty-first century technologies when: (a) the twenty-first century technology was useful in assisting them in teaching their content, (b) when they had appropriate time to plan for integration, and (c) when support was available to assist them in their integration efforts.

Research Question Two. How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction? An overwhelming majority of the participants noted when technology was used by their professors, it was

for basic uses of the technology. There were a few notable exceptions that will be discussed later. Most participants spoke of their professors displaying notes using PowerPoint or sending emails or using discussion boards for communicating with them, as can be seen from the statement by Kathy, "Basically, just the PowerPoints, maybe videos here and there like web videos; other than that, not much."

There were a few exceptions to this theme. One participant noted his professor had used the SMART Board throughout his class. The participant also noted the professor worked with them in a lab and by the end of the course the participant had a host of SMART Board activities which could be used later in his classroom. In addition, there were a total of four participants who had either majored in mathematics or had mathematics concentrations who spoke of using Geometer Sketchpad. This software program assists the teacher in helping students see angles, figures, translations, and reflections, etc.

A second theme that emerged in participant responses was related to the type of assignments they were expected to complete as pre-service learners. All but five participants spoke of how the twenty-first century technology related assignments were neither purposeful nor rigorous. Participants noted most often they were required to mention how technology was to be employed in their lessons plans with the accompanying technology standard or they were required to develop a PowerPoint presentation for an assignment. When describing a typical technology assignment, Heather had this to say, "…we had to create a PowerPoint about a vocabulary word of choice…I can't remember what else but that was just one class…we never actually got to use it in a classroom…"

Finally, when describing their pre-service exposure to twenty-first century technology integration, participants indicated they did not really begin to understand how to integrate technology into their instruction until they began their field experiences and internships. Most of the participants had not had opportunities to see how twenty-first century technology could serve to facilitate learning while in their college methods and technology classes. During field placements and their internships, many of the participants had opportunities to see in-service teachers using twenty-first century technology in meaningful ways. SMART Boards, document cameras, iPads, desktop computers, and software packages were being employed in classrooms participants visited. As noted by Larry:

> In my field experience I worked a lot with a teacher…she used a lot of technology. She would…use technology in something that she was doing with her students, whether it was just doing morning work…teaching a lesson, assessing students…she incorporated technology…I learned how to use the SMART Board…assess children with [the] Reading 3-D [program]…[use] the palm pilot and things like that.

Although participants as pre-service teachers noted how inadequate their training regarding twenty-first century technology integration was during their methods and technology courses, many did note the field placements and internships provided them opportunities to learn how to integrate. Participants felt their knowledge related to technology integration could be enhanced through the interaction between themselves and their mentors.

Results obtained from question two indicated participants began to believe after reflecting on their pre-service twenty-first century technology training the ability to

understand how to incorporate twenty-first century technology into their instruction is dependent upon: (a) modeling of the technology integration by university faculty, (b) authentic learning experiences using technology, and (c) opportunities to observe technologies being used in their respective fields of expertise.

Research Question Three. How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction? Participant responses on how in-service technology training had assisted them in integration efforts were a little more positive. Many participants spoke of how the staff development had exposed them to an abundance of technology which could make their jobs easier. For instance, they could use software packages to assess and gather assessment data to plan for instruction easily; they could create centers using iPads or desktops which allowed groups of students to be engaged with the content; and they could create lessons using the SMART Board which "wowed" their students, many of whom thought they were playing games but were learning and being assessed. Susan had this to say regarding how the twenty-first century technology had altered the way she assesses:

> I'm not doing as much formative assessment but doing a lot more informal assessments based on what they're doing with the technology. I use a lot more iPad apps where it [the app] follows and tracks the progress and I can go in and look at their individual progress rather than looking at what the whole class is doing….

Participants reported the use of twenty-first century technologies had served to make their jobs easier as it related to data collection, attendance keeping, typing up lesson

plans, displaying notes, etc. They also noted staff development did not assist them in developing better approaches to instruction nor did it alter the content or context of learning, and instruction.

Staff development had exposed in-service teachers to these twenty-first century technologies, yet all too often participants were left to "figure out on their own" how to successfully integrate the twenty-first century technologies into their instruction. Participants spoke of how the staff development had lacked focus and purpose. Most of the time allotted during the training sessions was spent on the basic uses of the twenty-first century technology. This was echoed in a statement by Johnny:

> …they'll present technology and show you the basics and then a few months later it circles back around. They'll introduce the same technologies, and give us another rundown of how you use it…

Participants noted in order for them to develop the ability to integrate twenty-first century technologies into their instruction, they needed staff development that provided more than skill building with twenty-first century technology; emphasizing mentoring, peer collaboration, lesson design, and pedagogic and content connections.

As noted, participants argued for a more differentiated approach to staff development. Participants felt a staff development focus on the basic uses of twenty-first century technology only benefitted individuals who were beginning level learners. Many participants thought it was a waste of time to participate in these sessions. Billy spoke about this need to differentiate when he responded:

> …it really depends on what planning period you have….with younger teachers…you get to the pedagogy part how to use it [technology] in teaching. [With] Some older teachers….you spend a little bit more time showing them just

how to use a piece of technology…our staff development *tries* to focus on pedagogy….

Participants noted their lack of ability to understand the connection between the technology and the content to be taught. Technology training when tied to individual needs assisted participants in adopting sustained uses of technology which transformed the teaching and learning process.

Finally, participants noted there was a lack of follow up regarding twenty-first century technology staff development. Jamie articulated this finding thusly:

> There hasn't really been anyone to come by and say, "Okay, well let's see how are you integrating the technology based on what we've learned." or "Let me see how you're using it.", that is not really happening.

When reflecting on question three regarding their in-service training participants indicated they felt the twenty-first century technology integration staff development training could be more effective if: (a) the training was situated within a curricular focus, (b) was differentiated based on teacher specific teaching assignments, and (c) was offered over time with consistent follow-up. Participants noted they needed more time and support in their efforts with integrating twenty-first century technologies into their instruction.

CHAPTER FIVE: DISCUSSION

With the numerous technological advances during the past 20 years, America's schools and students they serve are exposed to a multitude of twenty-first century technologies. How those technologies should transform teaching and learning has been researched (Ertmer & Ottenbreit-Leftwich, 2010; Rogers & Wallace, 2011; Russell et al., 2007). However many of America's teachers are falling short in their efforts to truly integrate twenty-first century technologies into their pedagogy (Barron**,** Kemker, Harmes, & Kalaydijian, 2003; Cuban, 2001; Russell et al, 2003; Zhao & Frank, 2003). Even newer teachers, sometimes referred to as "digital natives" (Kumar & Vigil, 2011, p. 144; Prensky, 2001), have difficulty in their integration efforts (Kvavik, 2005; Rogers & Wallace, 2011; Russell et al., 2003; Russell et al., 2007; Smith, Salaway, & Caruso, 2009).

The purpose of this transcendental phenomenological study was to examine how participants viewed their training regarding the integration of twenty-first century technologies into their instruction, first at the collegiate level as pre-service teachers and later as in-service staff development participants. In addition the study attempted to inform teacher computer self-efficacy relative to the integration of twenty-first century technologies.

Three specific research questions guided this study:

1. How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction?

2. How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction?
3. How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction?

Data was collected from 20 participants by employing interviews, a focus group session and by the use of a survey. The interviews consisted of 17 questions (see Tables 2, 3, & 4 in Appendix F). The focus group session included an additional six questions (see Table 5 in Appendix G). Finally data from the Computer User Self Efficacy Scale (CUSE) (Appendix E) was employed as a third data collection instrument regarding teacher reported feelings of computer self-efficacy.

In this final chapter a brief summary of findings and discussions related to each identified theme along with supporting statements from participants are provided. Current literature related to building efficacy regarding twenty-first century technology usage and training practices at the college of education level and school or district level is interwoven within this discussion. In addition, participant reports regarding best practices in training adults to integrate twenty-first century technologies will be identified and supported by participant statements and related literature. Finally, comments regarding the implications, limitations and suggestions for future research will be discussed.

Summary of Findings

Chapter 4 included an analysis of data taken directly from participant statements. The transcendental phenomenological reduction process resulted in the identification of

two themes that describe how participants felt about their ability to employ technologies effectively. These identified themes are as follows:

- Participants reported a high level of confidence and skill when selecting technologies to employ in their classrooms.
- Technology integration must be planned and must be purposeful in order to build integration confidence.

Three themes were identified which illustrated how participants as pre-service teachers viewed their college of education experience related to technology integration training. Those themes were:

- When technology was used by college professors, it was mainly basic uses of technology.
- Assignments involving the use of technology were neither purposeful nor rigorous.
- Participants did not really begin to understand how to integrate technology until they began their field experiences and internship.

Two themes were identified that illustrated how these same participants as in-service teachers viewed staff development initiatives related to helping them integrate technologies into their instruction. Those identified themes were:

- Through staff development participants were exposed to a myriad of technologies designed to make them more effective teachers.
- Staff development seemed to lack focus and purpose.

Theoretical Implications

Andragogy

Andragogy, defined as "the art and science of helping adults learn" (Knowles, 1980, p. 43) served as one of the theoretical frameworks for this study. Andragogy provides a framework which is diametrically opposed to the methodology-centered process to teaching adults (Birzer, 2004; Cartor, 1990; Cross, 1981; Knowles 1975, 1980, 1984a, 1984b), and as such articulates core principles which should be at the heart of any training process geared toward adults. These core principles are relevant to this study since I am attempting to describe what the training process was like for teachers as pre-service learners and later as in-service learners regarding twenty-first century technology integration, while informing best practices relative to this training.

Training scenarios rooted in andragogical principles would mean trainees would understand: (a) the purpose for the training, (b) how the training will build on what they currently know, (c) how the training will assist them when completing a necessary task, and (d) how the training will assist them at increasing professional competence (Holton, Swanson & Naquin, 2001, p. 120). As can be seen from the identified themes, participants training both at the collegiate and at the school/district level were not aligned with andragogy's core principles as articulated by Knowles (1980).

Most of the participants as pre-service teachers had many experiences with twenty-first century technology; what they needed was for their professors to model how to integrate those technologies into their teaching specialty. Participants, whether at the pre-service or in-service level, needed for their training to be relevant, and purposeful in order for them to develop competence and confidence in their ability to integrate twenty-first century technologies into their instruction. Relevant twenty-first century technology training would serve to: (a) motivate the adult learner internally to integrate, (b) increase participant pedagogic and technological competence, and (c) assist participants in the task

of employing technologies which "support inquiry, collaboration, or re-configured relationships among students and teachers" (Culp et al., 2005, p. 302).

Technological, Pedagogical, Content Knowledge (TPACK)

TPACK served as one of the theoretical frameworks for this study and springs from the earlier work of Shulman (1986) where he put forth the idea a teachers' knowledge is complex and includes: content knowledge (CK), pedagogical knowledge (PK), and Shulman's concept of pedagogical content knowledge (PCK) (Shulman, 1986). Building on this Mishra and Koehler (2006) and Neiss (2005) introduced the idea of a teachers' "Technological Pedagogical Content Knowledge" (TPACK) (Meagher et al., 2011, p. 244). This interplay between technology, pedagogy, and content knowledge is helpful in understanding how teachers develop knowledge about the integration of twenty-first century technologies.

When studying this symbiotic relationship between and among these teacher knowledge's and the interplay required for teachers to integrate twenty-first century technologies one must constantly be aware of each knowledge type independently and how each knowledge impacts the total TPACK framework. For example technological pedagogical knowledge (TCK) would require teachers know the subject matter they teach and how the subject matter can be altered through the integration of technology (Mishra & Koehler, 2006).

Technological pedagogical knowledge (TPK) is an understanding of technology itself, i.e, the "existence, components [of] and capabilities of various technologies" (Mishra & Koehler, 2006, 1028) and how it is used in instructional settings. Teachers would also need to understand how instruction might be changed by the integration of twenty-first century technologies. Finally, technological pedagogical content knowledge

(TPACK) makes necessary an understanding of: (a) how to represent concepts to be learned utilizing twenty-first century technology, (b) pedagogical practices which use twenty-first century technology in instruction, and (c) what makes certain concepts easy or more difficult to learn and how twenty-first century technology can remedy these issues in students (Mishra & Koehler, 2006).

Participant perceptions regarding their pre-service and in-service training with integrating twenty-first century technologies was not aligned with the principles of TPACK as defined by Mishra and Koehler (2006). Many of the participants possessed a lot of technological knowledge (TK) prior to training efforts but did not understand how to use the technologies to support content in their future instructional settings (TCK). Training must be relevant, and purposeful in order for the knowledge regarding twenty-first century technology to be transformed into knowledge not only of technology but knowledge of how technology can transform content. Participants need training which would build on their prior knowledge regarding technology by situating it within the context of their particular teaching assignment (Lawther et al., 2008; Smith & Smith, 2004; Swan & Dixon, 2006; Zho & Bryant, 2006). This differentiation of training can assist teachers in developing TPACK.

Identification of Best Practices

The following best practices which can assist training efforts in America's colleges of education, and school and district level staff development programs are taken directly from participant responses. According to participants, feelings of self-efficacy can be improved by following several of these identified best practices as well. Understanding why twenty-first century technology integration training was perceived as

ineffective by the participants in this study can assist technology integration trainers in adopting better training scenarios.

These best practices attempt to incorporate the core principles of Andragogy as articulated by Knowles (1986) which argue adults: (a) should understand why they need to learn something before being trained, (b) are self-directed learners whose prior-experiences should be taken into account, and (c) are ready to learn when they need to perform a life centered task which builds competence (Holton et al., 2001). In addition participant reported best practices are mindful of the relationship between a teacher's technological pedagogic knowledge (TPK), technological content knowledge (TCK) and technological, pedagogical, content knowledge (TPACK) (Koehler & Mishra, 2008; Mishra & Koehler, 2006). Twenty first century technology training should begin with exposure to the technology, its characteristics, terminology, and basic uses (TK).

Training should then assist the learner in connecting the twenty-first century technology with an understanding of how learning occurs (PK), what the potential barriers to learning are and how technology can assist in overcoming these barriers (TPK) yielding competence at integrating the twenty-first century technology in content specific ways (TCK). Finally, training should then move to helping the learner understand how the twenty-first century technology, as a tool to facilitate teaching and learning, can assist in extending and enriching learning activities in the classroom (TPACK) (Kereluik et al., 2011).

For Improving Computer Self-efficacy

Self-efficacy in twenty-first century technology integration can be strengthened by modeling integration practices; by providing opportunities for teachers to practice using the twenty-first century technology; and by connecting the twenty-first century

technology to the teachers' pedagogy and content. The following best practices for improving computer self-efficacy were identified through analyzing participant statements.

- The requirement to employ twenty-first century technology must be based on how the twenty-first century technology can improve teacher practice and student outcomes, not to satisfy a requirement to use technology.
- Authentic learning experiences are necessary in order for pre-service and in-service teachers to develop competency and confidence using twenty-first century technologies to teach their specific content.
- Afford pre-service and in-service teachers enough time to practice with, reflect upon, and plan for twenty-first century technology integration.

Teachers should only be required to utilize twenty-first century technology if it improves their efforts at instruction. Research indicates placing pre-service teachers in real-world contexts which employ technologies improves technology integration competence (Bradshaw, 2002; Brown, 2003; Brown & Warschauer, 2006; Hinson et al., 2006; Kulik, 2003; Mouza, 2009). These practices can be summed up by Beth:

> …if it [technology] could be… shown to teachers in a way that was easily integrated to where it's just another tool that you can use that would be ideal for me. But as far as me venturing out looking for things like that, there's not enough hours in the day. But I think an inhibitor for me would be the fact there are a lot of things that I don't know about SMART Board or … website programs, there's, … so many programs out there that students can create and build that I don't… know about and if I do know about it I don't know enough about it to implement it in my classroom so that could be an inhibitor for me.

For Colleges of Education

According to participants best practices America's colleges of education could adopt in order to meet the twenty-first century technological needs of pre-service teachers as adults and meet TPACK guidelines are:

- Modeling of twenty-first century technologies should be pervasive throughout the teacher education program, in content and methods courses.
- Pre-service teachers should be afforded multiple opportunities to employ technologies as an instructional tool through simulated teaching experiences.
- Strong partnerships between K-12 schools and teacher education programs should be leveraged in order to expose pre-service teachers to content specific applications of twenty-first century technologies during field placements and internships.

There is research which supports the notion pre-service teachers need exposure to effective uses of technologies by college faculty (Brown, 2003; Smereden et al., 2000). In addition, it has been shown when pre-service teachers are afforded opportunities for hands-on applications of technologies in real world contexts they develop confidence and competence in utilizing those technologies to teach (Bullock, 2004, Moersch, 2003; Sutton, 2011). Finally when colleges of education follow through on NETS for Teachers and the Essential Conditions from ISTE they will attempt to establish connections within the K-12 education community which support teacher candidate exposure to effective uses of technology through field experiences in schools were technology is being integrated (ISTE, 2000b). Cindy spoke of how powerful the modeling and simulated teaching exercises had been for her during her field placements:

> … the field experiences are really what helped me. I got to use the document camera, because it was hands on, I mean instead of … somebody telling me what I needed to do about technology I was able to use it. When I used the document cam I knew exactly how to do it and… how to make it interactive with the SMART Board…

For School/District Level Staff Development Coordinators

School level and district level staff development coordinators could adopt the following best practices to assist them in training in-service teachers how to integrate twenty-first century technologies:

- Provide content specific or differentiated staff development which gives participants time to make the connections between the technology, pedagogy and their content, and time to plan for instruction. Rather than adopting a "one size fits all" approach to training.
- Situate the staff development within a curricular focus.
- Introduce new technologies while connecting their adoption to existing pedagogic and content specific practices.
- Provide sustained technological and pedagogic support while teachers develop confidence and competence to integrate.

Twenty-first century technology staff development in order to be successful according to participants should begin with understanding the basics of the twenty-first century technology (TK) but should not stop there. It is imperative the training be content based (TCK) and pedagogically connected (TPK) when building twenty-first century technology integration competence and confidence (TPACK) (Koehler & Mishra, 2008; Mishra & Koehler, 2006). This type of twenty-first century technology staff development

improves teacher confidence at integrating (Kim et al., 2012). Curricular content may provide supports for the successful integration of twenty-first century technology as well (Koehler & Mishra, 2008; Mishra & Koehler, 2006). There is evidence providing opportunities for teachers to connect technology to their curriculum builds their confidence in employing technology (Niess, 2005; Polly et al., 2010). Finally it has been noted sustained staff development has been shown to be more effective in assisting teachers in their adoption of technology integration practices (Garet, Porter, Desimone, Birman, & Yoon, 2001; Greeen & Cifuentes, 2008; Guskey, 2003; Speck & Knipe, 2001).

Linda had experienced staff development with a purpose, she was teaching in a school that had decided on a literacy focus for the year. All staff development, including technology staff development was aligned with this focus. She spoke of her training thusly:

> Most of the [technology-centered] staff development that we've done …I think it's been mostly… literacy honestly…. we have those trainings … our curriculum specialist, Ms. S, she'll give us the feedback forms that we have to fill out and get back to her…and usually, when we have future meetings, they always refer back to those trainings… to kind of help us build on it and do other things.

Linda spoke of how a curricular focus based in the content area of literacy served to assist her in her twenty-first century technology adoption efforts. In addition, Linda stated the support she received from her curriculum specialist served to build twenty-first century technology integration confidence.

Implications

For Improving Computer Self-efficacy

Continued assistance with the adoption of twenty-first century technologies with relevant follow-up can assist in developing confidence and willingness to integrate (Ertmer & Ottenbreit-Leftwich, 2010; Swan & Dixon, 2006). Affording teachers ample time to assimilate twenty-first century technology into their teaching context builds confidence and competence with technology. Finally, the rationale for integrating twenty-first century technology in any lesson should be because it assists in the teaching and learning process, not because there is a requirement to do so.

For Colleges of Education

There needs to be a re-tooling of the college of education faculty. Most faculty members do not know how to teach their students how to integrate twenty-first century technologies into the content they are expected teach (Sutton, 2011; Teclehaimanot et al., 2011). According to the participants many professors used technology for basic functions such as displaying notes, and sending emails. Technology staff development at the collegiate level should prepare college faculty to model effective uses of twenty-first century technologies in order for pre-service teachers to develop the competency to do so themselves (Angeli & Valanides, 2008; Smerden et al., 2000). This can be accomplished by professor modeling, not only in the methods or technology courses, but throughout the college experience (Sutton, 2011).

Improving competence and confidence at integrating twenty-first century technology in pre-service teachers is partially dependent on college faculty requiring their students to use technology in simulated teaching experiences (Dexter et al., 1999; Kumar & Vigil, 2011; NCATE, 1997). This goes far beyond the requirement to use PowerPoint

for a classroom demonstration. When college professors are adept at employing the twenty-first century technology in pedagogic and content specific ways, they will be better able to assist their students in developing the ability to do so (Koh & Frick, 2009).

In addition America's colleges of education need to work to establish strong networks with schools which integrate twenty-first century technologies. These connections could then provide a vehicle through which pre-service teachers can experience authentic methods of integrating twenty-first century technologies into the content they will one day be expected to teach (ISTE, 2000b; Meagher et al., 2011; Sutton, 2011; Teclehaimanot et al., 2011). Technology rich field placements and internships, according to the participants in this study, serve to build confidence and competence in integrating twenty-first century technologies.

For School/District Level Staff Development Coordinators

Twenty first century staff development should be differentiated in order to meet the pedagogic, content or grade level specific needs of the curriculum of participants. A "one size fits all" approach is anathema to best practices related to training. Twenty first century technology staff development should begin with the basics but should then quickly begin to situate the twenty-first century technology within the particular context of the participant's content area (Hughes 2005; Kopcha, 2012, Ottenbreit-Leftwich, 2010). This does not mean staff development coordinators should hold multiple sessions. It may be as simple as grouping participants and allowing them to have conversations about the twenty-first century technology and how they can use it in their individual instructional settings (Cifuentes et al., 2011).

When possible, adopting a curricular focus for the staff development will immediately place it squarely within an instructional context (Koehler & Mishra, 2008).

For instance, if school improvement teams have identified a weakness in reading, then it would be easy to build the twenty-first century technology staff development around reading. This immediately gives the training a focus and purpose while at the same time situating the twenty-first century technology integration training within a curricular context.

Limitations

This transcendental phenomenological study designed to understand how in-service teachers with three to five years of experience perceive their pre-service and in-service training regarding the integration of twenty-first century technology into their instruction has many limitations. The interview data, focus group data and the survey data indicate participants feel confident in their ability to employ technology. Other researchers have noted teachers with stronger efficacy about their ability to use technologies will persist in learning how to integrate (Ertmer & Ottenbreit-Leftwich, 2010; Ottenbreit-Leftwich et al., 2010; Vanatta & Fordham, 2004), it would be difficult to determine how twenty-first century training efforts alone had impacted participant feelings regarding twenty-first century integration training.

Participants may have differing prior experiences with technologies which impact their view as to whether or not the training they received was sufficient or worthwhile. Not all participants would have attended the same institution of higher education nor participated in the same staff development exercises which may account for differences in views regarding their training. Cultural differences between schools could have an impact on the ease with which twenty-first century technology integration change occurs, thereby impacting participants' willingness to integrate regardless of the training they had

received. Additionally, there were an overwhelming number of elementary education majors (75%) in this participant pool. It may be these teachers find it easier to integrate twenty-first century technologies.

Finally the very definition of twenty-first century technology integration used in this study could serve to limit the study. For the purposes of this study technology integration was defined as technology used as a tool to facilitate the teaching and learning process.

Suggestions for Future Research

Without twenty-first century technology integration training which builds participant technological content knowledge (TCK), develops participant's pedagogic and content connections (PCK), and helps participants assimilate the technology into what they already know about teaching and learning (TPK) true twenty-first century technology integration will not occur (TPACK). Further research is needed regarding the complex interplay between technological pedagogic knowledge (TPK), technological content knowledge (TCK), and pedagogical content knowledge (PCK) in determining best practices for developing teacher twenty-first century technology integration competence and confidence.

There has been very little research concerning best practices in training adults how to integrate twenty-first century technologies into their teaching. This study has shown continued research in this area can yield valuable insights into how adults learn to employ twenty-first century technologies. Studies at the state and or national level should be conducted so twenty-first century technology integration training can be understood from an adult perspective within wider contexts. Close examination of these experiences

may promote change within teacher education and technology staff development programs from the current methodology centered approach to teaching twenty-first century technology integration to one more attuned to the needs of the adult learner.

Another recommendation would be to look further into the differences between preparation programs. Do mathematics and science methods and content professors use more technologies when teaching? Is it easier for elementary education majors to integrate technologies? To what extent are professor uses of technologies aligned with NETS for Teachers? Nearly all participants noted the lack of modeling by their college of education professors, more research is needed to confirm these findings. Finally participants noted field placements and internships helped them understand how to integrate twenty-first century technology, more research is needed to understand how and why this was observed.

Conclusion

The overall conclusion of this study is when training adults to integrate twenty-first century technology, schools of education and staff development coordinators need to take adult learner characteristics into account, and should capitalize on the interplay between technology, pedagogy and content knowledge in the acquisition of twenty-first century technology integration confidence and competence. From the perspective of andragogy, adults as learners need to; situate the new learning within the context of their prior knowledge; need to understand why it is necessary to learn something; and need to understand how the learning activity is going to improve their overall competency (Knowles, 1980). TPACK would have the training begin with an understanding of the technology and the pedagogy of using the technology (TPK). Next the learner would

need to develop the ability to see how the technology can assist in delivering content (TCK). Finally when the previous two objectives begin to be synthesized within the learner's TPACK teachers can create classrooms were twenty-first century technologies are employed as tools thereby transforming teaching and learning (Koehler & Mishra, 2008).

Participants noted they needed the college of education experience to provide them with authentic, relevant and purposeful exposure to twenty-first century technologies. This can be accomplished by ensuring college faculties understand how to model the twenty-first century technology within curricular contexts. Teachers as pre-service learners should be afforded multiple opportunities to practice using twenty-first century technologies by engaging in simulated teaching exercises which require the integration of twenty-first century technology into the lessons they plan to teach. Finally field placements and internships need to be in schools where teachers are employing twenty-first century technologies as tools to facilitate teaching and learning.

Staff development at the school and district level should be differentiated. Adult learners need to have the training they receive situated within their own instructional contexts. Follow up and sustained support through the technology adoption process is essential.

Finally providing pre-service and in-service teachers with authentic experiences with the twenty-first century technology rooted in pedagogy and content will build confidence and competence in teachers' ability to integrate. When twenty-first century technology integration is achieved, changes to learning modalities should follow. This kind of change is predicated on training teachers in pedagogical and contextual applications of the twenty-first century technology. According to participants college of

education programs and staff development initiatives should introduce twenty-first century technologies from a relevant curriculum-based platform in order to successfully develop twenty-first century technology integration competence and confidence.

REFERENCES

AERA. (2006). Standards for reporting on empirical social science research in AERA publications. *Educational Researcher, 35*(6), 33-40.

Al-Awidi, H., & Alghazo, I. (2012). The effect of student teaching experience on preservice elementary teachers' self-efficacy beliefs for technology integration in the UAE. *Educational Technology Research & Development, 60*(5), 923-941. doi:10.1007/s11423-012-9239-4

Albee, J. J. (2003). A study of preservice elementary teachers' technology skill preparedness and examples of how it can be increased. *Journal of Technology and Teacher Education, 11*(1), 53-72.

Albion, P. R. (2001). Some factors in the development of self-efficacy beliefs for computer use among teacher education students. *Journal of Technology and Teacher Education, 9*(3), 321-347.

America at a Glance, Inc., (2011). Retrieved from http://www.aaag.com/county/robeson-county-nc-population-demographics.htm

American Public Works Association, (APWA). (2013). Retrieved from http://www.apwa.net/learn/Continuing-Education-Credits-%28CEU%29

Anderson, R., & Becker, J. (2001). School investments in instructional technology. *Teaching, Learning, and Computing Report,* Report 8. Retrieved from http://www.crito.uci.edu/tlc/findings/report_8/startpage.htm

Angeli, C., & Valanides, N. (2008, March). *TPCK in preservice teacher education: Preparing primary education students to teach with technology.* Paper presented at the AERA annual conference, New York.

Anthony, A. B. (2012). Activity theory as a framework for investigating district-classroom system interactions and their influences on technology integration. *Journal of Research on Technology in Education 44*(4), 335-356.

Ary, D., Jacobs, L. C., Razavieh, A., & Sorensen, C. (2006). *Introduction to research in education* (7th ed.). Belmont, CA: Thomson Wadsworth.

Ashworth, P. (1999). "Bracketing" in phenomenology: Renouncing assumptions in hearing about student cheating. *International Journal of Qualitative Studies in Education, 12*(6), 707-721.

Bandura, A. (1986). *Social foundation of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Barak, M., & Shakhman, L. (2008). Reform-based science teaching: Teachers' instructional practices and conceptions. *EURASIA Journal of Mathematics, Science & Technology Education, 4*(1), 11-20.

Barron, A. E., Harmes, J. C., & Kamker, K. (2005). Authentic instruction in laptop classrooms: Sample lessons that integrate type II applications. *Computers in Schools, 22*(3-4), p. 119-130. doi: 10.1300/J025v22n03_10

Bauer, J., & Kenton, J. (2005). Toward technology integration in the schools: Why it isn't happening. *Journal of Technology and Teacher Education*, *13*(4), 519-546.

Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *Computers and Education*, *39*(4), 395-414. doi:10.1016/S0360-1315(02)00075-1

Becker, H. J., & Riel, M. M. (2000). *Teacher professional engagement and constructive-compatible computer usage* (Report No. 7). Irvine, CA: Teaching, Learning, and Computing. Retrieved from http://www.crito.uci.edu/tlc/findings/report_7/

Bereiter, C. (2002). *Education and mind in the knowledge age*. Mahwah, NJ: Erlbaum.

Birzer, M. L. (2004). Andragogy: Student centered classrooms in criminal justice programs. *Journal of Criminal Justice Education, 15*(2), 393-411.

Bloom, A. (1987). *The closing of the American mind: How higher education has failed democracy and impoverished the souls of today's students*. New York, NY: Simon and Shuster.

Bradshaw, L. K. (2002). Technology for teaching and learning: Strategies for staff development and follow-up support. *Journal of Technology and Teacher Education, 10*(1), 131-150.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (1999). *How people learn: Brain, mind, experience, and school.* Washington DC: National Academy Press.

Brinkerhoff, J. (2006). Effects of a long-duration, professional development academy on technology skills, computer self-efficacy, and technology integration beliefs and practices. *Journal of Research on Technology in Education, 39*(1), 22-43.

Brown, D., & Warschauer, M. (2006). From the university to the elementary classroom: Students' experiences in learning to integrate technology in instruction. *Journal of Technology and Teacher Education, 14*, 599-621.

Brown, S. (2003). *The effects of technology on effective teaching and student learning: A design paradigm for teacher professional development.* Retrieved from www.gse.uci.edu/person/warschauer_m/docs/integrate.pdf

Browne, J. (2007). *Evidence supporting the validity of inferences required by the intended uses of the Technology Integration Confidence Scale.* Retrieved from ProQuest Digital Dissertations database. (Publication No. AAT 3270247).

Buckingham, D. (2007). *Beyond technology: Children's learning in the age of digital culture.* Malden, MA: Polity.

Buckenmeyer, J. A., & Freitas, D. J. (2005, June). *No computer left behind: Getting teachers on board with technology.* Paper presented at the National Educational Computing Conference, Philadelphia, PA.

Buckman, A., & Resnick, M. (1995). The MediaMOO project: Constructionism and professional community. *Convergence, 1*(1), 94-109. Retrieved from http://www.cc.gatech.edu/~asb/papers/journal/convergence.html

Bullock, D. (2004). Moving from theory to practice: An examination of the factors that preservice teachers encounter as they attempt to gain experience teaching with technology during field placement experiences. *Journal of Technology and Teacher Education, 12*(2), 211-237.

Cartor, R. A. (1990). *A comparison of andragogy and pedagogy: Assessing the relationship between individual personality differences, learning styles, and training types.* (Unpublished Dissertation). The University of Tennessee, Knoxville, TN.

Caruso, J. B., & Kvavik, R. (2005). *ECAR study of students and information technology 2005: Convenience, connection, control, and learning.* CO: EDUCAUSE Center for Applied Research. Retrieved from http://net.educause.edu/ir/library/pdf/ERS0506/ekf0506.pdf

Carvin, A. (1999). Technology professional development for teachers: Overcoming a pedagogical digital divide. *The Digital Beat, 1*(16), 1-5.

Cassidy, S., & Eachus, P. (2002). Developing the computer user self-efficacy scale: Investigating the relationship between computer self-efficacy, gender, and

experience with computers. *Journal of Educational Computing Research, (26)*2, 133-153.

CDW-G. (2005). *Teachers Talk Tech Series.* [White Paper]. Retrieved from http://newsroom.cdwg.com/features/2005NatlTeacherSurvey.pdf

CDW-G. (2006). *Teachers Talk Tech reveals technology access and professional development are driving improved teacher and student performance.* [White paper]. Retrieved from http://newsroom.cdwg.com/news-releases/news-release-06-26-06.html

Chen, J. & Chang, C. (2006). Using computers in early childhood classrooms: Teachers' attitudes, skills, and practices. *Journal of Early Childhood Research, 4*(2), 169-188. doi: 10.1177/1476718X06063535

Chen, G., Gully, S. M., Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods, 4*(1), 62-83.

Chenoweth, T., Carr, C., Ruhl, T. (2005, August). *Best practice in educational leadership preparation programs.* Paper presented at the Administrator Licensure Planning Forum, University of Oregon.

Cifuentes, L., Maxwell, G., & Bulu, S. (2011). Technology integration through professional learning community. *Journal of Educational Computing Research, 44*(1), 5-13.

Cilesiz, S. (2010). A phenomenological approach to experiences with technology: Current state, promise, and future directions for research. *Educational Technology Research & Development 59*(4), 487-510. doi:10.1007/s11423-010-9173-2

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.

Cole, M. (1996). *Cultural psychology: A once and future discipline*. Cambridge, MA: Harvard University Press.

Computer User Self Efficacy Scale, (CUSE). (2002). Retrieved from: http://psychint.net/selfefficacy/questnnr.htm

Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Cross, K. P. (1981). *Adults as learners* (1st ed.). San Francisco: Jossey-Bass.

Cuban, L. (1988). Constancy and change in schools (1880s to present). In P. W. Jackson (Ed.), *Contributing to educational change: Perspectives on research and practice* (pp. 85-105). Berkeley, CA: McCutchan.

Cuban, L. (2001). *Oversold and underused: Reforming schools through technology, 1980-2000.* Cambridge, MA: Harvard University Press.

Cuban, L., Kirkpatrick, K., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal, 38*(4), 813-834.

Cullen, T. A., & Greene, B. A. (2011). Preservice teachers' beliefs, attitudes, and motivation about technology integration. *Journal of Educational Computing Research, 45*(1), 29-47.

Culp, K. M., Honey, M., & Mandinach, E., (2005). A retrospective on twenty years of educational technology policy. *Journal of Educational Computing Research, 32*(3), 279-307.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319-339.

Deci, E. L., & Ryan R. M. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist*, *55*(1), 68-78.

Dede, C. (1998). *Association for Supervision and Curriculum Development (ASCD) Yearbook: Learning with Technology.* Alexandria, VA: Association for Supervision of Curriculum Development.

Denzin, N. K. & Lincoln, Y. S. (Eds.). (2000). *Handbook of qualitative research* (2nd ed.). Thousand Oaks, CA: Sage Publications Inc.

Dexter, S. L., Anderson, R. E., & Becker, H. J. (1999). Teachers' views of computers as catalysts for changes in their teaching practice. *Journal of Research on Computing in Education*, *31*(3), 221-238.

Dexter, S., & Riedel, E. (2003). Why improving preservice teacher educational technology preparation must go beyond the college's walls. *Journal of Teacher Education*, *54*(4), 334-346. doi:10.1177/0022487103255319

Dockstader, J. (1999). Teachers of the twenty-first century know the what, why, and how of technology integration. *T. H. E. Journal*, *26*(6), 73.

Drazdowski, T. A. (1994). Preservice teachers and computer technology: A case study perspective. *Journal of Technology and Teacher Education, 2*(4), 251-263.

Dutta, P. (n.d.). *What is the definition of staff development?* Retrieved from http://www.ehow.com/facts_5059005_definition-staff-development.html#ixzz2McD9VlMg

Earle, R. S. (2002). The integration of instructional technology into public education: Promises and challenges. *Educational Technology, 42*(1), p. 5-13.

Education First NC School Report Cards, (2011). Retrieved from http://www.ncreportcards.org/src/search.jsp?pYear=2010-2011&pList=1&pListVal=780%3APublic+Schools+of+Robeson+Coun&GO2=GO

Edutopia, (2013). *What is successful technology integration?* Retrieved from http://www.edutopia.org/technology-integration-guide-description

Ely, M., Anzul, M., Friedman, T., & Gardner, D. (1991). *Doing qualitative research: Circles within circles*. Bristol, PA: The Falmer Press.

Engestrom, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki, Finland: Orienta-Konsultit.

Engestrom, Y., Miettinen, R., Punamaki-Gitai, R. L.(Eds.). (1999). *Perspectives on activity theory*. Cambridge, MA: Cambridge University Press.

Ertmer, P. A., (1999). Addressing first-and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(1) 47-61.

Ertmer, P., A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development 53*(1), 25-39.

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

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), 255-284.

Feist, L. (2003). Removing barriers to professional development. *T.H.E. Journal, 30*(11), p. 30-36.

Fidishun, D. (n.d.). *Andragogy and technology: Integrating adult learning theory as we teach with technology,* Malvern, PA: Penn State Great Valley School of Graduate Professional Studies.

Figg, C. & Jamani, K. J. (2011). Exploring teacher knowledge and actions supporting technology-enhanced teaching in elementary schools: Two approaches by pre-service teachers. *Australasian Journal of Educational Technology, 27*(7), 1227-1246.

Fleming, L., Motamedi, V., & May, L. (2007). Predicting preservice teacher competence in computer technology: Modeling and application in training environments. *Journal of Technology and Teacher Education, 15*(2), 207-231.

Fullan, M. (1993). *Change forces: Probing the depths of educational reform*. London: The Falmer Press.

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915-945.

Garrison, M. J., Bromley, H. (2004). Social contexts, defensive pedagogies and the (mis)uses of educational technology. *Educational Policy, 18*(4), 589-613.

Georgina, D. A., & Hosford, C. C. (2009). Higher education faculty perceptions on technology integration and training. *Teaching and Teacher Education, 25*, 690-696.

Gess-Newsome, J. (2001). The professional development of science teachers for science education reform: A review of the research. In J. Rhoton, & P. Bowers (Eds.). *Professional Development: Planning and Design*, (pp. 91-100). Arlington, VA: NSTA Press.

Gess-Newsome, J., Blocher, M., & Clark, J., Menasco, J. & Willis, E. M. (2003). Technology infused professional development: A framework for development and analysis. *Contemporary Issues in Technology and Teacher Education*, *3*(3), 324-340.

Gilmore, A. M. (1995). Turning teachers on to computers: Evaluation of a teacher development program. *Journal of Research on Computing in Education*, *27*(1), 251-269.

Giorgi, A. (2002). The question of validity in qualitative research. *Journal of Phenomenological Psychology*, *33*(1), 1-18.

Glesne, C., & Peshkin. (1992). *Becoming qualitative researchers: An introduction.* White Plains, NY: Longman.

Góktaş, Y., Yildirim, S., & Yildirim, Z. (2009). Teacher educators' ICT competencies, usage, and perceptions. *Gazi University Journal of Gazi Educational Faculty (GUJGEF)*, *29*(1), 109-125.

Gray, L., Thomas, N., & Lewis, L. (2010). *Teachers' use of educational technology in U.S. public schools: 2009 (NCES 2010-040).* Washington, DC: National Center

for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Green, M., & Cifuentes, L. (2008). An exploration of online environments supporting follow-up to face-to-face professional development. *Journal of Technology and Teacher Education, 16*(3), 283-306.

Grudens-Schuck, N., Allen B., & Larson K,. (2004). *Focus group fundamentals*. Ames, Iowa: Iowa State University Extension. Retrieved from http://www.extension.iastate.edu/publications/pm1969b.pdf

Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Technology Research & Development, 29*(2), 75-91.

Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *Educational Communications and Technology Journal, 30,* 233-252.

Guskey, T. R. (2003). What makes professional development effective? *Phi Delta Kappan, 84*(10), 748-750.

Hadley, M., & Sheingold, K. (1993). Commonalities and distinctive patterns in teachers' integration of computers. *American Journal of Education, 101*(3), 261-315.

Hall, G. E., & Hord, S. M. (2001). *Implementing change: Patterns, principles, and potholes*. Boston, MA: Allyn and Bacon.

Harris, J. B., & Hofer, M. J. (2011). Technological pedagogical content knowledge (TPACK) in action: A descriptive study of secondary teachers' curriculum-based, technology-related instructional planning. *Journal of Research on Technology in Education, 43*(3), 211-229.

Hasselbring, T. S., Glaser, C., Barron, L., Risko, V. J., & Educational Resource Information Center (U.S.). (2000). *Literature Review: Technology to Support Teacher Development*. National Partnership for Excellence and Accountability in Teaching, Washington DC.

Hew, K., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development, 55*(3), 223-252.

Henderson, K. A., & Bedini, L. A. (1995). Notes on linking qualitative and quantitative data. *Therapeutic Recreation Journal, 29*(2), 124-130.

Hinson, J., LaPrairie, K., & Heroman, D. (2006). A failed effort to overcome tech barriers in a K-12 setting: What went wrong and why. *International Journal of Technology in Teaching and Learning, 2*(2), 148-158.

Holden, H. & Rada R. (2011). Understanding the influence of perceived usability and technology self-efficacy on teachers' technology acceptance. *Journal of Research on Technology in Education, 43*(4), 343-367.

Holton, E. F., Swanson, R. A., & Naquin, S. S. (2001). Andragogy in practice: Clarifying the andragrogical model of adult learning. *Performance Improvement Quarterly*, *14*(1). 118-143. doi: 10.0000/j.1937-8327.2001.tb00204.x

Hosack-Curlin, K. (1988, April). *Measuring the effects of a peer coaching project.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA (ERIC Document Reproduction Services ED303883).

Hsu, S. (2011). Who assigns the most ICT activities? Examining the relationship between teacher and student usage. *Computers and Education, 56*(3), 847-855. doi:10.1016/j.compedu.2010.10.026

Hughes, J. (2005). The role of teacher knowledge and learning experiences in forming technology-integrated pedagogy. *Journal of Technology and Teacher Education, 13*(2), 277-302.

Husserl, E. (1970a). *Logical investigations*. Atlantic Highlands, New Jersey: Humanities Press.

Inan. F. A., & Lowther, D. L. (2010). Laptops in the K-12 classrooms: Exploring factors impacting instructional use. *Computers and Education, 55*(3), 937-944.

In-service (n.d.). In Merriam-Webster's online dictionary (11th ed.). Retrieved from http://www.merriam-webster.com/dictionary/in-service

International Society for Technology in Education (ISTE). (2000b). *NETS for teachers 2000 essential conditions.* Retrieved from www.iste.org/standards/nets-for-teachers.aspx

International Society for Technology in Education. (2008). *NETS for teachers.* Retrieved from http://www.iste.org/standards/nets-for-teachers/nets-for-teachers-2008

Inventory of Teachers Technology Skills, (n.d.). *Framework and indicators for basic technology skills*. Retrieved from http://www.flinnovates.org/info/indicators.htm

Jarvis, P. (1985). *The sociology of adult and continuing education*. Bechenham, UK: Croon Helm.

Kanaya, T., Light, D., & Culp, K. (2005). Factors influencing outcomes from a technology-focused professional development program. *Journal of Research on Technology in Education, 37*(3), 313-329.

Keane, J. (2002). Teacher vs. computer: Where educators stand in the technology revolution. *T.H.E. Journal, 30*(1), 38-40.

Kim, C., Kim, M. K., Lee, C., Spector, J. M., DeMeester, K. (2012). Teacher beliefs and technology integration. *Teaching and Teacher Education, 29*(1), 76-85.

Knafl, K., & Breitmayer, B. J. (1989). Triangulation in qualitative research: Issues of conceptual clarity and purpose. In J. Morse (Ed.), *Qualitative nursing research: A contemporary dialogue*. Rockville, MD: Aspen.

Knowles, M.S. (1970). *The Modern Practice of Adult Education: Andragogy versus Pedagogy*. New York, NY: Association Press.

Knowles, M. S. (1980). My farewell address...andragogy-no panacea, no ideology. *Training and Development Journal, 34,* 48-50.

Knowles, M. S. (1980). *The modern practice of adult education: From pedagogy to andragogy*. Englewoods Cliff, NJ: Cambridge Adult Education.

Knowles, M. S. (1984a). *The adult learner* (3rd ed.). Houston, TX: Gulf Publications.

Knowles, M. S. (1984b). *Andragogy in action.* San Francisco, CA: Jossey-Bass.

Knowles, M. S., Holten, E., III, & Swanson, R. (1998). *The adult learner: The definitive classic in adult education and human resource development* (5th ed.). Houston, TX: Gulf Publishing Company.

Koh, J. L., & Frick, T. W. (2009). Instructor and student classroom interactions during technology skills instruction for facilitating preservice teachers' computer self-efficacy. *Journal of Educational Computing Research, 40*(2), 211-228. doi:10.2190/EC.40.2.d

Koehler, M. J., & Mishra, P. (2005). Teachers learning technology by design seminar: Integrating content; pedagogy, and technology. *Computers and Education, 49*, 740-762. doi: 10.1016/j.compedu.2005.11.012

Koehler, M. J., & Mishra, P. (2008). Introducing TPCK. In ACTE Committee on Innovation & Technology (Eds.), *Handbook of technological pedagogical content knowledge for educators* (pp. 3-29). New York, NY: Routledge.

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

Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *The American Journal of Occupational Therapy, 45*(3), 214-222.

Kulik, J. (2003). *Effects of using instructional technology in elementary and secondary schools: What controlled evaluation studies say.* Retrieved from http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&ved=0CDUQFjAA&url=http%3A%2F%2Fonderzoek.kennisnet.nl%2Fattachments%2F%2B1693516%2FKulik_ITinK-12_Main_Report1.pdf&ei=2zD_UOzfJonC9QTftIC4CQ&usg=AFQjCNF8nkQQaZ019K26fBaz3FlJ9UfWNg&sig2=5_JkYFKlqr4Sk0BfKh9SEw&bvm=bv.41248874,d.eWU

Kumar, S., & Vigil, K. (2011). The net generation as preservice teachers: Transferring familiarity with new technologies to educational environments. *Journal of Digital Learning in Teacher Education, 27*(4), 144-153.

Kvale, S. (1996). *InterViews.* Thousand Oaks, CA: Sage Publications, Inc.

Kvavik, R., B. (2005). Convenience, communications, and control: How students use technology. In D. G. Oblinger & J. L. Oblinger (Eds), *Educating the Net generation* (pp. 7.1-7.20). Educause. Retrieved from http://www.educause.edu/research-and-publications/books/educating-net-generation/convenience-communications-and-control-how-students-use-technology

Laferriere, T., Lamon, M., & Chan, C. K. (2006). Emerging E-Trends and models in teacher education and professional development. *Teaching Education*, *17*(1), 75-90. doi:10.1080/10476210500528087

Lambert, J., Teclehaimanot, B. (2005, March). *Redesigning an Introductory Educational Technology Course to Maximize Student Learning.* Society for Information Technology and Teacher Education (SITE), International Conference, Phoenix, Arizona.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, MA: Cambridge University Press.

Lawler, Patricia A. (1991). *The keys to adult learning: Theory and practical strategies.* Philadelphia, PA: Research for Better Schools.

Lawless, K., & Pellegrino, J. (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. doi: 10.3102/0034654307309921

Levin, T., & Wadmany, R. (2006). Teachers' beliefs and practices in technology-based classrooms: A developmental view. *Journal of Research on Technology in Education*, *39*(2), 157-181.

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.

Lincoln, Y. S. (1995). Emerging criteria for quality in qualitative and interpretive research. *Qualitative Inquiry, 1*(3), 275-289.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.

Lindeman, E. C. (1926). *The meaning of adult education* (Redistributed edition 1989 ed.). New York, NY: New Republic.

Liu, S. (2011). A multivariate model of factors influencing technology use by preservice teachers during practice teaching. *Educational Technology and Society, 15*(4), 137-149.

Llorens, S., Sllanova, M., & Grau, R. (2002). Training to technological change. *Journal of Research on Technology in Education, 35*(2), 206-212.

Loucks-Horsley, S., Hewson, P. W., Love, N., & Stiles, K. E. (1998). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press, Inc.

Lowther, D. L., Inan, F. A., Strahl, S. M. (2008). Does technology integration "work" when key barriers are removed? *Educational Media International, 45*(3), 195–213.

Luke, A. (2005). Why pedagogies? *Pedagogies: An International Journal, 1*(1), 1-6.

Maddus, C., & Cummings, R. (2004). Fad, fashion, and the weak role of theory and research in information technology in education. *Journal of Technology and Teacher Education, 12*(4), 511-533.

Marcinkiewicz, H. R. (1994). Computers and teachers: Factors influencing computers use in the classroom. *Journal of Research on Computing in Education*, *27*(2), 220-237.

Maney, J. K. (1999). The role of technology in education: Reality, pitfalls, and potential. In G. J. Cizek (Ed.), *Handbook of educational policy* (pp. 387-415). San Diego, CA: Academic.

Meagher, M., Özgün-Koca, S. A., & Edwards, M. T. (2011). Preservice teachers' experiences with advanced digital technologies: The interplay between technology in a preservice classroom and in field placements. *Contemporary Issues in Technology and Teacher Education, 11*(3), 243-270.

Merriam, S. B. (1998) Qualitative research and case study applications in education. San Francisco CA: Jossey-Bass.

Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. *Directions for Adult and Continuing Education, 89*, 3-14.

Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco, CA: Jossey Bass.

Miles, M. B., Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Thousand Oaks, CA: SAGE.

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

Mistretta, R. M. (2005). Integrating technology into the mathematics classroom: The role of teacher preparation programs. *Mathematics Educator, 15*(1), 18-24.

Moersch, C. (1995). Levels of technology implementation (LoTi): A framework for measuring classroom technology use. *Learning and Leading with Technology, 23*(3), 40-41.

Moersch, C. (2003). Measures of success: Six instruments to assess teacher's use of technology. *Learning and Leading with Technology, 30*(3), 10-28.

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage Publications, Inc.

Mouza, C. (2009). Does research-based professional development make a difference? A longitudinal investigation of teacher learning in technology integration. *Teachers College Record, 111*(5), 1195-1241.

Mueller, J., Wood, E., Willoughby, T., Ross, C., & Specht, J. (2008). Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration. *Computers and Education, 51*(4), 1523-1537.

National Center for Educational Statistics. (2002). Retrieved from http://nces.ed.gov/

National Center for Educational Statistics. (2011). Retrieved from http://nces.ed.gov/fastfacts/display.asp?id=28

National Council for Accreditation of Teacher Education (NCATE). (1997). *Technology and the new professional teacher: Preparing for the twenty-first century classroom.* Washington, DC: Author.

National Council for Accreditation of Teacher Education. (2008). Professional standards for the accreditation of teacher preparation institutions. Retrieved from www.ncate.org/documents/standards/NCATE%20Standards%202008.pdf

National Council for Accreditation of Teacher Education (NCATE). (2010). *Transforming teacher education through clinical practice: A national strategy to prepare effective teachers.* Washington, DC: Author

National Staff Development Council. (2001). *NSDC's standards for staff development, revised edition.* Retrieved from http://www.glades-schools.org/files/NSDC%20Standards%20for%20Staff%20Dev-Extended.pdf

National Staff Development Council. (2009). *Nation making progress in ensuring more teachers have deep content knowledge and mentoring but U.S. teacher development lacks intensity, follow-up, & usefulness.* Retrieved from http://www.aypf.org/documents/062609NSDCSTUDY209.pdf

Newby, T. J., Stepich, D. A., Lehman, J. D., & Russell, J. D. (2006). *Instructional technology for teaching and learning,* Upper Saddle River, NJ: Prentice Hall.

Niess, M., L. (2005). Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge. *Teaching and Teacher Education, 21*(5), 509-523.

Nilsson, P., & Driel, J. (2010). Teaching together and learning together: Primary science student teachers' and their mentors' joint teaching and learning in the primary classroom. *Teaching and Teacher Education, 26*(6), 1309-1318.

Norman, L. (2013). *Teacher certification definition.* Retrieved from http://www.ehow.com/info_7919961_teacher-certification-definition.html

Norris, C., Sullivan, T., Poirot, J., & Soloway, E. (2003). No access, no use, no impact: Snapshot surveys of educational technology in K-12. *Journal of Research on Technology in Education, 36*(1), 15-27.

Office of Technology Assessment. (1995). *Teachers and technology: Making the connection* (OTA-HER-616). Washington, DC: U.S. Government Printing Office. Retrieved from http://www.coedu.usf.edu/itphdsem/eme7938/ota9541.pdf

Ohman, A. (2005). Qualitative methodology for rehabilitation research. *Journal of Rehabilitation Medicine, 37*(5), 273-280.

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 and Education, 55*(3), 1321-1335.

Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Models of innovative knowledge communities and three metaphors of learning. *Review of Educational Research, 74*(4), 557-576. doi:10.3102/00346543074004557

Palacio-Cayetano, J., Schmier, S., Dexter, S., and Stevens, R., (2002). *Experience counts: Comparing inservice and preservice teachers technology integration decisions.* (Report No. IR-021-916). San Antonio, Texas: National Educational Computing Conference Proceedings. (ERIC Document Reproduction Service No. ED475944).

Palak, D., & Walls, R. T. (2009). Teachers' beliefs and technology practices: a mixed methods study. *Journal of Research on Technology in Education, 41*(4), 417-441.

Parana, J., West, A., Johnson-Gentile, K., & Lonberger, R. (2000). Preparing preservice teachers for the technological classroom: A school-college partnership. *Journal of Technology and Teacher Education, 8*(2), 97-109.

Pea, R. D. (1985). Beyond amplification: Using the computer to reorganize mental functioning. *Educational Psychologist, 20*(4), 167-182.

Pedagogy (n.d.). In Merriam-Webster's online dictionary (11th ed.). Retrieved from http://www.merriam-webster.com/dictionary/pedagogy

Pitler, H. (2011). So many devices, so little use. *T. H. E. Journal, 38*(6), 42-44.

Polkinghorne, D. (1989). Phenomenological research methods. In R. Valle & S. Halling (Eds.), *Existential-phenomenological perspectives in psychology* (pp. 41-60). New York, NY: Plenum Press.

Polly, D., Mims, C., Shepherd, C. E., & Inan, F. (2010). Evidence of impact: Transforming teacher education with preparing tomorrow's teachers to teach with technology (PT3) grants. *Teaching and Teacher Education, 26*(4), 863-870.

Pons, M. (Ed.). (1999). Education budget alert for fiscal year 2001. Washington, DC: Committee for Education Funding.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon 9*(5). Retrieved from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Pre-service teacher. (2013). Retrieved from http://www.education.com/definition/preservice-teacher/

Project Tomorrow. (2008). *Twenty-first century learners deserve a twenty-first century education: Selected national findings of the Speak up 2007 survey.* Retrieved from http://www.tomorrow.org/docs/national%20findings%20speak%20up%202007.pdf.

Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher, 29*(1), 4-15. doi:10.3102/0013189X029001004

Ragin, C. C., Nagel, J., & White, P. (2004). *Workshops on scientific foundations of qualitative research.* Arlington, VA: National Science Foundation.

Reischmann, J. (2004). *Andragogy: History, meaning, context, function.* Retrieved from http://www.andragogy.net

Redman, D. H., & Kotrlik, J. W. (2009). Family and consumer sciences teachers' adoption of technology for use in secondary classrooms. *Journal of Family & Consumer Sciences Education, 27*(1), 29-45.

Reinking, D. (1997). Me and my hypertext:) A multiple digression analysis of technology and literacy [sic]. *The Reading Teacher, 50*(8), 626-643.

Reynolds, C., & Morgan, B. (2001). Teachers' perceptions of technology in-service: A case study. *Society for Information Technology and Teacher Education International Conference, 2001*(1), 982-986.

Rice, M. P., Johnson, D., Ezell, B., & Pierczynski-Ward, M. (2008). Preservice teachers' guide for learner-centered technology integration into instruction. *Interactive Technology and Smart Education, 5*(2), 103-112.

Roberts, B. S. (2003). *Using computers and technology in the social studies classroom: A study of practical pedagogy.* (Unpublished doctoral dissertation). Georgia State University, Atlanta, GA.

Rogers, R. K., & Wallace, J. D. (2011). Predictors of technology integration in education: A study of anxiety and innovativeness in teacher preparation. *Journal of Literacy and Technology, 12*(2), 28-61.

Rovai, A. P., & Childress, M. D. (2003). Explaining and predicting resistance to computer anxiety reduction among teacher education students. *Journal of Research on Technology in Education, 35*(2), 226-235.

Russell, M., Bebell, D., O'Dwyer, L. M., & O'Connor, K. (2003). Examining teacher technology use: Implications for preservice and inservice teacher preparation. *Journal of Teacher Education, 54*(4). 297-311. doi:10.1177/0022487103255985

Russell, M., O'Dower, L. M., Bebell, D., & Tao, W. (2007). How teachers' uses of technology vary by tenure and longevity. *Journal of Educational Computing Research, 37*(4), 393-417.

Salaway, G., Caruso, J. B., Nelson, M. R., & Ellison, N. (2008). *The ECAR study of undergraduate students and information technology 2008.* Boulder, CO: EDUCAUSE Center for Applied Research. Retrieved from http://www.educause.edu/library/resources/ecar-study-undergraduate-students-and-information-technology-2008

Sandholtz, J. H., Ringstaff, C., & Dwyer, D. C. (1997). *Teaching with technology: Creating student-centered classrooms.* New York, New York: Teachers College Press.

Salomon, G., & Ed., (1993). *Distributed cognitions: Psychological and educational considerations*. New York, NY: Cambridge University Press.

Sandars, J., & Schroter, S. (2007). Web 2.0 technologies for undergraduate and postgraduate medical education: An online survey. *Postgraduate Medical Journal, 83*(986), 759-762.

Schaverien, L., & Cosgrove, M. (1997). Learning to teach generatively: Mentor-supported professional development and research in technology-and-science. *Journal of the Learning Sciences, 6*(3), 317-347. doi:10.1207/s15327809jls0603_2

Schrier, L. (2010). Developing teacher capacity and best practices: Achieving balance with inservice teacher development. *Foreign Language Annals, 43*(2), 181-182. doi:10.1111/j.1944-9720.2010.01070.x

Schrum, L. (1999). Technology professional development for teachers. *Educational Technology Research and Development*, *47*(4), 83-90. doi:10.1007/BF02299599

Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher, 27*(2), 4-13. doi:10.2307/1176193

Shelly, G., Cashman, T. J., Gunter, R. E., & Gunter, G. A. (2007). *Integrating Technology and Digital Media in the Classroom*, Boston, MA: Thomson.

Shihkuan, H. (2010). The relationship between teacher's technology integration ability and usage. *Journal of Educational Computing Research*, *43*(3), 309-325. doi:10.2190/EC.43.3.c

Showers, B. (1984). *Peer coaching: A strategy for facilitating transfer of training.* Eugene, OR: Center for Educational Policy and Management.

Sime, D., & Priestley, M. (2005). Student teachers' first reflections on information and communications technology and classroom learning: Implications for initial teacher education. *Journal of Computer Assisted Learning*, *21*(2), 130-142. doi:10.1111/j.1365-2729.2005.00120.x

Smarkola, C. (2008). Efficacy of a planned behavior model: Beliefs that contribute to computer usage intentions of student teachers and experienced teachers. *Computers in Human Behavior*, *24*(3), 1196-1215. doi:10.1016/j.chb.2007.04.005

Smerden, B., Cronen, S., Lanahan, L., Andersen, J., Iannotti, N., & Angeles, J. (2000). *Teachers' tools for the twenty-first century: A report on teachers' use of technology.* Retrieved from www.nces.ed.gov/pubs2000/2000102A.pdf

Smith, M. K. (2002). Malcolm Knowles, informal adult education, self-direction and andragogy. *The Encyclopedia of informal education. Retrieved from www.infed.org/thinkers/et-knowl.htm*

Smith, S. (2001). The four sources of influence on computer self-efficacy. *Delta Pi Epsilon Journal*, *43*(1), 27-39.

Smith, S. D., Salawya, G., & Caruso, J. B. (2009). *The ECAR study of undergraduate students and information technology*, 2009: EDUCAUSE Center for Applied Research. Retrieved from http://marlajarmer.net/yahoo_site_admin/assets/docs/ECAR_Study.303124811.pdf

Smith, S. J., & Smith, S. B. (2004). Technology integration solutions: Preservice student interns as mentors. *Assistive Technology: Benefits and Outcomes*, *1*(1) p. 42–56.

Snoeyink, R., & Ertmer, P. A. (2001/2002). Thrust into technology: How veteran teachers respond. *Journal of Educational Technology Systems, 30*(1), 85-111.

Speck, M. (2002). Balanced and year-round professional development: Time and learning. *Catalyst for Change, 32*(1), 17-19.

Staff-development, (2013). *What is the definition of staff development?* Retrieved from http://www.ehow.com/facts_5059005_definition-staff-development.html

Staples, A., Pugach, M. C., & Himes, D. (2005). Rethinking the technology integration challenge: Cases from three urban elementary schools. *Journal of Research on Technology in Education, 37*(3), 285-311.

Sugar, W., & Wilson, K. (2005). Seeking alternatives to inservice technology workshops from teachers' perspectives. *International Society for Technology in Education (ISTE), 21*(4), 91-98.

Sutton, S. R. (2011). The preservice technology training experiences of novice teachers. *Journal of Digital Learning in Teacher Education, 28*(1), 39-47.

Swan, B., & Dixon, J. (2006). The effects of mentor-supported technology professional development on middle school mathematics teachers' attitudes and practice. *Contemporary Issues in Technology and Teacher Education, 61*(1), 67-86.

Swanson, R. A., & Holton, E. F., (2009). *Foundations of human resource development*. San Francisco, CA: Berett-Koehler.

Taylor, B., & Kroth, M. (2009). Andragogy's transition into the future: Meta-analysis of andragogy and its search for a measurable instrument. *Journal of Adult Education, 38*(1), 1-11.

Tearle, P. (2003). Enabling teachers to use information and communications technology for teaching and learning through professional development: Influential factors. *Teacher Development, 7*(3), 457-472. doi:10.1080/13664530300200209

Teclehaimanot, B., Mentzer, G., & Hickman, T. (2011). A mixed methods comparison of teacher education faculty perceptions of the integration of technology into their courses and student feedback on technology proficiency. *Journal of Technology and Teacher Education, 19*(1), 5-21.

The Computer Self-Efficacy Website. (n.d.). Retrieved from: http://psychint.net/selfefficacy/

Thompson, A. D., & Mishra, P. (2007-2008). Breaking news: TPCK becomes TPACK! *Journal of Computing in Teacher Education, 24*(2), 38-64.

Thorsen, C. (2008). *Techtactics: Technology for teachers.* Boston, MA: Allyn & Bacon.

Underdahl, J., Palacio-Cayetano, J., & Stevens, R. H. (2001). Practice makes perfect: Assessing and enhancing knowledge and problem-solving skills with IMMEX software. *Learning and Leading with Technology, 28*(7), 26-31.

UNESCO (2002). *Information and communication technology in teacher education: A planning guide.* Paris, France: UNESCO.

United States Department of Education, (n.d.). *Family Educational Rights and Privacy Act (FERPA)*. Retrieved from http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html

United States Department of Education, (n.d.). *Use of technology in teaching and learning.* Retrieved from http://www.ed.gov/oii-news/use-technology-teaching-and-learning

United States Department of Education (1998). 1998 Amendments to the Higher Education Act of 1965. Retrieved from http://www2.ed.gov/policy/highered/leg/hea98/sec101.html?exp=2

United State Department of Education. (2005). *Toward a new golden age in American education: How the Internet, the law and today's students are revolutionizing expectations.* Retrieved from http://www2.ed.gov/about/offices/list/os/technology/plan/2004/index.html

United States Department of Education, (2010). *U. S. Department of Education releases finalized national education technology plan*. Retrieved from http://www.ed.gov/news/press-releases/us-department-education-releases-finalized-national-education-technology-plan

VanFossen, P. J. (2001). Degree of Internet/WWW use and barriers to use among secondary social studies teachers. *International Journal of Instructional Media, 28*(1), 57-74.

Vannatta, R. A., & Fordham, N. (2004). Teacher dispositions as predictors of classroom technology use. *Journal of Research on Technology in Education 36*(3), 253-271.

Wade, A., Abrami, P. C., & Sclater, J. (2005) An electronic portfolio to support learning. *Canadian Journal of Learning and Technology, 31*(3). Retrieved from http://www.cjlt.ca/index.php/cjlt/article/view/94/88

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), 231-250.

Ward, J. R., West, L. S., & Isaak, T. J. (2002). Mentoring: A strategy for change in teacher technology education. *Journal of Technology and Teacher Education, 10*(4), 553-569.

Watson, G. (2006). Technology professional development: Long-term effects on teacher self-efficacy. *Journal of Technology and Teacher Education, 14,* 151-165.

Wells, J. (2007). Key design factors in durable instructional technology professional development. *Journal of Technology and Teacher Education, 15*(1), 101-122.

Wenglinsky, H. (1998). *Does is compute? The relationship between educational technology and student achievement in mathematics.* Princeton, NJ: Policy Information Center.

Whitacre, M., & Peña, C. (2011). From the classroom to the field: Pre-service teachers integration of technology during field placement. *International Journal of Instructional Media, 38*(3), 237-244.

Wozney, L., Venkatesh, V., & Abrami, P. C. (2006). Implementing computer technologies: Teachers' perceptions and practices. *Journal of Technology and Teacher Education, 14*(1), 173-207.

Yildirim, S. (2000). Effects of an educational computing course on pre-service and in-service teachers: A discussion and analysis of attitudes and use. *Journal of Research on Computing in Education, 32*(4), 479-495.

Yildirim, S., & Kiraz, E. (1999). Obstacles to integrating online communication tools into preservice teacher education: A case study. *Journal of Computing in Teacher Education, 15*(3), 23-28.

Zemelman, S., Daniels, H., Hyde, A. A. (1998). *Best practice: New standards for teaching and learning in America's schools.* Portsmith, NH: Heinemann.

Zhao, Y. (2007). Social studies teachers' perspectives of technology integration. *Journal of Technology and Teacher Education, 15*(3), 311-333.

Zhao, Y., & Bryant, F. L. (2006). Can teacher technology integration training alone lead to high levels of technology integration? A qualitative look at teachers' technology integration after state mandated technology training. *Electronic Journal for the Integration of Technology in Education, 5*, 53–62.

Zhao, Y., & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Research Journal, 40*(4), 807-840. doi: 10.3102/00028312040004807

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

APPENDICES

APPENDIX A: IRB APPROVAL DOCUMENTATION

LIBERTY
UNIVERSITY

The Graduate School at Liberty University

March 25, 2013

Christopher Clark

IRB Approval 1566.032513: A Phenomenological Study of the Impact of Pre-Service and In-Service Training Regarding the Integration of twenty-first century Technologies into Selected Teachers Pedagogies in a Rural Public School System in Southeastern North Carolina

Dear Christopher,

We are pleased to inform you that your above study has been approved by the Liberty IRB. This approval is extended to you for one year. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.
Thank you for your cooperation with the IRB and we wish you well with your research project.

Sincerely,

Fernando Garzon, Psy.D. *Professor, IRB Chair*
Counseling (434) 592-4054

LIBERTY
UNIVERSITY.

Liberty University | Training Champions for Christ since 1971

APPENDIX B: DISTRICT LEVEL CONSENT

DISTRICT CONSENT FORM

A PHENOMENOLOGICAL STUDY OF THE IMPACT OF PRE-SERVICE AND IN-SERVICE TRAINING REGARDING THE INTEGRATION OF 21ST CENTURY TECHNOLOGIES INTO SELECTED TEACHERS PEDAGOGIES IN A RURAL PUBLIC SCHOOL SYSTEM IN SOUTHEASTERN NORTH CAROLINA

Christopher Clark
Liberty University
Department of Education

Dr. Linda Emanuel, the Public Schools of Robeson County is invited to be in a research study concerning best practices related to instructing teachers how to incorporate 21st century technologies into their pedagogy. The district was selected as a possible participant because the primary investigator resides within the district. Participant selection will be based on whether or not a teacher has: (1) completed a teacher of education program within the past 5 years, (2) participated in school or district level technology staff development and (3) between 3 and 5 years of experience as a teacher.

Dr. Emanuel, as the Research Consultant for the Public Schools of Robeson County, you are asked to read this form and ask any questions you may have before agreeing for the district to participate in this study.

This study is being conducted by: Christopher Clark, Department of Education, Liberty University.

Background Information

The purpose of this study is to examine the approaches to integrating 21st century technologies as a pre-service endeavor at the university level and as an in-service endeavor at the school level through professional development opportunities.

Procedures:
If you agree for the district to participate in this study, I will collect data on teacher experiences related to their college of education program, and their technology staff development activities by employing interviews, surveys and focus group discussions. In addition I will be collecting documentation regarding teacher technology continuing education credits, certification and experience. Teacher technology integration training during the college of education program and teachers as school and/or district level technology staff development participants will be the phenomenon under study. I will video and tape record all interviews and focus group discussions. These recordings will be used for detailed transcriptions of all interviews and discussions.

Risks and Benefits of being in the Study

Risks associated with this study are minimal in that participants will not encounter any other risk than they would during everyday life.

Benefits: The results of this study will provide a deeper understanding of best practices related to teaching pre-service teachers how to incorporate technologies into their teaching practices and best practices related to professional development in helping in-service teachers infuse their pedagogy with technology. In addition, it is hoped that practices related to increasing teacher self-efficacy in incorporating 21st century technologies will be informed. This data is essential in helping with school-wide technology staff development initiatives, and with planning and implementation practices. Also, understanding how pre-service teachers decide to implement technology will aid in smoothing the transition from pre-service to in-service teacher.

Compensation:

There will be no compensation for participating in this study.

Confidentiality:

The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a participant. Research records will be stored securely on a flash drive in my home and only I will have access to the records. Video and audio recordings will be stored in a secure location under lock and key at my residence, thereby limiting access to these recordings to only me. At the end of 3 years all these documents and recordings will be destroyed.

Confidentiality will be adhered to related to information shared (i.e. the use of pseudonyms, securely filing data and recordings, etc.). However, when employing focus groups I will not be able to ensure that other participants will maintain subject confidentiality and privacy during this study.

Voluntary Nature of the study:

Participation in this study is voluntary. The districts' and participants' decision whether or not to participate will not affect their current or future relations with the investigator nor Liberty University. If you decide for the district to participate, participants will be free to not answer any question or withdraw at any time without affecting those relationships. Should the district or any participant wish to withdraw from the study, this may be accomplished at any time by expressing that desire in writing to me, Christopher Clark, the principle investigator.

Contacts and Questions:

The researcher conducting this study is: Christopher Clark. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact me at: home 910-843-1349; by cell 910-785-0250; or via email at cclark7@liberty.edu or Christopher.clark@robeson.k12.nc.us *(Advisor: Dr. Ellen Lowrie Black, 434-592-4104, elblack@liberty.edu).*

You will be given a copy of this information to keep for your records.

Statement of Consent:

As the Research Contact for the Public Schools of Robeson County, I have read and understood the above information. I have asked questions and have received answers. I give my consent for the district to participate in this study.

Signature: [redacted]

Signature of Investigator: [redacted]

APPENDIX C: CONSENT FORM FOR PRINCIPALS

A PHENOMENOLOGICAL STUDY OF THE IMPACT OF PRE-SERVICE AND IN-SERVICE TRAINING REGARDING THE INTEGRATION OF twenty-first century TECHNOLOGIES INTO SELECTED TEACHERS PEDAGOGIES IN A RURAL PUBLIC SCHOOL SYSTEM IN SOUTHEASTERN NORTH CAROLINA

Christopher Clark
Liberty University
Department of Education

Dear Principal your district is invited to be in a research study concerning best practices related to instructing teachers how to incorporate twenty-first century technologies into their pedagogy. You are asked to read this form and ask any questions you may have before agreeing to the district's participation in the study.

This study is being conducted by: Christopher Clark, Department of Education, Liberty University

Background Information

The purpose of this transcendental phenomenological study is to understand how in-service teachers with three to five years of experience perceive their pre-service and in-service training regarding the integration of twenty-first century technology into their instruction.

Procedures:
If you agree for the district to be in this study, I will ask permission to do the following things:
I will collect data on the shared experiences of teachers using interviews, document analysis, a survey and focus group accounts of their experiences. Technology integration training during the college of education program and later as school level staff development participants will be the phenomenon under study. I will video and tape record all interviews and focus group discussions. In addition, I will ask participants for copies of their continuing education credits earned (CEU's) looking for participation in technology staff development. Finally, I will also ask for documentation verifying that all participants have been certified by traditional means (i.e. completing an education program).

Risks and Benefits of being in the Study

Risks associated with this study are minimal in that the participant will not encounter any other risk than they would during everyday life.

Benefits: The results of this study will provide a deeper understanding of best practices related to teaching pre-service teachers how to incorporate technologies into their teaching practices and best practices related to professional development in helping in-service teachers infuse their pedagogy with technology. In addition, it is hoped that practices related to increasing teacher self-efficacy in incorporating twenty-first century technologies will be informed. This data is essential in helping with school-wide technology staff development initiatives, and with planning and implementation practices. Also, understanding how pre-service teachers decide to implement technology will aid in smoothing the transition from pre-service to in-service teacher.

Compensation:

There will be no compensation for participants in this study.

Confidentiality:

The records of this study will be kept private in a secure locked cabinet in my home office. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely on a flash drive in my home and only I will have access to the records. Video and audio recordings will be stored in a secure location under lock and key at my residence, thereby limiting access to these recordings to only me. At the end of 3 years all these documents and recordings will be destroyed.
Confidentiality will be adhered to related to information shared (i.e. the use of pseudonyms, securely filing data and recordings, etc.). However, when employing focus groups I will not be able to ensure that other participants will maintain subject confidentiality and privacy during this study.

Voluntary Nature of the Study:

Participation in this study is voluntary. The districts' decision whether or not to participate will not affect your current or future relations with the Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships. You may withdraw from this study at any time. Should you wish to do so, simply put your desire to do so in writing to me, Christopher Clark, the principle investigator.

Contacts and Questions:

The researcher conducting this study is: Christopher Clark. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact me at Home xxx-xxx-xxxx or via email at cclark7@liberty.edu *(Advisor: Dr. Ellen Lowrie Black, xxx-xxx-xxxx, elblack@liberty.edu*

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Institutional Review Board, Dr. Fernando Garzon, Chair, 1971 University Blvd, Suite 1582, Lynchburg, VA 24502 or email at fgarzon@liberty.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read and understood the above information. I have asked questions and have received answers.

☐ Please check this box if you are willing to participate in this study.

Signature:_____ Date: _____

Signature of Investigator:_____Date: _____

APPENDIX D: CONSENT FORM FOR PARTICIPANTS

A PHENOMENOLOGICAL STUDY OF THE IMPACT OF PRE-SERVICE AND IN-SERVICE TRAINING REGARDING THE INTEGRATION OF twenty-first century TECHNOLOGIES INTO SELECTED TEACHERS PEDAGOGIES IN A RURAL PUBLIC SCHOOL SYSTEM IN SOUTHEASTERN NORTH CAROLINA

Christopher Clark
Liberty University
Department of Education

Dear Participant your district is invited to be in a research study concerning best practices related to instructing teachers how to incorporate twenty-first century technologies into their pedagogy. This district was selected because there are an abundance of accredited institutions of higher education within a 3 hour driving range. It is hoped that the study will be able to capitalize on this diversity within subjects (differences between their colleges of education programs). You are asked to read this form and ask any questions you may have before agreeing to the district's participation in the study.

This study is being conducted by: Christopher Clark, Department of Education, Liberty University

Background Information

The purpose of this study is to examine the approaches to integrating twenty-first century technologies as a pre-service endeavor at the university level and as an in-service endeavor at the at the school level through professional development opportunities

Procedures:

If you agree for the district to be in this study, I will ask permission to do the following things:
I will ask you to participate in an interview session where I will ask 17 questions related to: (a) your feelings regarding computer efficacy, (b) your perceptions regarding your college of education exposure to twenty-first century technology training, and (c) your perceptions regarding your school/district level staff development training. In addition, I will ask you to participate in a focus group discussion regarding these same topics. Finally I will administer the Computer User Self Efficacy scale, a 30 item, survey

designed to measure computer efficacy to you. This is in an effort to determine your level of computer efficacy.
The interview and focus group session should last between 30 to 45 minutes, while the survey should be completed within 15 to 20 minutes.
The interview and focus group session should last between 30 to 45 minutes, while the survey should be completed within 15 to 20 minutes.
In addition I will ask you to provide me with information regarding your continuing education credits (CEU's) relative to technology training. I will also ask you to verify that you have completed an education program from an approved institution of higher education. Finally, I will ask you to verify that you have between three and five years of experience teaching.

Risks and Benefits of being in the Study

Risks associated with this study are minimal in that the participant will not encounter any other risk than they would during everyday life.

Benefits: The results of this study will provide a deeper understanding of best practices related to teaching pre-service teachers how to incorporate technologies into their teaching practices and best practices related to professional development in helping in-service teachers infuse their pedagogy with technology. In addition, it is hoped that practices related to increasing teacher self-efficacy in incorporating twenty-first century technologies will be informed. This data is essential in helping with school-wide technology staff development initiatives, and with planning and implementation practices. Also, understanding how pre-service teachers decide to implement technology will aid in smoothing the transition from pre-service to in-service teacher.

Compensation:

There will be no compensation for participants in this study.

Confidentiality:

The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely on a flash drive in my home and only I will have access to the records. Video and audio recordings will be stored in a secure location under lock and key at my residence, thereby limiting access to these recordings to only me. At the end of 3 years all these documents and recordings will be destroyed.
Confidentiality will be adhered to related to information shared (i.e. the use of pseudonyms, securely filing data and recordings, etc.). However, when employing focus groups I will not be able to ensure that other participants will maintain subject confidentiality and privacy during this study.

Voluntary Nature of the Study:

Participation in this study is voluntary. The districts' decision whether or not to participate will not affect your current or future relations with the Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships. Should you wish to withdraw your participation, please indicate that desire in writing to me Christopher Clark, the principle investigator.

Contacts and Questions:

The researcher conducting this study is: Christopher Clark. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact me at Home xxx-xxx-xxxx or via email at cclark7@liberty.edu *(Advisor: Dr. Ellen Lowrie Black, xxx-xxx-xxxx, elblack@liberty.edu*

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Institutional Review Board, Dr. Fernando Garzon, Chair, 1971 University Blvd, Suite 1582, Lynchburg, VA 24502 or email at fgarzon@liberty.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read and understood the above information. I have asked questions and have received answers.

☐ By checking this box, I indicate that I agree to participate in this study and give my permission to be audio and video recorded

Signature:_____ Date: _____

Signature of Investigator:_____Date: _____

APPENDIX E: THE COMPUTER USER SELF-EFFICACY SCALE (CUSE)

Attitudes Towards Computers

The purpose of this questionnaire is to examine the benefits and difficulties people experience when using computers.

The questionnaire is divided into two parts. In Part 1 you are asked to provide some basic background information about yourself and your experience of computers, if any. Part 2 aims to elicit more detailed information by asking you to indicate the extent to which you agree or disagree with a number of statements provided.

Part 1

Your name [ ] or anon if you wish to remain anonymous.

Your age [ ]

Your sex

○ male ○ female

Experience with computers

○ none

○ very limited

○ some experience

○ quite a lot

○ extensive

Please indicate (tick) the computer packages (software) you have used

☐ Wordprocessing packages

☐ spreadsheets

☐ Databases

☐ Presentation packages (eg. Harvard Graphics, Coreldraw)

☐ Statistics packages

☐ Desktop publishing

☐ Multimedia

Other (specify) [ ]

Do you own a computer?

○ yes

○ no

Do you have access to a computer when you are not in college or at work?

○ yes

○ no

Have you ever attended a computer training course?

yes

no

Part 2

Below you will find a number of statements concerning how you might feel about computers. Please indicate the strength of your agreement/disagreement with the statements using the six point scale shown below where 1= strong disagreement and 6= strong agreement with a particular statement.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

You can indicate how you feel by choosing a number between 1 and 6.

Circle in the oval which most closely represents how much you agree or disagree with the statement. There are no 'correct ' responses, it is your own views that are important. It will take you only a few minutes to complete the thirty statements that make up the questionnaire, but it is important that you respond to each statement.

Q1. Most difficulties I encounter when using computers, I can usually deal with.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q2. I find working with computers very easy.

Strongly Disagree 1; 2.; 3; 4; 5; 6; Strongly Agree

Q3. I am very unsure of my abilities to use computers.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q4. I seem to have difficulties with most of the packages I have tried to use.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q5. Computers frighten me.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q6. I enjoy working with computers.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q7. I find computers get in the way of learning.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q8. DOS-based computer packages don't cause many problems for me.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q9. Computers make me much more productive.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q10. I often have difficulties when trying to learn how to use a new computer package.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q11. Most of the computer packages I have had experience with, have been easy to use.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q12. I am very confident in my abilities to use computers.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q13. I find it difficult to get computers to do what I want them to.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q14. At times I find working with computers very confusing.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Q15. I would rather that we did not have to learn how to use computers.

Strongly Disagree ○ 1; ○ 2; ○ 3; ○ 4; ○ 5; ○ 6; Strongly Agree

Well done, you have completed half the questionnaire, please keep going.....

Q16. I usually find it easy to learn how to use a new software package.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q17. I seem to waste a lot of time struggling with computers.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q18. Using computers makes learning more interesting.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q19. I always seem to have problems when trying to use computers.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q20. Some computer packages definitely make learning easier.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q21. Computer jargon baffles me.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q22. Computers are far too complicated for me.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q23. Using computers is something I rarely enjoy.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q24. Computers are good aids to learning.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q25. Sometimes, when using a computer, things seem to happen and I don't know why.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q26. As far as computers go, I don't consider myself to be very competent.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q27. Computers help me to save a lot of time.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q28. I find working with computers very frustrating.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q29. I consider myself a skilled computer user.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

Q30. When using computers I worry that I might press the wrong button and damage it.

Strongly Disagree 1; 2; 3; 4; 5; 6; Strongly Agree

You have now completed the questionnaire; thank you for your time.

This scale was created by Dr. Simon Cassidy and Dr. Peter Eachus

APPENDIX F: INTERVIEW QUESTIONS VALIDITY AND RELIABILITY

The interview questions were designed by referring to the literature review to achieve face validity. Individual interviews facilitated confidentiality and allowed for frank answers from participants. The interview questions were guided by andragogy which attempts to outline learning strategies focused on adults. In 1833 Alexander Kapp originally introduced the term andragogy which has often been interpreted as a process of engaging adult learners in the learning experience (Reischmann, 2004). Malcolm Knowles, considered the father of andragogy, articulated five principles in designing, implementing and evaluating adult learning (Knowles, 1998). Adults need to be involved in planning and evaluating their instruction, experience should provide a basis for learning, there should be immediate relevance to their job or personal life, and adult learning should be problem-centered instead of content centered (Merriam, 2001).

A total of 17 interview questions were asked. Seventeen questions are enough to develop an understanding of how a participant perceived their college of education experience and their staff development experiences related to assisting them at incorporating technologies into their pedagogy. Limiting the number of questions to 17 also served to prevent participants from attempting to speed up the process by providing short answers that did not effectively describe the studied phenomena. I attempted to ensure the questions are short, clear and did not contain jargon that may be unfamiliar with participants. Most teachers with three to five years of experience would have little difficulty describing their experiences relative to technology training either at the collegiate or the pre-K-12 school level and how training has been or has not been effective.

The literature and andragogy were considered when the interview and focus group questions were developed. The questions were written in an open-ended manner that facilitated rich descriptions of the phenomena from the perspectives of the participants. As can be seen in Tables 2, 3, and 4 questions related to pre-service and in-service training and on feelings of self-efficacy were based on several themes which appear extensively in the literature.

Table 2

Technology Training at the Pre-service Level Interview Questions

1. Describe the kinds of activities and classroom interactions you were engaged in during your college of education experience that strengthened your capacity to integrate technology.
2. Explain how technology was employed by your instructor during your methods and or technology courses that improved your competency in utilizing technologies to teach.
3. Describe a typical assignment in which you were required to design a technology-integrated curriculum project.
4. In terms of collaboration (interactions with staff and other students), what were the characteristics of the planning session for the assignment?
5. Describe how your field experiences helped you develop the ability to integrate technology into your pedagogy.
6. Describe how your student teaching placement assisted you in developing technology integration competence.

Table 3

Technology Training at the In-service Level Interview Questions

7. In what specific ways has staff development assisted you in integrating technology into your teaching?
8. How would you describe the focus of your staff development in technology integration? (i.e. On pedagogically significant integration efforts or on technology as a stand-alone component?).
9. How would you describe the follow-up activities associated with the technology staff development?
10. How has your classroom dynamics changed since participating in the technology-related staff development?
11. How has the staff development altered the way you present lessons and how you assess?
12. How has the technology staff development altered the way you interact with students and how you allow students to interact with you and each other?

Table 4

Teacher Reported Technology Integration Self-Efficacy Interview Questions

13. Describe how you feel when making an instructional technology selection based on curriculum standards (pedagogy).
14. Explain how your current technology skill set assists or inhibits you in using emerging technologies that can increase your effectiveness and productivity.
15. How would you characterize your confidence level when attempting to keep abreast of emerging technologies?
16. Discuss your ability to implement instruction that allows students to use technology in problem-solving and decision-making situations.
17. Explain how adept you are at using technological resources (spreadsheets, databases, portfolios, etc.) to analyze assessment data for enhancement of your teaching practice.

Questions one through 12 were aimed at understanding how practicing teachers viewed their pre-service and in-service training related to technology integration. Andragogy, a "central model for adult learning" (Holton, Swanson, & Naquin, 2001, p. 118) argues that adult learner situations should: (a) be predicated on the needs of the learner, (b) prepare learners by helping them relate learning objectives to their specific situations, (c) be environments where learners feel relaxed, work collaboratively, and feel supported, and (d) should offer experiential hands on learning activities (Holton et al., 2001, p. 124).

In addition these questions attempted to understand how participants began to integrate their existing knowledge regarding technology (TK) with their content specific knowledge (CK) and their knowledge of pedagogy (PK). There is a complex interplay between these knowledge bases during the participants technological, pedagogical, and content knowledge (TPACK) development (Koehler & Mishra, 2005).

All content cannot be presented the same way to all learners, nor should it be. Learning paths to new knowledge should be fashioned to the learners' specific needs, experiences, and situations. The material presented should be motivating and should challenge/extend the learners' existing knowledge base.

Teachers need opportunities to learn firsthand why it is important to use technology in meaningful ways. Pre-service teachers must experience effective applications of technology if they are to use them in their own classrooms and if they are to develop confidence in doing so (NCATE, 1997). Questions one and two were asked in an effort to understand best practices related to strengthening teacher capacity to integrate technologies. Pre-service teachers should be exposed to technology being modeled during

their field experiences and by their university professors during class (Teclehaimanot et al., 2011).

Dexter and Riedel (2003) identified three factors which could improve the likelihood a pre-service teacher would incorporate technology more effectively. First, setting expectations for student teachers to use technology should become a goal for all teacher education programs. Secondly, teacher education programs must ensure students have ample opportunity to learn to integrate technology through their courses. Finally, field experiences must be relevant; they should also incorporate all the latest technologies and must provide opportunities for pre-service teachers to develop skills for their future students. Research continues to show current focus at the pre-service level regarding technology is on developing technology competency at the expense of employing technology to enhance learning (Teclehaimanot et al., 2011).

Questions three, four and five seek to illuminate how assignments at the university level reinforce the notion technology should be integrated into all lessons. In addition, information regarding field experiences and how they have served to develop confidence to integrate technology on the part of the pre-service teacher were explored. Mishra and Koehler (2008) found the exemplary teaching with technology required an interweaving of pedagogic, content and technology knowledge. Finally according to Figg and Jamani (2011) beginning teachers need "successful experiences with their initial technology-enhanced teaching experiences" since teachers tend to employ strategies they deem successful (p. 1238).

Research indicates school placements should offer opportunities for pre-service teachers to use technologies in "practical settings, either through school placement, microteaching or role playing scenarios" (Sime & Priestley, 2005, p. 141). Meagher et

al., 2011, found if pre-service teachers were to develop technology integration competence, they needed more than methods classes. These teachers needed "modeling of exemplary practice" in technology rich field placements in order to develop positive attitudes about the integration of technology (Meagher et al., 2011). In an effort to understand how pre-service teacher placement affected technology integration competence, question six was employed.

Question seven was intended to elicit responses related to how teachers incorporate what they have learned in training within their individual specific content areas. Wozney, Venkatesh, and Abrami (2006) have found teachers must believe "that they can successfully implement the innovation within their own context; if not, they may neither take the initial risk nor continue to persevere in implementing it" (p. 195). In order to change practice related to technology integration, teachers must see the value of technology as a tool for improving classroom practices. Teacher value beliefs regarding how technology can help them meet their professional needs and the needs of their students generally guide their decisions to employ technology or not. Therefore technology training efforts should be tailored to target teachers' beliefs regarding how a particular technology can be applied to their particular classroom setting (Ottenbreit-Leftwich et al., 2010).

Simply being exposed to a form of technology does not within itself provide the impetus to transform teaching. True integration requires much more than computer competence. Therefore question eight was asked in an attempt to understand how staff development practices extended participant involvement with technology in cognitively challenging ways. Using computers as tools to "achieve greater outcomes of students"

(Becker & Riel, 2000, p. 34) requires that teachers create powerful learning environments which integrate technologies into their instruction.

Question nine attempted to understand the impact of follow-up activities related to staff development initiatives. In a study by Watson (2006) it was found the length of the staff development activity positively affected the teachers' ability to use the Internet in the classroom effectively. Watson found the "long-term contact between the inservice teachers and the project" (p. 164) seemed to help teachers bridge the gap between the training they had received and the classroom application of what they had learned.

The ultimate goal of staff development is to assist teachers in developing competency related to teaching and learning in an effort to make informed instructional decisions which result in improved student learning. In a study by Levin and Wadmany (2006) teachers were exposed to a technology rich environment and engaging staff development for three years. Observations revealed most of the teachers significantly changed their classroom practices, "discarding direct instruction and adopting practices focusing on facilitating collaborative learning processes, where most emphasis was on coaching, modeling, reflection and exploration" (p. 170). Questions 10, 11 and 12 were designed to determine how staff development had altered classroom instructional practices of the participants in this study.

Questions 13 through 17 attempted to discover the level of self-efficacy related to technology integration efforts on the part of teachers. Bandura (1986) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391). There are a variety of barriers to the integration of technology. According to Brinkerhoff (2006) these

barriers can be grouped into four categories: resources, institutional and administrative support, training and experience, and attitudinal or personality factors.

Cullen and Green (2011) have concluded technology integration is not simply a staff development or school system issue but is a "process informed by personal beliefs, and actions based on attitudes and each teachers' confidence" in their ability to employ emerging technologies (p. 43). In addition, Wozney et al., (2006) found when teachers reported confidence in employing technology; they exhibited better attitudes about technology usage. Others have found motivation to incorporate technology into teaching requires teachers must feel competent in their ability to do so (Deci & Ryan, 2000).

Drenoyianni and Selwood (1998) found the lack of teacher competence related to technology was directly related to technology usage. Piper (2003) found self-efficacy significantly influenced the use of technology. Others have found teachers' belief regarding their capacity to use technology is a significant factor in classroom use (Albion, 1999). Questions 13 through 17 attempted to understand how attitudes and personality factors (self-efficacy) affected teacher technology integration efforts.

Face validity was addressed by anchoring the interview questions within the existing literature while professionals in the field of education reviewed the questions in establishing content validity (Creswell, 2007). Two staff development professionals, one college of education professor/District Media Director, one teacher and one Assistant Principal who has also worked as a former University Lecturer examined the interview questions to confirm content validity. Reviewer A has 13 years of experience in education and is currently serving as a Lead Teacher in an Education Technology department. She holds a Masters in Administration, a Licensure Endorsement in Educational Technology and a Bachelor of Arts Degree. She has worked extensively in

developing on-line and face-to-face technology staff development activities for a large district of 43 schools. Her education and expertise relative to staff development made her an excellent candidate for examining the interview and focus group questions to ensure content validity.

Reviewer B currently serves as a School Library and Media Services supervisor. In addition she is employed as an assistant professor at a University. She has 30 years of experience in education and holds a Ph.D in Education, a Masters in Library Science, and a Bachelor of Science Degree. She has been instrumental in assisting her district in garnering technology grants and in helping schools build strong technology supported instructional programs. This experience in supporting schools in their efforts to infuse technology into their practices makes her a qualified candidate to review the interview and focus group questions.

Reviewer C, a district level Career-Technical Education director, has served in numerous capacities that enable him to critically analyze the interview and focus group questions. He has previously served as a Career-Technical Education teacher, and as a district Staff Development Director. He has 25 years in education and holds a Masters in Administration, and a Bachelor of Science degree. Reviewer D is an Exceptional Children's teacher with 27 years of experience. She holds a Masters in Teaching and Learning with Technology degree and a Bachelor of Science Degree with certifications in K-6 Elementary Education, Special Education K-12 and Middle School Mathematics 6-9. Her education and experience with technology serves as preparation for reviewing the research questions.

Reviewer E is currently employed as an Assistant Principal but has also served as a teacher and as a Lecturer in a school of Education and as the Director of Instructional

Technology at a school of education. He holds an Ed.D in Educational Leadership, a Masters in Instructional Technology and a Bachelors of Arts Degree. His experience in teaching educational technology courses at the University level makes him an ideal candidate for determining content validity of the interview questions. All reviewers were instructed to look for wording that could be leading and for any other biases that could contaminate results.

Specifically each question received a rating of one to three for clarity and the questions ability to inform best practices related to technology integration. When assigning values for clarity, reviewers could assign a value of one if the question was unclear, or if it should be deleted altogether. A value of two could be assigned if the question was somewhat clear, but should be reworded. The reviewer was then to offer a suggestion as to how to re-write the question. The value of three was assigned if the question was clear, and acceptable as worded. Reviewers were also required to judge questions based on their ability to inform best practices related to technology integration either at the pre or in-service levels. When the value of one was assigned, the reviewer felt the question missed the point and should be dropped. An assigned value of two meant that the question had some potential for informing best practices related to technology integration. When the reviewer assigned a value of three they felt the question had good potential for informing best practices.

Reviewer A and I met and discussed the study in great detail. Reviewer A made a few suggestions for improvement. Question one was worded "Describe how you feel when making an instructional technology selection based on curriculum standards (pedagogy), Reviewer A recommended I change the question to "Describe how you feel when selecting instructional technology tools based upon curriculum standards

(pedagogy)" instead. Reviewer A felt the changed word choice would provide greater clarity. Reviewer A felt question 10 was asking far too much for one question. The question read, "Has the staff development altered the way you present lessons, how you assess, how you interact with students and how you allow students to interact with you and each other?" Reviewer A suggested this be separated into two questions, one related to lesson presentation and assessments and the other related to student interaction. This suggestion has resulted in the following two questions question 10 asks, "How has the technology staff development altered the way you present lessons and how you assess?" and question 11 now asks, "How has the technology staff development altered the way you interact with students and how you allow students to interact with you and each other?"

Next I met with Reviewer B to discuss the research study. Reviewer B also felt I was asking too much in question 10 and suggested it be broken into two questions. Otherwise Reviewer B felt the questions were clear and able to inform best practices related to integrating technology into ones pedagogy. Initially question eight was worded thusly: "Has the focus of your staff development in technology been on training you how to incorporate technology into your pedagogy or are you trained on the technology as a standalone component?" Reviewer C felt this question was not open-ended and suggested the following wording, "How would you describe the focus of your staff development in technology integration? (i.e. On pedagogically significant integration efforts or on technology as a stand-alone component?)." Reviewer C also felt question 10 should be broken into two questions. Additionally Reviewer C felt the wording in question 13 should be changed from "employing" to "using." Reviewer C also felt the following word changes should be made in question 16: "employing" should be changed to "using" and

the phrase “to improve your teaching practice” should be changed to “for enhancement of your teaching practice.”

The only suggestion Reviewer D had was again to make question 10 into two questions. Most of the suggested changes from Reviewer E were grammatical in nature. Reviewer E suggested I remove “this” from questions four, where it was to be replaced with the word “the” and in question six, where it was to not be replaced. Finally Reviewer E suggested that the word “standalone” in question seven be hyphenated to “stand-alone.”

APPENDIX G: FOCUS GROUP QUESTIONS VALIDITY AND RELIABILITY

Table 5 contains the six questions that were designed to delve deeper into participants' pre-service and in-service training related to technology integration and participants' feelings of self-efficacy related to technology integration efforts.

Table 5

Focus Group Questions

1. What specific training, courses, or experiences have enabled you to employ technology in your pedagogy?
2. In what ways have your prior experiences with technology integration contributed to your distinctive professional development schema.
3. What would you recommend to positively influence staff development initiatives aimed at technology integration? Why?
4. What specific strategies, activities or characteristics would describe an effective technology staff development training?
5. Explain in detail how technology integration has improved your professional practice as an educator.
6. Describe in detail how the integration of technology into your pedagogy has empowered you as an educator.

Focus group question one was related to pre-service attempts to integrate twenty-first century technologies. Fleming, Motamedi & May, (2007) found when pre-service learners were exposed to university instructors modeling technologies pre-service teacher perception of skills increased. Pre-service teachers' "hands-on experience with computer

technology was most strongly related to perception of skills" (Fleming et al., 2007, p. 216). The Office of Technology Assessment (1995) recommends pre-service teachers: (a) see technology modeled by university professors and cooperating teachers, and (b) seek opportunities to effectively incorporate technology themselves.

Question two provided understanding of the dynamics of how prior experience with technology drives staff development participation. Andragogy argues that one's life experiences provide a rich source for learning (Holton et al., 2001). It has also been shown teachers' personal use of computers at home is a strong predictor of technology usage in the classroom (Wozney, Venkatesh, & Abrami, 2006). The literature also indicates teachers build on professional development experiences when "their existing knowledge and priorities are acknowledged and made central to the learning process" (Kanaya et al., 2005, p. 313). Technology training initiatives must be connected to the learners' needs and interests and not simply based on technical training.

Questions three and four attempted to uncover teacher ideas related to best practices in implementing staff development. Research by Kanaya, Light, and Culp (2005) has found staff development activities should "organize teacher-learners into learning communities" (p. 313). There are other specific qualities which are characteristic of good staff development. For instance research has suggested that teachers need extended time for training and follow through support (Kanaya et al., 2005). It has also been suggested training must be aligned with "teachers' current pedagogical knowledge" (Kanaya et al., 2005, p. 313). Training initiatives that help teachers understand how technologies can be used daily for instruction rather than how to use a specific software package or new technology are most effective (Anderson & Becker, 2001; Dede, 1998;

Drazdowski, 1994; Figg & Jamani, 2011; Harris & Hofer, 2011; Office of Technology Assessment, 2000).

Research by Wozney, Venkatesh, and Abrami (2006) indicated that teachers reported they needed "applied training that goes beyond skill development" (p. 194). In addition, research indicated most in-service teachers want workshops which are hands-on in their approach; however this hands-on approach should also "emphasize a collaborative method" (Sugar & Wilson, 2005, p. 95). For instance it was found more than 90% of respondents "preferred to discuss, talk and collaborate with other teachers (92%), experts (92%), and mentors (90%) while they learn new technologies" (Sugar & Wilson, 2005, p. 95).

Andragogical training models argue for adults to be trained in authentic real world situations in conjunction with their peers. Finally research by Sugar and Wilson (2005) noted prior knowledge related to technology training determines what and how staff development participants approach learning. Interestingly it was found teachers with more experience preferred a "trial and error method in learning new technologies" (Sugar & Wilson, 2005, p. 95) while newer teachers tend to take fewer risks.

TPACK argues that any technology training should take into account the teachers' knowledge of technology, curriculum and teaching practice. Koehler and Mishra (2005) argue that inorder for teachers to understand how to effectively integrate technology the knowledge reagarding technology must be connected with their content.

In order for technology professional development to improve practice, it must "anchor technology in the curriculum" (Staples, Pugach, & Himes, 2005, p. 306). Increased technology integration must begin with a deep understanding of pedagogy. Workshops which interweave content knowledge and technology practice in conjunction

with active hands on learning and mentoring are the most successful at empowering teachers to incorporate technologies (Kopcha, 2012). The teacher must not get lost in the "back and forth….between learning technology itself and the curriculum" (Staples, Pugach & Himes, 2005, p. 306).

It should be noted the most important by-product of any technology training should be positive teacher pedagogical practice illustrating a deeper understanding of pedagogy (Lawless & Pellegrino, 2007). Kanaya, Light, and Culp (2005) found when teachers perceived training as pedagogically relevant the training resulted in significant achievement in "both basic outcome (use of new tools) and the optimal outcome (use of multiple new technology-rich lessons)" (Kanaya et al., 2005, p. 325). Many practicing teachers do not understand how educational technologies can improve their instructional practice (i.e., learning activities, and projects). Most technology staff development continues to be skills based, neglecting to expose teachers to "usable and customizable strategies for curriculum-based uses for technology" (Harris & Hofer, 2011, p. 228).

Several studies have shown technology incorporation training alone is not sufficient when attempting to build teacher technology integration efficacy (Ertmer, 1999, 2005; Ertmer et al., 2003; Hew & Brush, 2007; Kopcha, 2012; Sime & Priestley, 2005). Questions five and six attempted to uncover best practices in improving teacher technology integration efficacy. One's perception of technology determines the amount of resistance and the amount of effort a person will exhibit when attempting to employ technology as a tool (Al-Awidi & Alghazo, 2012). Individuals with positive feelings of self-efficacy regarding the implementation of technology will persevere in their attempts at successful integration of technology. Al-Awidi and Alghazo (2012) also found that "perceived information literacy self-efficacy is affected by computer experience, skill

levels and frequency of computer and internet use and access opportunities to computer and internet" (p. 848).

Bandura (1986) has found feelings of self-efficacy can be increased by building knowledge and skills related to technology integration through the use of projects, experiences and research which develop teachers' abilities in using technology. Albion (2001) found that the frequency of teachers' technology usage was the most significant factor related to improved self-efficacy. Finally an increased sense of self-efficacy and improved positive attitudes has been shown to increase the use of technology in the classroom (Holden & Rada, 2011).

Focus groups allowed me to delve deeper into understanding the phenomenon under study by allowing participants opportunities to share with one another and possibly assist one another in unearthing memories about the phenomenon under study. These interactions between participants became an important source of information since focus group "elicit[s] information that paints a portrait of combined local perspectives" (Grudens-Schuck, Allen, & Larson, 2004, p. 2). A good focus group design allows for "synergy to occur, which produces greater insight due to the fact that participants work together during the session" (Grudens-Schuck, Allen & Larson, 2004, p. 3). Working together allowed participants to reconstruct their experiences and encouraged them to reflect deeply on the meaning of those experiences (Cilesiz, 2011).

As with the interview questions the focus group questions were guided by andragogy which defines how adults learn best. Adult learning situations should be organized around relevant application (Holton et al., 2001), should be collaborative, and should take the learners' experiences into account. Face validity of the focus group questions was addressed by anchoring the focus group questions in the review of

literature. Content validity was addressed by reviews of the focus group questions by other professionals in the field (Creswell, 2007). The focus group questions were reviewed by the same reviewers used in reviewing the interview questions.

Reviewer A commented it appeared that in question one I was asking about skills which participants possessed prior to employment which facilitated their ability to incorporate technologies. However I was attempting to understand what training, classes, or experiences had enabled the participants to successfully incorporate technologies. I have since reworded the question to state, "What specific training, courses, or experiences have enabled you to employ technology into your pedagogy?" instead of "What specific practices have enabled you to employ technology into your pedagogy upon employment?"

Reviewer B felt the focus group questions were clear and had good potential for informing best practices related to technology integration. Reviewer C felt the word "activity" in question four should be changed to "training." Reviewer D felt the word "impacted" in question two should be changed to "contributed to." Reviewer E requested the word "into" be changed to "in" in question one. Finally reviewer E felt "and as an individual" should be deleted from question six.

APPENDIX H: REFLECTIVE JOURNAL

In beginning the research project which consists of conducting the interviews and focus group session and administering the survey, I have identified some resources that may influence my thoughts, research methods and analysis of data. I find that after reading material related to phenomenological research, I am overwhelmed with trying to attend to it all while operationalizing the research process in my mind. Therefore I have chosen to separate these resources and their influences on me so I may critically analyze their impact on me as the primary researcher.

This journaling process will assist me in accomplishing certain goals in ensuring that I am viewed as a credible scholar in qualitative research. I will include documentation regarding (a) the daily logistics of the study, (b) a methods log where decisions and rationale are discussed, and (c) reflections, feelings, ideas, and frustrations regarding the process of conducting this research (Creswell, 2007, p. 243, p. 218). There are certain goals that I want to accomplish and would like to be able to evaluate the extent to which I achieve them at the end of this study. Some of the goals are:

- Pay close attention to details relative to conducting phenomenological research (methodology)
- Attend to participant needs during the scheduling of interviews and focus group sessions
- Make sure that I support the research findings with data weaving in the theoretical frameworks and the focus and purpose of the study.

Before beginning site and participant selection, I re-read Creswell's (2007) material on conducting snowball and intensity sampling procedures and material regarding Celesiz's (2011) views on phenomenology. I needed to make sure that I had internalized this process so that I could utilize Moustakas'(1994) phenomenological procedures correctly. I had decided to utilize sites that had a 1:3 ratio of computers per student indicating that participants had the ability to integrate technology based on the NC School Report card data. So the foundation had been laid from which to choose sites. Participant selection was dependent on the meeting with the site principal.

Ideas about the process and how it would affect my research:

Ideas	Influence on Research
Selection of Phenomenology	Phenomenology was "designed to study the essence and meaning of experience" (Cilesiz, 2011, p. 493). Therefore methodologically phenomenology is well suited to understanding participants perceptions regarding training with technology.
Selection of sites	Had to make sure that sites had enough computers to ensure integration. The

	district has a 2.02:1 student to computer ratio. I selected a 3:1 ratio (38% of districts schools have this ratio). Once the site met this criterion I had to get from principals: (a) permission to conduct the study on their campus, (b) assistance in selecting possible participants that met criteria for selection.
Selection of Participants	Held discussions with principals regarding possible participants. Participant criterion: had to have completed an education program at an accredited institution of higher education; must have from 3 to 5 years of experience and must have participated in technology staff development.
Meeting with potential participants	Discussed study; asked for verification regarding participant criterion above; asked for participation; asked them to sign consent; asked them to select a time and place to conduct interviews.

After re-reading Creswell (2007) and Cilesiz (2011), I began to have a deeper understanding on how to carry out site and participant selection. In addition I began to understand how in the end phenomenology would help me describe how participants viewed the phenomena of technology integration. Intensity sampling was dependent upon site principals in large part, because they knew their teachers and knew which ones used technology to some degree. I made it explicitly clear that I did not want to interview teachers who were considered "pros" nor did I want teachers that did not know how to integrate, since they would be extreme cases. Intensity sampling would provide "information-rich cases that manifests the phenomenon intensely but not extremely" (Creswell, 2007, p. 127).

Principals were willing to take the time to sit down with me and go through the discussion process in selecting participants. I found this to be refreshing. I had been so worried that I would not have enough principals interested in helping me and was also worried they would not want to take the time to assist me in selecting participants. My worries were unfounded!

After a potential list of participants was generated, I asked principals to assist me in setting up a time when I could meet with these possible participants and explain the study. This was accomplished without any problem. At a few schools participants did not want to participate, which is fine, but at the time pressured me to find another site so I could get the required number of participants. I found it hard to understand why someone would not want to answer a few questions. But I had to realize that the individuals had the right to refrain from participating. Participants who decided not to participate were in no way made to feel bad.

Questions/worries that I still have

I wonder what the interview sessions will be like. Will I have any problems with the equipment (audio and video recorders)? Will I have any participants that change their mind on the day of the interview? If so where will I find a replacement?

Days 1:-3

It was during this time that I met with the possible participants, asked them to participate, got them to sign the consent form and scheduled a time for their individual interviews. Setting up the interviews was the easiest part! I thought I would have been running back and forth to the schools multiple times in order to conduct the interviews. But the participants began discussions about the interviews and scheduled them around their planning's. This allowed me to visit all but one school a single time. In most cases most of the day was spent at that school but it really did facilitate my completion of the interviews. What a relief!

I did not have a single issue with the equipment. When I completed an interview, I saved the video file to my computer, then formatted the sd card so I could begin the next interview without worrying about "running out of room". I recorded up to 4 people per audio tape, these recordings were also separated by school.

Some participants wanted to be interviewed in their rooms which was fine. It was easy to pack up my material and move about. Some wanted to be interviewed in the schools conference room which was ok too. When the interviews were scheduled, participants told me then were they wanted me to interview them.

All Interview Recordings are Time and Date Stamped

Day 1: (10:00-1:00)

Scuffletown Elementary Interviews

This principal was willing to help me. The selected participants had a great working relationship with each other too. You could tell it by the way they interacted with each other during the initial meeting to discuss the study, and get them to sign consent forms. They worked out a schedule for the interviews; all I had to do was show up and set up my equipment. They handled the relieving of each other to participate.

Individual Interview	What I thought/felt regarding the interview
Abbey	Abbey was bright; articulate; and seemed to be really trying to answer the questions truthfully. She tended to be to direct and to the point. I wondered one time if she was telling me enough (describing the essence of the phenomenon)
Larry	Larry was extremely interested in sharing with me his answers to the questions. I remember thinking that I was going to get a lot of information from him regarding the

	phenomena. I began to wonder though if he was trying to impress me with what he knew..I think in the end though he just wanted to make sure that he had told me everything he could think of regarding the question. I also remember thinking I would like him to participate in the Focus Group session since he was willing to be exhaustive in his descriptions regarding the phenomena.
Kimberly	Kimberly in her responses was direct and to the point. She did answer the questions succinctly. I remembering worrying about her voice. She had such a soft voice I wondered if the video and audio recordings were picking her up…also she spoke really fast and I remember thinking it was going to be difficult transcribing her interviews.
Samantha	Samantha's interviews were the most daunting. I remember thinking that she had a negative view regarding technology and its availability at her school. I knew what the ratio of computers per student was in her school and knew that each class had a SMART board from having met with the principal. I really do not understand why Sarah answered this way. Especially since she was the last one interviewed here and none of the other participants had this feeling. I remember thinking that I may have to select another teacher. But after further reflection I began to realize that the purpose of these interviews is to understand how participants viewed the TRAINING they had received regarding the integration of technology. Not their access to it.

The teachers at this school were extremely helpful in assisting me in setting up my interviews. They were also great at describing their exposure to the phenomena under study. They each had their CEU documentation printed out and they completed the survey and brought it back to me before I left the building. All in all this was a very successful 1st set of interviews!

Day 1: (2:45- 3:30)

Interviews at Union Station Elementary

Individual Interviews	What I thought/felt about the interviews
Debbie	I remember feeling that Debbie was going to provide me with rich data. She was good at sticking to the question at hand and answering in such a way that I could describe what that feeling was like for her.
Cindy	Cindy was a pleasure to work with. I was feeling glad that she had agreed because that meant that the interview sessions were over! I also thought that even though Cindy could describe her feelings accurately, I thought that her self-confidence was low.

Day 2: (8:00-10:30)

Interviews at St. Anthony's Elementary

Again the principal allowed me access to his building; met with me to discuss possible participants and arranged a meeting with these possible participants one evening after school. During this meeting the 4 selected participants again all agreed on a time for the individual interviews….I was to interview them in the conference room.

Individual Interview	What I thought/felt regarding the interview
Ruth	Of all the participants, Ruth seemed to know more about technology. This knowledge seemed to not be related to any training she had had as a staff development participant and college of education participant. From her responses I thought that she had simply acquired all her prior knowledge by having grown up with the technology. Her responses were somewhat in line with other participants regarding how the training she'd been exposed to had assisted her. Although of all the participants her responses to all the questions were the shortest. I remember thinking "Why did you agree to participate if you are not going to describe your experiences in detail?"
Beth	I could tell that Beth was extremely interested in sharing. Her responses

	indicated that she loved teaching and wanted to expose her students to all the resources she could. But again the purpose of this study was to understand how she had perceived her training. Not on how she was as a teacher. One thing that worried me was that her interview was longer than the average 20 minutes I had experienced before. I remember thinking that Beth would be a good Focus Group participant as well since she is good at describing what her experiences were like. (when she did the member check she responded back to me that she had no idea that she used so many umm's while talking)
Jill	By far Jill's interview lasted the longest! A whopping 45 minutes. I was actually late for the final one at her school. I remember thinking how frustrating it was to hear her ramble on and on about things (sometimes unrelated to the question at hand). Her responses did contain an answer to the question; however she did have a tendency to ramble.
Kathy	Kathy was direct and to the point in her responses. I remember thinking how refreshing that was after having heard Jill!

At the end of this session I was thinking that I had this interview stuff down pat. My mind then began to wander to the transcription phase of the research and how I was to handle that.

Day 2: (11:30-2:30)

Interviews at Buffalo Run Elementary

When I met with the principal at this school to look at possible participants he initially had a list of about 7 teachers that did fit my research agenda. I was delighted with this notion. However when I met with the individual teachers that list was changed to only 3 participants. Four were not able to participate; one individual had been a lateral entry teacher which means he had not completed an education program; another individual had only been teaching for 2 years, and the other possible participant that was rejected had resigned his position the week that I scheduled our initial meeting; the last rejection was due to the participant's unwillingness to participate.

It was at this point that I really began to realize that conducting research was a complicated proposal. I remember being a little concerned that I was definitely going to have to find another site in order to get the 20 participants I needed. But I was determined to finish this and was not going to quit.

One other issue was that the participants needed to meet with me in the conference room; this room was in a mess. All sorts of "junk" was packed into this room. There were 3 chairs, and a enough free space to set up my camera and conduct the interview. Participants were ok with the setting so I did not let that bother me. I remember wondering how this principal held conferences with large groups….

Individual Interview	What I thought/felt about the interview
Susan	Susan was an exciting participant. I could tell that she was really interested in sharing how her training had assisted her over the years. She was also concerned with being the best teacher she could be. I remember thinking that she would be a great person to participate in the Focus Group.
Amber	Amber's interview as a good one in terms of her answering the questions and succinctly describing her training in technology.
Heather	Heather was a little hesitant at first to go into detail concerning her training. She had the necessary years of experience teaching but had only been in this system for 2 years. Once I assured her that the system where the training occurred did not matter, I was just interested in how she perceived this training to be, she began to open up and describe her experiences more fully.

It was at this point that I knew that I needed to find another school. I had 4 participants at a local high school to interview but that meant that I needed 3 more. It was at this point that I decided to contact one of the two principals that had agreed to allow me access to her teachers. During discussions with her, the two teachers were identified and agreed to participate.

Day 3: (8:00-10:00)

Interviews at Deep River Elementary

I had met with the principal and she had agreed to participate and had signed the agreement form. When I arrived for the meeting to discuss further participants, she gave me a list of teachers that she thought fit the criteria. Something had come up and she was not able to meet with me. She did however have her acting AP meet with me to discuss possible participants. Everyone on her list fit the intensity sampling procedures; however one of the individuals had not participated in methods or technology courses while in college. Her program had been completed online and she told me she had not taken any of those courses. I remember thinking at this point that I may wind up having to select another site to get enough participants.

Individual Interview	What I thought/felt regarding the interview.
Luke	Luke was a willing participant; had to repeat the questions constantly for him. I remember how frustrating it felt for me to do this and I remember thinking that these questions were not confusing, because if they were I would have had this problem before. I don't think he could tell. I kept thinking that his mind must have been on something else. He answered the questions well enough.
William	Conducting this interview was wonderful, especially after having to repeat myself so often with the first one at this school. William seemed to understand exactly what the question was asking and answered them with what I thought was complete answers. He is another participant that I remember thinking I would like to have in the Focus Group.
Jamie	Jamie's interviews seem to go without any problems. She was thorough in her responses and seemed to describe what she experienced well enough for me to get the idea of what her training was like.

Before I began my interviews I had selected sites and then participants within those sites until I reached the 20 participants I needed. Now with the loss of one at this school I knew I was probably going to need to select another possible site. (I could afford to lose 1 participant, since I had spoken to and had exactly 21 signed participant forms.) I decided to complete the interviews that I had scheduled before selecting another site so I would know how many participants I needed, if any. During this time I had had 2 other principals contact me letting me know that if I needed their assistance, they would be

more than glad to allow me access to their schools. This was a relief. At least I knew at this point that I was going to be able to find enough participants.

Day 3: (11:00-3:35)

Interviews at West Robertson High

I spent the better part of the day at this school. These teachers have 90 min plannings each and most of this time was spent waiting on them to go on planning. This was not that much of a problem for me.

Individual Interviews	What I thought/felt about the interviews
Leslie	Leslie was a willing participant. She really enjoyed discussing her exposure to technology and sharing how she felt about that experience. I also thought at the time she would be a good Focus Group participant.
Sally	Well Sally was not too much interested in technology. I felt that Sally would have rather not use technology, unless it was a calculator. I felt that she was not interested in creating a classroom that used technology as a tool to facilitate learning. I decided to just ask the questions and allow her the opportunity to answer, without judging her motives.
Billy	Billy was a History teacher and coach. I got the distinct feeling that he enjoyed using technology to help with his coaching more so than in his classroom. I firmly believe that coaches teach! So This was alright by me. He did explain how he'd been exposed to technology training.
Johnny	Johnny was adept at describing his exposure to technology training. He seemed willing to try and learn as much as he could as long as it helped his students learn more. At the end of his interview I remember hoping that he would agree to participate in the Focus Group.

Evening of Day 4 (6:00-7:00 meal; 7:10-8:30 session and wrap-up)

Focus Group Session

This session was held at a local restaurant selected by the participants. I paid for their meal. All participants were invited to attend only 6 showed up however. This session was informative and fun. The participants and I got a chance to get to know each other (plans for the future, etc.).

The session began immediately after we finished our meal. I video and audio recorded the session as well. Participants were asked 6 questions and were free to interact with each other in answering them. There were many times with one participant remembered something because of what another had said. I remember enjoying this session because there was a lot of interaction between the participants and richness to the discussion that I had not really seen in the interviews.

Transcription Process

I know that this procedure is invaluable in understanding research findings. I had been so worried about how I was going to accomplish this task. I had called a couple people that had been court reporters but neither were willing to assist me. One had developed carpel tunnel issues, the other was out of town and really did not want to do it.

I began planning for this weeks in advance (by calling possible transcribers). Once I realized that I would have to do this myself, I started thinking about how I would handle it. I stumbled upon the Dragon Diction software on my iPad and the flashlight went off! I began playing one of the interviews (video recorded) and would say what the participant said to the Dragon software on the iPad, stopping every min or so. To my amazement the information was typed!

After I repeated the interview, I went into the document and made any grammatical corrections that were necessary and saved the document. It was at this point that I re-played the recording while reading the transcribed version making sure that what was said was accurately transcribed. This made the process easy but having to do 20 of these was a daunting task. I remember feeling under pressure to accomplish this and feeling like I'd rather be at the dentist!

The focus group sessions were transcribed using this same process.

Qualitative Data Analysis

Ephoche. I began this process with subjecting myself to the systematic process of epoche, where I set aside my own personal feelings, and prejudgments regarding the phenomena under study. This journal is part of that process. I did not major in education and did not participant in methods or technology courses related to teaching. Bracketing this would not be a problem since I did not experience it.

I have held several staff development sessions regarding the use of technology in classrooms and would have to be mindful when dealing with participants that do not employ technologies. I want to have an open mind when looking listening to the

participants regarding their training. In addition, I want to have an open mind when evaluating the results.

Phenomenological reduction begins by listing statements that have equal value but are considered as unique. I looked at the transcribed interviews and began highlighting these statements (horizonalization). Delimited horizons are statements that do not change when viewed from multiple sources. Significant statements are then grouped into themes and an individual textural description is written (how the phenomena were experienced by each participant). These individual descriptions are then grouped together to form a composite textural description.

Identifying these themes was really difficult. I remember taking the delimited horizon statements and highlighting them. Then I cut them out and pasted them onto poster board underneath the research question they were designed to answer. I mulled over these charts for days trying to figure out just what the participants were telling me. I read and re-read them. On the 4th day of this mental processing, I was taking a shower when it hit me like a flood. I knew exactly how to describe what the participants perceived.

I jotted down the theme and sub themes..in my own words hurriedly so I could at least the idea down on paper. Later I organized my findings thusly:

Research Question One

How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction?

Theme1: Participants report a high level of confidence and skill when selecting technologies to employ in their classrooms.

Participants spoke of the abundance of resources. (One participant talked of too many resources causing a selection problem.)

Participants' repeated exposure to: staff development, collaboration with peers, and with "playing with the technology" builds confidence.

Participants did note that there was some apprehension about employing evolving technologies. (e.g., I know what I know and would be less likely to use something new, etc.)

Theme2: Technology integration must be planned and must be purposeful in order to build integration confidence.

Participants stated that "technology must not be used simply to satisfy a requirement to include it", its usage must positively impact learning and the standards.

Participants need time to research and plan for technologies integration, its usage cannot be a "spur of the moment thing".

Research Question Two

How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction?

Theme1: When technology was used in college classrooms it was mainly for displaying notes using PowerPoint.
Notable exceptions (1 participant)-one professor used the Smart Board; another used Geometer Sketchpad (4 participants).

Theme2: Assignments involving the use of technology were neither purposeful nor rigorous.
Participants had to mention technology standards in their lesson plans.
Participants had to create PowerPoints for classroom presentations.
Notable exceptions (2-webpages; 1-webquest; 2-virtual fieldtrips)

Theme3: Participants did not really begin to understand how to integrate technology until they began their field experiences and internships.

Research Question Three

How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction?

Theme1: Through staff development participants are exposed to a myriad of technologies designed to make them more effective teachers.
Some technologies make participants jobs easier (managing data, designing lessons, differentiating the classroom, assessing etc.)
Some technologies serve to peek students' interests and engage them in the learning process where the act of learning itself becomes secondary in the minds of students.

Theme2: Staff development seems to lack focus and purpose.
Most technology staff development is concerned with the basic uses of the technology. Participants argued for a more differentiated approach to technology training.
Notable exception is when there is a whole school focus such as reading improvement where all training is tied to that, then the technology training is on using technology to teach reading.
Generally participants are left to "figure out on their own" how to incorporate the technology into their pedagogy.
There is a noted absence of follow-up regarding technology training.

I put these thoughts away for 3 days before beginning the re-coding procedure. During the recoding procedure, I uploaded the interview questions into Nvivo 9 and began looking at word maps. These word maps indicated which words were being repeated over and over. Once repetitive words were identified, I began looking at

phrases/sentences around those repeated words. These were highlighted and cut out and posed on another set of poster boards by research question they were designed to answer. Then the data mining process began anew. This process did yield the same themes that precede this discussion.

Quantitative Analysis

I collected the surveys and began the scoring process and identified a computer efficacy score for each participant. The higher the score the greater the participant's computer efficacy, this data was used to verify results related to computer self- efficacy collected during interviews. The mean and standard deviation was calculated as well. I do not remember anything surprising regarding this data.

Regarding the findings and my feelings regarding them.

I remember during the time I was trying to identifying themes how worried I was in determining exactly what the participants were saying to me. After I had identified them and had re-coded the data and got the same results I felt confident that I had successfully identified what the participants were saying regarding their feelings of computer efficacy and feelings regarding the training they had been exposed to.

Reporting the findings in Chapter 4 was easy for me. All I had to do was back up the identification of themes with participant statements. The problem here was just how many should I include in under each theme. I had interviewed 20 participants and the majority of them had touched on each of these themes. But if I had included what every one of them had to say regarding a specific theme I would have a 500+ page paper. I felt as if I was "throwing away" important information by not including all those responses. I decided to mine their responses and identify the most representative ones to include.

In identifying the best practices.

I was again worried if I would have enough. My mind kept thinking about how big my list of best practices was gonna be; how big or long should it be? I spoke with a colleague who had completed a qualitative study some years ago. She made this statement to me, "Don't worry about a specific number, let your participants tell you what they are." It was at this point that the proverbial light bulb went off and I understood.

I began looking at the themes in a new light. If participants were saying these things about their training or their feelings of efficacy, what did these statements say about improving those things? It was easy after that! I simply reported what the participants had to say regarding best practices. I am so glad I had this conversation with her!

Conclusion

This journal itself seems almost like a dear friend of mine at this point. I have shared in these writings how I felt about different aspects of this study. This process kept my mind on what was experienced by the participants rather than on what I felt personally about the phenomena. I was able to bring forth my own assumptions and realize that they had no bearing on what I was hearing in the voices of the participants.

Their voices and their voices alone are what is represented in these findings. To that I owe a great debt to this journaling exercise.

APPENDIX I: PARTICIPANT INFORMATION FORM

Name:_____

Years of service:_____

Submitted Survey:_____

Submitted copy of CEU report:_____

Completed an education degree:_____

Degree awarded from:_____

Signature:_____
Date:_____

APPENDIX J: INTERVIEW AND FOCUS GROUP TRANSCRIPTIONS

Interview Transcriptions

Interview with Beth

Question One ..Describe the kinds of activities and classroom interactions that you engaged in during your college of education experience that strengthened your capacity to integrate technology.

Beth: Ahmm, we had things, we had Smart Boards. That was my first introduction to Smart Boards and there was not a lot of emphasis on it but there was some, umm, basics, umm, you know, they even offered courses at the college if you wanted to learn, you know, how to manipulate and how to use it. Umm, we had assignments where we had to integrate the Internet into it for our students. So we had to create a scavenger hunt type of situation where they would have to use different websites and links in order to complete the scavenger hunt to find specific documents. It would have to use different websites in links in order to complete the scavenger hunt or find specific documents or, you know, wordings or things like that online. But that was the two things that really stick out the most to me that I can remember about using technology helping us to integrate it into the classroom

Question Two..Explain how technology was employed by your instructor during your methods and or technology courses that improved your competency in utilizing technologies to teach.

Beth: Well ahh, I was a ahh off-campus students so I used a lot of online classes so they made, umm, a lot of use of the discussion board so as you know now Edmodo is basically the same thing for teachers and for students really. So that helped because it got you more familiar with, you know, technology using it in a chat way or, you know, in a way to use it in conversation. Umm, as far as, they used it, nothing really sticks out my mind other than that because it was not used that much other than the Smart Board here and there. But a lot of my teachers or all my professors were right out of the classroom teachers so I guess they just didn't feel like we needed that as much as they would have used it the classroom maybe they were just old school, I don't know, but there just wasn't a lot of it.

Question Three…Describe a typical assignment in which you were required to design a technology integrated curriculum project.

Beth: That would be where the scavenger hunt came in we had to create that and I remember that because we had to… It had to be in a format where they had to access it online, they had to follow the instructions and then go online and to do, you know, complete the assignment. So that was, that was a big one that sticks out in my brain because I thought "Wow this is something that they have to completely go paperless for." which I thought was interesting.

Question Four…In terms of collaboration, interaction with staff and/or the students, what were the characteristics for the planning for this assignment?

Beth: For this particular assignment?

Yes, for the scavenger hunt. Interactions with staff, or other students.

Beth: Well I know that we had to work in a group that was it. Umm, I'm not mistaken, umm it was in class. I mean it was a face-to-face class but we had to go online and complete discussion boards on our planning so basically it was not talked about in class. The assignment was given and you worked with your group via online conversations to complete it, and to get it together and to submit it. So it was completely technology-based there was no face-to-face contact regarding this assignment which was hard because you, you go from not having any of that to you have to complete the whole thing online you don't talk about it except online.

Question Five…Describe how your field experiences helped develop the ability to integrate technology into your pedagogy.

Beth: Ahmm, I did a lot of experience in Cumberland County. I did my internship there and I had a wonderful teacher who really believed in technology. So we used it every day. We, umm, at that school, we didn't have a computer lab teacher we were the teachers for the computer lab so when we went, we had to have lessons developed ready to do with our students to teach them those skills. Because they were third-graders they needed to know that and even though this was, you know, several years ago, we knew that test was coming. It's, it's, on it's time now for it to be completely online and we wanted our students to have those skills. So it was a big, it was a big deal and it really helped that she was so technology savvy cause it, it made me have to learn some things to keep up with her.

Question Six…Describe how your student teaching placement assisted you in developing technology integration competence.

Beth: The same thing yeah… well I do a lot of my work with that same teacher so I got that in my field experience and then I really got a heavy dose of it in her classroom and we had those couple of weeks to learn how she did things and then when I was on my on, I kinda had to stay up to that because that's what the students had come to expect. They expected that technology in that, you know, in that mode of learning so I had to stay on with it.

Question Seven…In what specific ways has staff development assisted you in integrating technology into your teaching?

Beth: It's made it very available, because, umm, our principal believes the technology is how you're going to get them. It's how you're gonna get their attention and he believes in making sure that we have it. So there are Smart Boards in every room. So when we initially got this last year we had trainings we had times when we actually went to, to the

learning commons during the day and sat down and he said okay show them how to do this and show them where these sites are and it's basically a learning commons person, the librarian's, job to know what we, you know, were we could go to find things. And it was really good, it was, you know, it was developing, and we learned a lot about that. So there are websites that I learned about last year that I continue to use this year and so that was helpful because even my first-graders needed to know how to get to those things and learn how to do that.

Question Eight…How would you describe the focus of your staff development on technology integration is it on pedagogically significant integration efforts or on technology as a standalone component?

Beth I think it's integrated. I think it's both. I think that, umm, there's a recognition that technology as a standalone component is important but I think that it's obvious that it needs to be integrated but it needs to be together because you can't focus on just technology because it, it's a skill. But you need to get it in your pedagogy get it together because I, I think that I think he recognizes that. That's the reason that we have so many sites that are interactive and that work and that our students can, you know, work on but are not just for the fact that, oh, I know how to use this on the Smart Board it's for a reason, you know.

Question Nine…How would you describe the follow-up activities associated with the technology staff development?

Beth: Umm..we, the follow-up for us is that we're expected to use it and there's a check up on it and there are, umm, references to that technology that we've learned later on. So there may, we may have, umm, a session on Smart Boards and then the reference back to that would be a couple weeks later he'll send out things regarding Smart Boards or things, specific activities that you need to know how to use that board for in order to, you know, use it in your classroom. So I guess that would be a kind of, umm, a follow up for it to make sure that you got skill and that you're using that because it's important.

Question Ten..How was your classroom dynamics changed since participating in the technology-related staff development?

Beth: Umm, well I, the first year I was here we had a different administration so technology was not a big deal. But then when, umm, we had a new administration come in we had a big, ahh, I guess influx of resources come in. So it went from, I use my Smart Board and I use my technology as sideline things, to where now, I have four computers running and I'm using the Smart Board daily. So, it's a big thing because I had that knowledge and I was, you know, this is such a big deal and you need to make sure you're using it because it has this effect on your children it has increased the use dramatically. Beyond dramatically because before I didn't use it I used it is a dry erase board, it was there, okay great, but now it's interactive every day every single day.

Question Eleven …How has the staff development altered the way you present lessons and how assess?

Beth: Umm, I think that it makes assessment more broad, there's less, umm, maybe formal assessment, and there's situations where I can only sit back and watch them interact with things on the Smart Board and I say Smart Board because, I use that, that's what I use every day. So that's my references is a Smart Board I use that as a way of assessment because I can say, alright this groups working on here I'm just going to sit back and watch them and see what they can do and see how well they were performing, how well they know the task and how well they can do the task and it makes it that much easier. Because they don't know they're being tested but they really are and so they're more likely to do that, umm, task without the apprehension, about, you know, the formal setting, so, it makes it easier.

Question Twelve…How is the technology staff development altered the way you interact with students and how you allow students to interact with you and each other?

Beth: Umm, at this grade, at this point, ahh in first grade, it hasn't really affected it because I think in higher grades if you have that technology and you've been trained on it through staff development and you can communicate with your children via online services then it does make a big difference. But at my grade level it really doesn't because my students, they're not getting online and chatting with me on Edmodo, they, they don't have that access and they don't have that knowledge. So for me it's not made a big difference but I'm sure in upper grades it would.

Question Thirteen…Describe how you feel when making an instructional technology selection based on curriculum standards.

Beth: Umm, I feel like there's lots to choose from. Because I feel like I'm comfortable with it enough that I know what I'm looking for and I know what I'm doing and I can handle the technology enough to be able to manipulate and use it to the best of my ability for it to be effective in my classroom. So I, I mean when it comes, the Common Core, especially Common Core, you can find anything and you can use it as long as you can explain it they understand it then you're Gold and it's good to go.

Question Fourteen …Explain how your current technology skill set assists or inhibits you in using emerging technologies that can increase your effectiveness and productivity.

Beth: I feel like I know enough to do what I need to do in my classroom. Now if he were to bring something new like a Smart Table in, we've got that in our grade level, I would not know what to do with that. I guess that would be an inhibitor for me. But I feel like, umm, I'm not going to say that I'm technology savvy cause I'm not by any means but I know how to operate what I need to in order to get things done. Umm and I know, I know that I have enough sense to look for help when I need it. But I think an inhibitor for me would be the fact there are a lot of things that I don't know about Smart Board or umm, website programs, there's, especially because, there's so many programs out there that students can create and build that I don't, I don't know about. And If I do know about it I don't know enough about it to implement it in my classroom so that could be an inhibitor for me.

Question Fifteen…How would you characterize your confidence level when attempting to keep abreast of emerging technologies?

Beth: Umm, most of the time I'm good. I feel like I can handle, umm, my confidence is fine. But when it comes to a lot of information at once, or websites that I've not ever heard of, or that I'm not particular familiar with, it makes me more apprehensive to go to them because I know what I know and I'm comfortable with that. I know what web sites that work and are effective and I can use and they actually work, like, they don't just crash on you. So when I hear of new things I'm more apprehensive about that because I don't know about that and I don't have time to sit and look and venture out. I base it on what I've already done and what I know and I leave it at that so I guess I'm not jumping out into the wild.

Question Sixteen..Discuss your ability to implement instruction that allows students to use technology in problem-solving and decision-making situations.

Beth: Umm I have not done that I don't think I've really implemented it that point I've done it to and, and, maybe, no, not even in real life situations because we're not using it in that way it's more of ahh a task it's not a situation where they have to build or create or think in that way so I don't think I'm I don't think I'm where I need to be with that area of it where they have to use it to, you know, to handle situations and things like that.

How could you get there? What do you think it would take for you to get there?

Beth: I think the want is there because I want my students to be where they need to be but as far as technology because that's…We're in Robeson County, we have, you know, wireless it's a big deal. We have a lot of things but our students don't have those experiences. So I think in order for me to get there, I don't want to say the word staff development, because I just think that would just be, you know, an easy thing to say, but I think that, umm, ahh, ideas or specific examples or integrations into what I'm already doing or things like that so that I, I can feel comfortable with it. And I know that they can do it and that I can teach them that or that I know that it actually is something that's reliable and efficient, umm, I think the ideas would be great somehow if it could be, umm, shown to teachers in a way that was easily integrated to where it's just another tool that you can use that would be ideal for me. But as far as me venturing out looking for things like that, there's not enough hours in the day. I mean there's not the idea of it is great you're going on that higher Blooms , you know, that would create an opportunity for them to have to create or to think or, you know, even at a higher level but it's a matter of finding the time to look for it

Question Seventeen… Explain how adept you are using technology technological resources spreadsheets, databases, portfolios, etc. to analyze assessment data for enhancement of your teaching practice.

Beth: Now, I've used spreadsheets in the past for my grading and it helped with that because it was easy to see, ok, well on this assignment the students or 80% of the

students passed or failed, you know, that sort of thing. Umm I'm good with that I don't have a problem with that I think that it's very effective especially in the upper grades. In lower grades, I tend to not use it as much because I want to see it for myself I wanna, because in lower grades it's not just cut and dry. Where I feel like an upper grades it is so in the past when I taught upper grades yes I used it and I was fine with it I enjoyed it, it made life a lot easier but in lower grades I'm not using it currently the spreadsheet currently because I want to see it for myself. I mean it's not as cut and dry to me because yeah read not read nahh it doesn't work that way there's more to it than that.

Interview with Larry

Question number one, describe kinds of activities and classroom interactions you were engaged in during your college of education experiences strengthened your capacity integrate technology.

Larry: Um, during the college of education experience we had to do several activities in different interaction with SmartBoard and word processing documents, creating PowerPoint presentations. Um, one activity in particular, we had to take all of the new Common Core standards and compare them with the old North Carolina standard course of study. And the way that I went about doing that was, I created a PowerPoint where I listed of the all North Carolina standard course of study objectives and compare them with the common core objectives. And I kind of found where there were some connections there were there were some gaps and I kind of created another slide to address those gaps in those connections there. Um, other activities that created: we had to type lesson plans which of obviously were in word processing documents. I am a mathematics minor, I have a mathematics minor as well so, in several of my classes there I had to do some Excel things creating graphs. Um, I know for one class in particular, geometry class, I had to create different activities in Geometer's Sketchpad, which is, um, another software that we had to use the computer and technology for.

Question number two, explain how technology was employed by your instructor during your methods and/or technology courses that improved your competency in utilizing technologies to teach.

Larry: Um, they strongly encourage this use of technology there. Um, whenever they assign different assignments there was always a technology piece there, there were always technology standards addressed, you know, this is how it would meet the technology standard, or whatever. Um, we had to want actually incorporate that with our assignment. If it was a written document or typed document, we had to list those standards that were the technology standards that were addressed there. Um, like I said, they strongly encouraged us to use technology and, you know, reinforce that times have changed, you know, you no longer have a just overhead and things of that nature, but you have SmartBoards, you have, um, Elmo document cameras and different things like that to use.

How did they use it, how did the instructor use it?

Larry: During the class, several my classes, we had some SmartBoards in there so they would create PowerPoints and things their, um, notes and objectives and different things were already created on there and they pull them up. They would actually uses SmartBoard in the classroom to show us different ways to teach math lessons and different things like. Um, we were able to use the SmartBoard in the class. I know in my teaching math class we had to create a, an assignment and, um, a lesson plan and teach in the class actually use the technology there. Um, our professors, they used just about every (especially my education classes) just about every class have a SmartBoard, or if they didn't, we would always find that if we were going to use it on that particular day we would just rearrange our class and we would go to another class that there was a SmartBoard that we could use. Um, they used even like opaque projectors, different things like that, they did incorporate some of those things to show how technology has enhanced, um, and how you can incorporate those into your actual classroom.

Describe a typical assignment in which you were required to create a technology integrated curriculum project.

Larry: Um, for one particular (like I mentioned before in the geometry class) we had to use the Geometer's Sketchpad, and what that was: we took different strands from the geometry unit and we created a an entire unit of geometry. Um, where one assignment that I know that I did was like classifying different, um, angles using the different shapes and objects and things. And in Geometer's Sketchpad, you were able to pull those objects up, you were able to expand those objects, you were able to turn those objects around. Um, actually you can implant the degrees and the angles in there. Um, you could show how this angle was perpendicular to another angle, how it was parallel to another angle. Um, so that was one assignment that I really enjoyed doing because it made geometry real life. You know, it brought it right there it was concrete you were able to do it you were able to maneuver you were able to use it on the SmartBoard as well.

In terms of collaboration, interaction with staff and other students, what were the characteristics of the planning session for the assignment?

Larry: Um, in that actual assignment that I did, um, in terms of collaboration we were, you were able to work either in a group, or you were able to work alone. Um, we actually since there were we had K-12 majors in there and what we actually did was all of the elementary ed. majors, we got together and we pulled those objectives that we thought were most important and we were able to sit down and we collaborated outside of class. We were able to meet in class. Some days she cancelled class for us just to go to the library or other places to work on that particular assignment. And so what we did we work together to, um, pull those most important objectives and those objectives we felt that students would struggle with the most. Um, and we were able to find other books in different things that we could incorporate with it to kind of introduce the lesson and then create the actual lesson using the Geometer's Sketchpad.

Describe how your field experiences helped you develop the ability to integrate technology into your pedagogy.

Larry: In my field experience I worked a lot with the teacher that I felt strongly that I was going to student teach with, so. In her classroom, she used a lot of technology. She would, every day, she would use technology in something that she was doing with her students. Whether it was just doing morning work, um, teaching a lesson, assessing students; however she incorporate technology. So when I would go in to do my field experience with her, I made sure that I had a technology piece in there. I made sure that I was able to use the SmartBoard and other things that I was going to use, you know, to create that lesson to teach that lesson. Um, and then once I made that transition from field experience to student teaching I was very comfortable using her SmartBoard; using her other technology devices there. Just computers the children were working on, um, using different things such as assessing students with reading 3-D data and things of that nature. Um, using the palm pilot and things like that. So, seeing that field experience, seeing that during field experience, naturally working with it and manipulating it made for an easier transition when I actually started student teaching and then later into the classroom for myself.

Describe how your student teaching placement assisted you in developing technology integration competence.

Larry: Like I said you know, with student teaching with her and being able to use those different technology devices. When I actually I had her there with me during student teaching which made it a little easier so when I have a question she was right there. She did a lot of the assessing and I could watch her but then I when I became the classroom teacher of my own, she was no longer there but I feel comfortable doing it because I had that experience with her.

Question seven through twelve deal with your staff development exposure. Question seven, in what specific ways has staff development assisted you in integrating technology into your teaching?

Larry: Okay, when I, when I student taught I student taught in second grade in the my first teaching job was actually in fourth grade. Um, in fourth grade we did not use, um, programs such as Waterford, but in second grade we did. The next school year I was moved from fourth grade to second grade at a different school. When I went into the second grade I was back to having to do Waterford. Well, in student teaching they were already accustomed to using Waterford. I didn't actually pull the Waterford reports; the actual teacher did that. So, when I went to second grade as the classroom teacher, it all fell back on me. So at the beginning of the year, I was able to go to a Waterford training session. There, I went to a computer lab. I sat down with the Waterford technician. He went through everything with us. He showed us everything using the SmartBoards. So, when what our screen said was the same thing he screen was saying. And I was able to see how to pull the reports, how to use that to analyze, how to use those reports to group my children based on the skills that they needed the most help in. Um.

Number eight, how would you describe the focus of your staff development in technology integration? Is it on pedagogically significant integration efforts or on technology as a standalone component?

Larry: I think it's, um, I feel that it's an integration of both; it's a combination of both areas there. Um, not only do they just give a staff development we're not only attending staff development that focuses on just technology but it on incorporating all areas to pull the technology teaching all the standards teaching across the curriculum using technology to pull it together. Um, from what than I know I went to a summer session and they use technology as to how to assess your students, not only just as a teaching method, but a way to assess as well. Because we know that your student testing will be done on the computer using technology. So it's a way to incorporate in your classroom now so that students are becoming more familiar with and teachers are becoming more confident with it.

Okay, how would you describe the follow-up activities associated with the technology staff development?

Larry: Um, in some situations it was really good because I was able to go back to my school and actually, um, not necessarily train the staff but maybe like in our grade level meetings I was able to go back and tell my other teachers on my grade level this is what we did here. Um, there were some of them who had been teaching a while and they are not very comfortable with technology, but because I was able to go to those workshops and I was able to pull it in the way I was able to sit down one on one with them and say you know we could actually pull reports doing this, we could group our children like this, we can create an intervention pieces based on this data that we're getting from technology. Um, ways that we could actually incorporate technology in the classroom based on that data. Um, just pulling the different technology devices there and actually incorporating them in the classroom versus just putting a piece of paper under the document camera and say we're using technology, but using it in a way that is meaningful to the children as well as the teachers.

Um, how has your classroom dynamics changed since participating in the technology-related staff development?

Larry: Um, for one I know that the children seem more interested in things, um, versus I know this year I'm using technology to create PowerPoints for notes versus just writing those notes on the board something like that. Um, using things like Microsoft PowerPoint, using prezi.com, other ways to do to get the same method across but in a different approach; something that's more meaningful to the children. It offers sound, it offers graphics, and different things like that that are actually motivators and pullers that kind of draws the children in, and then letting them actually get up and manipulate instead of me just doing something on the SmartBoard. Using a SmartSlate taking it over to a group and telling them, alright,you manipulate this problem, you solve this problem on the SmartBoard from your desk, but using the SmartSlate. Um, changing the colors and different things like that, incorporating the iPads and the actual mobile carts that we

have here school and pulling all those things in and allowing the children to use and be a part of the instruction.

How has the staff development altered the way you present lessons and how you assess?

Larry: Um, it offers different avenues you know it shows you different ways that you can actually do things and not the old traditional way. Um, it allows you to assess in a different way, you know, um. For one I know when we were doing in my math class this semester we were doing divisibility rules and I was able to check out the mobile lab and in the library and over the weekend I found this cool activity online that gave different, um, games and strategies that the children could do. I could either do it whole group on the SmartBoard, but I decided check out the mobile lab, have the website available for the children, and they were able to go there and play these games which was to me to them it was a fun game way but it was a way for me to assess the children. Because it would give them a number, and it would say you know, how is this or is this number divisible by this number and then from then I was able to see really quickly informal and formal observations of my students who knows the divisibility rules. You know if they could or if they knew that this number is divisible by that one that I could even deepening by saying but how do you know you know instead of well they could have just guessed. It was a way that I could walk around quickly accessing and a fun way for them. They didn't see it as a test. They saw it as we're playing, but to me it was playing through learning.

How has the technology staff development altered the way you interact with the students and how you allow students to interact with you and each other?

Larry: Well, um, our children they are very technology savvy; they are very technology driven and the first day that I checked out the laptops you know they they have used in another classes but not necessarily in my math class. So, the first day that I checked them out they thought, wow we're going to use the laptops today. Well, from the then they were saying why can't we do this every day. You know, this is a fun way that we can learn, we're working, we're learning, but it's fun. You know, it's a different way. Um, and then they were able to form groups, you know, they were able to say well this game this is a two player game so can I partner went with my friend and let's interact together and do this together. Um, from that they were it kind of creates a different… I see it as creating a different bond between you and your children; it's another way, it's another avenue to get the same point across but in a more exciting and fun way for them. Um, they're able to interact with their peers. Um, I know I've talked to other teachers and they've done different things on the computers where they've done virtual field trips. They've actually videotaped classes and they sent things him you know they've kind of swapped videos with each other's classes and the children are able to see well at another school they're doing this, you know, and then they're able to pull that together and say well, we can do the same thing and kinda do some virtual things across the technology. There's so many opportunities and things that you do, just pulling it in and doing it.

Questions thirteen through seventeen deal with your feelings of self-efficacy as it relates to the integration of technology. Number thirteen, describe how you feeling making instructional technology selection based on curriculum standards.

Larry: When I have the opportunity, I always try and start ahead of time to see you know what actually can I pull in to make it more meaningful what can I pull in to help me, um, further my instruction. Um, I feel comfortable if I have the opportunity to do it ahead of time. I feel a whole lot better about using the technology. Um, I don't like a spur of the moment thing, but we always know that there are those times when technology doesn't work as well or doesn't do what we need it to do and we have to take a different route there. But, um, I feel comfortable enough and I think to working in the field experience and drawing up, growing up in the era of technology. You know, when I was in school we didn't have as much technology now, but we had a lot more then say my parents or my grandparents did. So, being able to use that technology for myself, I feel a lot more comfortable with it and then moving into the classroom, um, working with other teachers, working with my mentors and different things like that, being able to explore, I feel very confident in using the technology in there.

Explain how your current technology skill sets assists you or inhibits you in using emerging technologies that can increase your effectiveness and productivity.

Larry: Um, I think the skills that I have really I don't think it prohibits me at all. Um, I think if anything it enhances, um, it enhances the lesson, it allows me to find different things. Um, I don't feel, like I said, I don't feel it prohibits me at all. If anything it enhances, it helps a lot.

How would you characterize your confidence level when attempting to keep abreast of emerging technologies?

Larry: Um, my confidence level I think is pretty high. I feel, like I said, I feel confident in using it. Um, professional development really helps with that because I'm able to… I am a very visual learner so when I'm going to these technology workshops, I'm going to any type of professional development, if they are using the technology right, they're showing me exactly well you know you can do this and I'm able to see it, feel it, touch it, do it, manipulate it right there it makes it a whole lot better for me. And then once I go back I know they can't show me everything but if I can see the bigger picture of it, I can always go back and sit down at my leisure and go through it and feel and find exactly what I need and you know it may not work exactly the way I want it to, but I can fit it for my teaching style and modified it to fit my students' learning styles.

Discuss your ability to implement instructions that allows students to use technology in problem-solving and decision-making situations.

Larry: My ability to implement it, um, isn't as strong as I would like for it to be because we can always enhance, we can always change, we can always increase that level there. But, um, like I said I feel very confident using it. Um, and I know that there are opportunities out there, there are other resources out there that I can go to and say, hey, I

want to do this, I'm thinking about using this piece of technology. I'm thinking about using it in this way, but do you have another suggestion, pulling those suggestions in, and then being able to attend different professional development opportunities. Um, I know the county offers a lot. I know there are in-state and out-of-state opportunities. Just a couple of weeks, they had an iPad training in Charlotte that I really would've liked to of gone to, but I think it was during the time of something else here at school, and I was't able to go. But knowing that those opportunities are there that those resources are there, that those people are there really helps, and really makes me feel a lot more comfortable knowing that even if I can't do it right away or if I can't figure it out for myself there's always somebody there this always an opportunity. There's staff development there's professional development that I can go that I can say, hey, I need some help doing this; as a mentor there, there's somebody there that can help me through it.

And then our final question, explain how adept you are using technological resources (spreadsheets, databases, portfolios, etc.) to analyze assessment data for enhancement of your teaching practice.

Larry: Um, I feel that I have a really good handle on that. Like I said, you know in student teaching and, um, through my college years, you know, having that opportunity in the school of education has really helped. Um, having a background in mathematics education, um, we had to do a lot of spreadsheets and documents and taking data, um you know, they're giving you a list of students test scores and different things and you were able to go through, uh, analyze that data, compare with another group of data, put it in a spreadsheet to show, um, create a graph to show the percentages there, and different things like that. Being able to, having those experiences through the college years and then now being a testing grade and being a Master's program, myself, those are opportunities for me to get contact hours in. From our benchmark scores from just this past month, I was able to sit down with our principal and actually go through for our grade level and compare those test scores with our grade level as opposed to another grade level. Creating a spreadsheets documents to analyze that data and get it in a more user-friendly terms or user-friendly document that I could actually look at and say alright here's our strong points, here are weak points, this is where we need to go, these are things that we need to incorporate. What is this grade level doing that another grade level isn't doing that, and it's evident through that document it's evident that whatever they're doing is working there so we need to try something; take another alternative route there.

Focus Group Transcription

Question one, what specific training, courses, or experiences have enabled you to employ technology into your pedagogy?

Beth: As far as formal training, unless you want to include internship, that was what opened the door for me. Because my internship-the teacher was all into the SmartBoard; she knew it front and back. They had had really good training on it at their school. So, when I got in there, it was just automatic-that's how we roll, that's how the class operates, it's in there everyday, this is how it works, by the way. But, it was just

common. So, that got me familiar with it so that when I got my own, then I, it just kinda was easy.

Larry: Second nature.

Beth: Uh-huh.

Kimberly: I would say, we interned at the same school too.

Beth: Different times.

Kimberly: Yeah, and the whole classroom was centered around the SmartBoard. So, the board was in one direction in my room, and the SmartBoard was in the other. And instead of the kids facing the board, they faced the SmartBoard. And then that white board was for like, extra support; it wasn't the basis of the room, like in most classrooms.

Larry: I'd have to say my student teaching experience was the most beneficial to me. And then once I actually became a teacher, um, going to different SmartBoard trainings really helped, um, that the county offered and that our school offered. Um, we had people who were very familiar with SmartBoard; teachers who were on site, who were very familiar with the use of a SmartBoard, and they conducted training. So, many, you know, having that opportunity to go, and then in county at different schools, I've gone around to different schools in the county and been involved in several of those workshops as well.

Linda: In terms of formal training, like, in college we had an education technology class, but we only did, you know, basic things: Microsoft Word and Excel, I mean, stuff that I pretty much already knew how to do. I mean we really didn't look at educational technology, stuff like SmartBoards and, um, things like that so, like y'all and you know most of the stuff that I learned about technology was through my student teaching internship and then in the classroom itself. I did learn NCWise, which was useful with our county (laughs) when they moved to the NCWise program. So, that was pretty cool.

Larry: Um, also, during my college years, um, I have a mathematics concentration, so, in that area we had the math-teaching math and technology-integrated course there and from that I was able to utilize a lot of different math technology and things. Things that I could do with technology there, like, Geometer's Sketchpad, which was a software all about geometry, and you were able to put formulas in and, um, actually build geometric shapes and test the angles, and rotate and flip, and slide and do all of those different things there. So, with that technology, with that experience in college, really helped as well.

Susan: I never had any college classes with, as far as technology. All my training come from, we were a Reading First school and the first year I got there, just getting SmartBoards and document cameras, everything, and we had training on top of training, on top of training on how to use it. So, we became very familiar with it through it. Most

of my training was in house, um, classes and going to different, ah, training sessions that the county offers.

Heather: It seems like I had a different experience than all of you, cause all of my technology just came from me playing with it. Um, my student teaching, I mean, I had to teach the woman how to open her email, it drove me nuts. And, you know, in college (she still doesn't know how to do it) in college, we only had one SmartBoard in the whole college. I still remember I had one class in that classroom and the chalk board was around it, and he just wrote and wrote over the Smartboard and then kept going, never touching the SmartBoard, so. I was like, oh that thing's really cool, what is that? And then I get here, and I'm like ooh, SmartBoard, what, what's going on, and oh, you can touch it, that's so cool. So, I sat there and played with it; I never got the training because I came a year or two after her, but that's just me…I like to play with stuff.

Kimberly: I agree with you to that. Even being in an internship where they did use it, I feel like whenever I got to the classroom they were already there, and they'd throw you in, and you should already know how to use it-like that's their mind-set. So, it did take a lot of playing and Google. I say Google's my best friend.

Heather: If you don't know how to Google, then you're pretty much lost (laughs). Cause we have teachers at our school that like, I mean, we went to learn how to open our email four times, when they're at workshop. K-2 teachers still learning how to use Gaggle and on that and YouTube, and I'm like you know what…I know how to do this. But they're so uncomfortable with the technology they don't, I don't even know how they use it.

Kimberly: We've had, we've had workshops where they teach you where to put your cords into the computer. So, like, for people who know what they're doing or need help with other things to get even better, we're like, it seems like…

Linda: They're not really differentiated…at all. Because I'm like you, I like to play with things myself and figure it out myself, that's how I learn technology. And that's pretty much how I've learned what I know other than going to workshops. But, yeah, it's…

Larry: Experimenting has been the best teacher.

Susan: You know, I was a BK major and I went to my interview at the school and they're like, oh we're getting SmartBoards and document cameras and we're going to have the most technology of any school in the county, but Okay, what is a SmartBoard, what is a document camera? Because BK classes did not have any of that at UNCP. So, I get there the first day and it's just sitting there-it's just sitting on the cart, waiting on somebody to connect it all together and show us how to use it. And one afternoon, I just said, I'm not waiting any longer, I went ahead and connected all mine and started playing. And our Reading First Coordinator come by, and she's like, how did you figure out how to do that? I said, I got sick of seeing it sit on the cart; I just put it together, figured out where the cords is, played until it started working.

Heather: It's color-coded and all the different shapes.

Okay, question number two, in what ways have your prior experiences with technology integration contributed to your distinctive professional development schema?

Susan: You're talking about wasting a lot of time just sitting there listening to people talk about how to do something that you already know how to do?

But how do you know how to do it; what prior experiences got you to this place?

Kimberly: I took a class in either middle school or high school and I think it might, may have been middle school, I don't know how I ended up in that class, what it was. But we had to do that there, that was one of the things that we had to learn, is how to put everything on the computer together and what cords went where and all of that. And I think, I don't even think it was a class, I think it was like, a few kids got picked out to go every now and then.

Beth: Well I didn't get that lucky. But it was a matter of, um, requirement that it be used and so you're kinda on your own, and so you're like, ooh, if they walk in and this isn't being used, I'm up a creek, so…I better figure this out; it's a trial and error situation…where you just, it's basically just, where you plug it in and see what happens, if sparks fly, you unplug it real fast (laughs). I mean, it's just…I don't think it was any, um, professional development or any specific class, or I don't think it was anything, um, any outside source, other than just a need to know what in the world is going on and figuring it out for myself. Because, in a situation where you come in, especially in mine, for me, because I came in mid-year, all that new welcome, let's get you set up, all that fun stuff is…no, we're, it's down and dirty, especially fifth grade math, it's we got, we have things to learn. In a matter of two or three months, you're gonna start doing review; you're not teaching anymore, you going backwards. So, you need to have your ducks in a row. So, I think it was, um, a situation of, um, sink or float, so you have to figure it out. So, I think when you're in that situation you're more apt to build on what, anything you've got, that you have used or learned in middle school or high school or in, some, whatever you got in college and just figure it out. I think that that's the only way that you're going to survive, it do that, because all the professional development, it's what , what she said, it's either way up here-where it's talking about programs that I'm not even gonna click on, yeah, it's not even relevant. Yeah, because if they have professional development, and I speak generally, it's usually they pull in K-5, they pull in everybody, and you may have components that are just for ELA. So, if you teach Kindergarten and they're talking about how to have a novel displayed on your board…and manipulate that novel and take and list of features and all that stuff, that's not doing you any good, you don't need to know that. So, you've got to go back to the basics and figure it out for yourself. So, I think it's just a matter of sink or swim…in my case, that's just my personal case. Because I guess I came in mid-year, that's just natural to me at this point, you just figure it out.

Larry: And then to add to what she said, when I was in elementary school, I just, I've always enjoyed technology. And then I had a teacher who was very, she utilized the technology that she had; she knew the importance of technology, apparently she could

see the future and knew where we were going. Um, and she sparked an interest in me, you know, she would always suggest that I use a computer, maybe talk to my parents about getting a computer. Um, which I had a computer at home, but I never really used it. And then, I remember in seventh and eighth grade we had to take a computer skills class, and there you know, we learned to, how to hook up a mouse to the CPU, how to hook up the keyboard. So, you know, you learn those foundation things earlier, and then going through high school seeing different things being utilized there. And then in college, you know, the few experiences that I did have, um, such like I said before, like the Geometer's Sketchpad that I thought was very interesting. You know, I found that that was a way that, if I was going to teach geometry, hey I can use this to enhance the lesson. It would brighten things up and just using those experiences that you did have and having a drive for yourself, knowing that, hey I have this, I must utilized it in some way, how am I going to do it; how am I going to use that to better help me, to better serve my students?

Heather: I think you're right. I think it has a lot to do with the people that introduced the technology to you. So, I know my dad when I was little, he was always playing with the computer with the little green screen and the floppy disks, and stuff. I learned right away that you know, you can't Bethak it; you can mess it up a little bit, but you can't Bethak it. So, now as an adult, you know, I'm not afraid to play with things, play with new technology, because I know I'm not going to Bethak it entirely, it's not gonna die on me.

Larry: There's always a computer geek out there that can help me do something.

Heather: Exactly. And some people out there are so afraid to play with it; they're going to crash it.

Beth: I hadn't thought about that but that's true. Because I can remember, now that I think about it, um, I lived with my mom and I visited my dad. But at my dad's house, I had my own room. And my grandfather owned an insurance company and so he had gotten new computers for his people, and I got one of his old ones, and it was a green screen with the big floppies. And so my dad bought a clown game, oh, I thought I was something. But I realized then how to use the big, I mean, like even if it was just playing, people don't know this, but if you add all of the numbers on the little keypad, that equals 45. I know that because I did it about a bagillion times (laughs). So, because I would just…see it equals 45…one plus whatever all the way through nine, it's 45. But, because I just played, so I guess it just comes off, not naturally, but I guess if you're introduced to it at a young age, it's kind of like teaching a toddler to speak two languages. It comes a lot easier.

Kimberly: It's second hand…

Linda: And that's true because now I'm thinking about what you're saying, and you know, we did do a lot of computer stuff. Starting in elementary school with Oregon Trail and when we got to middle school, we had the computer skills and then by the time you get high school you take Computer Apps 1 & 2, and maybe even 3.

Larry: Digital Communications and all of those technology classes…

Susan: We didn't have anything 'til I got to high school, with computer soft-uh, computer programming class. And just seeing how you could come up with your own programs and create you a program and do anything you wanted to do. Was, that's what made me fall in love just with technology and how to use technology, different things you can make that computer do. And how the teacher, like you said, that's excited about using, showing you the things you can do with it.

Larry: And like I said, she didn't have a lot of technology, but she utilized what she did have. You know, and I enjoyed it. I thought it was just an exciting thing.

Questions number three, what would you recommend to positively influence staff development initiatives aimed at technology integration? What would you recommend?

Beth: Make it…differentiate it.

Make it relevant, differentiate it.

Kimberly: I would say…the time thing, we go in and they say bring your computer, and either we don't use it at all, or they're telling you step-by-step-by-step how to do something. To me, if you want us to use Discovery Streaming then, say okay, here's discovery streaming, here's how you get in, this is your password, you have ten minutes to yourself, or fifteen minutes to play with it, and see what you could do, Because, you telling me step-by-step is not doing me a bit of good.

Larry: And I say how…

Kimberly: I'm like on Edmodo… (laughs) texting people across the room.

Larry: I say well, multiple sessions, you know, don't come at the beginning of the school year, September, when I'm swamped trying to do beginning of the year things and hold an hour session just to do whatever. And then I don't see you or hear from you ever again. You know…

Beth: And then you get a report two months in, well you've not been using this.

Larry: I know I've had to go to Waterford trainings and things and on…that first Waterford training, he could not get something to cooperate so, we never learned how to pull reports and do different things like that. Because, I was in fourth grade where we did not use Waterford, but then I go to second grade, where it's mandated, but I have no idea what to do. And we have that one training session and never again do we have anything else the entire school year. So, I say, you know, hold multiple sessions, have focuses, you know, start here and then maybe monthly, bi-monthly, have a different focus-we're gonna learn this, we're going to do this, and actually go in depth with that and utilize it to it's fullest potential. Don't tell me that I can do this, but don't show me or allow me to do it and then expect me to do it later.

Susan: Yeah, cause like you said, there's teachers starting at all different times of the school year that are gonna need to know the same information.

Larry: And I don't have the time to sit them down and say, you know, you need to do this. If you're a professional development coordinator or planner or implementer that's your job.

Linda: And also by subject area to, you know, there's going to be things with math and science that, you know, hey with social studies I don't really need to know that. You know, where as, you know English and social studies, you know, we may have similar needs, you know. Especially when we're reading things like…yeah, the Constitution, stuff like that it would work but. Um, yeah, I would say definitely separating by subject area.

Beth: I think having it succinct and organized is important, because, especially, like, with this year. This is what's in my mind right now, this is fresh, it's raw, it's right here, we were given multiple resources to use for the year, and I understand that these are important, that's awesome, but there's six of them, and you're giving them to me at staggered points. And there's no, it's just hey this is this, use it-here's your password, make sure you use it. Or and then, like, two or three days you get another email or you get something put in your box-and then two months later, it's like, well you're not using any of this.

Kimberly: My thing with that was, with those six things, whenever they realized that you weren't using them, you go into a meeting and you go over all six things within an hour.

Beth: Yeah.

Kimberly: So that doesn't…it defeated the purpose of it.

Larry: You tell me to do all of this, but nothing is getting done.

Beth: And bring your laptop, and bring (laughs) your laptop, but we're not going to open it.

Kimberly: And then go plug it back up.

Beth: And I understand that these resources are important because we're paying for them, they are important, I understand that. And I realize they offer wonderful things to our students, but I feel like if it was put out in a neat format, and it was like here it is, we're going to talk about this one today for a half an hour…I'm going to talk for ten minutes and I'm going to give you twenty to play, or you know, whatever ratio you want to use, as long as the ratio of play is longer than the ratio of yak. Cause I don't need to hear you yak, just tell me and let me do it. But…this is one of those things where, don't pull me into the meeting, the hour long meeting, where we're gonna cover six, and treat me like an idiot when I don't understand. Because I would understand a lot better if we

had gone over it like this in the first place, and it was talked about one by one. But when you give them out scattered, and then want to know why I'm not using them…I have no idea what you're talking about, Discovery who? Like A to Z what?

Kimberly: And only three of the six are for upper grades.

Linda: Something that I'm hearing is follow up; there's no follow up. You get it, it's there but then, you know, one month later, two months later, there's no going back and saying, okay why…have you been using this?

Larry: How far have you progressed?

Linda: Yeah…do we need a review, you know…

Heather: It would be kind of interesting to do you, the two ideas together and have a choice…to, you know, train on. You bring, like, six people in and this person's going to train on A to Z, and this person's going to train on Discovery Ed or whatever. And then the teacher gets to pick what they want to learn. Like, I have no idea how to use the iPad, I'm going to go over there, I'm not going to go to the hey, how do you open your email one, because I know how to do that. So I get to pick, do I feel like learning one, and I get better at that one thing.

Beth: Cause centers are big right now; let's utilize it for teachers too.

Kimberly, Linda, Heather: Yeah, yeah.

Larry: Let me perfect this one thing…then I'll move on.

Beth: I love like, differentiation and centers are huge right now, but we don't use them in teaching teachers. So…

Linda: Of course not, we listen to lectures like an hour long.

Beth: And that big 80/20 rule you hear every day; they should be doing 80, you should be doing 20, okay, well, you do your twenty and let me go do my eighty, and we'll be doing great.

Question number four, what specific strategies, activities, or characteristics would describe an effective technology staff development training

Beth: Centers and differentiation…next question (laughs).

Larry: I think the hands on and the follow ups are the two biggest things. You know…going back…and revisiting.

Kimberly: I think choices, yeah, because like, like she said with the, half of them need that over there, you know, they need to learn how to put something together. But, I don't need to do that…

Linda: Or to get onto NCWise…we don't need …it's a waste of time

Larry: Sometimes at our school, she doesn't really require that you go, you know, like um, our librarian came around today and said to all of us, who have just received the new SmarBoards, do you feel that you need additional training on the SmartBoards. If you don't, then you don't have to.

Kimberly: At our school every one would say no though…even though they need it, they wouldn't say they do.

Heather: It, we wouldn't get an option…it would be like, you're going to that.

Well, I give the option; I sent that email out to the staff, and said the ones of you who want to go, sign up, so that we know that you're going.

Larry: Yeah, our principal did the same thing. If you want to go; if you feel that you need to go…

Kimberly: Our staff, even if they knew that they needed it, would be like, I'm not going to that…and waste my time.

Beth: That's why…but I think if, just think about the possibilities you could create if you did take the center idea and you did, you had this table for this, and this table for this, and I said well, you know, I would really love to know that A to Z thing, and Judy says well, I am all over that Discovery Ed, and we're both in the same grade level, then you've got an expert on A to Z and you've got an expert on Discovery. So they could come back, just like we do in classrooms, if you can teach it, then you know it. She comes back and teaches me, I teach her, now you've got two experts in half the time, and we both are happy, because we got to do what we wanted to do and then we helped our partner when we needed to. So, I mean, it's not rocket science.

Question number five, explain in detail how technology integration has improved your professional practice as an educator. How has technology integration improved your professional practice?

Susan: Makes it more engaging for your students. They get more into the lessons. You give them some kind of technology component…

Kimberly: They don't think that they're working…or, they don't think that they're learning anything.

Larry: It's fun, we're playing.

Beth: A perfect example was, like, today, today we did a collaborative project with, um, learning common, through the library and we had three centers running. And one of the centers was, you had a non-fiction books, a stack of non-fiction books and they and six components they had to locate, like the title, the author, the illustrator, the glossary, caption, the label, things like that. Well, the media coordinator's over there and she has a digital camera, and so when you find one of your components, you get to take that digital camera and take a picture of it, and then you're going to print your picture off to show the class you know what a caption is, and this is what it is and you used your digital camera to do it. You would have thought that the world had just turned gold…because they were beyond excited. And, yeah, it's a digital camera, most people know how to use it, but a first grader doesn't. And so today, they got a hands on experience learning how to do it, and they were running to the printer, literally, she's like, you're gonna fall, quit running, they were running to the printer to print those pictures and to bring it to me. They were like, I know what a caption is, and I'm thinking you just realized you know what a caption is. And it didn't take writing, it didn't take anything, it took a digital camera and you were on the verge of wetting your pants (laughs).

Kimberly: That's something where their parents probably say, you know, don't touch that. And it's like, ooh, I get to touch it.

Beth: Exactly…and she's, like, standing there with two of them dangling, when you find your component, you just ask and you're ready.

Heather: There's so many people who grew up and don't let them touch the camera.

Linda: You know, at the high school level, especially with AP now, I'll give them a project, a research project, and give them their parameters, set them on Google and let them go. I mean, they've had the writing training, they've had the research training, so you know, I mean, they love doing stuff like that.

Beth: It's a sense of freedom almost. Because they had that control; you're not there, but you are there, and they're just like, oh yes, let's just see what we can do with this. Cause, you know, Google…the options are limitless.

Larry: And to, I think it makes our life as a teacher much easier. I mean you know, like, if you're teaching, yeah, if you're teaching a unit and you found a WebQuest that deals exactly with that unit, the exact things that you were going to teach, but you allow the students to search the WebQuest and find those key points for you, your job's over. I mean, you've led them, you've helped lead them to their information, and now it's up to them to compose that information and learn that information and apply it in different places.

Beth: You're not a teacher anymore, you're just like a facilitator.

Larry: You're there for the support. You're there to just walk around and monitor and assist when needed and, now you have that chance to pull for small groups if you need to.

It's a, but seriously, technology should allow us as educators to relinquish the tight control that we have historically had on the dissemination of information in the classroom. And it should empower students to self-learn, you know, almost like…

Larry: And it does, I mean, they see, they're not listening to you. You know, and now I can, I can learn on my own and a lot of students today, they are tech savvy; they are all about technology, they are all about let me play, let me do this, and what better way…they're learning…

Susan: Being with those that have never seen it before, they've heard of it, they've never had the opportunity to put it in their hands and use it, just like our iPads at work. When you say here, this is for you to use they start fighting, who's getting it first.

Beth: You know, in like first grade, I speak from that point of view, our options are not quite as broad. Because we can't, we can't give them the research project and let them get on Google…because they can't handle it. Just a thought of them being up on the SmartBoard manipulating things and finding answers and, you know, doing math work or doing, or find nouns or whatever their doing, that, I think that gives them the sense of ownership on their own learning, because they have that opportunity to go out and they're not necessarily exploring…to them I think it is, because it's like you said, it relinquishes…we're done, we're just stepping back, we're good.

Larry: It empowers your students.

Heather: They don't get bored. Because you can change it everyday. But I thought the same thing about second grade; that they wouldn't be able to handle it, the technology, but my kids are making PowerPoints. All I have to do is click undo if they mess something up, I just go, click undo and they're like oh, it's back. (laughs) I mean, they're sitting there, they're making PowerPoints, they're learning how to type and change the font color, because you know, they just play with it. You know, they put pictures in, they shared them with other teachers, they're ecstatic. They don't have to write, this is awesome; they love it. It's amazing what they can handle.

Um, question six, wow I wish I had seven, describe in detail how the integration of technology into your pedagogy has empowered you as an educator? How has it empowered you?

Susan: You feel like you're actually getting something across to the students; they're actually learning it and it's not taking you as much work yourself to get it done. They want to go to it. They're asking when are we going to do this.

Larry: Can we do this everyday? Can we do this every week? You know, I check out the mobile lab and they're like, why can't we do this every week? We're not the only class in the school you know.

Beth: Yeah, my kids will know if, we're not, if we have a week where, of course they've said it this week, well we really haven't seen this this week, and I know that's what

they're talking about, you know. I think you also get a sense of, um, almost like you're giving them, like, not a gift, but they don't get that stuff at home, just like the digital camera-don't touch, like you said, I think the fact that they get to come to me and I get to give that to them, it's almost like you're making their little day, when they get together on that SmartBoard, because, when it's their groups turn to get up there on that SmartBoard, they are ready. If you say stand on your head with, you know, your arms in the air, they're ready, they're gonna do it, just to get on that SmartBoard. Because they want to do that, and so, you know, especially in our school. Because our students are so, like, poverty-stricken, I mean, we have real needs, you know, serious needs. And so, it's a, and they're little, they're little people, so I think the fact that they can come and they can have that access, and it's not limited, it's not ooh you broke it, you're in trouble, it's not don't touch they can have that freedom. I think it's almost like, you almost feel like, yay, like you have given them something that they can't get elsewhere, it's like they feed off of it.

Larry: Like I said generally, you feel empowered to empower them. You know, to allow them to now take ownership and do for themselves.

What would the act of exposing a child in, to a piece of technology; think about what that act of just exposing them to an iPad, a kid coming from an environment like that, what would the act of exposure do for that child? What do you think?

Heather: Oh my gosh, it would like open up the world to them.

Beth: Yeah, I agree. I have a child now who, um, has no technology at home. He is so into just computers and games. And he sees it on TV, so he knows that it's there, so the fact that he gets to come to school and even see a, well now we don't have iPads, but see the SmartBoard, or to have that opportunity to touch that digital camera like he did today, or to get on the computer and even deal with the computer, because you know, that's not even an option. He'll tell you, I'm going to go to school and I'm going to be a graphic designer, that's what I'm going to do, I'm going to design games. And he's very serious, I mean, this child does not play, Perry is no joke…and that's not his real name.

Kimberly: That's an inside joke.

Beth: But he is very serious about that, and I think that if he did not come to a school that was technology savvy, where he saw that this stuff really does exist, the possibilities are really there, then I don't think that he would consider that even an option. I think he would think that it was a thing that happens on TV, and it's not real because TV's not real and that's where it stays. But because he's had the opportunity to see it real live person, touch it, manipulate it, play with it, he knows that it can happen. So, I think that's a brand new door opened that would have never been opened before. He had the opportunity, it would have never been…a realism for him.

Kimberly: I think it's great where the high poverty schools, we do get that. Because there's some schools that have the money or the doctors or lawyers as the parents that don't have that technology. They may have it at home, but they don't have it at school.

And hopefully it will get to the point where they are at that, but we have it where they don't get it at home, and then they get to come to us and we do get to open a whole new world to them. And they learn fast.

Larry: I think it, you know, reforms their mentality, you know, they see that, um, maybe it's a motivation to get them to school. Hey, at school I can use this, hey I'm going to be at school everyday. You know, for your behavior children. You know, use it for a positive for you as well as them. If you're doing this, then, hey, you have thirty minutes of iPad time.

Kimberly: And I've done that, and I did it with time, like, this is your time, so you have to know how to work a clock. Because if you don't know how to read that clock, then you're going to miss your time.

Susan: I have a child that if he does good for the day, last year it was cry and scream all the time. But I figured out, he loves computers, and then when he realized I had an iPad, it's not, I don't want to go to the computer, I want your iPad. Well, you've got to go all day without crying and screaming, putting your hands on somebody else, if you do that then you get your time in the afternoons. When it's about time for his time, he says okay I haven't cried today, I want the iPad. And he'll go unplug it from my charger at my desk, go where ever he wants to in the class and sits there, he knows how to manipulate it, get in any game that he wants to, knows how to go on the Internet, whatever he feels like doing for that day. And it has, his behavior has just since the beginning of the year has changed, you know, everybody is amazed at how well he's doing, and it's just because he knows, it's that behavior. You cry one time, or you do something wrong, it's automatically gone.

Chris: So, you've been empowered as change agents, as far as discipline, controlling that. You're empowered as a better time teacher, because that was one of the hardest things for my kids to learn. I never have thought about that.

Kimberly: Oh they know they're time not…they know 11:55, it's my time (laughs).

Larry: I've reached you in some way.

But that is a perfect way to teach time, but I mean all the elementary schools need to do it. Um, and then the thing about the story-open the doors for a kid, and it's like, wealthier families go on field trips to go, or not field trips, but summer trips to see the Grand Canyon or the Hoover Dam or that kind of thing, where a lot of our kids never leave the county. But a piece of technology can open the door and will allow you, empower you as an educator, to expose them to that.

Linda: Something that I hear is, there's a big level of inequality in access, even within our own county. It would be great if our principals could get together and get on the same page. Because like I said, I mean, I would love to do more research type things, especially with AP, you know, they're going to college next year, but I'm having to fight against Benchmark testing for the mobile labs, I'm having to fight against the fact that we don't have mobile labs any more. Um, the iPad labs that we have are given to the

English teachers, so I think it would be great for the principals to get together and get on the same page with the technology.

Kimberly: And that it's important for all subjects, not just English and math.

Linda: Yeah, well of course, they're the EOC tested.

Kimberly: But they need to know everything else too.

Linda: Oh, absolutely.

Kimberly: And also with history, like for me history is boring, but I found that Under Ground Railroad

Larry: I was going to say…

Kimberly: Have you done that? Oh my God, the best field trip ever. And they got to choose, you know, are we going to knock on this person's door or not, and you know they all want to knock. And I don't know, just things like that where you could actually go and do it, or feel like you're doing it.

Larry: If nothing else, it motivates them. I mean, you know, it makes them want to do it. You know, we talk about how they don't want to do a lot, but doing, allowing them to do things like that, it enables them to do, you know, it brings it, it makes it real life, it makes it meaningful to them. And they are going to, if they remember nothing else, they will remember that, and they remember that why, because it was meaningful to them; it was beneficial to them.

Beth: Well, you see what sticks out in our brains, I mean, you think we in college we can remember WebQuests out of four years of college. We remember that and that was only because it, we had to do it, we had to do it ourselves, we had to take ownership of it. And that was it, I mean, it was all of, it was all up to you. So, if they have to do that then I think it's got to be burned in their brain more.

And what about the act of learning-passive versus active, and how technology, what role technology can play in that? You've just mentioned how you hate, might not like history, you don't want to read; that's a passive activity.

Kimberly: Oh, but if I'm doing it, or if I'm going on the Under Ground Railroad, then I'm ready, I'm ready to go.

Linda: You can highlight and play with it on an iPad, you can like text, you know that's active.

Kimberly: And we would do centers, so if it was like a multiple choice thing on the SmartBoard, they would have to, before they could press that choice, they would have to argue amongst theirselves about what it is and why. So they had to have reasoning

behind it, so that made them active. And then they had to convince this person, then before they pressed it, because you know they didn't want the wrong answer, you know, that was the right answer, you know. So, I'd definitely say that makes them all active. I mean in some cases you'll have that one that will wait for somebody else to do it.

Larry: But it sparks the collaboration and it forces those who would normally sit back and say nothing; it forces them to join in, in some kind of way, provide some type of input.

Beth: Even if they're not actually verbally saying, they're hearing the juice that's going on between these two, so they're listening to it (laughs). So it's kind of like when you cover your room in information and people say well why, well even if they're looking around, maybe they'll get something, and maybe that's what's going on…

Susan: I've taken a couple posters off cause they just went through and painted our rooms, I took a couple posters off and didn't put them back up, and they're like, why didn't you put it back up. I can't use it because you don't have it up there no more, and then you're like, that was the whole point, now you need to learn it and quit looking up there in that spot for it. So, it's a couple of things like that.

APPENDIX K: SCRIPTS

Principals

Your school has been identified as a possible site for participating in a study that is designed to determine participant perceptions regarding twenty-first century technology integration training. This study should inform college of education programs and school and district level staff development initiatives. If you would be willing to participate, I would like for you to read this consent form sign it if you agree to participate. I will also provide you with a copy of this form. Thank you.

Script used for Participants

You have been selected to participate in a study that is designed to determine participant ideas regarding best practices related to training adults to incorporate twenty-first century technology into their instruction. This study should inform college of education programs and school and district level staff development initiatives. If you would be willing to participate, I will ask you to participate in: (a) an interview lasting from 30 to 45 min, (b) a focus group session lasting from 30 to 45 min, and (c) a survey which should be completed within 15 to 20 minutes. Should you decide to participate I would like for you to read this consent form (see attached Participant consent form) and sign it. I will also provide you with a copy of this form. Thank you.

Script used for Interview

Hello and thank you for agreeing to participate in this study that is designed to understand participant ideas regarding best practices related to training adults to incorporate twenty-first century technology into their instruction. You may choose to answer any or all of the following questions. Questions 1-6 are aimed at understanding the college of education experience, questions 7 – 12 are aimed at understanding participant perception's regarding the in-service twenty-first century technology training while questions 12 – 17 are aimed at understanding participants' feelings regarding computer self-efficacy.

Script used for Focus Group

Hello and thank you for agreeing to participate in this study that is designed to understand participant ideas regarding best practices related to training adults to incorporate twenty-first century technology into their instruction. You may answer choose to answer any or all of the following 6 questions. Questions are aimed at understanding the college of education experience, at understanding participant perceptions regarding the in-service twenty-first century technology training and at understanding participants' feelings regarding computer self-efficacy.

APPENDIX L: EMAILS

Email to Principals

Hello,

I hope to conduct my study concerning how teachers perceive the training they received at the university level and school/district level related to technology integration within this district. Your school was chosen as a possible site due to the ratio of 3 students per instructional computer. If you are willing to allow me to interview teachers on your campus, please sing the attached principle consent form and return it to me. I will then schedule a meeting with you to discuss possible teacher participants on your campus.

Thank you.

Email to Participants (member checking)

Hello,

Attached to this email you will find copies of your transcripts from the individual interviews and the focus group session (if you attended). In addition you will find an additional attachment listing the themes that have emerged from your interviews. These themes attempt to answer the three research questions that I have previously discussed with you.

I am asking that you read through your transcripts and let me know if you agree that this is what you said. Additionally, read through these preliminary findings (themes) and feel free to comment on whether or not you agree with these findings. Please feel free to make any suggestions that you feel necessary. This process is called member checking and is a necessary component of my research.

Thank you.

Email to Peers (peer examination)

Hello,

Here is the email that I have spoken to you about. There are two attachments to this email. The first contains each research question followed by the answers to the questions that were designed to answer them. The second attachment lists each research question and the themes that were identified in participant answers.

I am asking you to check the veracity of the themes that I have identified. This process (peer examination) is a necessary component in my research and serves to keep me honest about the identified meanings and interpretations.

Thank you.

Email to Focus Group Participants

Hello,

I want to thank you for participating in the individual interviews. Your perceptions regarding your training will be invaluable to me in completing my research project. I now need to conduct a focus group discussion regarding the same topics that were discussed during the individual interviews. I will ask 6 questions during the focus group session and we can meet at any of the restaurants (Sheffs; Papa Bills; or Showguns) in Pembertonville on Thursday night. This session should only last about an hour and a half.

Email me by Wednesday afternoon with your selection. I will tally the ballots and let everyone know which restaurant to meet at by noon on Thursday.

APPENDIX M: TABLE OF INTERVIEW SEQUENCE

Table 7 (The names are pseudonyms)

Interview Sequence

Day	School	Time
1	Scuffletown Elementary	10:00-1:00
1	Union Station Elementary	2:45-3:30
2	St. Anthony's Elementary	8:00-10:30
2	Buffalo Run Elementary	11:30-2:30
3	Deep River Elementary	8:00-10:00
3	West Robeson High	11:00-3:35

APPENDIX N: PHENOMENOLOGICAL REDUCTION

Research Question One Significant Statements and Themes

How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction?

- Umm, I feel like there's lots to choose from.
- Because I feel like I'm comfortable with it enough that I know what I'm looking for and I know what I'm doing and I can handle the technology enough to be able to manipulate and use it to the best of my ability for it to be effective in my classroom. Umm, most of the time…
- I feel like I can handle, umm, my confidence is fine.
- Umm, how do I feel? Let's see, I'm very comfortable with technology.
- I had to, well, by being a new teacher I'm still, let's see, I didn't grow up in the digital age. I'm not a digital native.
- Nothing's gonna blow up just because I didn't press the right button.
- Um, for implementing technology, I'm very comfortable with technology.
- So, pretty comfortable.
- I, usually my technology is not the basis of my lesson.
- And so, I really don't feel comfortable choosing new things or, you know, adding new things that I've never done before.
- I think it actually helps me, because I am willing to go out and try new things.
- Like I said, I am the kind of person I'll just jump in and play with it and figure it out.
- And so one of my newest projects has been Prezi; trying to learn the world of Prezi, so that's been really fun.
- I'm usually pretty good at using the technology we have and finding new ways of using the technology,
- As soon as I find something new, whether it's an iPad app I'll try to share with my grade level and other teachers. .
- Um, and then I would constantly play on my stuff trying to figure out new ways to use it and things to do with it.
- I'm not scared of technology.
- I'm confident, I mean umm, I feel confident
- Um, I feel that I'm pretty good at finding the programs I need to help my kids become more critical thinkers.
- There's a lot of programs again online that we can pull from especially with math, with science and social studies, where they can do different games; they can do different activities; they can do Web Quests.
- I feel that I have the ability, but that goes back again to not having the time I need to really get the most out of it.
- I think I have good ability to do that [select technologies to use], because I understand what children need to help them learn and then the technology is just a piece to throw in there, because you get how they learn.

- And the technology just makes it more interesting and makes them want to learn. It motivates them.
- Um, I think, I feel like spreadsheets have been around for a while but that's something that I'm not as a comfortable with.
- Um, I am comfortable with, you know, doing a table in Word and things like that. And I know the Internet now has where you can type in your own data and use the charts, you make charts, all sorts of different charts.
- Um, as far as assessment, I feel like with things like Star Reading, Reading 3-D, where you can print off your data, I've used that to my advantage
- And so I do go on and play with it and on my own time to try to learn it so that when I come here I can use it. So, yeah I think it for me it's so-so.
- And I, I don't use every little thing that's given to me and sometimes it's because of time.
- It takes a lot of time to learn this and that for every, everything that they want us to incorporate.
- if it [technology] could be, umm, shown to teachers in a way that was easily integrated to where it's just another tool that you can use that would be ideal for me.
- But as far as me venturing out looking for things like that, there's not enough hours in the day.
- How's this going to help my kids? Can I incorporate it in the class, and if I incorporate it, is it going to be something that is going to weigh my kids down, or is it going to free them up to delve into the content area deeper?
- And as a real classroom teacher you don't have that much time to go and create all that stuff like you would want to, or even like you need to.
- There's not enough of me and there's not enough time, but… ideally, yes I want to create I have all these ideas and I don't have time to spend on it.
- Um, I feel comfortable if I have the opportunity to do it ahead of time.
- Um, I don't like a spur of the moment thing,
- I, I hesitate at first with the iPad. It's, it's very fun to use but I didn't feel comfortable, umm, integrating into the lessons because I didn't know everything about it I did not know how to make it effective.
- You can throw it out there but it's not effective so at the beginning you know you're hesitant but the more you get comfortable with it yourself the easier it is to integrate it into your classroom.
- Umm.. I have to see it.
- Like I got to be hands-on with it.
- I can't like watch somebody standup and just tell me.
- I want you to show me and I want to be able to be a hands-on learner so once I get the hang of it being able to use it myself I'm actually doing it myself then I'll feel more confident in showing my students how to use it.

- I mean, I feel good about it.
- I'm comfortable with technology. Anything I do as far as technology goes, I mean, it has a purpose.
- I'm not going to just throw something out there just for no reason.

- I just don't know if I have enough practice with them, umm, I had to go through and do a lot of it on my own
- we did it over a period of time rather than just one night or one class we're gonna do this one class we do this and we're doing a different one each night, umm, it would've been more effective.

Themes identified from these statements

Theme	Evidence
Participant confidence/skill	• I'm very comfortable with technology…I'm not a digital native. So at first I was a little bit hesitant but as far as time goes along my confidence is built up and I'm not scared anymore. Nothing's gonna blow up just because I didn't press the right button. • I'm very comfortable with technology. I'll find something and just go at it by myself and figure it out 'til I got it and I usually share with my colleagues. So, [I am] pretty comfortable".
Integration requirements must be planned and purposeful.	• I feel comfortable if I have the opportunity to do it [select the technology] ahead of time. • I mean, I feel good about it. I mean, I'm comfortable with technology. Anything I do as far as technology goes, I mean, it has a purpose. I'm not going to just throw something out there just for no reason.

Research Question Two Significant Statements and Themes

How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction?

- Umm, we had assignments where we had to integrate the Internet into it for our students.
- So we had to create a scavenger hunt type of situation where they would have to use different websites and links in order to complete the scavenger hunt to find specific documents.
- It would have to use different websites in links in order to complete the scavenger hunt or find specific documents or, you know, wordings or things like that online.
- we had to create, umm, different lessons and create different shapes and show how equations work using that piece of software.

- we had a list of different resources that were online, umm, online highlighters, bookmarks, ahh grading sites all these different things and how some of them were for us to use as teachers to help make our jobs better
- Umm I think that I got a lot of resources I got a lot of things from them, umm, I just don't know if I have enough practice with them, umm, I had to go through and do a lot of it on my own
- Okay, to be honest with you, we really didn't use a lot of technology.
- I came out in 2009 and we didn't have the Smart Boards yet they were getting ready to put the Smart Boards up.
- I didn't actually know what a Smart Board was until I did my student teaching but in my student teaching that's where I really learned how to use the technology …
- We did have to design a Webpage, umm, but that was about it as far as integrating technology
- we did, we did have to do some, umm, we did an interactive, umm, field trip, we did an interactive field trip
- PowerPoint presentations.
- we did a lot of PowerPoint presentations.
- Um, during the college of education experience we had to do several activities in different interaction with SmartBoard and word processing documents, creating PowerPoint presentations.
- I know we had a class, um, dealing with school-based things like, um, you know, how to make flyers and stuff on Microsoft Word
- I kind of already knew how to do that that stuff.
- PowerPoint, projectors that was pretty much it.
- It was mostly like a retraining on Word and stuff like that but as far as incorporating technology into an everyday classroom: our professors, I mean, we talked about it and we went over PowerPoints and stuff like that.
- create an, like, Excel document with the title of the story, the author, and what that story was about, so that anytime we needed it we could just get back to that document and pull it up, that was number one.
- how to use spreadsheets, how to use Excel, how to input, um, formulas for the spreadsheet to come up with the answers, um, how to make graphs and charts-pretty much the basic things.
- Geometer's Sketchpad, teaching us the Geometer's sketchpad, how to make triangles and circles perfect.
- We use things like PowerPoints
- Word documents and BlackBoard to submit assignments, but as far as teaching us the different types of technology, I didn't have any of that in school.
- remember Miss L. K., in particular, we get a lot with Geo Sketchpad and also we did my Microsoft Excel spreadsheets.
- as far as technology, that was about the extent: laptops, Geometer's Sketchpad, and little bit of Microsoft Excel.
- I honestly don't recall any of my instructors using a lot of technology to, to teach.
- Umm, it was usually just mostly lecture.
- using the overhead projectors or something like that but, ahh,I mean we did do, we e-mailed of course but that, that as far as that was about it.
- the Smart Board here and there.
- She always used Smart Notebook.
- as far as like doing anything with technology, PowerPoint was the most, the most, that we did.

- they used PowerPoint as far Smart, umm lessons or anything like that, that engaged us we didn't ever have any.
- It was more or less just PowerPoint.
- Basically, just the PowerPoints, maybe videos here and there like web videos.
- Again, I mean, it was just PowerPoint and projector, not really anything else…lecture.
- We used a lot of the document cameras, um, the teacher- the professors used those.
- The professors also, um, used PowerPoint and we would do, um, Web Quests online.
- The assignments a lot of times were interactive and they were using various programs on the computer.
- Um, it was mostly, when I went through, it was just lecture; except for the online classes with BlackBoard was really the only technology that I had was during taking online classes with BlackBoard.
- we used Geometer's Sketchpad sparingly and that with about the only technology that was incorporated.
- PowerPoint, but me in particular, I don't necessarily categorize PowerPoint so much as technology anymore; not in 2012, it's so basic. .
- always used a lot of PowerPoint.
- Reading was the main subjects that we had to use technology and, umm, reading together in PowerPoints.
- Like I said, umm, really the only thing that I remember is the teacher website we did a website other than that I can't remember any other technology projects I had in college.
- That would be where the scavenger hunt
- I had to present a chapter for class using a Smart Board and present that way and then I also had to write a Pourquoi, which is a story that explains why something happens,
- Let's see, the PowerPoint,
- I mean I already knew how to use PowerPoint going in there and as far as like being able to help it my instruction no not.
- a virtual field trip that was geared towards Social Studies like a region in North Carolina.
- Umm, I had one technology course in college where we had to create a PowerPoint
- we had to do website like through Microsoft.
- And in Geometer's Sketchpad, you were able to pull those objects up, you were able to expand those objects, you were able to turn those objects around.
- Microsoft Word, simple things. Um, we actually did a, um, a web search; we created one on Ellis Island.
- But that was probably one of the most complicated things we ever did.
- Webpage: we had to create a webpage. Um, we used Microsoft to type it, to type the lesson plans up. We used Excel to make a graph, a spreadsheet and then we used it to make a graph and then we had to use Geometer's Sketch pad to make our handout, worksheets.
- a PowerPoint for 3 to 5-year-old student that was theme-based that would teach, uh, a letter and color concepts
- We had 20 activities to perform on Geometer's Sketchpad, and we had to list the sequence of steps.
- Student teaching helped me see the long-term effect of technology.
- Um, so I was able to see how I could integrate it across the curriculum. So that's really how students teaching helped.
- Well, my teaching placement, I was placed in a school that it was the first year that they received document cameras and SmartBoards,.

Research Question Two Themes

Theme	Evidence
Basic uses of technology	• I honestly don't recall any of my instructors using a lot of technology to, to teach… it was usually just mostly lecture. There might have been some using the overhead projectors or something like that • Again, I mean, it was just PowerPoint and projector, not really anything else…lecture. ..we had a class… dealing with school-based things like… how to make flyers and stuff on Microsoft Word like that. I kind of already knew how to do that that stuff. …from what I saw professor-wise, most of them used, like, PowerPoint, projectors that was pretty much it. • It was mostly like a retraining on Word and stuff like that but as far as incorporating technology into an everyday classroom: our professors… we talked about it and we went over PowerPoints and stuff like that NOTABLE EXCEPTION • We used a lot of the document cameras…the professors used those. The professors also…used PowerPoint and we would do…WebQuests online • we used Geometer's Sketchpad sparingly and that was about the only technology that was incorporated
Assignments neither purposeful nor rigorous.	• I had one technology course in college where we had to create a PowerPoint about a vocabulary word of our choice. And we had to make it so the kids had to interact with it so there would be sounds on there and there were images on there. I can't remember what else but that was just the one class and then we had to present it to the professors…we never actually got to use it in a classroom which was too

	bad. • We had to design a lesson plan based upon just technology using the computer, you know, different activities-different programs on the computer or the Internet or whatever to make our lesson plans. Um, we used Microsoft to type it, to type the lesson plans up. We used Excel to make a graph, a spreadsheet and then we used it to make a graph and then we had to use Geometer's Sketch pad to make our handout, worksheets.
Importance of field experiences and internships.	• when I did my student teaching…they had SMART Boards and I had never seen those until I went into the classroom. And she [teacher] was really good at it so I came really well rehearsed in SMART Board through field experience and my student teaching. • the field experiences are really what helped me. I got to use the document camera, because it was hands on, I mean instead of just somebody telling me what I needed to do about technology I was able to use it. When I used the document cam I knew exactly how to do it and, umm, like I said how to make it interactive with the SMART Board… • that [field experience and internship] probably helped [me] more than anything else, because I was able to go into the different classrooms, different grade levels. I was able to see how they incorporated twenty-first century technology. …I found lots of wonderful resources as far as websites…different programs for the SMART Board…that helped more than anything else, actually getting into the classrooms and seeing how technology was used.

Research Question Three Significant Statements and Themes

How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction?

- It's made it very available, because, umm, our principal believes the technology is how you're going to get them. So there are Smart Boards in every room.
- There's been a lot of resources that's been provided,
- Umm and how to create specific test questions or specific probes or specific things that we want our kids to do.
- Umm also we have been given the resource of Khan Academy,
- we learned about designing a web story using pictures and animation.
- We learned that there and they had, umm, she talked about the iPad and the different Apps you could use, umm,
- learning different literacy strategies for that, but they, I mean, they had all kinds of stuff that they, umm, that they incorporated technology in.
- Oh, our staff development here has been pretty good. Um, any, ah, everything from GaggleTube, you know, GaggleTube videos, to using the, ah, it's not a SmartBoard, it's the other interactive board, to using that.
- Our staff developments have really helped us as far as technology integration, you know, exposing us to new things and new ideas and stuff like that.
- One of the biggest things as far as my, um, experience with technology training was SmartBoard.
- staff development that I've received, um, has been more or less for webpage and communications,
- It's integrated with all subjects along with the technology.
- I like that better instead of just technology by itself since we have to teach all of it.
- The students may not realize that they're doing reading, math, and technology at the same time but we know they are.
- I think it's more or less teaching us how to use the technology.
- finding the best way to integrate it and that was kinda on, on our own.
- Instead of just technology alone cause it's literacy.
- Everything that we do with technology is bringing in literacy just like with Success Maker we're bringing that in.
- It helps us learn which areas we are weak in and which ones we are strong. But it's literacy.
- more of the staff development that we have here was real basic turning on, basic functions, because a lot of people here are uncomfortable with it.
- So there hasn't been anything specific about here's how you integrate technology into your lesson plans it's more "This is how you turn it on.", umm, "Here's how you write on it.", "Here's how you erase on it.", umm, things like that.
- There hasn't been any development with delving real deeply.

- Most of the staff development that we've done I don't think really has been technology-centered. I think it's been mostly, um, literacy honestly, um
- there's not really a point in having a piece of technology in the classroom if it's just there for looks. I mean, you've got to be able to use it, so.
- Technology as a standalone component: how to turn it on, how to turn it off, how to download apps, not really as far as how I can integrate it into my specific content area.
- It's been really general.
- It's been really broad.
- Um, I've never had a technology staff development meeting where it has been solely math teachers or solely history teachers and this is how you integrate this piece in your content area and you take it to another level.
- Usually, they present and they leave you to figure out the rest.
- They'll give you A to Z and they want you to find B through Y, so that's where we're at today.
- I can't really think of any follow-up activities we've had as far as technology staff related…
- There's nothing like "Hey, what are you doing?
- Follow-up activities, hum, that's kinda slim, umm, here there's really not that much follow-up.
- We've not done any follow-up activities.
- we've done the same staff development a few times and we have to go over and over and over it for the people that don't understand.
- I know there was supposed to be a follow-up, but nobody's ever come by and said, do…unless you do it yourself or collaborate with a peer.
- our school is really, is pretty good about following up with stuff like that.
- Um, they're usually pretty good; if you need any kind of help, you can go back and they'll help you out.
- There hasn't really been anyone to come by and say okay, well let's see how are you integrating the technology based on what we've learned. let me see how you're using it, that has not really happening.
- Well, we haven't experienced any of that so far.
- It's pretty limited. All you got is incorporating this and they want to see it in the sequence of instruction and they want to see it in the lesson plans.
- It has a lot more going on in my class and a lot of it is more differentiated.
- "I want to play." ," I want to play.", I wanna play the game.", and I'm like "Okay if" ..they don't even realize you're, you're taking a quiz right now.
- for one I know that the children seem more interested in things
- actually motivators and pullers that kind of draws the children in, and then letting them actually get up and manipulate instead of me just doing something on the SmartBoard.
- Using a SmartSlate taking it over to a group and telling them, alright,you manipulate this problem, you solve this problem on the SmartBoard from your desk, but using the SmartSlate.

- Um, changing the colors and different things like that, incorporating the iPads and the actual mobile carts that we have here school and pulling all those things in and allowing the children to use and be a part of the instruction.
- our kids are more interested in it.
- He's so excited to read and I finally looked at him and I said "Okay." But if I said "Here's a book go ahead and read." Nah he wouldn't want to, but if I had the same story on the computer and somebody's reading aloud to him or he's reading along with it he's amazed. He's fascinated by it. He loves it. So I think just that in itself, I don't know why, but they get more interested in it.
- there are also things that are on the computer, things like A.R. and Star Reader that keep track of the kids progress without you having to do all the math
- I think it has changed the way that I present, because I'm able to access more things myself.
- I really have been able to see through these technology workshops and training how it really gets the students attention; how to become more engaged in activities that are aligned with technology.
- Not doing as much formative assessment but doing a lot more informal assessments
- I use a lot more iPad apps where it follows and tracks their progress and I can go in and look at their individual progress rather than looking at what the whole class is doing;
- I've let the kids take on more of leadership role in their learning.
- I have a lot more centers that are technology centered.
- because they have that you know they had the desire to use the technology stuff.
- I think technology definitely helps do the 80/20.
- So, the first day that I checked them out they thought, wow we're going to use the laptops today.
- It gives you a lot more one-on-one time if they're working on technology you can sit down and work with them one-on-one, because your other students are working on something also.
- It's brought us closer together; it's linked that communication gap.
- But really just communicating more with parents and allowing them to electronically communicate with me either through webpage or e-mail

Research Question Three Identified Themes

Theme	Evidence
More effective teachers due to staff development.	• My first year we did a lot of SMART Board activities and those really helped me understand SMART Board how to use it specifically for my grade level and for the subjects that I was teaching. I really have been able to see through these technology workshops and training how it really gets the students attention; how to become more engaged in activities that are aligned

Staff development seems to lack focus and purpose	with technology. • there are also things that are on the computer, things like A.R. and Star Reader that keep track of the kids progress without you having to do all the math and then you can just print out and that's great because you can use it for data really quickly you can pull it up • I've learned how to use Engrade, which is instantaneous access for them [students] in terms of my grade book. I message all my kids on Engrade. So, instead of texting my kids, it's a whole lot safer if I can message my whole class on Engrade. Whenever they had issues with their grades or they have questions that they don't want to address in class, they can always message me on Engrade. It's brought us closer together; it's closed that communication gap. • I think it's [staff development] more or less teaching us how to use the technology…the integration part is been more on us. How much we are willing to sit down with it. Just like when we got the iPads. I mean they showed us…how to go on apps and get them. But actually finding the best way to integrate it…that was kinda on, on our own. • there hasn't been anything specific about here's how you integrate technology into your lesson plans it's more "This is how you turn it on."…"Here's how you write on it.", "Here's how you erase on it." …things like that. [When speaking about the SMART Board.] NOTABLE EXCEPTIONS • Most of the staff development that we've done I don't think really has been technology-centered. I think it's been mostly…literacy honestly • Everything that we do with technology is bringing in literacy just like with Success Maker we're bringing that in.

	Waterford does different programs; Myon Reading it's all…a lot of its software, but it's teaching us how to run more reports and keep up with data on our students. It helps us learn which areas we are weak in and which ones we are strong. But it's literacy.

APPENDIX O: STRUCTURAL QUALITIES

Structural qualities are invariant textural descriptions regarding the phenomena under study. (The "what" that was experienced.)

Research Question One

How do third through fifth year teachers in one public school district in North Carolina feel about their technological awareness and ability to integrate twenty-first century technologies into their instruction?

When participants spoke of what their perceptions were concerning their self-efficacy, they used words such as "comfortable," "know," "handle," "manipulate," confident," and "pretty good." One individual stated "I'm not scared of technology. If you introduce something to me, and…it's going to make me more effective as a teachers in a class, I'm all for it." Another person spoke of their confidence in selecting technology that improved their instruction thusly: "I'm pretty good at finding the programs I need to help my kids become more critical thinkers."

In addition participants spoke of how they perceived the requirement to employ technologies using statements like "shown to teachers in a way that was easily integrated," "opportunity to do it [select the technology] ahead of time," "purpose," and "time to practice." One participant summed up how the requirement to employ technology "is it going to be something that is going to weigh my kids down, or is it going to free them up to delve into the content area deeper?"

Research Question Two

How do third through fifth year teachers in one public school district in North Carolina describe their college experiences with training them to integrate twenty-first century technology into their instruction?

When participants reflected on their college of education experience regarding twenty-first century technology integration training, they employed the following terms, "just used PowerPoint," "were not engaged," "mostly lecture," and "Microsoft Word." Participants noted that their professors "simply lectured" or "just used the SMART Board to display notes," or "only used communications technology like Blackboard, and email." There were a few notable exceptions. For instance participants mentioned a few software packages, "Geometer's Sketchpad," WebQuests," "SMART Board tools." These individuals were either mathematics majors or minors and were exposed more modeling of technology usage.

When speaking about how participants had experienced assignments they used statements like, "PowerPoint," "present to professors," "lesson plan," "type," "graph," and "teacher website." One participant stated, "I already knew how to do PowerPoint," were another stated "I just don't see where it [technology training] really helped me."

There were a couple notable exceptions to what participants were expected to do for assignments. The following terms were noted in their statements, “activities to perform,” “construct polygons,” “bisect angles,” “geometry come to life.” Many of these terms were derived from participants that were either mathematics majors or minors.

Finally when speaking about their college of education experiences another grouping of terms were clustered. For instance participants said “I came well-rehearsed in SMART Board through field experience,” “field experience really helped me,” and “ideas, websites to use, Story Line online.” One participant summed up this ideal when he said it was “getting into the classrooms and seeing how technology was used” that helped him more than anything else.

Research Question Three

How do third through fifth year teachers in one public school district in North Carolina describe the staff development initiatives aimed at training them to integrate twenty-first century technology into their instruction?

Statements like “technology workshops help me get students attention,” “keeping track of students’ progress,” “communications,” and “brought us [student and teacher] closer together” were used when reflecting on how staff development had assisted participants. Participants did note however that sometimes the staff development was “not specific enough to their curriculum,” “no follow up,” and “integration left up to us.” One participant stated that most of the training had been “this is how you turn it on,” “here’s how you write on it”, etc.