1-1-2011

Elementary Teachers' Perceptions of Technology Proficiencies and Motivation to Integrate Technology in School Curriculi

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2011

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Teacher Leadership

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Abstract

Despite the availability of technological resources, the number of teachers integrating and using technology innovatively in the classroom is unknown. This qualitative investigation explored teachers' perceptions of proficiency in the use of computer technology in the classroom. Self-determination theory assisted the examination of motivation as decisions are made to integrate technology into the classroom curriculum. The research questions addressed the self-determination of teachers, decision making processes to integrate technology, and perceived technology competence. A qualitative, multiple case study design was used to explore the views of 10 technology-using elementary teachers in the use of technology in the classroom. These participants were interviewed, participated in a focus group, and submitted an integrated technology lesson plan. Data were analyzed using the constant comparative method. The results showed that teachers were found to be efficacious when incorporating technology into the curriculum and believed their actions could produce the desired results despite their technological skill level. Teachers were found to be self-determined and motivated to integrate technology; however, innovative practice was not evident while existing practice conformed to the instructional norms of the school. Implications for positive social change include allowing teachers to study current beliefs and practice, reflecting on best practices when integrating technology, and identifying technological innovation to enhance the learning of their own students. Recommendations include providing opportunities through professional development initiatives in which teachers and administrators alike study practice in collaborative ways, take ownership of instructional decisions, and take risks while integrating technology.

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Dedication

This dissertation is dedicated to my husband, Fernando and my daughter, Cassandra, who inspire me, motivate me and lift me up. And to the memory of my Dad, who taught me how to stand tall and to always remember from whence I came and where I dare to go. In the words of *Edwin Markham*…

There is a destiny that makes us brothers;

none goes his way alone.

All that we send into the lives of others

comes back into our own.

Acknowledgments

I would like to thank the participants and the school district for allowing me to conduct this research. Their openness and heartfelt welcome allowed me the opportunity to understand the culture of the district as well as the prospect to expand my awareness of each participant's point of view.

Dr. Kathleen Hargiss, my committee chair, contributed her expertise and words of encouragement that allowed me to complete this research. Her thoughtful insight and deep understanding of inquiry afforded me the opportunity to think critically about educational practice.

I would also like to extend gratitude to my committee member Dr. Judith Orth and former committee member Dr. Anthony Chan for their continuous sharing of their time and knowledge throughout this process.

Finally, I would like to extend a heartfelt thank you to my friends and colleagues Dr. Kimberley Cuero and Dr. Fern Dallas from the University of Texas at San Antonio for their time and support when I needed it the most.

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Section 1: Introduction to the Study

The National Center for Education Statistics (NCES; 2005) determined that the ratio of students to instructional computers with Internet access had significantly decreased to a 3.8 to 1 ratio from its original findings in 1998 of 12.1 to 1. As these ratios indicate, the anticipated increase in hardware and infrastructure has been realized in classrooms across the United States and integrating technology into the curriculum has been actualized (NCES, 2005). Public schools in the United States have become technology-rich environments (NCES, 2000) and yet questions remain about how this technology is being used (O'Dwyer, Russell, & Bebell, 2004; Zhao & Cziko, 2001; Zhao, Pugh, Sheldon, & Byers, 2002).

This qualitative study investigated the use of technology in one large school district in Texas. To provide specific support to schools and teachers, the Technology Services Division of this school district worked within six key areas of service (a) technology management services, (b) academic technology services, (c) library and textbook services, (d) technology training and development services, (e) integrated infrastructure services, and integrated information services. Nationally recognized for using technology to achieve educational goals, this independent school district was awarded the Technology Leadership Salute District Award by the National School Boards Association (NISD, 2009).

The development and implementation of this district's technology initiatives have been well documented, but what has yet to be determined is the amount of innovative success taking place in the classrooms. This investigation offered both qualitative viewpoints on the integration of technology into the classroom curriculum and the motivational challenges brought forth by the personal perspectives of the participants.

Background

In this study, examining the motivation of Texas elementary teachers to integrate technology innovation into their classroom curriculum was central to understanding the choices they make during the planning and preparing process of teaching. During this process, decisions to integrate technology might have been affected by teachers' overall technology proficiencies.

Since the publication of A Nation at Risk, public officials, state legislatures, corporate executives, school administrators, and teachers embraced technology as a way to reexamine the traditional views of schooling. Similar to moving from teacher-directed instruction and didactic teaching (Means et al., 1993) to more innovative approaches to teaching and learning such as student-centered teaching, multidisciplinary work, and constructivist practices (Cuban, 2001; Means et al., 1993). The reform movement in education recognized that "the primary motivation for using technologies in education was the belief that they would support superior forms of learning" (Cuban, 2001; Means et al., 1993).

Seeking to find superior forms of learning or innovative approaches, cognitive psychologists used the work of cognitive theorists, such as Jerome Bruner, to better understand intellectual performance as well as to design effective learning environments. Bruner (1960, 1966) proposed the belief that students should construct their own understanding and become more self-directed in their learning, hence the idea that constructivism could work hand-in-hand in varied learning situations using technology tools to support the construction of ideas and the building of social constructs to support knowledge sharing (Cuban, 2001). Thus, the notion that constructivist teaching and technology integration was labeled within the concept of educational reform (Judson, 2006).

In response to the report, A Nation at Risk, a task force was formed by the American Psychological Association (APA) composed of experts in the fields of education and psychology (Murphy & Alexander, 2002). This task force developed a framework for guiding educational practice of what is now known as the 14 learner-centered principles. Reflective of the most favorable learning experiences for a student, these principles become critical about how teachers teach. These principles are contained within five categories, of which motivation and affect is one. Murphy and Alexander (2002) characterized motivation and affect as (a) intrinsic motivation, which leads to greater achievement through personal interest, (b) the pursuit of understanding through mastery and learning goals, and (c) student's self-efficacy, which is the belief in the ability to complete a task, no matter the actual ability. As motivation and affect remain key components in learner-centered principles, they also become a factor when evaluating the level of technological competency or proficiency for teachers. Therefore, teachers become learners in a highly technology-based environment where motivation will be challenged and personal beliefs in teaching and learning will be questioned.

Problem Statement

Despite the growing availability of technologies to be used in the classroom, computers could be used more in schools (Zhao & Cziko, 2001; Zhao et al., 2002). Even when teachers are given all the necessary, hardware, software, training, instructional, and technical support (NISD, 2009), technology is not always integrated into their classrooms. Technology initiatives in the school district in this study have been well documented and yet, despite the availability of technological resources, the number of teachers using the technology and the amount of innovative success taking place in the classrooms is unknown. Teachers are not held accountable for the integration of technology into the classroom curriculum and, likewise, are not assessed for their individual technology proficiencies.

The participants in this study were identified as well-trained teachers who were highly supported administratively and instructionally, and had access to the latest hardware and software capabilities (NISD, 2009). These teacher participants were considered to be technology-using teachers, experiencing integrative practices within their curriculum and their desire to use innovative practices. Understanding the motivation of teachers who have been successful in the integration of technology in the classroom might help to create learning opportunities for teachers who have yet to take advantage of technology in the classroom.

Purpose of the Study

The purpose of this qualitative, multiple case study was to explore teachers' technology proficiencies and to determine whether motivation factors played a role in their decision making processes to integrate technology into the curriculum. The integration of educational technology is a priority for schools. According to The Forum for Education and Democracy (2008), the integration of educational technology is a promising practice and is considered a federal priority for supporting educational research, development, and innovation. As the Forum for Education and Democracy found, “Teaching strategies, curriculum programs, technology uses, and new school designs that appear to be successful need to be studied and, when found to be productive, disseminated” (2008, p. 35).

Studies that can help to understand a variety of approaches and strategies beyond the traditional methods of teaching are needed to transform classrooms to a new 21st century design. Advances made to date include technology applications applied to all disciplines in the curriculum, a new understanding of competent teaching as well as pedagogical skill, and the understanding of how technology interplays with student needs and interests (The Forum for Education and Democracy, 2008). These advances are still underdeveloped, yet teachers need access to the continued development in their technological proficiencies and the sustained willingness to integrate technology and the belief that technology can help to transform classrooms and make them ready for 21st century learning.

The investigations in this study were based on the assumptions that simply providing all the necessary hardware, software, training, instructional, and technical support cannot guarantee successful use and incorporation of educational technology. Understanding the motivation of teachers to integrate technology and their willingness to take risks, their willingness to alter their beliefs in teaching, and to believe that technology has a purpose in the classroom will benefit the educational community at large.

Nature of the Study

The target population for this qualitative study consisted of 6,146 teachers in one of the largest school districts in Texas. The district had a student-teacher ratio of 15.8:1 and the computer-student ratio was 1 to 4. The student population consisted of 64% Latino American, 24% European American, 8% African American, and 4% Asian American and/or Native American. The teacher population included 35% Latino American, 62% European American, 3% African American, and 1% all other (NISD, 2009). Based on the district's 2008-2013 strategic plan, increasing student achievement and academic success through programs such as effective instructional technology and implementing and supporting technology systems to ensure academic, personal, and organizational excellence, are key priorities to district improvement (NISD, 2009).

A qualitative, multiple case study design was used to explore the views of 10 technology-using elementary teachers in the use of technology in the classroom. These participants were interviewed, participated in a focus group, and submitted an integrated technology lesson plan for data analysis using the constant comparative method. More detail on the methodology is presented in section 3.

Research Questions

The overarching research question for this study was: How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms? This investigation was supported by subquestions:

1. What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson?
2. How does teachers' perceived technology competence affect their decision to integrate technology into their classroom curriculum?
3. How do teachers determine their success when integrating technology?

Conceptual Framework

Using theoretical perspectives of motivation as found in Bruner (1960, 1966), intrinsic motivation was found deep within a person's being. Bandura (2006) and Bandura and Locke (2003) suggested that personal efficacy regulates human functioning and makes distinction between adult and child learning. Houde (2006) distinguished the differences between adult learning and child learning in that adult learning is based on motivational states as found in Knowles' theory of andragogy. Houde (2006) further elaborated that andragogy was further intensified by self-determination theory where individuals have a need for growth and a psychological need for autonomy, relatedness, and competence. These needs were intrinsically bound to adult learning and formed the theoretical framework for this study. Self-determination theory was the focus of motivation and provided a better understanding of teachers' and how they made decisions to integrate technology innovation. More detail on each of the concepts and theories used to frame this research is provided in section 2.

Definition of Terms

Competency: Hertzberg Whitman (1976) defined teacher competencies as the "knowledge, skills, behaviors" and sometimes "attitudes" (p. 2) that they possess. For this study, competency was defined within the area of educational technology as the knowledge, skills, behaviors, and attitudes that could be measured by observation and/or performance.

Levels of Technology Implementation (LoTi): LoTi was defined as a framework/scale designed to accurately measure authentic classroom technology use. The LoTi framework focuses on the use of technology as a tool within the context of student-based instruction with a constant emphasis on higher order thinking (Moersch, 2006).

Motivation: Houde (2006) believed that adults are responsive to some external motivators, that is, better jobs, promotions, higher salaries, and so on. The most compelling motivator was intrinsic motivation, which lead to greater achievement through personal interest such as, perceived autonomy of individual choice, perceived relatedness with other people, and perceived competence as in the challenge of the context and skill (Ryan & Deci, 2000; Deci & Ryan, 2000). In this study, motivation was defined as it applies to adults and their responsiveness to extrinsic motivators and intrinsic motivators.

Proficiency: Klein (1983) suggested, “the attainment of proficient performance implies that a person can perform a skill so well and so efficiently that it can be a building block for the acquisition of additional skills, and is easily extended to unfamiliar tasks” (p. 821). In this study, proficiency and competency were used interchangeably and defined within the area of technology as the knowledge, skills, behaviors, and attitudes that can be measured by observation and/or performance.

Technology: Jonassen, Peck, and Wilson (1999) stated that technology consisted of “designs and environments that engage learners” (p. 12). In this study, technology was defined similarly to the beliefs of Jonassen et al. Technology was more than the computer hardware. Computer technologies also included software programs or tools to support knowledge construction (e.g., word processors, spreadsheets, databases, multimedia authoring, and desktop publishing). Computer technologies as information access tools supported learning-by-construction (e.g., internet). Computer technologies as problem solving tools supported learning-by-doing (e.g., learning environments) provided real world situations and solve problems. Computer technologies as a social medium tool supported conversation and communication with others for the purpose of collaborating and knowledge building, for example, the Internet and social networking. Computer technologies as a cognitive tool supported and extended thinking much like those found in knowledge construction (Jonassen et al., 1999).

Assumptions

1. Since the original LoTi training from 2000-2005, attitudes may have changed and teacher perceptions about their own technology skills may be different.

2. Teachers have taken full advantage of the technology integration support in planning and instruction as well as computer literacy training provided by the Campus Instructional Technologist (CIT).
3. Teachers have completed all required computer literacy hours in application training.

Limitations

1. Other researchers may view the interpretation of qualitative research differently.
2. The respondents of this study had varying degrees of teaching experience and the level of experience may have influenced the objectivity of the information.

Scope and Delimitations

The scope of this study was delimited to the interviews of the participants identified as technology-using elementary teachers within the school district. These teachers participated in previous technology staff development by using Moersch's framework, Levels of Technology Implementation (LoTi; 2006). Other data collected was obtained from focus group discussions, analyses of integrated technology lesson plans, and field notes for further analysis of the phenomenon.

Significance of the Study

The significance of this study is that it might provide teachers a better understanding about self-reflecting on their own teaching practice, which was consistent with their pedagogical beliefs, and an understanding that technology cannot stand-alone. Also, new longitudinal studies might be encouraged by these results, which may improve instructional practices as well as adding to the body of research on this topic. Administrators and teachers alike might be provided with viable research to support a more focused approach to professional development. This increased understanding and support could lead to the increased use of technology in classrooms.

Implications for Social Change

Providing professional development for teachers to help them integrate technology in their classrooms will allow them to not only identify the appropriate needs involved with integrating technology, but will also help them to make decisions based on targeting the suitable action to be taken to fulfill their instructional practices. Studies such as this can effectively make a difference in how teachers view technology in the classroom and can shift the understanding of teaching and learning in order to effectively support instruction in the classroom.

Summary and Transition

In summary, there is a gap between access to computers in classrooms and how much they are actually used. This gap led to the exploration of teachers' proficiency in the use of instructional technology in the classroom as well as a need to examine if motivation factors played a significant role in their reasoning. Researchers (Zhao & Cziko, 2001; Zhao et al., 2002) found that to determine teachers' technology proficiencies was whether they used technology in innovative ways in the classroom. As studies (Kulik, 2003; Reeves, 1998; Waxman, Connell, & Gray, 2002) showed, educational technology positively affected student outcomes. More evidence was needed to understand why teachers chose not to integrate technology into their daily curriculum.

This investigation sought to understand the motivation of elementary teachers' to integrate technology into the classroom and whether their technology proficiency levels affected their decision making.

The literature review in section 2 discusses relevant research and theory related to elementary teachers' proficiencies in technology use and their motivation to integrate technology into the curriculum and presented the framework for this study. Section 3 outlines the details of the methodology used to answer the questions of how motivation affected the way teachers chose to integrate technology innovation in their classrooms and what differences existed between a teachers' motivation and the degree of technology proficiency they possessed. Section 4 presents the data analysis in a rich descriptive narrative and the results found for the qualitative data collected in this study. Section 5 presents the conclusions and discussion along with recommendations made from this study.

Section 2: Literature Review

Section 2 develops the contextual framework on which this study was based. The need to explore teachers' competency in the use of instructional technology in the classroom, along with the examination of whether motivation factors played a significant role in their decision making processes, were critical to the understanding of how teachers chose to teach. The exploration of motivation began with the self-determination theory as it applied to adults and their need for growth and a psychological need for autonomy, relatedness, and competence. These needs were intrinsically bound to adult learning and form the conceptual framework for this study. Understanding the need for adults to feel autonomy in decision making, relate to the experiences of others, and be competent in their use of technology, helped in developing an understanding of how teachers chose to teach based on their own pedagogical beliefs in best practices.

Overview

Pertinent research and theory were the key components for understanding teachers' proficiencies in technology use and their motivations to integrate technology into the school curriculum. This literature review is organized into six themes or sections. The first section sets forth strategies for reviewing the literature. The second section provides background information and the need for improving education and preparing students for the digital age of literacy. The third section reviews early research found in educational technology's effectiveness. The last three sections are based on the basic themes initiated by the research questions. The first theme includes teachers' competencies in technology use, which is then found in the fourth section. This section provides an overview of national and state technology standards for teachers and the implications they faced. The fifth section includes the topic pertaining to the factors that influenced teachers' instructional practices. In this section, pedagogical factors, extrinsic factors, and intrinsic factors found in teachers' instructional practices and their use of technology are addressed. These are listed as follows:

1. Pedagogical factors were characterized as those that were influenced by teachers' attitudes and beliefs,
2. Extrinsic factors urged a teacher into action by other interests but were highly influenced by barriers that discouraged technology integration into the daily practices of teaching, and
3. Intrinsic factors encouraged or discouraged technology use due to teachers' beliefs about teaching, beliefs about technology use, classroom practices, and openness to change.

The last section explores exemplary technology-using teachers. In this section, studies are presented that show the characteristics of exemplary technology-using teachers including their classroom practices and belief systems that were involved in the practices of teachers who used computer technology effectively in the classroom. This portion of the review allowed a better perspective to be drawn on the exemplary use of educational technology in order to draw comparisons of the technology-using teachers who participated in this study.

Research Strategy

The search for relevant sources for this study began with the structure of forming terms such as, *motivation, self-efficacy, affect, technology, instructional strategies, technology proficiency, technology competency, instructional technology,* and *adult learners.* Databases selected for this study were based on the degree of published material that could be found and the popularity of the database and its use. These databases included EBSCO Database, ProQuest, the Educational Resource Information Center (ERIC), Education and Information Technology Digital Library (Ed/ITLib), and the Center for Applied Research in Educational Technology (CARET). These databases sorted through relevant research by using a variety of search strings. Strings such as, motivation and technology, self-efficacy and technology, technology proficiency, technology competency, instructional technology, and motivation and affect were used to locate the best and most reliable research available. Duplication of sources within the three databases were evident, but this became a tool for verifying the logic of the search string as well as finding other sources published elsewhere.

The search began using the EBSCO database and within this database ERIC was used specifically to identify the basic terms of motivation, technology, adult learners, educational technology, and competency. ProQuest was the next source used to identify educational, peer-reviewed journals to search through the terms such as, technology and motivation. This investigation also, used a series of other peer-reviewed journals to find the most current studies. These journals included the Journal of Technology and Teacher Education, Association for the Advancement of Computing Education Journal, Teachers

College Record, Journal of Research on Technology in Education, Journal of Research on Computing in Education, and the Journal of Technology Education.

Over 100 publications were found and 90 were identified to be relevant to this investigation. Of these 90 studies, about half span the years 2000-2005 and were found to be seminal or germane to this study. Five studies published prior to the year 2000 were either categorized for the purpose of showing historical evidence of educational technology's effectiveness or for the connected nature to this study.

An eight-column literature matrix was created to simplify, codify, and analyze the literature. The columns include (a) author and date, (b) theoretical framework, (c) research questions, (d) methodology, (e) analysis and results, (f) conclusions, (g) implications for future research, and (h) implications for practice. Each study within the matrix was further color coded into separate categories to reflect the position within the literature review. This coding reflected early research in educational technology's effectiveness, technology competencies, instructional practices, motivation, and exemplary practices.

Background

The CEO Forum on Educational Technology in Washington, DC, estimated that in 1999, the United States spent more than $300 billion on K-12 public education, but less than 1% of that amount was used to determine what educational strategies worked or to research ways for improvement (The CEO Forum, 2001). This 5-year exploration on the impact of educational technology helped to clarify where monies were spent and the new course of action needed to set educational objectives for 21st century skills.

Recommendations from The CEO Forum report were to make federal policymakers aware of three major areas for improvement. The first area was student achievement, which included digital age literacy, inventive thinking, effective communication, and high productivity abilities. Second, the report recommended expanding federal support for education technology investments. The third area for improvement was increasing investment in research and development and the dissemination of such research (the CEO Forum, 2001).

As the CEO Forum (2001) recognized the learning environment becoming a more "student-centered, problem or project-centered, collaborative, communicative, customized and productive" environment (p. 5), the need to expand federal support for educational technology investments was necessary. Therefore, a proposed investment strategy needed to focus on the technology integration into teaching and learning to promote teacher technology competency as part of the teacher quality measurement. However, the need to maximize a greater return on the original national investment in educational technology was not the only dilemma. Other considerations needed to be tended to, as Fullan (2007) clarified in reference to massive reform changes in the early 1970s, when making educational changes meant that innovations were superficial. Changes were made to the language and structures, but not to the practice of teaching. In comparison to today's circumstances, to make large-scale changes such as those found in constructivist practices and technology integration, as education reform suggests, Fullan (2007) made clear that reform is not about putting into place the latest policy. It means changing cultures of the very classrooms, schools, districts, and universities educators work with. It takes purposeful and sustained action over several years where teachers work toward common planning, observing one another's practice, and reflective practices of teaching on a continual basis. As Fullan suggested, changing the culture of schools and taking purposeful action toward teaching would serve as a springboard to understanding the gap that exists between access to and use of computers in schools (Zhao et al., 2002) as well as understanding teachers' technology proficiencies needed in order to integrate technology into the classroom curriculum and the motivation needed to do so. This literature review used the research questions as the foundation to draw relationships to previous research. These questions included:

1. How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms?
    a. What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson?
    b. How does teachers' perceived technology competence affect their decision to integrate technology into their classroom curriculum?
    c. How do teachers determine their success when integrating technology?

The literature was based on what research revealed about teachers' technology competencies in technology use, the factors that influenced their instructional practices, and whether motivation factors had anything to do with their decision making processes. This study also compared what exemplary technology-using teachers did to be more effective within their practice.

In this current investigation, the terms *educational technology* and *instructional technology* were used interchangeably to identify the integration of computer technology within the classroom curriculum. The terms proficiency and competency were also used interchangeably based on the assumption that the knowledge, skills, behaviors, and attitudes lie within the use of computer technology.

Early Research in Educational Technology's Effectiveness

Studies analyzed in the area of instructional technology from 1980 through 1998 had a distinct purpose. They were strongly influenced by computer-based learning and integrated learning systems to show instructional technology's effectiveness for student learning (Kulik, 2003). The findings were based on meta-analyses covering 335 studies published before 1990 and 61 controlled studies that were published after 1990. This study identified important factors that influenced studies done prior to 1990 and those that transpired after 1990 (Kulik, 2003). The decision to use this type of methodology was based on the number of reviews already written on the effectiveness of instructional technology during the 1970s and 1980s; therefore, it was necessary to survey the earlier literature on instructional technology from the perspective of earlier reviewers (Kulik, 2003). Also, Kulik (2003) claimed that studies published since 1990 have been many and careful scrutiny needed to be made to examine individual studies and not reviews.

Kulik's (2003) meta-analyses beginning in 1990 included 27 controlled evaluation studies on instructional technology and reading, 12 controlled studies of technology effects on student writing, and 36 controlled studies of technology effects on mathematics and science learning. These studies included the application of technology through the use of (a) integrated learning systems, (b) writing-based reading programs, (c) reading management programs, (d) word processing studies, (e) studies of computer writing prompts, (f) studies of computer enrichment, (g) computer tutorials, (h) computer simulations, and (i) microcomputer-based laboratories. Kulik (2003) found that (a) teachers were better prepared to integrate technology in the classroom than they were in the 1980s, (b) even though 98% of schools in 2000 had Internet access, the digital divide remained with less affluent schools having fewer computers and Internet access than the more affluent schools; and (c) students today used computers more as tools rather than tutors as well as students use computers to find information in comparison to a decade ago where students used computers for basic skills in computer literacy. Even though these findings were not surprising, early research was conducted from the point of view of teaching effectiveness when using computer-based programs. Since the 1990s, educational technology evolved from computer-based programs or computer tutorials toward a more cohesive integration within the classroom curriculum. Therefore, new research based on new instructional technology practices needed to be current and aligned to meet 21st century skills.

Reeves (1998) approached research from a different perspective. Summarizing the evidence for effectiveness of media and technology in K-12 schools all over the world, but limited to English speaking countries, Reeves compared two differing approaches in the realm of technology in education. Reeves discussed one approach of “learning from media and technology” and the other “learning with media and technology” (Reeves, 1998, pp. 2-5). Reeves further defined learning from as instructional television, computer-based instruction, or integrated learning systems. Learning with was defined as using cognitive tools and constructivist learning environments. Reeves defined cognitive tools as learning tools that “activate complex cognitive learning strategies and critical thinking” (p. 20). Examples of this included: databases, spreadsheets, semantic networks, expert systems, communication software, online collaborative environments, multimedia/hypermedia software, and computer programming languages (Reeves, 1998).

The difference between the learning from and the learning with approach could be seen very clearly in the philosophy of technology education versus educational technology. Technology education is based on the premise that technology is the focus of instruction such as in computer science courses and computer programming. As Reeves (1998) indicated, “learning from media and technology, the student becomes the tutee and the technology is the tutor” (p. 2). An example of the learning from approach was Jostens Learning Corporation. Its specific approach was tutoring students on drill-and-practice skills and delivering immediate feedback on student performance.

Educational technology takes into account the various content areas taught in school and uses the technology to support learning in these different areas (Reeves, 1998). The technology is the tool to acquire more knowledge about a particular subject. With a move toward a more integrated instruction, educational technology shifted to achieve cognition and higher order thinking instead of drill-and-practice of basic skills.

In summary, findings in the first approach as students learn from media and technology showed that media and technology could be effective tutors in a K-12 environment (Reeves, 1998) although concluded that there were still questions whether it enabled learners anymore than traditional methods of teaching. In the second approach, as students learn with media and technology, results were positive even though Reeves (1998) indicated that long-term research using both quantitative and qualitative methods would be needed to further develop differing approaches to teaching with media and technology.

The Reeves (1998) report was very important. It helped to define the differing approaches to learning from and with technology. This report also helped to identify the allocation of funding for technology which in the past had been to support the tutorial approaches to learning much like the learning from approach as seen in Kulik's (2003) study rather than the cognitive tool approach as found in the learning with approach. Studies questioned whether or not technology was effective in learning and identified the types of tutorial approaches that affected learning (Kulik, 2003; Reeves, 1998).

The first longitudinal study conducted on teachers and the integration of instructional technology into the curriculum was the landmark study, Apple Classrooms of Tomorrow (ACOT) Project. Reeves (1998) recognized the importance of conducting such longitudinal studies to show pedagogical innovation in conjunction with positive learning results. Reeves acknowledged the ACOT Project, which led to groundbreaking results within a teacher's ability to change and adjust instruction and emphasized the need to invest in time and support for teachers to adopt constructivist pedagogies when integrating media and technology.

Research in cognition showed that learning is most effective when four characteristics are present: (a) active engagement, (b) participation in groups, (c) frequent interaction and feedback, and (d) connections to real world contexts (Roschelle, Pea, Hoadley, Gordin, & Means, 2000). As researchers furthered their understanding of these fundamental characteristics of learning, “they realized that the structure and resources of traditional classrooms often provide quite poor support for learning, whereas technology—when used effectively—can enable ways of teaching that are much better matched to how children learn” (Roschelle et al., 2000, p. 79).

These characteristics were evident in the groundbreaking study, the ACOT Project. This project began in 1985 as a group effort between Apple Computer, Inc., universities, and teachers. This qualitative, longitudinal study took place over a 10-year period and encompassed five classrooms from five different geographical areas in the United States (Sandholtz, Ringstaff, & Dwyer, 1997). As part of the research, each teacher and student received a computer for the classroom and one for the home. The researchers for this project, once teachers themselves, investigated how routine use of technology by teachers and students would affect teaching and learning (Sandholtz et al., 1997). The stated goals of the study were as follows:

1. Install and operate computer-saturated classrooms as living laboratories in every grade K-12 classroom.
2. Integrate state-of-the-art technologies into the instructional fabric of schooling.
3. Bring about positive educational development and change.

4. Study and understand the impact of total computer access on students, teachers, and instructional processes. (Sandholtz et al., 1997, pp. 3-4)

In 1985, research had yet to be established in the area of teaching and learning with technology, but researchers knew that computer technology had to be looked upon as a tool to support teaching and learning which followed the theory of constructivism where the learner becomes a self-sufficient problem solver, making an attempt to solve the problem on their own (Bruner, 1966). This notion was considered on the cutting edge of educational technology. Early in the study, expectations were not necessarily high, but the researchers thought that outcomes would generally be positive. As the study progressed, student's learning tasks did not change dramatically, but the researchers noticed other very important changes. These changes were as follows:

- Teachers began working in teams and across disciplines,
- Classrooms became a mix of traditional and constructivist instruction,
- Students became more collaborative,
- Teachers altered daily schedules to allow more time for student projects,
- Teachers began to use alternative forms of assessment such as; performance and portfolio based,
- Technology encouraged a student-centered environment and cooperative learning,
- Teachers often used more complex tasks and materials in their instruction, and
- Teachers realized that teaching and learning with technology occurs over time. (Sandholtz et al., 1997, pp. 9-10)

In reflecting and analyzing what was learned during this long-term study, these researchers recognized four very important facts about teacher's experiences in technology-rich classrooms over several years.

- First, even when classroom environments are drastically altered and teachers are willingly immersed in innovation; change is slow and sometimes includes temporary regression.
- Second, teacher commitment to an innovation will not occur until they see positive benefits for themselves and their students. …the process of integrating technology into the classroom instruction initially increases teachers' workloads and creates additional management problems. Moreover, the process involves gradual shifts in both beliefs and practices.
- Third, the contextual supports necessary to promote teacher change are rarely in place when technology is added to schools. Although teachers are central to change, it is equally important that parents, administrators, and policymakers understand and support these shifts in beliefs and practices.
- Fourth, shifts in the larger sphere of teacher professional development are occurring even more slowly than in the classrooms of individual teachers. Consequently, teachers have few models of successful technology integration to draw upon as they prepare to become teachers and launch their teaching careers. (Sandholtz et al., 1997, pp. 181-182)

To this day, other researchers (Kulik, 2003; Reeves, 1998) viewed this study as the radical change agent needed to induce the reform movement in educational technology thus, affecting the purpose for this study. Knowing that change was slow, innovation required a shift in beliefs and practice, contextual support was necessary for change, and very few successful models of integration to observe (Sandholtz et al., 1997), this current investigation drew upon current practices found within a set of technology-using teachers and their efforts to integrate technology successfully.

Although both the ACOT study and the Reeves report made a clear distinction in their approach to research, one from a qualitative perspective and the other from a report to summarize past evidence. What is apparent in both studies is that more investment in time and support for teachers to infuse technology into current pedagogical practices was vital. As Reeves (1998) alluded to the fact that the most influential component of learning is pedagogy and not media or technology, however media and technology are fundamental to innovative instructional practices.

Teachers' Competencies in Technology Use

Since the inception of educational technology, a growing concern had been mounting in establishing the implementation and the development of skills and knowledge for teachers to effectively use technology in the classroom. A 1999 report from NCES (2000) indicated that approximately one-third of teachers were well prepared to use computers and the Internet in the classroom. However, 84% of teachers believed that computers and access to the Internet improved the quality of education, only two-thirds reported that the internet was not being well integrated into their curriculum (Cradler, Freeman, Cradler, & McNabb, 2002). Preparing teachers to integrate technology was a priority and steps had been taken to provide federal funding to support professional development efforts. These efforts included building teacher competencies in the use of computer technology.

Technology Standards in Texas

To begin the process of developing teacher competencies in United States, the International Society for Technology in Education (ISTE) took the lead and created the National Educational Technology Standards for Teachers (NETS). These standards further led states and local districts to branch off the NETS and created their own version of teacher technology standards to be met. One such example was the Texas State Board of Education Certification (SBEC) technology application standards (see Appendix A). For all beginning teachers, standards I-V were incorporated into the new Texas Examination of Education Standards (TExES) for pedagogy and professional responsibilities at each certification level (TEA, 2002). As preservice teachers began to incorporate these technology standards into their undergraduate courses, the challenge existed in developing professional development opportunities for veteran teachers to increase their level of technology competency.

A search was conducted to reveal any type of professional development strategies being employed to further technology competencies among educators in the state of Texas. Three studies were found. One such study by Guhlin, Ornelas, and Diem (2002) reviewed existing technology development programs in Texas school districts that incorporated (a) problem-based learning approaches, (b) development of technology skills in a variety of formats, and (c) application of these skills in the classroom with students. Data was collected through visiting district web pages to determine an educator competency program, emailing the Texas Center for Educator Technology (TCET) for suggestions of exemplary school districts to review, and emailing school districts for their educator competencies. Nine of the school districts identified for use in this current investigation are represented in this list. The study revealed that all districts provided a traditional staff development delivery method such as, lecture and inservice (Guhlin, Ornelas, & Diem, 2002). Few school districts actually changed instructional methods used to develop competencies, which included teacher reflection. One school district used practicums for basic technology skills for various software applications but did not assess unless through the required implementation of technology integration projects (Guhlin et al., 2002). Another school district received a 9 million dollar technology innovation grant for the purpose of using multiple instructional delivery methods for professional development, reflective practices, and evaluation approaches. An evaluation of the success of the grant was not available. Since this attempt, no other studies have been found that sought out professional development strategies in Texas public schools having an impact on technological competencies. More studies would be required to measure the success of such professional development as well as any type of funding provided.

Knezek and Christiansen (2001, 2006) believed that both student and teacher attitudes work closely with computer competencies as one of the key factors to managing a successful technology infused learning experience. In another study, to measure such factors, professional development activities were provided during the 1999-2000 school year in a northern Texas district. More than 500 teachers were assessed regarding their proficiency and attitudes toward technology. Using four different questionnaires throughout the year, two measured attitudes toward computers and new information technologies and one measured skill levels based on the ISTE standards. The last questionnaire measured teachers' beliefs and needs regarding technology as well as level of classroom use (Knezek & Christiansen, 2001). Results included that professional development activities were highly effective ($p < .001$) in email skills, World Wide Web (WWW) skills, classroom use of integrated applications, and methods of teaching with technology. Teachers' performance moved one stage of adoption level based on a six-stage scale from a stage four, familiarity and confidence to a stage five, adaptation to other contexts. Knezek and Christiansen (2001) disclosed that teachers' general beliefs remained seemingly the same, but specific needs changed. These included that teachers no longer have a need to learn how to use a computer but have a greater need to be trained in teaching strategies to integrate technology into the curriculum. Using a self-reporting format, teacher perceptions of their own skills and knowledge sets differed greatly. Self-reporting data can be misrepresented as Cuban (2001) clarified; there is too much reliance on self-reports and not enough on-campus investigations.

A third study by Knezek, Christensen, Mayes, and Morales (2005) sought to find the most appropriate method for assessing a teacher's proficiency in the integration of classroom technology. These researchers compared and contrasted assessments of four separate indices including the ratings of campus technology integration specialists, teacher self-reports of stages of adoption of technology, outside observer ratings, and teacher self-reports of Apple Classroom of Tomorrow (ACOT) stage development. Another purpose was to draw a distinction between those teachers who participated in the

Beyond Hardware technology integration initiative and those that did not participate (Knezek et al., 2005). This quantitative study analyzed 13 elementary school classrooms in the Dallas-Ft. Worth area of Texas where data sets gathered included an observation of a technology-enriched lesson using a qualitative assessment tool completed by a curriculum and technology specialist from the University of North Texas and later rated based on the stages of adoption of technology. Along with this observation, a teacher self-report was collected based on the ACOT stages of development as well as stages of adoption of technology, and ACOT ratings for teachers collected from campus technology integration specialists. For self-reporting measures, Knezek et al.'s (2005) inter-rater reliability results of $W = .592$ showed a highly significant ($p < .001$) concordance across all 13 teachers. To measure a teacher's proficiency, all four measures of technology integration were combined for internal consistency reliabilty using Cronbach's Alpha, $r = .66$, which is in the range of minimally acceptable. The findings of this study ranked and placed each rating technique as follows: (a) campus technology integration specialist rating is most strongly aligned, (b) teacher self-report of stage of adoption of technology is second, (c) teacher self-report of ACOT level is fourth, and (d) outside observer from the university was least aligned. As Knezek et al. (2005) confirmed the findings that a long-term, on-site campus expert in the area of technology integration has the highest inter-rater consistency rather than a one-shot observation from an outside source. Also, these researchers indicated that a combination of the stage of adoption self-rating along with the ACOT teacher stage rated by the campus technology integration specialist would provide the best measurement of a teacher's level of technology integration proficiency. A critical difference in this study was that participants perceived their level of proficiency skills much higher than their observers (Knezek et al., 2005). This was similar to Cuban’s (2001) findings that the discrepancies between self-report and practice are common to classrooms as well as in other professions. Using a reliable qualitative assessment tool for long-term observations along with a reliable self-rating tool would help in developing consistency in proficiency determinations.

Technology Standards in the United States

In their attempts to prepare for the 1997 educational technology performance standards, the San Luis Obispo County Office of Education’s (SLOCOE) Advisory Board proposed a Technology Certification Program for teachers, administrators, and staff (Scheftic, 2000). This certification program included a three-tier structure to evaluate the level of technology proficiency for teachers and students. Level one included personal proficiency demonstrated by basic skills in the use of email, discussion groups, online chat rooms, internet tools, desktop publishing and the comfort level when using technology to be able to learn new programs as the need arises. Level 2 included instructional proficiency in the use of designing and implementing activities where students demonstrate their skills in desktop publishing, display tools for presentations, Internet for research, and the use of databases and spreadsheets for organizing and analyzing information. Level 3 consisted of leadership proficiency, which only a few were expected to attain. Teachers who mentored and provided leadership in the use of technology in their schools and throughout the district were considered. This could be done through modeling of best practices or the coaching of other teachers (Scheftic, 2000).

The advisory board also chose portfolios as the tool for documenting evidence for the various proficiencies (Scheftic, 2000). Although, the criteria for the portfolio assessment were mostly evidential and in hardcopy format, little effort was made to require teachers to move toward an electronic portfolio format, moving teachers' technological skills even further. As the advisory board evaluated the portfolios, they looked for how well the teacher met the requirements and how well the process of evaluation seemed to be working (Scheftic, 2000). The program certification team reviewed all completed portfolios and once they passed the review, a certificate from the SLO County Office of Education was issued.

Consequences of this program reflected in how the individual school districts chose to adopt the certification process allowing level one and level two certification be required within a certain time frame (Scheftic, 2000). At the regional level, several counties adopted a similar program or looking at the possibility of adopting. At the state level, the California Technology Assistance Program (CTAP) sought out ways to initiate the program statewide. Attempts were also made to support a statewide initiative for the development of a certification process for technological proficiencies in California K-12 teachers.

In another California study by Ivers (2002), a training module was examined to increase teachers' technology proficiencies and in the process, explored a self-assessment measure and its relationship to teachers' use of technology in the classroom. A state sponsored, coordinated effort between the Instructional Technology Partnership (ITP) Program hosted by California State University, Fullerton, Orange County Department of Education, Anaheim City School District, and CTAP. The ITP program used a 2 week, face-to-face sessions of 40 hours of training followed up by 80 hours of individual work (Ivers, 2002). Two hundred K-12 teachers from 40 different schools completed a pre- and post online assessment and participants were asked to maintain a portfolio of their work to include computer-based lessons and sample student work. Observations were also used to support findings.

The online self-assessments responses were categorized as (a) introductory (little or no experience, 0 to 1), (b) intermediate (some experience, 1.1 to 2), and (c) proficient (a lot of experience, 2.1 to 3). The mean ratings of pretest responses fell into the intermediate category whereas, the posttest mean ratings jumped to the proficient range in all areas (Ivers, 2002). The portfolio evaluations confirmed that the teachers who rated themselves as highly proficient in the online self-assessment found their portfolios to indicate the use of technology as a teaching/management tool as well as an instructional tool for students. The majority of participants rated themselves as “intermediate users” of most technologies meaning that they are able to generate worksheets, create presentations, and record grades rather than using the computer as a tool for students (Ivers, 2002). Findings from this study confirmed previous research that teachers may not be prepared to teach with technology (Cuban, 2001, NCES, 2000). As Knezek et al. (2005) and Cuban (2001) concurred; teachers’ self-reporting perceptions of their technological proficiency levels may be misrepresented. Borg and Gall (1989) also agreed and warned that self-assessment measures are only accurate to the degree that self-perceptions are correct and if the person is willing to express them honestly (cited in Ivers, 2002, p. 5).

Frieden, Scott, and Mills (2002), in their Preparing Tomorrow's Teachers to Use Technology (PT3) grant for the use of a professional development model for teachers, teacher candidates, and university faculty, reversed their processes and sought to have teachers demonstrate their technological proficiency through performance assessment rather than attending workshops or courses. In this study, teachers and preservice teachers were to complete authentic activities including those that needed to solve problems, create portfolios of products, or conduct experiments using computer simulations. These activities were based on 16 technological fluency standards of which were further organized into three phases (a) technology operations, (b) technology management, and (c) technology integration. These standards were further disclosed in an integration matrix for ease of use and as a benchmark for performance (Frieden et al., 2002). This matrix helped to identify the actual teaching practices and instructional strategies that classroom teachers employed when integrating technology. As the study suggested, great success had been met, but much work had yet to be completed. What had transpired was that phase I, II, and III of the matrix came together as a commercial assessment instrument and recommendations were made for participants to develop portfolios for review and feedback as to the level of fluency the participant had demonstrated (Frieden et al., 2002). Much like Scheftic's (2000) research, portfolios were a good way for documenting evidence for various proficiencies, however campus observations could provide a better lens to determine the level of use and engagement of students.

Technology Standards Worldwide

Knezek and Christensen (2006) focused on the importance of attitudes and competencies in the implementation of information technology in education. Testing of technology proficiencies had been underway on the international scene to include more formal models in the use of educational technology, based on competencies, attitudes, and other factors. Using observational methods of teaching and learning activities were also necessary to establish a “true picture” of behaviors of students and teachers in a learning environment (Knezek & Christensen, 2006). To have a successful technology-infused learning experience, Knezek and Christensen suggested the following variables as key factors within a successful environment (a) teacher and student competency and attitudes, (b) access to technology tools, (c) supportive environment, (d) technical support team, and (d) curriculum support team. This was also confirmed in a study by Velasquez-Bryant (2003) sought to identify variables that contributed to technology integration that may influence or predict behaviors for integration. Velasquez-Bryant (2003) specifically indicated that attitude, skill, and access positively influenced the level of technology integration in teaching and learning. As competencies in the global market become common knowledge, the incorporation of competency-based environments would increase successful use of computers in the classroom, which effects the positive dispositions towards computers (Knezek & Christensen, 2006).

In Chen and Chen's (2008) quantitative research, they chose to investigate the relationship between individual characteristics of Taiwan teachers and their technology proficiency level. Characteristics included gender, years of teaching experience, instructional content area taught, and number of teachers in each school in relation to an assessment of teachers' advanced technology proficiency by the Education Network Center of Taichung at the Department of Education of Taichung City Government in Taiwan. Although these types of studies were common and have been repeated in the United States (Velasquez-Bryant, 2003), the importance of discussing this study is to verify the results and whether they align with those found in the United States.

A sample size of 201 teachers from elementary, junior high, and comprehensive schools completed the assessment of teachers' advanced technology proficiency answering ten different tasks of which required a minimum score of 70%. Descriptive and inferential statistics along with Pearson's correlation coefficient were used to analyze the data. The results showed that gender was weakly positively associated with advance technology proficiency ($r = .022$, $p = .755$). Also, teaching experience was weakly negatively correlated with advanced technology proficiency ($r = -.084$, $p = .235$). The number of teachers in schools as well as teachers' instructional subject was weakly positively linked with advanced technology proficiency ($r = .055$, $p = .436$) and ($r = .248$, $p = .911$) respectively (Chen & Chen, 2008). The results of this study indicated that the four independent variables were not statistically significant with the participants' advanced technology performance (Chen & Chen, 2008). This was similar to Velasquez-Bryant's (2003) findings that age, gender, years of experience, or grade level taught did not influence or predict whether teachers integrated technology into their classroom curriculum.

In this review of teachers' competencies in technology use, the standardization of technology proficiency skills have been well documented and correlated nationally. What has yet to be determined is the degree of measurement, consistency in assessment methods, and acceptable forms of assessment nationally or internationally. States, such as Texas and California, have made significant efforts, but studies have yet determined how school districts will move forward in determining educator competencies. Cradler et al. (2002) have concluded that national, state, and local teacher technology standards can be met by (a) the integration of standards into school-site professional development, (b) incorporating standards into professional development of practicing teachers as well as teacher-preparation courses, (c) opportunities for teachers to develop their own skills, (d) intensive and ongoing staff development in modeling, practice, and reinforcement of technology use matching curricular goals, (e) increasing a school's capacity to change by embedding technology training in an overall reform effort, (f) visual literacy skills should be modeled for preservice teachers, and (g) education faculty should learn to integrate technology into preservice teacher activities and assignments by providing them time to learn. In relation to this study, efforts in professional development and training for these teacher participants were on-going whereas; considerations for more intensive and self-reflective practice as well as modeling effective uses of technology in the classroom would be more beneficial.

Factors that Influence Instructional Practices

Pedagogical Factors

ISTE's (2007-2008) next generation of standards makes the shift from learning to use technology as a tool to using technology to learn. These standards reflected recent findings of educational reform's proposal in using student-centered teaching practices and instructional technologies to support active student learning (Baylor & Ritchie, 2001; Brinkerhoff, 2006; Cope & Ward, 2002; Fletcher, 2006; Judson, 2006; Levin & Wadmany, 2006; Rakes, Fields & Cox, 2006; Wozney, Venkatesh & Abrami, 2006). Because educational technology and constructivist practices were found to be labeled within education reform, many factors have been identified that influenced teachers' instructional practices. Pedagogical factors were one such set of factors. Cuban (2001) defined these factors to include an array of decisions teachers have to make within their classrooms such as how space, furniture, and time were to be used along with student grouping, student participation and the instructional tools that were used as well. Cuban further explained that with such critical decisions made, teachers' beliefs and attitudes about "how students learn, what they should know, what forms of teaching are best, and the purposes of schooling all get factored into teacher decision making" (p. 167). Cuban referred to this as situational autonomy where teachers' beliefs and values impel choices made in the classroom. These beliefs and attitudes were seen in the following.

Levin and Wadmany (2006) made clear that teachers typically teach in a teacher-centered way, imparting knowledge in an authoritarian manner, resisting reformists beliefs in student-centered practices. Unsatisfactory to many researchers and educators alike, this widespread idea might be endorsed by strongly held teachers' educational beliefs concerning teaching and learning (Cuban, 2001; Fullan, 2007; Levin & Wadmany, 2006; Palak & Walls, 2009; Zhao et al., 2002;). It was these beliefs that guided teachers in their decision making, thus moving instruction in more innovative ways. But as Fullan clarified, for teachers to move toward educational change with new technologies, the difficulty to make the changes to their practices and skills as well as their educational beliefs have been underestimated (as cited in Levin & Wadmany, 2006). This was evidenced in a recent study, examining the relationship between teachers' beliefs and their instructional technology practices among technology-using teachers (Palak & Walls, 2009).

Using an explanatory, sequential, mixed method approach, Palak and Walls (2009) used two separate instruments of which the first, measured teachers' student-centered and teacher-centered beliefs, and the second instrument measured the use of technology in the classroom of 113 teacher participants. To satisfy the qualitative phase of the study, a multiple case study design of two teacher pairs from PK-12 was used to include classroom observation, interviews, lesson plans, and written reflections to four open-ended questions about the participants professional beliefs and practices. Multiple regressions and correlation results indicated that a teacher's attitude toward technology was the most important belief factor for instructional technology decisions made in the classroom. Across the four case studies, participants used technology for planning, management, and communication, which supports what, is found in the literature (Cuban, 2001; Fletcher, 2006), however, the technology did not support the way they taught in the classroom (Palak & Walls, 2009). The way they taught and the way students used technology was influenced by their educational beliefs and what they believed to be good teaching. Palak and Walls concluded that even though these teachers had access to technology, positive attitudes toward technology, adequate general and technical support, and were comfortable using technology, the shift in teacher practice did not occur. These researchers also found that neither student-centered nor teacher-centered beliefs were predictors of teachers' practices. This might be contributed by the failure of the teacher self-reports to capture teachers' views of what student-centered instructional strategies were and the difficulty to gauge teacher beliefs in self-reporting, which was confirmed in the literature as well (Levin & Wadmany, 2006).

Results were more promising during Levin and Wadmany's (2006) longitudinal study on the evolution of teachers' beliefs on learning and teaching in the context of a technology-based classroom environment. This study was based on a set of theoretical assumptions, which call for a constructivist approach to using technology tools in the classroom. These assumptions were (a) educational technology and professional development experiences can effect change in teacher belief systems, (b) a teacher's view of technology can pose a barrier, but can also be modified through technology-based experiences, and (c) changing educational beliefs is a gradual process (Levin & Wadmany, 2006). This 3 year qualitative case study used interviews, questionnaires, and observations of six teacher participants and 164 students.

Findings were categorized into four theoretical modes of teaching (Levin & Wadmany, 2006). The researchers defined these as the behaviorist orientation in which the learner made an immediate change, cognitive constructivism where learning was internalized, social constructivism required coconstruction within a social activity, and radical constructivism where learning is knowledge construction (Levin & Wadmany, 2006). At the beginning of the study, teachers were more behaviorist in nature, supporting a transmissionist view of teaching whereas, at the end, teachers were less behaviorist and focused more on student understanding. Classroom practices were more teacher directed at the beginning and moved toward more varied teaching models focusing on facilitation of collaborative learning, coaching, modeling, reflection, and exploration. Teacher views on technology did not significantly change.

Levin and Wadmany (2006) concluded that after 3 years in technology-rich environments, substantive change in teachers' educational beliefs and classroom practices did occur. These researchers explained that belief systems were dynamic and can change if individuals are open to it, which is confirmed in the literature as well (Baylor & Ritchie, 2001; Vannatta & Fordham, 2004). Also, when teachers were exposed to new goals, they modify their teaching styles and beliefs regarding effective practices. Teacher views and practices reside on a scale moving from transmission on one end to facilitating knowledge on the other end. These researchers also found that educational change was unique to each individual where teachers responded differently to innovative ideas (Sugar, Crawley, & Fine, 2004). However, Levin and Wadmany (2006) explained, "it's not just technology but the overall learning environment" (p. 173). This was affected by non-structured learning tasks, technology-based information resources, and exposing teachers to new vision which ultimately changed teacher beliefs and practices. Levin and

Wadmany were careful to suggest that teachers consistently hold a constructivist or behaviorist view. Instead, teachers changed educational lenses rather than pure beliefs. Concurred by Edmunds (2008), teachers place technology within the instructional context. Hence, tailoring instruction around the needs of their students, therefore, not all classrooms look and act the same. This in fact creates a contradiction between what researchers were saying versus what teachers were practicing. In lieu of using technology in innovative ways, teachers were hybridizing technology to coexist within their instructional practices (Cuban, 2001). The possibility of this theme existing in this study was quite evident. The search for ways the teacher participants were using technology in their classrooms might be revealed in the data from the technology integrated lesson plans as well as the semi-structured interviews. Research questions 1a and 1b solicited responses as to what motivation factors could be identified during the planning and preparation process and how their perceived technology competence affected their decisions to integrate technology.

Levin and Wadmany (2006) further stated that implications remained relevant and significant for several reasons. First, change in classroom practices occurred first before teachers could understand change in their beliefs. Second, professional growth extended a teachers repertoire, complimenting old ideas rather than having to abandon them. Thirdly, the adoption of technology oriented learning tasks was not enough to ensure successful integration of technology into teaching, and lastly, reliance on teacher statements regarding their beliefs and practices were not credible enough because teachers might not be aware of their own emerging beliefs during innovation.

Other studies determined that when teachers regularly integrated technology into their instruction they were more likely to possess constructivist-teaching styles (Dexter, Anderson, & Becker, 1999; Sandholtz et al., 1997). At the same time, teachers who preferred a more student-centered approach to teaching were more likely to integrate computer technologies more frequently, had a higher level of technology proficiency, and considered themselves at a more sophisticated stage of integration (Wozney et al., 2006). Hence, a new shift in teacher beliefs in teaching and learning. However, other studies had found no significant relationship between teachers' reported beliefs about instruction and their actual practice of integrating technology (Judson, 2006). The difference in the data might be contributed to quantitative, teacher self-reporting (Wozney et al., 2006) versus ratings of actual classroom observations using a classroom observation instrument (Judson, 2006).

Other quantitative studies isolated factors regarding technology integration (Baylor & Ritchie, 2001; Mueller, Wood, Wiloughby, Ross, & Specht, 2008; Vannatta & Fordham, 2004). Mueller et al. (2008) chose to identify those teacher characteristics that best discriminate between low integrating teachers and high integrating teachers, whereas, Baylor and Ritchie (2001) used variables from previous studies to measure the impact of seven related factors to school technology on five dependent measures in the areas of teacher competency, technology integration, teacher morale, student content, and higher order thinking skill acquisition. Vannatta and Fordham (2004) used a combination of factors that best predicted classroom technology use. These studies had promising results from teachers needing to see positive outcomes and successful practice through experiencing positive events (Mueller et al., 2008) to a teacher's openness to change regarding teaching beliefs and abilities (Baylor & Ritchie, 2001; Vannatta & Fordham, 2004). Vannatta and Fordham (2004) extended their findings to include teachers' time commitment to teaching and technology training were the best predictors of technology use. Although these studies had used common variables found throughout the literature, findings were inconsistent due to the combination and testing of variables. Similar to this study, variables would be inconsistent and would be generated through the research questions. Potential themes would be produced through keyword coding to find consistency in patterns. This procedure provided a better understanding of the actual variables that affected these technology-using teachers in their efforts to integrate technology in lieu of classroom teachers with or without technology experience. What had yet to be determined was the kind of results that could be acquired through the use of a longitudinal testing of common variables on various populations throughout the United States.

Extrinsic Factors: Motives and Barriers

According to self-determination theory, the facilitation of self-motivation was contributed to competence, autonomy, and relatedness (Deci & Ryan, 2000; Ryan & Deci, 2000). In a more simplistic explanation, Paris and Cross expressed it as the "willing portion of willing and able" or as suggested the "skill and will" (as cited in Brooks & Shell, 2006, p. 18). Motivation had also been described in terms of goals, values, and expectancies (Garcia as cited in Brooks & Shell, 2006, p. 18). When a person was authentically motivated, it became self-initiated with more self-interest, excitement, and confidence enhancing their performance, persistence, and creativity. Whereas, a person who was motivated or urged into action by other interests this would be considered external coercion (Ryan & Deci, 2000). Whatever the value, intrinsic or extrinsic, self-determination theory included the examination of environmental and social factors that would thwart self-motivation. This concept was further explored in the following.

In Ertmer, Addison, Lane, Ross, and Woods's (1999) qualitative study, the examination of the relationship between first- and second-order barriers to technology integration helped to categorize extrinsic and intrinsic factors for motivation specifically for this current investigation. *First-order barriers* to technology integration were factors that were extrinsic to teachers which included lack of access to computers, software, not enough time to plan for instruction, and not enough technical and administrative support. *Second-order barriers* were intrinsic to teachers and included beliefs about teaching, technology, classroom practices, and openness to change (Ertmer et al., 1999; Keengwe, Onchwari, & Wachira, 2008).

Ertmer et al. (1999) focused on the how and the why of teachers using technology in their classrooms and what supported or hindered effective use. Surveys, interviews, and observations of seven K-2 teachers, with varying degrees of integration, were conducted during a 6 week period. Constant comparative analysis results indicated that the most frequent first-order barriers or extrinsic factors included lack of equipment, time, and classroom help, which is consistent throughout the literature (Bauer & Kenton, 2005; Glazer & Hannafin, 2008; NCES, 2000; Mumtaz, 2000; Rakes et al., 2006;

Wozney et al., 2006). Second-order barriers found included lack of relevance, mismatch with classroom management style, and lack of confidence.

In Keengwe et al.'s (2008) article, references were made to the tenets needed to use computers skillfully and integrate technology willfully. When addressing extrinsic factors specifically, these were more easily observed and more easily addressed (Ertmer et al., 1999). Self-determination theory allowed for competency or the skill needed to attain some separate goal (Ryan & Deci, 2000) and became the beginning of what states, districts, and schools target to achieve a level of technology proficiency for all teachers prior to achieving higher levels of technology integration. Ertmer et al. (1999) further explained that teachers' uses of classroom technology evolved over time as they gained experience. At the inception of teachers' attempts to integrate, they used technology to support current teaching styles (Cuban, 2001) and transitioned through a series of stages from nonuser to expert user. To date, Ertmer et al.'s (1999) study influenced this current investigation, seeking to understand intrinsic and extrinsic motivation of teachers to integrate technology. However, this investigation went one step further to understand teachers' perceived technology competencies and how this affected their overall decisions to integrate technology as well as what they determined to be success in teaching.

Glazer and Hannifin (2008) prefaced a similar model of behavior, however the stages of development were relative to specific time frames. The first 8 weeks was the introduction phase, the next 8 weeks were developmental, followed by another eight weeks of proficiency, and a final mastery phase. Both studies agreed that when integrating technology, many factors came into play that encouraged or discouraged technology use (Ertmer et al., 1999; Glazer & Hannafin; 2008; Mumtaz, 2000). A major factor was the amount of time needed to move through the process of learning the technical skill, the pedagogical skill, and the competency skill in managing the classroom environment (Mumtaz, 2000). Extrinsically speaking, planning for instruction was an arduous task which ultimately affected the value for the task. Therefore, it would be important to take a deeper look into the pedagogical or curricular connection (Zhao et al., 2002) in which this investigation attempted to accomplish.

Another extrinsic factor not previously mentioned in this review was the administrative leadership component needed to support teachers in their efforts to implement innovative practices such as integrating technology into their classroom curriculum. Piper and Hardesty (2005) suggested that if a teacher is uncomfortable with change, than change will not occur. To initiate change, leaders must find a way to change the attitudes and minds of teachers. To put this to the test, Piper and Hardesty (2005) examined the relationship between leadership within a school and teachers' attitudes and self-efficacy beliefs of using computer technology in the classroom. Using a quantitative approach, 160 teacher participants were surveyed in 11 school districts. A Likert scale survey included sections on computer use, computer experience and knowledge, perception of leadership, self-efficacy, attitudes toward learning, and working with computers. Pearson Product Correlation and Multiple Regression findings demonstrated that depending on the type of attitude in question, different variables influenced the attitude (Piper & Hardesty, 2005). When working with computers at home or in the classroom, leadership styles positively influenced attitude by treating individuals as people, understanding their needs, providing assistance, and demonstrating expectations. However, when learning how to use computers, influences of personal experience and self-efficacy were still statistically signifcant. The inspirational motivation variable of leadership demonstrated a strong correlation to the attitude of learning about computers which led to encouragement, optimism, and a motivating leadership style. This style led to positively influencing teachers' attitudes to learn how to use computers (Piper & Hardesty, 2005). First and foremost, as Piper and Hardesty advised, school leaders must encourage and motivate their teachers and then they must provide the continuation of support for the innovation.

Intrinsic Factors and Motives

To reiterate, a person who was intrinsically and authentically motivated, self-initiated, self-interested, excited, and confident, their level of performance, persistence, and creativity were the results (Ryan & Deci, 2000). Ertmer, et al. (1999) and Keengwe et al. (2008) defined intrinsic factors as second-order barriers that encouraged or discouraged technology use which included beliefs about teaching, technology, classroom practices, and openness to change.

Intrinsic factors presented themselves to be clear indicators of why teachers have yet to integrate technology successfully and properly into the classroom. Other factors such as, teacher's motivations and frustrations, self-efficacy, and value for the task became the new topics for discussion amongst educational researchers. These factors were addressed in two different studies presented at the Society for Information

Technology and Teacher Education International Conference (SITE) during the 2001 conference and another during the 2006 conference.

Foster (2001) asserted that too many teachers were struggling everyday not to master the technology, but instead to avoid failing at using it. Through the use of entity theory of intelligence and the incremental theory of intelligence, his claim was based on a teacher's perceived self-efficacy, their motivation to achieve, and the utility factor. Foster (2001) defined a teacher's self-efficacy to be "the belief that he or she is an effective teacher" (p. 2718) correlated with how well their students performed a given task they had been taught. This further related to how teachers perceived themselves when using technology. If teachers did not possess the necessary skills to be proficient with technology, then they would not believe that they could help the student achieve at a task. Therefore, a low self-efficacy could initiate negative affect and a lowered sense of self-worth. Foster (2001) theorized that in order for teachers to avoid negative affect, teachers must use some type of means to protect their sense of self-worth. This could be accomplished by increasing their knowledge in technology use that would then increase self-efficacy or they could avoid using it all together.

In Foster's (2001) explanation of teacher's motivation to achieve, he used Atkinson's theory of achievement motivation. Foster proceeded to identify the motive to achieve success (Ms) which the individual carries from one task to another, which was influenced by the strength of expectancy or probability of success (Ps) and the incentive value of success at a particular task (Is), which produces the tendency to approach success based on the performance. This was shown as the equation Ms x Ps x Is; a constant characteristic of the person. Foster (2001) indicated, for most teachers, the Ps in mastering technology was very low. This was due to the difficulty of the task itself. Foster (2001) indicated that Atkinson's theory explained that based on teachers previous experiences, the perception had the same results with similar tasks, and therefore a teacher's Ps for computer-oriented tasks were perceived as being very low.

Foster (2001) in asking the question why aren't we seeing teachers with high degrees of motivation to achieve success (Ms) for technology, he claimed that Atkinson did not consider a teacher's utility or value of the task. Seventy percent of the teachers surveyed, said that they did not believe technology could make them better teachers, but what Foster (2001) interpreted was that when teachers did not value the usage of classroom computers, they were not willing to take on the task of integrating it within the curriculum. Foster determined that "when the task was greatly valued, the individual was inclined to devote more energy toward the task, invoke the use of more volitional strategies to accomplish the task and work toward the task over a longer period" (2001, p. 2719). At this point, he suggested it did not matter if failure came, what mattered was the value of the task, which would not affect the individual's self-efficacy therefore, no negative affect. Because of this, he believed that there were two different types of intelligence, entity and incremental. The entity theory of intelligence was considered fixed intelligence. No matter how much effort you place on developing it, it remained constant. The incremental theory of intelligence was flexible. If an individual worked hard and put effort into a task, intelligence could be improved and change the nature of the performance (Foster, 2001). These two types of individuals had different types of behavioral patterns, as they perceived themselves through their abilities. The incremental individual sought new challenges and fostered learning, whereas; the entity individual strived for positive judgments and avoided negative judgments of competence. Even though some teachers might be afraid of failing in front of their students, the technology could never make them a good teacher, good teachers use technology to improve learning. This is similar to Dexter et al.'s (1999) conclusion that teachers' changes in instruction were the result of their "thoughtful reasoning" (p. 15). Teachers' determined that the computers were not the catalyst for change in as much as their construction of what worked and did not work in the classroom, the reflection on those experiences, and the professional culture and environment that influenced their knowledge construction (Dexter et al., 1999).

Another study presented at the 2006 SITE conference considered motivations and frustrations of teachers when using technology of an introductory graduate course called Computer Awareness for Teachers. In this mixed method study, 71 teachers completed a pretest and posttest technological survey measuring the change in teacher's perceptions of their own motivation to teach and to use more common instructional technology. The researcher's purpose was to identify motivational and frustration factors when using technology in the classroom. The survey included 20 items requiring true/false answers, questions using a five-point Likert scale, and two open-ended questions asked for the qualitative portion of the study.

Tatum and Morote (2006) concluded that this course motivated and gave confidence to teachers to use technology in their classrooms. The most surprising statistic was that at the beginning of the course only about 15% of the teachers used technology in their classrooms, but at the end of the course 77.8% of the teachers were using technology in their classrooms. As the researchers indicated, a consistent pattern arose in motivation both in the pretest and posttest. Tatum and Morote (2006) determined that several factors increased teachers' motivation to use technology in the classroom. These factors included (a) when teachers increased their knowledge with technology and when they showed interest to learn and grow as an educator, they were more apt to learn to use technology and use it with their students, (b) teachers' confidence level rose when they understood software applications and troubleshooting, (c) when technology support was available, teachers were more apt to learn; and (d) teachers were more motivated because it was the way of the future. The researchers go on to say that frustration patterns such as when schools lack funding, technical support, and adequate equipment, teachers' frustration levels increased.

Another factor noted by Tatum and Morote (2006), was that the students of these teachers were more proficient at technology than the teachers themselves. Feeling inadequate and frustrated when their students knew more about technologies then they did, chances were that these teachers might not introduce technology into any of their lessons because of their lack of proficiency to use computer technology. Also, despite the lack of funding, technical support, adequate equipment, and the support from the school system for the integration of technology, courses such as this might help teachers understand and learn more about how technology works in the classroom and would be more confident when using it which will help them to grow as educators. However, Rakes et al. (2006) argued that the accessibility of computers and training does not necessarily result in widespread use of technology in the classroom. Rakes et al. claimed that this might be due to the growing need to further understand teacher beliefs in their ability to use technology and their beliefs in how technology effects student achievement. More research would be required to understand teachers' motives for integrating technology into the classroom curriculum.

In retrospect, these two different studies presented at the SITE International Conference during the 2001 and 2006 conferences, gave the educational technology research community a definitive record of what types of factors influenced teachers in their decision making processes to integrate technology innovation in their classroom. Factors such as, self-efficacy, value to the task, and motivations and frustrations were clearly marked within these studies. However, these factors were not new to researchers and coincided with other similar findings (Kortz, 2001; Piper & Hardesty, 2005). What had yet to be addressed in detail is the effect of teacher self-efficacy influenced by professional development. Did teacher self-efficacy improve after receiving technology professional development? A recent study of Greek secondary teachers sought to examine the relationship between individual characteristics of teachers and computer self-efficacy within the confines of using technology in the classroom (Paraskeva, Bouta, & Papagianni, 2008) to answer this question.

Two hundred eighty six secondary teachers received seminar training in the areas of technology, learning, and instruction. The investigation was to establish relationships between general self-efficacy and computer self-efficacy, relationships between general self-efficacy and basic computer skills, general self-efficacy and advanced computer skills, general self-efficacy and files and software skills, and the relationship between self-esteem and computer self-efficacy. Also, teachers' subject areas, prior experience in using computers and software, previous computer training, and computer self-efficacy were also examined (Paraskeva et al., 2008). This quantitative study used data collection instruments including a demographic questionnaire, The General Perceived Self-Efficacy Scale to measure a belief in personal competence, The Rosenberg Self-Esteem Scale to measure global feelings of self-worth and self-acceptance, and the Computer Self-Efficacy Scale to measure individuals' perceptions of their capabilities regarding computer knowledge and skills (Paraskeva et al., 2008). Multiple variable analysis was used to analyze variables and the Spearman Rank Correlations Method was used to investigate the relationships of variables.

Results were encouraging and proved most of the relationships between the characteristics of secondary teachers showed positive correlations. In reference to general self-efficacy and computer self-efficacy a significant positive correlation existed ($p = 0.000$) (Paraskeva et al., 2008). Paraskeva et al. (2008) determined that the higher a teacher's general self-efficacy was, the higher the computer self-efficacy. The researchers also indicated that teachers with higher general self-efficacy, the more open they were to new ideas and experimenting with new methods. As to the relationship between self-esteem and computer self-efficacy, Paraskeva et al. determined no signifcant correlation ($p = 0.0921$) as well as the relationship between self-esteem and advanced computer skills ($p = 0.1604$) and the other skills as well ($p = 0.0545$ for basic skills and $p = 0.0588$

for files and software skills). The relationship between teachers' subject area, prior experience in computer and software use, and computer self-efficacy, Paraskeva et al. found a strong, positive correlation with computer self-efficacy. Prior experience in computer use had the strongest correlation with computer self-efficacy ($r = 0.7662$) (Paraskeva et al., 2008). These researchers believed that this might be due to more positive prior experiences in computer use teachers might have, the forming of more positive attitudes toward computers might be evident, therefore the greater computer self-efficacy.

Whether or not the professional development or seminar training these teachers received contributed to the higher degree of computer self-efficacy was not clear, but what was clear was the overall general sense of self-efficacy these teachers possessed was due to their individual characteristics found in prior experience and training in the teaching profession (Paraskeva et al., 2008). These researchers indicated that if teachers received training to use technology as an educational tool, attitudes and confidence with technology could change. But more specifically Paraskeva et al. (2008) noted that targeting teachers' specific content areas (Barnes, Hodge, Parker, & Koroly, 2006) would decrease the reluctance and enhance the curricular support by emphasizing problem-based methods which supported constructivist approaches to teaching and learning. Since self-determination theory suggested authentic motivation to include a need to be self-aware and constructing value based on personal interest (Deci & Ryan, 2000), identification with a particular discipline or content area would need to be considered when planning professional development programs (Barnes et al., 2006).

According to Abdullah et al. (2006) teachers' positive attitudes toward the outcomes or consequences of computer use would disclose a higher rate of use, however, teachers first and foremost needed to recognize that their teaching styles needed to grow and adapt to new innovation. In Abdullah et al.'s (2006) mixed method study, the majority of the 62 English teachers that participated already had a positive attitude, were highly motivated towards the use of computers to teach English, and actually used them for teaching and learning. Evidence showed that 88.7% of teachers ranked self-determination as the intrinisc factor that motivated them most over self-worth, competence, and interest whereas, 74.2% of teachers ranked extrinsic factors of organization and administration as their most motivating factor over recognition, incentives, career advancement, and working conditions. The discussion therefore became not about teachers that are ready, willing, and able to integrate technology in the classroom but of those teachers who choose to opt not to participate (Abdullah et al., 2006; Taylor, Casto, & Walls, 2004). Taylor et al. (2004) confirmed that "giving tools, time, and strategies to build exemplary products and enduring skills" (p. 133) was not the only reason for the significant shifts in teacher and student learning, but also the influence of teachers who elected to self-participate in the training would be different than those who elected not to.

To continue the argument why teachers were choosing not to integrate computer technology into the classroom, Cuban stated that out of every 10 American teachers, fewer than two were serious computer users in their classrooms (cited in Tatum and Morote, 2006). Cuban stated that experts had revealed these reasons to be insufficient preparation in universities, lack of technology training, too little time to learn, and too many teachers were *technophobic* (as cited in Tatum and Morote, 2006). Although the argument continued, and the fact remained that seven out of these 10 teachers had computers at home and used them extensively for business and personal use. If this was the case, then the question still remained, why aren't teachers using technology in the classroom? Cuban believed that there were two reasons: (a) teachers lack an understanding of how to integrate technology in the classroom. "In the case of motivations, the comfort and skill with technology will lead to increased use of computers for instruction" (as cited in Tatum & Morote, 2006, p. 3630) and, (b) the structure of school systems do not support the integration of technology (as cited in Tatum & Morote, 2006). In respect to this study, Cuban's beliefs might not apply. The participants' school district availed many professional development opportunities of how to integrate technology into the classroom as well as the continuous support teachers received from school and district administration. However, Cuban's beliefs confirmed the results found within this literature review, but what had yet to be addressed was what did motivation of outstanding technology teachers reveal in the existing literature as well as in this study? This question was addressed in the last section of this review.

Exemplary Technology-Using Teachers

According to Dexter, Anderson, and Becker, teachers who were experts in technology-use reside on a continuum of teaching styles from instruction to construction (as cited in Ertmer, Gapalakrishnan, & Ross, 2001). Ertmer et al. (2001) further clarified that the literature specifically defined exemplary technology use, as those teachers who use technology in expert ways should reside along the constructivist side of the scale, possessing a constructivist teaching philosophy. Thus constructivist teaching included:

- Designing activities around teacher and student interests rather than in response to an externally mandated curriculum,
- Having students engage in collaborative group projects in which skills were taught and practiced in context rather than sequentially,
- Focusing instruction (and assessment) on students' understanding of complex ideas rather than on definitions and facts,
- Teaching students to self-consciously assess their own understanding, and engaging in learning in front of students, rather than presenting oneself as fully knowledgeable. (Becker & Riel as cited in Ertmer et al., 2001, p. 9)

This is not to say that all technology-using teachers were exemplary technology users, but that technology-use could influence teachers to change their current practices toward more student-centered approaches, hence a constructivist approach to learning and teaching (Ertmer et al., 2001).

Factors that Influence Exemplary Technology-Use

Becker's (2000) seminal research helped to define the factors that were associated with exemplary computer-using teachers as compared to other teachers. Becker (2000) conducted a national probability sample survey to identify exemplary computer-using teachers. Out of the sample of 516 third through 12th grade teachers, 45 met the criteria for exemplary. Factors that contributed to exemplary computer use among teachers included (a) a collaboration or social networking of computer-using teachers at the same school, (b) efforts in using computers for consequential activities, that is, computers are used for other activities such as, business applications, industrial arts, publishing and writing, (c) access to professional development and a full-time campus computer coordinator, and (d) fewer students per classroom computer (Becker, 2000). Becker also concluded that exemplary computer-using teachers were more likely to stress small group work.

Using Becker's results to form the theoretical nature for their study, Wetzel, Zambo, and Padgett (2001), through a collaborative effort of Arizona State University West and five partner school districts, developed five technology-rich K-8 classrooms. Five teachers, one from each partner school district, were selected based on the fact that they provided exemplary models of technology integration. This qualitative study reported changes that occurred in teacher practices and the factors that supported these changes.

Teacher change occurred in the following manner: (a) teaching methods, (b) ways of thinking about curriculum, (c) teachers' roles as leaders, (d) the level of teacher collaboration, and (e) the way teachers communicated with parents (Wetzel et al., 2001). These findings were similar to Becker's (2000) in that teaching methods changed from lecture-driven to a more project-driven classroom, which allowed for collaborative, small group work (Wetzel et al., 2001). Another factor that supported change was that all teachers acknowledged the importance of the staff development they had received. These workshops specifically addressed planned integration of technology into the curriculum within a group of teachers with common interest (Wetzel et al., 2001). This finding was also consistent with the literature that suggested a key factor to change was effective staff development (Becker, 2000; Raby, 2006). Another identifying factor similar to Becker's (2000) contributed significantly to regular use of computers. Access to 5-7 computers in the classroom rather than 40 minutes a week in a computer lab made the technology more an integral component rather than isolated time (Wetzel et al., 2001).

In another study, Raby (2006) categorized the various factors found in the literature that influenced exemplary technology-use. These categories were identified as follows:

1. Contextual factors which include time, expertise, support, resources, access, etc.
2. Institutional factors which include rewards and incentives, leadership, etc.
3. Social factors, which include collaboration with other teachers, belonging to a network of technology users, etc.
4. Pedagogical factors which include teaching philosophy, teaching practices, motivation and commitment towards learning, etc.
5. Personal factors, which include attitudes towards technology, resistance to change, access to Internet at home, etc. (Raby, 2006, p. 1)

This multicase qualitative study, sought to understand how and why seven elementary teachers managed to successfully integrate technology in their classroom (Raby, 2006). Using comparative analysis, some factors influenced all seven teachers, which prompted them to speed up the integration process:

1. All teachers devoted a considerable amount of professional and personal time learning and using technology. All were involved in their school and in their

professional development and also sought new ways to help their students and themselves learn more.

2. All teachers were resourceful, driven, and perseverant when facing difficult situations. They were all proactive in accessing adequate equipment for their classrooms.
3. All teachers surrounded themselves with a network of colleagues and chose to collaborate and exchange information.
4. All teachers adjusted their pedagogy and classroom management to facilitate technology integration.
5. All teachers were motivated by a significant technology event that affected them emotionally or intellectually. (Raby, 2006)

Most of these findings were consistent with the literature (Angers & Machtmes, 2005; Becker, 2000; Becker & Riel, 2000; Dexter et al., 1999; Ertmer et al., 2001; Riel & Becker, 2000; Sandholtz et al., 1997; Wetzel et al., 2001; Zhao, 2002) and demonstrated a long and arduous process to integrating technology. According to Sandholtz et al. (1997) when teachers' are willing to immerse themselves in technology-rich classrooms, "change is slow and sometimes includes temporary regression" (p. 181). Zhao et al. (2002) referred to this as the evolutionary course to change rather than a revolutionary one. Others suggested that it takes 5 or 6 years to gain mastery of integrating technology when given support, time to learn, and time to plan for integration (Hadley & Sheingold as cited in Mueller et al., 2008).

Classroom Practice

Researchers found that exemplary technology-using teachers created rich learning environments with technology-based learning projects immersed in student-centered lessons within their classroom practices (Angers & Machtmes, 2005). In addition to this, other studies indicated that constructivist teaching not only included the use of student projects and small group work, but also included the involvement of cognitive challenged tasks as well as the absence of direct instruction (Becker & Riel, 2000; Riel & Becker, 2000). Consequently, technology use in the classroom was important and seamless and was an integral part to student learning. Because of this, Angers and Machtmes (2005) added that when technology was used as a tool, student learning increased.

Under the direction by the Center for Technology in Learning at SRI International, research teams from 28 countries conducted a mixed method study to find similarities and differences in patterns of technological innovative classroom practices (Kozma, 2003). The 174 cases chosen for the study represented the best practices of their respective countries based on previously determined criteria. Results indicated that many countries had many qualities in common. These qualities included (a) the beginning of technology integration into the curriculum to support change in teaching and learning, (b) students were collaborating in teams and using computer tools and resources to search for information, publish results, and create products, and (c) teachers were no longer the primary source of information but who provided students with guidance, structure, monitors progress, and assessed (Kozma, 2003). Kozma (2003) also noted that based on self-reporting data, tool use and tutorials might not have as a great an impact on student learning as technology-based research projects and technology used for data management. Although, the cases found might still be small, these cases provided insight into the patterns of consistency teachers were showing when integrating technology into the curriculum.

In an early qualitative study by Wright and Custer (1998), these researchers sought to find out what outstanding technology education teachers identified as the most enjoyable and rewarding aspects of teaching. The participants that were chosen for the study were considered excellent technology education teachers who were committed to their students. Two themes emerged as the most enjoyable aspects of teaching. The first theme included the "excitement and stimulation of learning and working with new technologies" and secondly "the enjoyment of working with kids and making a meaningful difference in their lives" (Wright & Custer, 1998, pp. 65-66). Other themes had to do with the freedom and flexibility to be creative in developing their own curriculum and the hands-on nature of technology education. What Wright and Custer (1998) noted was that the theme low pay or salary for teachers was not a major factor in the study.

Although research emphasized outstanding teachers in technology education, no evidence was found to support successful technology integration practices in other content areas as found in educational technology. However, Becker and Riel (2000) and Riel and Becker (2000) stipulated that computer education teachers or teachers who teach computer classes were found to be more professionally engaged in a collaborative culture than teachers from other content areas. Therefore, finding excitement and stimulation when working and learning with new technologies along with the enjoyment of working with students, these teachers willfully made the decision and chose to teach and use technology in innovative ways. These teachers were also highly motivated by the high degree of autonomy to develop and create their own curriculum. Wright and Custer (1998) surmised that when intrinsic rewards such as autonomy and esteem were factored in, poor compensation was not an issue unless intrinsic rewards did not exist.

Riel and Becker (2000) and Becker and Riel (2000) considered the beliefs, practices, and computer use of teacher leaders and how they differed from other teachers. In this study, 4,083 teacher participants in grades 4-12 completed the *Teaching, Learning, and Computing 1998* national survey. Teacher leaders were defined as those teachers who were engaged in collaborative efforts with their peers in and out of school, who were involved with mentoring other teachers, presented at workshops, university teaching, or publishing (Becker & Riel, 2000; Riel & Becker, 2000). Private practice teachers had little or no time for meetings and did not participate in conferences or other professional engagement. On a continuum, other teachers such as teacher professionals were closer to teacher leaders and interactive teachers were closer to private practice teachers (Becker & Riel, 2000; Riel & Becker, 2000).

Becker and Riel (2000) and Riel and Becker (2000) concluded that professional engagement of teachers was found in their personal and educational backgrounds, teaching responsibilities, participation in staff development, teaching philosophies related to their pedagogy, and computer use. Teacher leaders tended to be female, were about 5 years older and had 5 years more teaching experience than other teachers. Teacher leaders also came from more selective schools and maintained higher grade point averages and were more likely to have graduate degrees (Becker & Riel, 2000; Riel & Becker, 2000). As noted, teacher leaders were spending more time in professional development practices. Becker and Riel (2000) and Riel and Becker (2000) stated that teachers leaders spent as much as 6 more days than other teachers in training. Along with this, these researchers found that teacher leaders and teacher professionals were constructivist in their practice far more than interactive teachers or private practice teachers, therefore they also tended to have a strong constructivist teaching philosophy (Becker & Riel, 2000; Riel & Becker, 2000). The data regarding computer use, teacher leaders and teacher professionals were more likely to have their students use computers on a regular basis during class time.

Becker and Riel (2000) and Riel and Becker (2000) noted in their research that teacher leaders as a group and who were professionally engaged were more likely to be constructivist teachers than other teachers in beliefs, practice, and computer use. Teachers who have made high investments in their own education, invested more time in their own professional development, and who shared their ideas with their peers were more prone to have constructivist philosophical beliefs which in turn supported the development of instructional practices that were related to these beliefs (Becker & Riel, 2000; Riel & Becker, 2000).

Attitudes and Beliefs

The motivations of exemplary technology-using teachers go far beyond the mere skills and abilities to integrate technology into the classroom. Angers and Machtmes

(2005) indicated that teacher's beliefs about classroom practice helped shape their goals for technology use and then made decisions on how to handle different barriers that might impede those decisions. As noted earlier, barriers were considered both external and internal in nature, however, internal barriers were those that challenge a teacher's belief about teaching, beliefs about computers, classroom practices, and unwillingness to change (Ertmer et al., 1999). To change a teacher's belief system required a tremendous amount of personal commitment, time, and a willingness to take risk and make mistakes along the way. Vannatta and Fordham (2004) indicated that technology training was important but the willingness to commit time and a risk-taking attitude was essential to the development of technology-using teachers. The willingness to change required a teacher to be proactive, to be reflective, and to want to learn and grow (Angers & Machtmes, 2005).

Summary

What was evident throughout this literature review was the degree of evidence found in research to support potential themes to support the development of teachers' abilities in the use of instructional technology in the classroom. Also, relevant research was included to show confirmation of factors found that influenced teachers to integrate technology innovation in their classrooms of which pedagogical, extrinsic, and intrinsic motivational factors were the main foci. A need for further research would be necessary to further establish and to acquire a better understanding of how teachers choose to teach and innovate based on their own pedagogical beliefs in best practices.

In summary, section 2 developed the contextual framework for this study. As this investigation suggested, teachers might acquire a better understanding of how they chose to teach by understanding their own pedagogical beliefs and reflecting on their own teaching practices as they use technology as an instructional innovation in their classroom. Pertinent research and theory was expanded to include evidence suggesting that two categories exist as critical components needed to support successful instructional practices when integrating technology. These categories included teachers' technology use and their instructional practices and the motivational factors influencing technology integration.

Teacher's technology use and instructional practices reflected on past research as well as a reflection on the current and latest research. What is known from these studies was that more investment in time and support for teachers to integrate technology into current pedagogical practices was imperative (Reeves, 1998; Sandholtz et al., 1997). The stronger the basic technology skills the teachers possessed, the more comfortable they were to support constructivist teaching practices (Rakes et al., 2006). In addition, availability to training and computers did not necessarily result in the widespread use of technology as well as technology related training did not provide enough connections between technology tools and the curriculum (Rakes et al., 2006).

What was also learned from these studies was that the key to understanding the lack of infusion of technology might be to further analyze teacher beliefs regarding the effectiveness of technology as an instructional tool. In order to change instructional practices, beliefs and attitudes about teaching and learning must change (Sandholtz et al., 1997; Zhao et al., 2002). Making small changes along the way where success was met at each step using successful pedagogical methods would produce increased student achievement. This could be further seen in the factors that influence technology integration, a category in this literature review.

Many factors that influenced teachers in their decision making processes to integrate technology were evident throughout this literature review. Factors such as, planning, leadership, curriculum alignment, professional development, technology use, teacher openness to change, teacher non-school computer use, teacher skills in technology competency and technology integration, and perceived student learning based on higher order thinking skills were all indicative of influencing teachers in their decision-making process (Baylor & Ritchie, 2001). But new research found other factors that were just as important. These included motivations and frustrations, self-efficacy, and their value of the task for instruction (Brinkerhoff, 2006; Foster, 2001; Piper & Hardesty, 2005; Tatum & Morote, 2006). Other factors mentioned also included the fact that teachers lacked an understanding of how to integrate technology in the classroom and the structure of school systems did not support the integration of technology (Tatum & Morote, 2006). Exemplary practices of technology-using teachers were also exposed and characterized.

Further research was needed to better understand how teachers chose to teach and innovate based on their own pedagogical beliefs in best practices. This study would contribute to the body of research needed to support school administrators and classroom teachers alike in finding the most appropriate professional development for their schools to provide best practices in teaching using innovative technologies. As this study suggested, exploring teachers' proficiency in the use of instructional technology in the classroom along with examining if motivation factors played a significant role in their decision making process, might provide a basis in establishing teacher belief systems.

The following section, section 3 outlined the detailed methodology used to answer the research questions.

Section 3: Research Methodology

This study used a qualitative, multiple case study design to answer the one central research question: How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms? The three subquestions were: What motivation factors can be identified during the planning and preparation process for a technology integrated lesson? How does teachers' perceived technology competence affect their decision to integrate technology into their classroom curriculum? How do teachers determine their success when integrating technology? The pursuit to develop a better understanding of how teachers choose to integrate technology was to explore a humanistic phenomenon. According to Creswell (1998) qualitative inquiry is the process of understanding, the exploration of a social or human problem. It is a process by which the researcher builds a holistic view of the phenomenon, analyzes words, reports detailed views of the participants, and conducts the study in a natural setting (Creswell, 1998).

The process of understanding how teachers make decisions about integrating technology was to ask open-ended questions as to what motivates them to integrate as well as how they perceive their own proficiency skills to accomplish the task. Qualitative inquiry allows for this type of design. This methodology comes from one of the four schools of thought about knowledge claims and how researchers learn and what they learn during their inquiry. One school of thought explains that constructivism concerns itself with how individuals seek understanding of the world in which they live and work (Creswell, 2003). The exploration of the participant views searched the complexities of how they construct meaning of their experiences. The questions within this study were broad and general for the purpose of allowing the participants to construct meaning typically found in discussion and interactions with others (Creswell, 2003). Crotty confirmed this and further explained that constructivism knowledge claims are based on the following assumptions:

1. Human beings construct meaning as they interact with the world around them. Qualitative researchers tend to use open-ended questions so participants can express their views.
2. Qualitative researchers seek to understand the context or the setting of the participants through visiting this context and gathering information. Researchers also interpret what they find and their interpretation is also shaped by their own experiences and backgrounds.
3. Meaning is always social which arises from the interaction within the human community. The process is inductive with the inquirer generating meaning from the data collected in the field. (as cited in Creswell, 2003, p. 9)

Because of the nature of constructivist knowledge claims, following such framework allowed for this qualitative study and warranted the exploration of the participants' views of the phenomenon being studied (Creswell, 1998, 2003). Qualitative inquiry supports the general framework for this study, which was to develop a better understanding of teachers' technology proficiencies and to determine whether motivation factors played a role in their decision making processes to integrate technology into the curriculum. This framework was further addressed in this section.

Type of Design

This study used a multiple case study design to explore teachers' technology proficiencies and to determine whether motivation played a role in their decision to integrate technology into their classroom curriculum. This study also included 10 elementary teacher participants identified as individual case studies. Because each case study was a separate empirical inquiry, the phenomenon was studied within real-life experiences for each individual participant. These participants planned and prepared their lessons and made decisions regarding what types of strategies were to be used to teach concepts within their curriculum. It was this process of planning and preparing that this study referred to as the phenomenon taking place when teachers made decisions to integrate technology into their curriculum. Yin (2003) referred to this as an "investigation of a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 13). The questions posed in this study were specific to ask the *how* question and alluded to the *why* question during the interview or focus group process. According to Yin (2003), case studies are the preferred strategy when answering how and why questions to an event the investigator has little control over where behaviors cannot be manipulated. Yin further explained that case studies could be used in a variety of situations to understand complex phenomena. Such phenomena can be seen in real life events, organization or system processes that help the investigator to retain the meaningful characteristics (Yin, 2003).

Case studies in this investigation used contemporary events dealing with contemporary phenomena; whereas, case studies from a historical perspective are considered the “dead past” (Yin, 2003) and therefore no manipulation of behaviors can take place. In case study investigations, Yin (2003) also called for several sources of evidence, which can span from primary, secondary documentation, and physical and cultural artifacts. This investigation considered only contemporary case studies and additional sources such as interviews of the persons involved in the event, focus groups composed of the same individuals, documents as in the technology integrated lesson plan, researcher’s field notes, and archival data such as the district’s strategic plan were used to give greater credence to answering the how and why questions in this investigation and give unique strength to the study. Reliable sources of evidence were directly related to the event and/or interviews of the persons involved in the event. Yin (2003) also noted that the additional strength within the case study was the assortment of evidence above and beyond the interviews to include documents and other artifacts and may cause evidence to overlap. In considering the technology integrated lesson plan and the focus group data, valuable insight into the contextual conditions that existed within the phenomena was significant to the case study (Yin, 2003). The lesson plan provided information common to the data acquired through the interviews, whereas the focus group led to detailed information regarding the perception and motivation within the context of grade level teams as well as the confirmation of the data in the interviews. More importantly, the case study inquiry relied on the variety of evidence where data converged toward triangulation for the benefit of data collection and analysis (Yin, 2003).

The credibility in using case study design was to understand the decisions teachers made when integrating technology; most importantly why they choose to integrate technology, how they implement integration, and whether or not they were successful. Using multiple case study design was an appropriate type of design because "it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result" (Schramm as cited in Yin, 2003, p. 12). The need to cover contextual conditions, which investigated the phenomena of the integration of technology into the classroom curricula, gave credence to the choices that teachers made when integrating technology. The interview protocol (see Appendix B) was discussed further within the data collection section.

The rationale for choosing multiple case studies derived its analytical benefits for having two or more cases (Yin, 2003). Drawing analytical conclusions from two or more cases was substantially beneficial in comparison to a single case. This multiple case study took place within one independent school district using 10 technology-using elementary teachers as individual cases. The fieldwork was conducted at each of the teacher's residing campus or home during Summer 2010. This multiple case study approach used a constant comparative method (Glaser & Strauss, 1967), which is discussed further within the data analysis section.

Data Collection

Researchers have stated that people can comprehend the world they work and live in by learning from conversations with friends, relatives, neighbors, clerks, and associates at work, along with newspaper and television (Rubin & Rubin, 2005). Unfortunately this was not enough to answer the how and why questions of why things occur. Rubin and Rubin (2005) made it clear that social research tools have become available for researchers to explore more complex questions. In naturalistic, qualitative research settings, the researcher gathers information by observing, talking with, and listening carefully to the people who are being researched (Rubin & Rubin, 2005). Hence, naturalistic researchers gather their data through observations and qualitative interviewing. Hatch (2002) indicated that qualitative interviewing helps to describe the how and why things change, to delve into the personal issues, and to help shed light on old problems.

The data collection methodology for the multiple case studies addressed the one central research question and the three research subquestions as shown in Table 1.

Table 1

Research Questions and Data Collection Methodology

Research Questions	Data Collection Methodology
1. How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms? a. What motivation factors can be identified during the planning and preparation process for a technology integrated lesson? b. How does teachers' perceived technology competence affect their decision to integrate technology into their classroom curriculum? c. How do teachers determine their success when integrating technology?	Semistructured, in-depth interviews Semistructured, focus groups Technology integrated lesson plan Field notes Archival data i.e., district technology strategic plan

A series of semistructured, in-depth interviews with an open-ended, loosely constructed question was asked to obtain the general essence of what it was like to integrate technology into the curriculum as shown in Appendix C. As the interviews progressed, a pattern emerged and a series of more specific, semistructured questions were used as suggested by Rubin and Rubin (2005) to broadly focus on events and processes to obtain meaning or description. This was evident in elaborated case studies "to find out what happened, why, and what it means more broadly" (Rubin & Rubin, 2005, p. 6). Each participant participated in a 60 minute semistructured, in-depth interview and a 90-minute focus group was conducted of which each participant was invited to participate. The in-depth interviews and focus group took place at the participant school sites in designated areas chosen by the participants or at their personal homes during the months of June, July, and August 2010. Consent forms were distributed to participants prior to data collection and participants were given an opportunity to review, sign, and return an original to the researcher. A total of 10 individual teachers were snowball or chain sampled to participate.

In-depth Interviewing

Yin (2003) stated that using interviews for data collection is one of the most important sources of case study information. Yin (2003) continued to elaborate that the interviews will be "guided interviews rather than structured queries" (p. 89). The job of the researcher is two-fold: (a) to follow the line of inquiry found in the case study protocol or the interview protocol with a priori set of questions (see Appendix B), and (b) to ask conversational questions in an unbiased manner, which also serves the line of inquiry. Difficulty would be found in wanting to ask the why question, but this may create defensiveness in the interviewee and therefore the researcher needs to ask the how question which may lead the interviewee to address the why question during the conversation (Hatch, 2002; Yin, 2003).

The use of in-depth interviewing in this investigation allowed for the development of rich, thick descriptions of the processes and actions that contributed to the understanding of how teachers' motivation has affected the way teachers chose to integrate technology innovation in their classrooms. According to Rubin and Rubin (2005), in order to achieve the depth, detail, and richness of these descriptions, researchers must carefully construct main questions, probes, and follow-ups. Therefore, the act of interviewing relies heavily on the art of listening. That is, listening to what is being said, acknowledging what is not understood, and the ability to ask what is not yet known (Rubin & Rubin, 2005).

Focus Groups

A focus group is a small homogenous group made up of six to eight targeted individuals who have been brought together to elicit views and opinions about a select topic and to provide qualitative data for the researcher (Creswell, 1998, 2003). Guided by a moderator, interviews are conducted with a few prepared unstructured, open-ended questions and probes to extract points of view, attitudes, feelings, ideas, and perceptions about the given topic. The advantage to focus groups is when the interviewees interact and cooperate with one another, which creates an environment for yielding the best information. On the downside, the researcher needs to monitor those who are hesitant to speak and those that dominate the conversation (Creswell, 1998). As mentioned, the questions were open-ended and generalized where the questions were specific enough yet applied to all participants (see Appendix D).

Field Notes

A researcher's field notes are simply to record information and gather data during an observation or interview (Creswell, 1998). Field notes were relied on to capture the descriptions of physical settings and behaviors of the participants. Additionally, reflective notes were used to provide further ideas and insights that would support theme development (Creswell, 1998). These notes were taken immediately after each interview and were maintained throughout the research.

Documents: Technology Integrated Lesson Plan

According to Tashakkori and Teddlie (1998), using multiple forms of data collection prove to be beneficial regardless of the type of study. Recognizing the realities of the field, I requested a sample technology integrated lesson plan, which was previously taught within the school year. These lesson plans provided a source of primary material related directly from the situation under study and therefore afforded additional data to support common themes within the topic of study. Creswell (2003) suggested "triangulate different data sources of information by examining evidence from the sources and using it to build a coherent justification for themes" (p. 196). These lesson plans were requested prior to the interview and were retrieved after the interview took place (see Appendix E).

Archival Data

Archival data such as the district's strategic plan and the district's technology plan were collected. These documents were necessary to support the perceptions and statements of the interviewees regarding the district's vision for the integration of technology in the classroom. The district's website was also used to gather archival data regarding the mission and uses of educational technology.

Data Recording and Storage Procedures

This study used a planned approach to data recording to facilitate the analysis of the collected data (Creswell, 2003). The data included transcripts, digital recordings, notes, and documented lesson plans. During the individual interviews and focus group, an interview protocol was used to record information during the process as seen in Appendix B. According to Creswell (1998) interview protocols enable the investigator to take notes during the interview and provide assistance in organizing thoughts and ideas. Creswell has identified key components within the protocol to include the key research questions, probes to follow key questions, transition messages, and a space for recording comments made by the interviewer as well as a space for reflective notes. The notes taken on the interview protocol were to support the digital voice recording in the event the equipment failed during the interview. The notes also provided further insights of other occurrences outside of the interview. The interviews were digitally voice recorded using an Olympus WS-500M digital voice recorder with an extended microphone to allow for clarity of voice and speech. These recordings were then downloaded onto the computer and stored. Each individual's data as well as the focus group data were separately assigned a number to maintain anonymity. The digital recordings were further imported into NVivo8 (QSR International, Inc., 2008) software and transcribed, sorted, and coded for analysis. The lesson plans were also imported into the NVivo8 (QSR International, Inc., 2008) software and coded and analyzed.

The data collected and stored were organized to provide an efficient database for instantaneous retrieval needed to quickly regroup information. The database was also used to enhance the ability to link concepts and themes, refined them, and located evidence (Rubin & Rubin, 2005). This raw data converged into data analysis and concluded the case studies findings. This raw data was destroyed at the conclusion of this study.

Site Selection

Population

The large urban school district in South Central Texas, ranked as the fourth largest growing school district in 2008, hosted a student population of approximately 88,000. A steady growth in student population since the 1960s proved a great challenge to the community and began an aggressive plan to create funding for the construction of future schools (NISD, 2007). Within the bond packages presented to the voters, developing the technology infrastructure as well as the matching instructional support for technology was evident throughout the strategic planning process. Part of this process included the hiring of campus instructional technologists (CITs), who previously held classroom positions and became the instructional technology leaders at their respective campuses for grades prekindergarten through 12th grades. Their responsibilities included the assurance that technology was carefully and appropriately integrated into the content areas as well as working with teachers to achieve integration between technology and content objectives. This was accomplished by providing training and support to teachers in their classrooms and lab settings as well as assisting grade levels throughout the planning process.

In 2001, the CITs and their principals were provided leadership and technology training with Moersch using his framework, Levels of Technology Implementation (Moersch, 2006). These principals and CITs returned to their respective campuses and implemented LoTi training. Prior to this implementation, the LoTi Questionnaire was disseminated throughout the district using an online delivery method to survey teachers on their opinions of their level of technology implementation (LoTi), their personal computer use (PCU), and their current instructional practices (CIP). This data was disseminated back to each individual campus as to the levels of implementation by their particular faculty. This data provided valuable and key information as to what teachers perceived to be their personal level of technology implementation, their personal computer use, and their current instructional practices.

LoTi training than began at each campus personally developed by their CITs who in turn collaboratively worked with other district CITs to develop and implement the training. This training took place from 2000 through 2005. Because of the nature of this independent school district's desire and commitment to educational technology, the necessity to further study these participants' attitudes and behaviors since the inception of the LoTi training, the amount of time that had passed, and the experiences of the teachers have changed. As of May 2010, there were 65 elementary campuses and the same number of CITs.

Sampling

When qualitative researchers sample a selected population they do so to yield the most information about the phenomenon (Creswell, 2003; Merriam & Associates, 2002). Merriam and Associates continue to elaborate that it is important for researchers to select a sample from which the most can be learned from hence, information-rich cases important to the purpose of the research. The population of all elementary teachers within this independent school district were afforded the opportunity to participate and were snowball or chain sampled based on the recommendations of their CITs who were the critical informants (Patton 1990). These CITs were asked to provide two names of classroom teachers on their campuses who were previously involved in the district-wide LoTi training from 2000-2005. These sampled participants had access to up-to-date standards for hardware, software, high-speed Internet access, on campus instructional technology support, and technical support through an online work order submission. Utilizing the district standards for technology, each elementary campus provided computer literacy training in the use of software applications and integration support through the efforts of the CITs. All elementary campuses required a variation of technology staff development hours each school year. These computer literacy hours included the completion of Microsoft Word, Access, Excel, PowerPoint, Inspiration, Groupwise email, KidPix2, and other Kid tool software applications. A district-wide commitment to educational technology was at the forefront and a clear understanding for the development of student's 21st Century skills were evident. These participants had a keen awareness to the development of their own technology proficiencies.

Based on the number of responses to participate, a total of 10 technology-using elementary teachers from the independent school district participated on a strictly voluntary basis. These participants' information was kept confidential and remained so throughout the study. Each participant was given a pseudonym and was referred to by a numerical assignation such as: T1, T2, T3, and so on. General demographic information such as the number of males to females, as well as their ethnic origin, ages, education level, teaching background, and years of teaching experience was undetermined until the completion of the study.

Data Analysis

Data analysis in qualitative research is complex and includes several components in the process of analyzing data to make sense out of the text and image data (Creswell, 2003). Creswell continued to say that these components include the following: (a) organize and prepare the data for analysis, (b) read through all the data to get a general sense of the information and reflect on its overall meaning, (c) begin a detailed analysis with a coding process or chunking of the material, (d) use the coding process to generate a description, (e) prepare on how the description and themes will be represented in the qualitative narrative, and (f) make an interpretation or meaning of the data as in "what was the lesson learned" (pp. 191-194). Similar to Glaser and Strauss's constant comparative analysis and further refined by Lincoln and Guba, this analytical scheme involves two general processes: (a) unitizing or breaking the text into units of information, and (b) categorizing or bringing together into provisional categories those units that relate to the same content (Tashakkori & Teddlie, 1998, p. 123).

Common to multiple case studies, the analytic approach in this study was based on the constant comparative method. Through the use of this analysis, emerging themes were constructed of the qualitative data and categories of themes were formed. As the purpose of this study was to explore teachers' proficiency in the use of technology in the classroom and to determine whether motivation factors played a role in teachers' decision making processes, the constant comparative analysis method was a logical way in developing an understanding of the phenomenon within the experiences of which it was lived.

The analysis of this study began with the importing of the interviews, field notes, and the technology integrated lesson plans into the NVivo8 (QSR International, Inc., 2008) software program for transcription, coding, and analysis. Lesson plan data was coded based on the verb usage within the objective to be taught as well as matching the activities to the lesson's objective. For example, using words such as identify, classify, explain, and compare, were situated within Bloom's Taxonomy to distinguish the level of higher order thinking used within the lesson itself. Then the lesson was further analyzed for the teaching approach used, that is, teacher-directed lesson or a student-centered lesson. This lesson plan data then provided support to the triangulation of the various data sources. The interview data was analyzed based on the essential questions asked during the interview (see Appendix B). These questions asked were for the purpose of generating responses toward the participant's decision making processes when deciding to integrate technology in the classroom, how they determined success, what motivated them to integrate technology in the classroom, and their beliefs about their technology proficiencies and how it effected their motivation to integrate technology.

The organizing process began with collecting the data from each participant and creating transcripts of each interview and focus group. The process then proceeded to reading and rereading the data to find patterns in beliefs and attitudes. Using archival data, field notes, and the technology integrated lesson plan supported the making sense process. As Creswell (2003) suggested, the next step would be to begin the detailed analysis using a coding process. The NVivo8 (QSR International, Inc., 2008) software database provided coding support and the locating of categories or themes such as that found within chunking. This process also located important quotations that could be used to provide additional descriptive support. As these categories or themes emerged, descriptor phrases were given as an identifying code.

Once the identifiable codes were given, a search of all evidence referencing these codes were conducted and found participant quotes and statements to justify themes. The process of grouping and regrouping continued to find emergent themes that supported the major findings in the analysis. In repeating the procedure helped to build on the concept of the constant comparative method to eliminate any potential evidence not found.

Validation and Reliability

Validity in qualitative research does not carry the same connotations as in quantitative research (Creswell, 2003). Strength in qualitative research, validity is used to determine if findings are accurate from the researchers, participants, or the reader's standpoint. Tashakkori and Teddlie (1998) suggested that these issues of information/data quality have been renamed as trustworthiness and dependability in lieu of external and internal validity. Some qualitative researchers viewed this design validity as transferability and credibility. Because data collection and data analysis were so closely interwoven, it was difficult to draw two separate evaluations of data quality (measurement validity and reliability) and inference quality (design validity, internal validity), but it was suggested to evaluate them separately as much as possible (Tashakkori & Teddlie, 1998).

In qualitative research, to check the accuracy of the findings would determine the validity or the inference quality. This idea was found in terms such as trustworthiness, authenticity, and credibility (Creswell, 2003). Several strategies were used within this research to support the validity and the credibility of the findings. The multiple case studies established construct validity and reliability by piloting the case study research questions, triangulating different data sources, using rich, thick descriptions, and creating a case study database (Creswell, 2003; Tashakkori & Teddlie, 1998; Yin, 2003).

Pilot Case Study

Prior to data collection, one pilot case study was necessary to pilot test the research questions and verified whether these questions elicited the rich responses needed for this study. According to Yin (2003) using a formative perspective allows the researcher to form "relevant lines of questions" as well as clarifying procedures to be followed during the interview process (p. 79). Yin (2003) also indicated that more time might be spent on this phase of the research, refining and modifying based on the amount of pilot data that can give considerable insight to the basic issues being studied.

The selection of the pilot case study was based on the possible participants who were snowball or chain sampled by their respective CITs. The final pilot case study was randomly selected from the chain sampling and was further considered based on convenience and access to the elementary campus. Consideration was also given to prior personal contact with the campus administration or classroom teachers.

The final case study report reflected the lessons learned from both the research design to the field procedures (Yin, 2003). The purpose of the case study report was to provide critical pilot data so modifications might be made prior to the actual data collection. These modifications were made directly to the case study protocol or interview protocol and provided a good model for data collection (Yin, 2003).

Triangulation: Multiple Sources of Evidence

Yin (2003) clarified that using multiple sources of evidence allows the investigator to address issues within a broader perspective relating to behaviors, attitudes, and histories. Another important advantage in using multiple sources is the ability to converge the lines of inquiry. Yin (2003) referred to this as a process of triangulation of which this study included data triangulation or the collecting of information from multiple sources but corroborated the same phenomenon. Each individual case study allowed for the convergence of data from multiple data sources and then was further triangulated through cross case analysis as seen in Creswell's (1998) case study template, visualizing the model as shown in Figure 1.

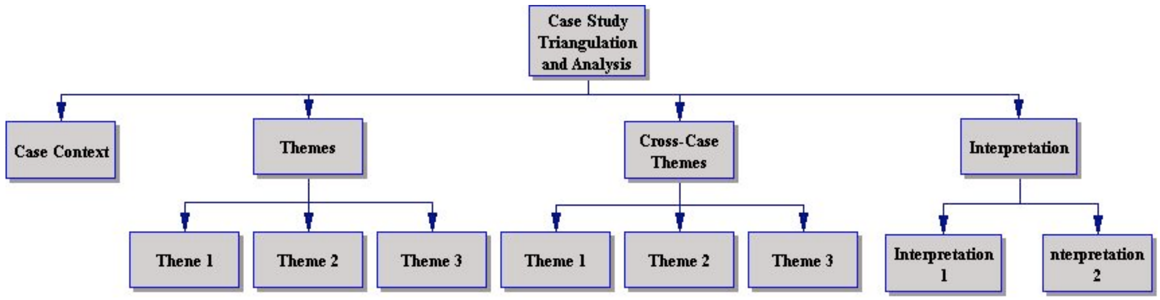

Figure 1. Case Study Triangulation and Analysis. Adapted from “Qualitative Inquiry and Research Design: Choosing Among Five Traditions” by John W. Creswell, 1998, p. 11 reprinted with permission from Sage Publications.

According to Yin (2003) “any finding or conclusion is much more convincing and accurate if based on several sources of information following a corroboratory method” (p. 98). Yin (2003) further documented that this may create problems with construct validity because multiple sources of evidence provide multiple measures of the same phenomenon. Yin clarified and suggested that those case studies using multiple sources rated more highly in overall quality in comparison to those that only relied on single sources of information.

Multiple data sources were obtained from 10 different technology-using elementary teacher case studies. Data included in-depth interviews, focus group, integrated technology lesson plans, archival data, and field notes. The data gathered was evidential to measuring the same phenomenon through corroboration and therefore improved the quality to support construct validity of various data sources for the purpose of data triangulation (Yin, 2003). The data gathered also supported internal validity by seeking commonality in themes through the triangulation process (Creswell, 2003).

Hatch (2002) indicated that "conversations should be recorded as close to verbatim as possible" (pp. 82-83) and to avoid any inaccuracies of the data, digital recording of all interviews was taken and further imported into a personal computer using NVivo8 (QSR International, Inc., 2008) software to be transcribed within the software. This process eliminated any potential threats to validity either through the collection of the data, analysis of the data, and the interpretation of the data. Participant permission to digitally voice record was requested prior to the actual interview.

Thick Descriptions

According to Creswell (2003), using rich, thick descriptions are to express the findings. This strategy allowed for the transferability and conclusions of the inferences made (Yin, 2003), but more specifically Hatch (2002) indicated that "researchers must carefully describe their data and their data sources so that readers can make their own judgments about the trustworthiness of the accounts in the study" (p. 121). These thick descriptions supported external validity in that drawing inferences or conclusions included interpretations carefully. Interpretations consisted of (a) identifying contexts and meaning of the data, (b) recognizing similarities and differences within contexts, and (c) judging relevance of theories to the data (Hatch, 2002). These thick descriptions came from interview data, lesson plan data, archival data, and field notes.

Creating a Case Study Database

The purpose of a case study database was to provide adequate data for the case study report as well as independent inspections might be made of the raw data (Yin, 2003). The practice of developing a formal and presentable database for other investigators to view increased the reliability of the entire case study. The raw data imported into the NVivo8 (QSR International, Inc., 2008) software on a personal computer included in-depth interviews, focus group, integrated technology lesson plans, archival data, and the researcher's field notes. A personal computer with the NVivo8 (QSR International, Inc., 2008) software housed the raw data and created a database for ease of use.

Ethical Considerations

Qualitative research design typically addresses the importance of ethical considerations because "the researcher has an obligation to respect the rights, needs, values, and desires of the informant(s)" (Creswell, 2003, p. 201). This research was designed to protect the participant's rights minimizing and anticipating any risk to subjects. Participants participated strictly on a voluntary basis and all assurances were made that confidential information and informants would remain as such. Written permission to conduct the study and gain access to the district was obtained from the Program Evaluation Specialist for District Programs. The following safeguards were implemented as suggested by Creswell (2003): (a) all research objectives were clearly articulated so that the participants understood the study and how the data would be used, (b) written permission to proceed was obtained from the participant, (c) the participant was informed of all data collection and activities, (d) the right to voluntary participation as well as the right to withdraw at any time, (e) a description of the procedures of the study so that the participants could anticipate their involvement, and (f) the participant's rights were considered first when choices were made regarding the reporting of the data.

Other safeguards included the anonymity of the school sites, participants remained confidential, and coding was used as the identifier. No reference of identification was made to the participant in relationship to the data. Before any research began, I sought approval from the Walden University Institutional Review Board (IRB; Walden University IRB approval #06-03-10-0308575).

Role of the Researcher

Qualitative research views this researcher to possess several key characteristics. According to Merriam and Associates (2002) researchers strive to understand the meaning that people have constructed about their world and their experiences and makes sense of it (p. 5). Secondly, I was viewed as the primary instrument for data collection and data analysis and therefore could adapt and respond accordingly (Merriam & Associates, 2002). Other characteristics included recording of data as in understanding nonverbal and verbal communication, processing, clarifying, checking, summarizing, and exploring consistencies of data immediately as well as exploring unusual or unanticipated responses (Merriam & Associates, 2002). In addition, I gathered data to build concepts, hypotheses, or theories in an inductive way rather than deductively testing theories or hypotheses. As an inductive process, I derived findings based on themes, categories, and concepts from understandings of being in the field. This experience helped me to provide a richly descriptive inquiry to convey what I have learned about the phenomenon (Merriam & Associates, 2002), but most importantly, I became an active learner, wanting to tell the story from the participant's perspective.

As a qualitative researcher, getting close to the action and close to the participants was necessary and in doing so, building a relationship of trust was essential. As Hatch (2002) indicated, teachers have little power and often perceive themselves to be in a subordinate position in relation to educational researchers. Providing full disclosure of my intentions as well as clarifying that participation was strictly voluntary, these participants were able to make a more sound decision to participate during the informed consent process.

My experiences in the educational setting have taken place in public and private school settings to include independent school districts in urban and suburban environments. I hold a Master's Degree in Education with a specialization in Instructional Technology from the University of Texas at El Paso and a Bachelor of Interdisciplinary Studies with an English specialization also from the University of Texas at El Paso. My teaching certification includes a Texas Life Provisional Certificate in Elementary English Grades 1-8 and a Texas Life Provisional Certificate in Elementary Self-Contained Grades 1-8. My teaching experience ranges from a first to fourth grade classroom to Campus Instructional Technologist along with administrative experience to include Director for The Center for Teaching Excellence as well as a student teaching supervisor and adjunct faculty with a local university. I am currently a Course Developer with Laureate Education, Inc. My experiences as a teacher, technology leader, and administrator provided me with the insight needed to understand and elaborate on the phenomenon. I viewed my contribution as useful and positive rather than detrimental, although I may hold certain biases to this study based on the fact that I worked closely with the participants, administrators, and district personnel to achieve the preliminary goals for the integration of technology. Every measure was taken to ensure objectivity and because of my previous experiences these biases may have shaped the way I viewed, understood, and interpreted the data (Creswell, 2003).

As a former Campus Instructional Technologist with this independent school district, I have provided staff development opportunities for elementary and secondary teachers in the area of integrating technology into the curriculum from 1999-2004. I also participated in Moersch's LoTi Framework training and developed staff development opportunities for teachers using this same framework. My aim and primary motivation in conducting this study was to contribute to education and improve teaching and learning through the effective uses of educational technology.

Summary

This section presented, explained, and justified the methods used within the framework of this qualitative, multiple case study design. The exploration of technology proficient teachers and their motivation to use technology in the classroom would take place was detailed. The procedures for the selection and recruitment of the participants were described. The data collection methods were described as well as an explanation of the constant comparative method used in the analysis to address the research questions. The study further explained that cross-case analysis would be used to further the triangulation process. The final analysis is presented in section 4 in a rich, detailed and descriptive narrative.

Section 4: Data Analysis and Results

The intent of this study was to better understand teachers' proficiencies in technology use and to determine whether motivating factors played a role in their decision making process to integrate technology into the curriculum. The exploration of teachers’ technology proficiencies as well as identifying the key variables that may impede or sustain their decision making to integrate technology was the primary focus. This section presents an overview of each technology-using teacher’s efforts to integrate technology into the curriculum along with a complete description and analysis of the collected data. Semistructured interviews, a focus group, technology integrated lesson plan, field notes, and the district’s strategic plan were collected in response to the following research questions:

1. How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms?
    a. What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson?
    b. How does teachers’ perceived technology competence affect their decision to integrate technology into their classroom curriculum?
    c. How do teachers determine their success when integrating technology?

The themes that surfaced from the data will be presented in narrative form under each individual question. The subquestions will be answered first and then the central question will finalize the overview.

The data collection took place at three elementary teacher's campus and at seven elementary teacher's individual homes. Of these 10 teacher participants, two teachers identified themselves as PreK-kindergarten teachers, five identified themselves as first through third grade teachers, two as fourth through fifth grade teachers, and one as a multi-age teacher to include students from grades first through fifth grade. All teachers were characterized by their use of technology in the classroom and were identified as technology-using, elementary-level teachers, and had received extensive training in the use of technology in the classroom.

The qualitative methodology of this multiple case study design used a combination of semistructured interviews, a focus group session, an integrated technology lesson plan, archival data, and field notes. A combination of semistructured interviews and one focus group session were conducted with a total of 10 participants over a 3 month time period in June, July, and August of 2010. All sessions were digitally voice recorded and transcribed verbatim. To maintain complete confidentiality, each participant in this study was identified with a numerical designation of T1, T2, T3, and so on. Each interview and focus group session was guided by the same set of semistructured interview questions as seen in Appendices C and D. Also, an interview protocol (Appendix B) was used for each session to maintain continuity in the data collection.

This section will include data that was examined using cross case analysis, which was assisted by the use of the NVivo8 software program (QSR International, Inc., 2008). The benefit of this software program provided a verbatim record of each semistructured interview and the focus group session as well as the support of cross coding of the integrated technology lesson plan, the archival data, and field notes. Another benefit of the NVivo8 software was that it allowed for drawing insight and meaning from the word usage and frequency patterns found in the text (Yin, 2003). Keyword coding and charts were used to display the data of each individual case in a uniform fashion for the purpose of drawing patterns for interpretive results (Yin, 2003).

Each response will be in narrative format within each research question discussed. Prior to the analysis, the case study demographics will be discussed in a separate section as well as a section related to the results of the pilot test. At the conclusion of each research question, a summary of the findings that emerged from the data will be given.

Multiple Case-Study Demographics

The 10 technology-using elementary teachers worked within the same school district and were spread out amongst six different elementary campuses. These campuses range from a student population of 627 the smallest to the largest campus of 1,333. Students at these campuses were identified from a range of 28.2% economically disadvantaged to a high of 81.6% (TEA, 2002). Four campuses were identified as TEA exemplary, one as TEA recognized, and one has yet to be identified. The average years of teaching experience at these campuses were 8.88. In comparison, Figure 2 reflects the years of teaching experience and the highest education level for the participants in this study as well as, Figure 3 reflects the diverse ranges of age.

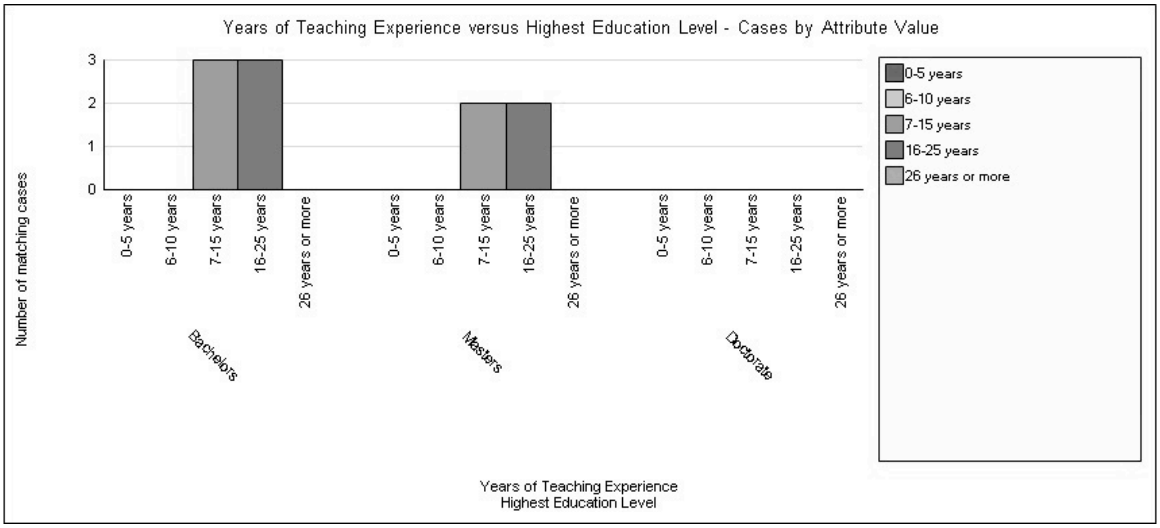

Figure 2. Years of Teaching Experience versus Highest Education Level.

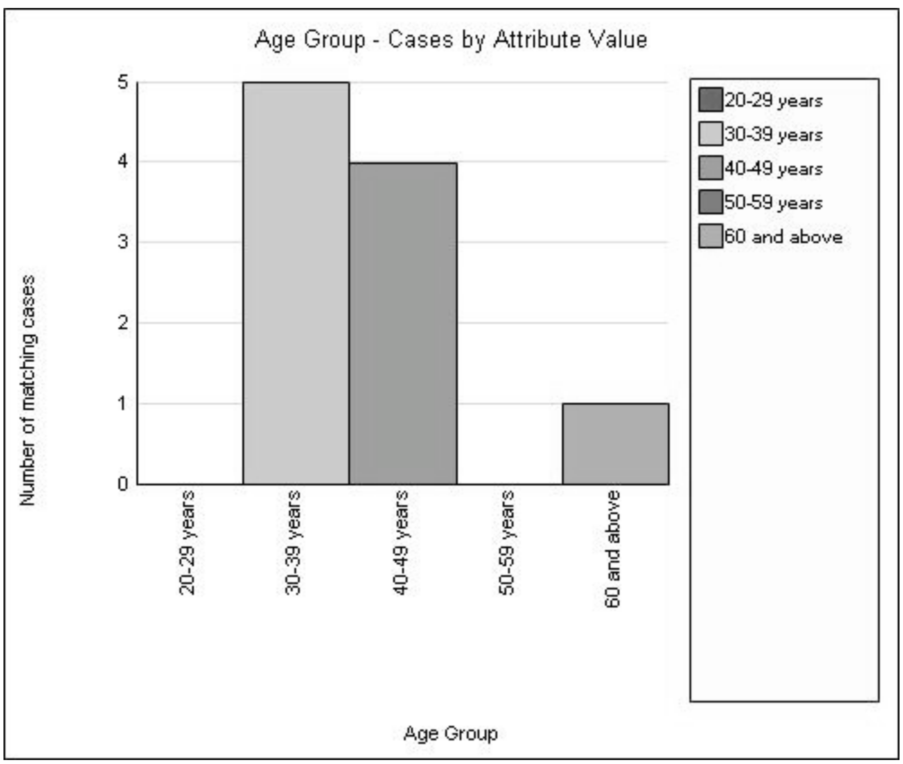

Figure 3. Age Group of Female Case Studies.

The Pilot Case Study

One pilot case study was found to be necessary to test the research questions and to verify whether these questions elicited the rich responses needed for this study. To determine the effectiveness of the research questions, the pilot test was used more as a formative tool to clarify and to develop continuity in questioning (Yin, 2003). The teacher participant selected for the pilot case was identified as a 35-year-old female with 15 years of teaching experience, teaching PreK-kindergarten, with a master's degree and teaches at one of the largest elementary campuses' for the school district. The pilot case participant was chosen based on proximity, personal contact, and the ease of access to the participant's home where the interview took place.

The pilot case participant was interviewed using the Interview Protocol (Appendix B), which included five essential questions. These essential questions were used to solicit deep, rich responses that supported the original overall research question as well as the research subquestions within this study (see Table 2). The following analysis or pilot report provides with greater detail the "lessons learned" (Yin, 2003, p. 80) from experiencing the use of the interview protocol as well as seeking to find the relevancy within the essential questions asked.

Table 2

Interview Protocol Essential Questions in Relation to Research Questions

Overall Research Question	
1. How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms?	
Interview Essential Questions	**Research Subquestions**
1. What does integrating computer technology in your classroom look like?	
2. How do you decide to integrate computer technology in your classroom?	1a. What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson?
3. How do you determine when you are successful when integrating computer technology?	1c. How do teachers determine their success when integrating technology?
4. What motivates you to want to integrate computer technology in the classroom?	1a. What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson?
5. What do you believe your technology proficiency/competency skills to be and how does this effect your motivation to integrate technology?	1a. What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson? 1b. How does teachers' perceived technology competence affect their decision to integrate technology into their classroom curriculum?

The first essential question asked was used to begin focusing the participant on the use of technology in the classroom. The goal of the question was to seek a description of how technology was used as well as to begin the discussion to build a better understanding and basic knowledge of technology use with students. The participant's response was very specific and included a clear objective for use. She indicated,

> At the kinder level, in the classroom, it's like a center that the children can visit during center time…at the beginning they probably do a little more exploring to develop fine motor skills but then towards the end of the year more of actual activities they are to complete during the center.

Through further prompting and probing, the participant continued and clarified that at the beginning of the year it is important to use technology for skill development and then move toward completing projects toward content mastery whether using the computer lab or classroom computers. The results indicated that the first essential question provided adequate data to satisfy and support the overall research question within this study and no further modifications were made to the question.

Essential question 2s data was used to support research subquestion 1a. This question was used to solicit responses based on how decisions were made when choosing to integrate technology into the classroom curriculum. Initial responses included the planning process with the campus instructional technologist and the librarian who were there to help guide the lessons. Further prompting and probing questions led to further defining the planning process and provided critical information as to whether integration was being used innovatively or to follow the district curriculum guides. The results showed that essential question 2 provided satisfactory data to support research subquestion 1a and no further modifications were needed to modify the essential question.

The third essential question helped to determine the success of integrating technology into the classroom curriculum. This question solicited responses for research subquestion 1c. The initial data focused on the success of the students while using technology to enhance their learning. The participant stressed the importance of completing the project and learning the content through the use of technology. To determine the success of the teacher, prompting and probing questions were used to delineate the difference between the student and the teacher. A richer response was exposed and the teacher participant revealed that through her observations, her success was measured by the excitement and level of engagement of her students. She stated,

> When I see them talking (and the lab doesn't have to be about them sitting at the computer and getting one thing done and leaving), if they are talking and communicating and researching and I see that they are engaged and excited, I see this by observation.

Because of the importance to prompt and probe further to understand the similarities and differences between the success of the student versus the success of the teacher, the additional prompting and probing questions remained as a subset of questions within the interview protocol. No other modifications were necessary to the essential question asked.

Essential question 4 related to the motivation of the participant to integrate technology in the classroom. This question was asked to gain a clear understanding for research subquestion 1a. The data collected identified several motivation factors that influenced the integration of technology into the classroom curriculum. These factors included high levels of engagement, excitement in the use of technology, and the teacher's passion for technology. Prompting and probing questions were used to clarify the differences between the motivation of the students and the motivation of the participant. Based on the data collected, no modifications were made to essential question 4.

The results of the first four essential questions were satisfactory to the original research questions and provided substantial data for this study. However, the fifth question regarding teachers' proficiency skills in relation to their motivation to integrate technology needed to include a deeper line of questioning, but one that was based on a common rating scale. A Likert-type scale was used to find commonality or difference within the case studies using the same rating scale for each. Question 5 was then adjusted to contain two separate subquestions for deeper contextual understanding. They were as follows:

5. What do you believe your technology proficiency/competency to be and how does this effect your motivation to integrate technology?
    a. How do you rate your technology proficiency skills, on a scale of 1 to 5, with 5 being the highest? Using this same scale, rate your motivation to use technology in the classroom?
    b. What do you think either stifles you to use computer technology in the classroom or supports you?

The original question 5 remained the same for the purpose of having the participants express their initial feelings and ideas and to gather their preliminary thoughts. The subquestions were then asked to solicit a true consensus of what their personal ratings to be as well as specifically identifying those variables that would either hinder or support their efforts to integrate technology in the classroom. The data collected needed to reveal similarities and/or differences between all cases studies and the use of a rating scale was necessary to reveal the patterns found in the data. This modification to question 5 was found to be effective and revealed consistency in the data. The following section includes the in depth analysis and results of each of the research questions for this study.

Results of Research Questions

The results indicated that the self-determination of teachers affected the way decisions were made to integrate technology into the classroom curriculum. Teachers were found to be more willing and motivated to use technology than the value for technology proficiency skills needed to perform the task. Decisions to integrate technology were based on instructional outcomes and the success for teaching. However, teachers also valued the importance of using curriculum guides to support their instruction, conforming to the district curriculum norms accepting traditional methods of teaching in lieu of innovative practices.

Research Subquestion 1a Analysis

Research subquestion 1a was: What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson?

The results found many intrinsic and extrinsic factors for integrating technology into classroom practices as well as data that revealed a deeper understanding of the decision making processes used to successfully integrate technology into the classroom curriculum. Research question 1a was disclosed through questions 2, 4, and 5 of the essential questions within the interview protocol.

The questions asked solicited open-ended responses to expose the key words found within motivation. These keywords were coded and identified within the NVivo8 (QSR International, Inc., 2008) database. The findings consisted of 17 motivation factors to include: (a) 21st century learning, (b) student interest, (c) teacher interest, (d) enjoyment, (e) campus instructional technologist (CIT), (f) district, (g) classroom benefits, (h) more to learn, (i) teacher success, (j) no fear of technology, (k) technology is important, (l) what programs I know, (m) built into the curriculum, (n) willingness to use, (o) administration/evaluation requirement, (p) sense of guilt, and (q) parent expectation. These factors were further categorized into 11 salient categories and identified within intrinsic and extrinsic motivation based on the definition of motivation (see Table 3).

Table 3

Factors of Motivation

Participants	Intrinsic: 21st Century Learning	Intrinsic: High Interest Value	Intrinsic: Classroom Benefits/Success	Intrinsic: Campus/District/CIT	Intrinsic: Staff Development Training	Intrinsic: Built into the Curriculum	Intrinsic: No Fear of Technology	Intrinsic: Willingness to Use	Extrinsic: Administration Requirement Evaluation	Extrinsic: Sense of guilt	Extrinsic: Parent Expectation
T1	x	x	x		x	x	x				
T2	x	x	x		x	x					
T3		x	x			x		x			
T4		x	x						x		
T5		x	x		x		x	x		x	x
T6		x	x		x		x				
T7	x	x					x				
T8	x	x			x						
T9		x	x				x				
T10	x		x		x						
Focus Group	x	x	x	x	x				x	x	x
Archival Data			x		x	x			x		

Factors of Motivation

The data within motivation exposed a high frequency pattern contained by the categories of high interest value, classroom benefits/success, and staff development and training which were all found to be intrinsic valued factors. What was also valued moderately was the intrinsic need to prepare students for 21st century learning as well as the fearlessness to use technology. What was contrary to expectation was the low frequency of data within the administration/evaluation requirement found in extrinsic motivation. This particular factor was part of the teacher evaluation process, which included the assessment of the required implementation of technology integration projects for each school year. Based on the data given, the participants did not find this to be a signifcant factor due to their need for a greater intrinsic value. Teacher evaluation was not as motivating as the overall benefits to their classroom success, their personal training, and their high interest in technology use. To better understand the participants view for intrinsic motivation, T6 expressed her high interest value by stating, "I am very interested in it and I enjoy it. I think technology is where we are headed and I think our children need to feel very comfortable with it. I don't want them to be intimidated by it."

During the focus group, one teacher made reference to her campus' high interest as "more teachers see the value and want to integrate. They are naturally curious and they want to evaluate the programs for their student's needs." Another teacher expressed it as,

> You see more people doing it [integrating] because they want to learn new things and see the benefit in it. The difference is having to do it versus wanting to do it. Yes, there are a few teachers that only do what they are required by they are in the minority, a very small percentage.

Realizing the high interest value in integrating technology in the classroom, the data also showed an increased benefit to learning and the success of teaching. T3 expressed it as "when you have a successful technology project, you're already thinking about the next successful technology project you can do." T4 and T5 connected their classroom success to student engagement in the learning process as well as connected learning through the use of technology for differentiated instruction. As T4 stated, "It's part of differentiated instruction; activating the brain and engaging the brain." Contrary to the literature (Foster, 2001), these participants showed a high value and interest in integrating technology as well as understanding the greater benefit in the use of computer technology. This can be demonstrated in Figure 4, which shows the value of motivation and desire these teacher participants have to integrate technology into their classroom curriculum.

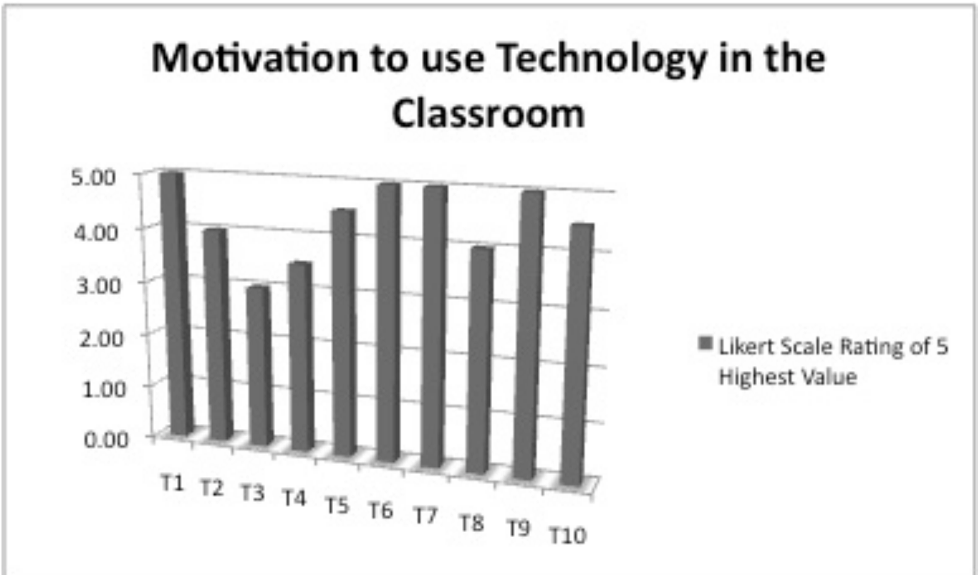

Figure 4. Value of Motivation.

The literature does not support this fact and finds that teachers do not value computer technology and therefore are not willing to integrate technology (Foster, 2001). The reason for this may be found in the degree of staff development and/or training teachers continuously received from their district or campus support system in which allowed teachers to reflect on the importance of technology in their student's future.

The data also indicated that 6:10 teacher participants expressed that staff development or training was pivotal in their efforts to integrate technology. A need to learn and know more and what software programs they were comfortable with, were clearly motivating factors. T1 expressed it as "I go above and beyond to do more but there is more for me to learn. My motivation is to learn more." T10 indicated "I think my motivation comes from what programs [software] I know and what I have been inserviced on." The more knowledgeable these participants were in using the software applications, the higher the confidence level when integrating technology into the classroom curriculum.

Technology Integrated Lesson Plans

Analogous to receiving appropriate training in a variety of software applications, 4:10 participants expressed that ready-made lessons, which have been built into the district's curriculum guides, serve as a motivating factor in the integration of technology as well. T2 articulated,

> If it was placed into the curriculum and people didn't have to take the time to create or look themselves, there might be a little more motivation to use it because it wouldn't be time consuming. Because creation is time consuming and sometimes that in itself is a deterrent to using technology.

This was also confirmed by T3, as

> Things would be a lot easier if the district could come up with more technology lessons that just fit into the curriculum naturally. Most of the ones that we do fit in and we do them, because they are there and they are already part of the timeline.

Similar to Cuban's (2001) assessment, instead of using technology in innovative ways, teachers are hybridizing technology to coexist within their instructional practices. Teachers adapt to the expectations that are set forth by the district's ready-made curriculum; integrating technology into their traditional teacher-directed practices in lieu of using innovative, constructivist practices as found in student-centered environments. Equally, “teachers with more traditional beliefs will implement more traditional or ‘low-level’ technology uses, whereas teachers with more constructivist beliefs will implement more student-centered or ‘high-level’ technology uses” (Haney et al. as cited in Ertmer & Ottenbreit-Leftwich, 2010, p. 262). This is clearly evident in the technology integrated lesson plans.

Six out of 10 participants submitted a technology integrated lesson plan that was previously taught. Out of these six participants, all of them revealed that these lessons were included in their district’s curriculum guides or replacements units for the specific content area. These lesson plans were analyzed based on the content objective and placed within the categories of Bloom’s Taxonomy (Bloom et al., 1956) to determine the level of critical thinking and further analyzed for the type of approach used for instruction. The following Figure 5 demonstrates the levels of cognition.

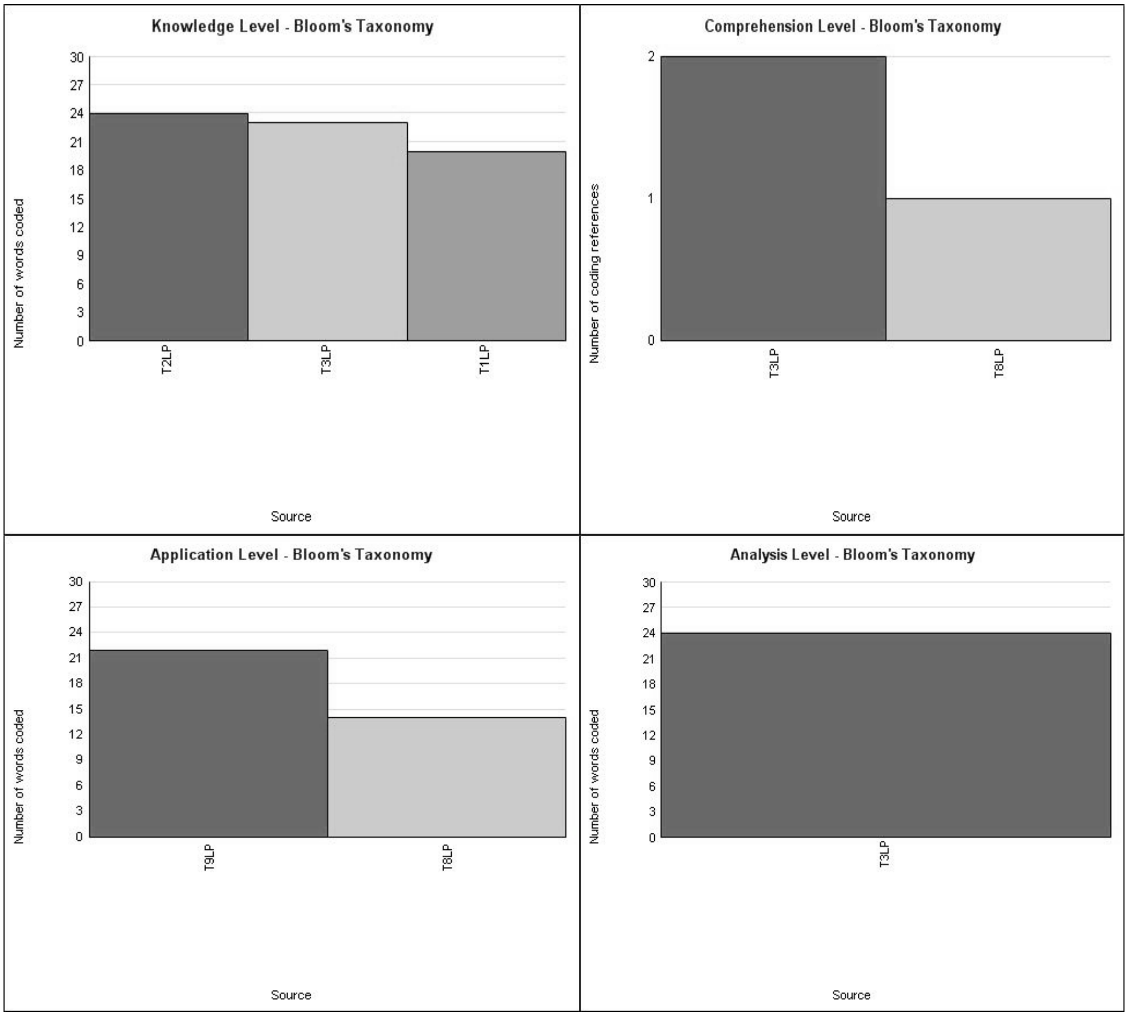

Figure 5. Levels of Cognition as they apply to the level of thinking during an integrated technology lesson.

All lessons were taught using a teacher-directed approach of which T3 and T8 included two or more objectives within their lesson. However, only one lesson demonstrated analytical thinking and the remaining plans were considered "lower level" thinking as shown in Figure 6.

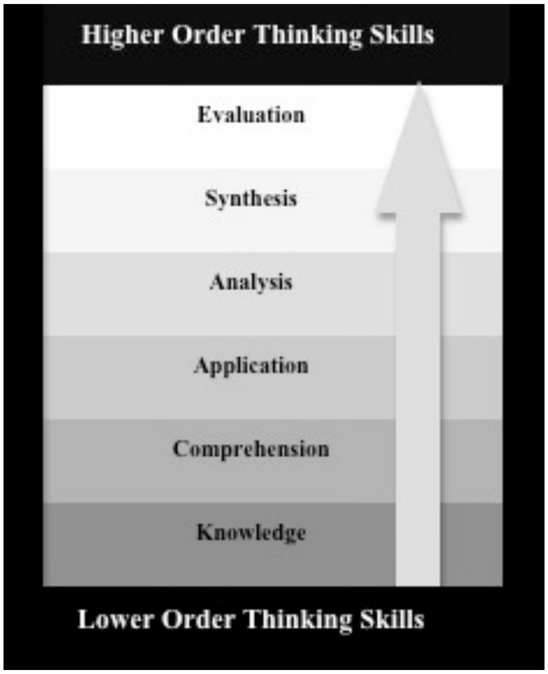

Figure 6. Bloom's Taxonomy (Bloom, B.S., Engelhart, M.D., Furst, E.J., Hill, W. H., and Krathwohl, D.R., 1956).

The lesson plans suggested that teachers were more apt to adjust and adhere to the districts curriculum standards due to (a) not to differ too much from current acceptable practices, (b) lack of time and planning on their own, and (c) not valuing the benefits of constructivist practices versus traditional ones. Despite the fact that the teacher participants had a great desire and willingness to use technology, many variables were found that either supported their efforts to integrate technology or hindered them. These variables can be seen within Table 4.

Table 4

Variables that Hinder or Support Technology Use

Hinders	Time for Planning	Time for implementation	Time for training	Lack of Training	Funds for software	New software training	CIT Availability	Lab Scheduling	Lack of Classroom Computers	Fit into the Curriculum	District Firewall	Standards and Testing	Technology Projects Required	Technical Support
T1	x	x	x		x									
T2	x	x				x	x	x			x			
T3	x	x						x	x	x				
T4			x	x				x	x					
T5		x	x	x					x			x		
T6								x					x	
T7			x						x	x		x		
T8	x	x	x	x			x	x	x					x
T9		x						x	x					
T10			x		x	x	x	x	x		x			

Supports	Training	New Technology in Classrooms	Software Purchases/Licensing	Lab Scheduling	Curriculum	CIT	Administration	Community/WebPages	Campus/Grade Level	District
T1	x								x	
T2			x						x	
T3			x		x	x				x
T4	x				x	x	x		x	x
T5	x					x		x	x	x
T6				x		x	x			
T7	x		x			x				x
T8						x				
T9	x				x	x	x			x
T10		x								

Variables that Hinder or Support the Use of Technology in the Classroom

Variables that supported the participants to integrate technology were clearly connected to the human or social factor, requiring them to receive support from those that they knew and those that they rarely interacted with (Zhao et al., 2002). High frequency patterns were related to the CIT, campus/grade level team, and to district support. In relationship to the CIT, 7:10 participants believed that the CIT was a supportive factor in their efforts to integrate technology. T5 expressed "our CIT is very effective; she schedules, she meets with us every month." T6 remarked, "the CIT is excellent at giving us ideas" and "she has a very good personality." Likewise, the support from the campus/grade level teams demonstrated the same type of support. T4 made reference to this support as "the team or the grade level supports me with ideas and we bounce things off of each other and we plan." T5 expressed it as "the grade level team makes it easy to collaborate, plan, and give advice." On the other hand, the district also contributed to supporting the participants. T2 stated, "The district has purchased many wonderful programs that do allow us to use quite a bit of technology." Along the same lines, T3 and T7 respectively voiced, "the district and my school have everything there and it's just a matter of fitting it in" and "our district is very supportive with a number of resources available such as, United Streaming."

Another factor found to be supportive was the amount of training that was available to the participants. The data reflected 5:10 participants believed that the amount of training being offered was essential in their efforts to integrate technology into their classroom curriculum. T5 and T8 indicated "the district offers so many workshops such as, ecamp and what they make available to us is very supportive." Similarly, T10 said, "we have a lot of classes offered…but, district training is two hours after school and I don't have time." This sentiment was shared throughout the study. This can be seen in the variables that were found to hinder or stifle the participants' efforts to integrate technology.

As seen in Table 3, factors that hindered integration efforts were also identified. These factors included time, lab scheduling, and lack of classroom computers with high repetitive patterns along with other factors such as, lack of training and CIT availability were minimally repeated but found to be essential. Time was further defined as a set of factors consisting of time for training, time for implementation, and time for planning. As the data indicated 6:10 participants found that finding the time to train was difficult and stifled their efforts to integrate technology as well as finding the time to actually implement their integration lessons was hard and problematic. T2 stated "there's not always the time that is needed to teach it well and a lot of times incorporating the technology is to teaching it well and not just teaching it." As far as training was concerned, T4 and T5 both stated that it is just finding the time. More specifically, T4 indicated, "sometimes it's just a matter of time. You're not given that and it's all on your own time [time to learn applications]."

Lab scheduling and lack of computers in the classroom worked uniquely together. The data showed that 7:10 participants found that scheduling the computer lab to be difficult due to the high demand of use therefore the need for more computers in the classroom. However, the data also indicated that 7:10 participants found that they also lacked computers in the classroom therefore needing to schedule more computer lab time for integration projects. The participants felt that they were neither supported by the computer lab scheduling nor by the computers in the classroom. This was clearly evident in T10's statement. "Lab scheduling is difficult because some teachers go and are on [scheduled] every week and it should be shared more. I'm glad they're using it [computer lab] but it's difficult for the rest of us." She further stated, "I need more hardware. I need more computers." T3 also expressed her concern

> We have 26 laptops and 13 for one classroom of 26 means that kids have to pair up and not ideal but better. Getting into the lab can be better some weeks than others. Competition of resources makes it difficult.

A comparison can be made here to help teachers further understand the differences between 1:1 computing versus cooperative learning groups using a 4:1 computing ratio. Professional development opportunities can be targeted toward the development of more innovative pedagogy as found in cooperative learning or small group work where constructivist practices work seamlessly within a student-centered approach to learning.

Two other factors, lack of training and CIT availability, were not as repetitive in their frequency, but found to be essential to the findings. Lack of training contributed to their lack of knowledge and therefore they could not be as effective when using technology. T8 addressed this, as “I’m more apt to use the older applications than the newer ones because of the lack of training” she further elaborated that she did not feel as confident in the new applications because she had yet to be trained on them. Because training was delivered at the district level or by the CIT, 3:10 participants recognized CIT availability as a hindrance to their efforts to integrating technology. T8 stated “our CIT is not always there about 90% of her time is doing other things. She needs to train us but she’s busy with other training. We need to focus on what is going to benefit the students.” As mentioned earlier, recognizing the human or social factor as a supportive measure toward the integration of technology, the CIT becomes pivotal to their growth and understanding in the use of technology. When the CIT is not available or not supportive, integration will not take place and will become stifled. When teachers increase their knowledge with technology and when they desire to learn and grow more, they are more motivated to learn technology and use it with their students (Tatum & Morote, 2006).

Summary of Subquestion 1a Findings

In summary, this first subquestion identified 11 salient categories within intrinsic and extrinsic motivation. Intrinsic factors included:

- 21^{st} century learning;
- high interest value;
- classroom benefits/success;
- campus/district/CIT;
- staff development/training;
- no fear of technology;
- built into the curriculum; and
- willingness to learn.

Extrinsic factors included:

- administration requirement/evaluation;
- sense of guilt; and
- parent expectations.

Based on the factors found, extrinsic factors were not found to be significant to the teacher participant’s motivation to use technology in the classroom. The participants were intrinsically motivated by the high interest value they discovered when using technology in their classrooms, the benefits and successes within their daily instructional practices, and the recurring staff development or training they received because of their need to learn and know more. Other intrinsic factors included the lack of fear when using technology and the participant’s willingness to learn and grow. Likewise, participants also reflected on the importance of the curriculum guides, which provided ready-made technology projects already included into their grade level timelines or scope and sequence. Also known as "hybridizing technology" (Cuban, 2001, p. 169), a standardized fit into the classroom curriculum may negate the possibilities of using constructivist approaches to teaching in lieu of using traditional methods as in teacher-directed lessons. The lesson plans suggested this notion and confirmed that the participants were more apt to adjust to districts curriculum standards due to: (a) not to differ too much from current acceptable practices, (b) lack of time and planning on their own, and (c) not valuing the benefits of constructivist practices versus traditional ones. Lesson plans also indicated that a traditional, teacher-directed approach was used which did not necessarily engage the learner to higher order thinking but used technology in lower level thinking ways.

High frequency patterns found within intrinsic motivation as well as the high degree for the value of motivation indicated that teacher participants had a desire and willingness to use technology; however, many variables were found that either supported or hindered their efforts to integrate technology. Variables found that supported teacher efforts included:

- training;
- new technology in the classrooms;
- software purchases/licensing;
- curriculum;
- lab scheduling;
- CIT;

- administration;
- community/webpages;
- campus/grade level; and
- district.

Variables found that hindered their efforts to integrate technology included:

- time for planning;
- time for implementation;
- time for training;
- lack of training;
- funds for software;
- new software training;
- CIT availability;
- lab scheduling;
- lack of classroom computers;
- fit into the curriculum;
- district firewall;
- standards and testing;
- technology projects required; and
- technical support.

Variables most indicative of supporting technology integration were connected to the social or human factor. The data showed regular occurrence as related to the CIT support, campus/grade level team support, as well as the district's overall support. Other variables found to show regularity was the availability of training for teachers. Even though training was made available through the district and the CIT, training took place after school, which became problematic for the participants. This was most notable in the variables that hindered the participant's efforts to integrate technology.

Similar to the literature, the data indicated that time for planning, time for implementation, and time for training stifled teacher participants most frequently. The data indicated that lab scheduling and the lack of classroom computers were difficult to overcome and presented many problems when wanting to use technology within their curriculum. Lack of training and CIT availability were less frequented but found to be essential to building teacher participant knowledge and growth in their development and understanding in the use of instructional technology.

The evidence clearly showed that teacher participants were motivated and willing to use technology within their classroom curriculum. What the data did not disclose was evidence of innovative practice, teachers going above and beyond their professional practice to use technology in constructivist ways. Questions still remain unanswered and will require further investigation. Further study would need to include: (a) Do curriculum guides hinder teacher's efforts to be more innovative and creative within their lesson planning, (b) If technology-using teachers did not have access to ready-made technology projects, would they still use technology within their practice; and (c) If professional development included a study of teacher practice similar to constructivist versus traditional, would teachers change their current traditional practices to more innovative ones? The next research question will further develop an understanding of teachers' motivation to integrate technology through their perceived technology proficiency.

Research Subquestion 1b Analysis

Research subquestion 1b was: How does teachers' perceived technology competence affect their decision to integrate technology into their classroom curriculum?

Technology proficiency studies in the state of Texas are few, but the studies found showed that participants perceived their level of proficiency skills to be much higher than their observers (Knezek et al., 2005). Cuban (2001) suggested that discrepancies between self-report and practice are common to classrooms. However, the findings in this study showed that self reporting was necessary to determine teachers' self-efficacy as they made decisions to integrate technology. Efficacious individuals believe their actions can produce the results they aspire no matter the level of the skill. Bandura (2006) and Bandura and Locke (2003) acknowledged that personal efficacy regulates human functioning through motivation, cognition, affective, and decision making processes. Therefore, this research question was answered through questions 2 and 5 of the essential questions within the interview protocol.

The district's strategic plan outlined several goals within technology and one of which indicated "provide appropriate staff development opportunities that meet the needs of diverse learners in order to promote continuous growth of technology competencies expected for successful job performance" (NISD, 2009, para. 4). Offering various training opportunities throughout the day and after school, the district and each campus'

CIT offered other opportunities in planning and curriculum management. This training allowed teachers to develop and grow as they moved toward establishing their proficiency in the use of technology. This can be seen in Figure 7.

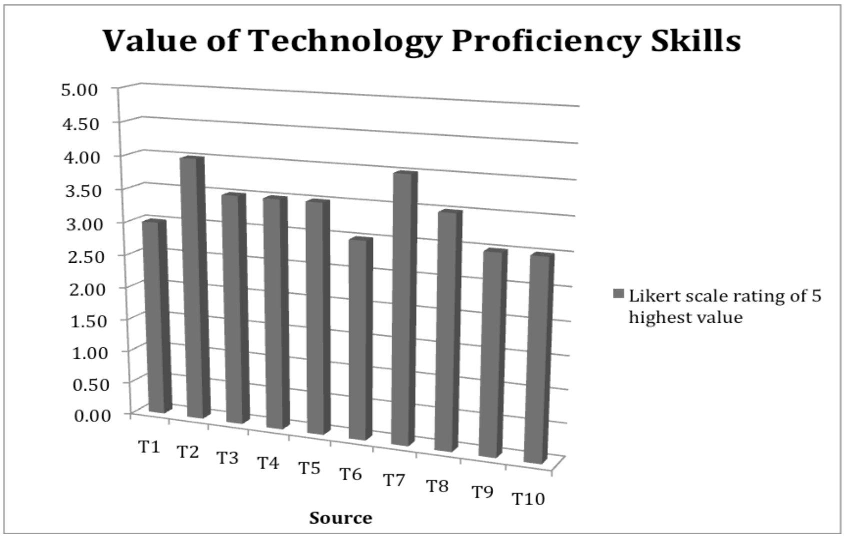

Figure 7. Value of Technology Proficiency Skills.

Using a five-point likert-type scale, with five being the highest, teacher participants rated themselves as to how they perceived their technology competencies to be. T1 expressed her skills as “my proficiency is probably about average…I go above and beyond to do more but there is more for me to learn. There is always room for growth.” T3 also articulated “my technology proficiency is pretty good. I am the type that I am not scared to try anything. I’m not going to guarantee that I can do it all, but I will try anything.” T5 went one step further and realized the intrinsic value of being technology proficient: “Self-satisfaction in doing my best in helping them to get information in a different way then I’m successful. It just reinstates or reaffirms my competence in that I can do this." T6 reaffirmed that her perceived proficiencies in the use of technology allowed her to be more open to accepting the use of technology in the classroom.

> I believe that I am a little above intermediate. I'm not as highly advanced, as I like to be. I'm pretty comfortable with it and I like to try new and different things. I like to think I am very proficient.

When comparing the data found in Figure 4, Value of Motivation to Figure 7, Value of Technology Proficiency Skills, teacher participants were more willing and motivated to use technology in the classroom than their proficiency skills enable them to. Keengwe et al. (2008) referred to this as the tenets needed to use computers skillfully and integrate technology willfully. Even though teachers' motivation was higher than their skills to integrate, self-determination theory allows for competency or the skill needed to attain a separate goal (Ryan & Deci, 2000), therefore a teacher needs to achieve a level of technology proficiency prior to achieving higher levels of technology integration. Based on the data, teacher participants are still at the beginning stages of technology use, acquiring more skills and gaining confidence to further their development into expert levels of technology integration. Cuban (2001) clarified, as teachers begin to use technology in their practice, they use it to support their current instructional goals. Similarly, Ertmer et al. (1999) explained that uses of classroom technology evolve over time as teachers gain experience, moving through various stages from nonuser to expert user. The level of motivation is likely to remain at a higher level as long as teachers are continuously supported. The question remains, are teachers still motivated to integrate technology into their curriculum even though support may flounder?

Decisions to Integrate Technology

The decisions to integrate technology into the curriculum were varied but were central to the theme of becoming a better teacher. In direct support of teachers was the district's strategic plan to help them to be more effective in their practice. The district's goals were outlined as follows:

- Ensure that all students demonstrate relevant information, communications, and technology competencies necessary for digital-age literacy.
- Infuse appropriate instructional technologies throughout the curriculum to engage students, differentiate instruction, and strengthen learning and achievement.
- Implement and support research-based, integrated technology systems and solutions that aid in decision-making and fulfilling instructional and operational requirements. (NISD, 2009, para. 4)

The opportunities afforded to teachers through staff development, an on campus instructional technology specialist, technical support, updated hardware and software, and a supported district infrastructure, allowed teachers the ability to make instructional decisions without any obstacles to overcome. Therefore, teacher participant decision making was solely based on instructional outcomes and the success for teaching. The data revealed the following in teachers' decisions to integrate technology:

- to achieve teaching objectives;
- to allow students to have fun;

- to demonstrate learned technology proficiency skills;
- to achieve curriculum standards;
- to evaluate student ability;
- to achieve student interest; and
- to access information through research.

To achieve teaching objectives, teacher participants referred to this as T1 suggested, "what's my purpose and what's my goal…what do I want them to learn." T2 expressed it as "if there's a program that I know lends itself to what I'm teaching, I work it in that way." What was more important to the teacher participants was to achieve curriculum standards. T2 also expressed "the curriculum drives everything," which was further confirmed by the focus group where team planning confirms what will be taught and "projects are based on the science and social studies curriculum." Interestingly, teachers also decided because they have taught the same lesson over the years. T10 indicated "a lot of times it's repetition over the years" as well as T3 "I have projects that I have done over the last many years I've taught 5th grade, and so the projects that I have come to really like I make sure I do them every year." However, as teachers feel more confident, they are apt to adjust and change plans based on their own student's needs and interests. T8 indicated, "I look at the students and the needs of the students in the classroom and what they have been exposed to" and T7 expressed it as "my team is very flexible and we address it to our own classroom needs. It really depends on the group of students."

Summary of Subquestion 1b Findings

Results found when comparing the data of teacher participants' value of motivation to their value of technology proficiency skills, the participants were more willing and motivated to use technology in the classroom than their value for technology proficiency skills. The belief in the personal technology proficiency skills they possess is enough to provide them with the confidence of completing the task at hand, hence their level of self-efficacy can produce the desired results no matter the level of the skill. This may be due to what the literature confirmed that teachers are still at the beginning stages of technology use, using it to support their curricular goals. As they acquire more skills and gain confidence, they will further their development into expert levels of technology integration.

Decision making was based on instructional outcomes and the success for teaching. These decisions included achieving the overall objective for the lesson, reaching and maintaining curricular goals, the overall needs, interests, and abilities of students; making it fun for students, using technology for research as well as maintaining their current technology proficiencies. Teachers were clearly motivated and confident to infuse technology into their classroom curriculum, but what has yet to be determined is when teachers will use technology in more innovative ways within their curriculum.

Research Subquestion 1c Analysis

Research subquestion 1c was: How do teachers determine their success when integrating technology?

The determination of teachers' success when integrating technology was addressed through question 3 of the essential questions within the interview protocol. This question was to provide a deeper understanding of the teacher participants' true purpose for integrating technology. In support of teachers, the district clarified in the strategic plan how it would support teachers in the success of their job performance. The strategic plan included the following "provide appropriate staff development opportunities that meet the needs of diverse learners in order to promote continuous growth of technology competencies expected for successful job performance" (NISD, 2009, para. 4). The plan did not identify how teachers would be supported in their efforts to further their knowledge and skills in furthering technology innovation in the classroom or how they would further their skills in learning how to integrate technology in the classroom. Nonetheless, the data showed how teachers identified their success when using technology in the classroom.

Teachers identified three specific areas of interest when measuring the success of technology integration. These are prioritized as follows:

1. student involvement during integration;
2. final product and/or technology project; and
3. teacher's growth in technology proficiency.

The data confirmed that teachers created lessons where student involvement would include the pure enjoyment of using technology, the level of engagement, how students made connections to the real world, how well they could demonstrate back what they learned, the overall performance of the task, and the opportune "aha moments." As discussed in the focus group, the importance of evaluating the technology projects as a team helped them further their planning because “when the project is successful the children are engaged and it shows their thinking and what they have learned.” T1 referenced that “the kids can take what they have learned through technology and be able to relate it to something they see maybe in another situation.” She continued and stated “I am successful when I see the interest and that they are engaged, then I know I am doing something right for them and they are able to relay that information that they learned back to me.” T2 further stated that “when they have the ‘aha moment’ I know I have successfully made the connection between what’s going on in the classroom and what they find in real life.”

The data also revealed that the final product or final outcome of the technology project was also important to the success of integration. This was evident when T3 indicated, “I usually go by the projects. What do the kids end up doing? Did they complete the original objectives?” She continued by saying “here is what the final product should look like and here is the information that they should cover.” T4 concurred and said, “they have a finished work product” as well as T6 further stated, “I determine success when I know the child has finished the project.”

The data also continued to show the teachers’ expectations for their own personal growth. As indicated by the district’s strategic plan, “to promote continuous growth in technology competencies” has provided teachers a beginning point for early users of technology. The teachers were successful when their personal growth in technology proficiency occurred. This was evident when teachers were familiar with various software programs when end of year evaluations revealed positive results, and the self-satisfaction of their level of technology competency. T4 made reference to the skills needed to integrate successfully and indicated, “I definitely need to understand how to use the program first and foremost. If I’m knowledgeable and you have to be in order to know what you are teaching.” T10 reflected on the importance of the end of year teacher evaluation process and justified

> When you get your end of year report and you have met your criteria and then even more than what was required, that’s when you can say ‘yes’ I did a great job or even I need to do more next year.

T5 also noted the importance of being self-efficacious and stipulated “self-satisfaction in doing my best in helping them to get information in a different way then I’m successful. It just reaffirms my competence in that I can do this.”

Results found that the teacher participants’ purpose for integrating technology came from three specific areas of interest, which measured their success when integrating. These were identified as how they observed student involvement during integration, the final outcome and/or technology project, and the teachers’ personal growth in technology proficiency. When comparing these results to their decision making processes, similar results were found in that teachers are still more concerned with instructional outcomes and the success for teaching. For example, decision making included achieving objectives, reaching and maintaining curricular goals, the overall needs, interests and ability of students, making it fun for students, using technology for research as well as maintaining their current technology proficiencies. Whereas their measured success was based on student involvement, the final outcome, and personal growth in technology competency. Teachers' overall success of an integrated technology lesson was indicative of the intrinsic value found in meeting their instructional and curricular goals as well as the motivational value they found when using technology with their students.

Research Question 1 Analysis

Research question 1 was: How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms?

Using the data from the previous subquestions, the overall research question was re-analyzed to acquire a better understanding of teachers' self-determination as the participants chose to integrate technology innovation. Ryan and Deci's (2000) and Deci and Ryan's (2000) self-determination theory, explains that individuals have a need for growth and a psychological need for autonomy of individual choice, perceived relatedness with other people, and perceived competence as in the challenge of the context and skill. Ryan and Deci (2000) furthered their explanation by clarifying that those individuals with "intrinsic motivational tendencies" require supportive conditions. The need for competence and autonomy requires "social-contextual events" similar to rewards and feedback that promote intrinsic motivation upon the task or action (Ryan & Deci, 2000, p. 70). In order for intrinsic motivation to occur, feelings of competence or efficacy must take place with the enhancement of a sense of autonomy, as well as the sense of security and relatedness to others, hence a continuous cyclical event weaving and working within each other. This can be seen in Figure 8.

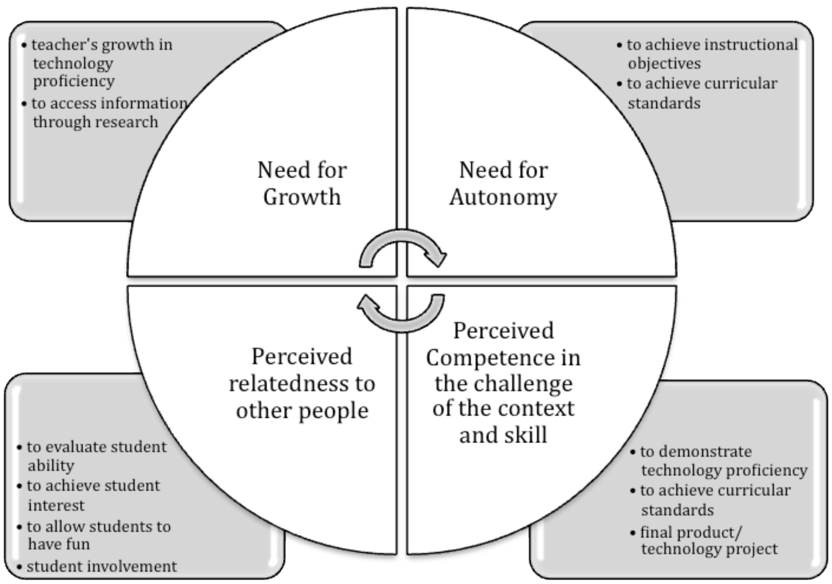

Figure 8. Self-Determination theory within decision making and success.

Using the data from teachers' decision making processes and the data found within the factors of success, self-determination theory is revealed throughout the process and shows the relationship of how teachers make their decisions to integrate technology into their classroom curriculum. As teachers move from one decision in the planning process to the next, they become more confident and efficacious in what they know, therefore a higher value for the task. A set of assumptions must be made assuming that intrinsic motivation factors found within the results of the data from the first research subquestion hold true. The assumptions include that all participants were intrinsically motivated by:

- the need for 21st century learning;

- the high interest value discovered when using technology in the classrooms;
- the benefits and successes within daily instructional practices;
- the support found within the campus, district, and CIT;
- the recurring staff development or training received because of the need to learn and know more;
- the lack of fear when using technology;
- the participants' willingness to learn and grow; and
- the high value for the curriculum guides, which provided ready-made technology projects.

In order for intrinsic motivation to take place, the teacher participants made decisions and measured success by knowing that the satisfaction for autonomy, competence and the desire to connect to others, sparked their interest for the activity, which holds their personal intrinsic interest. Therefore, if teachers hold a high degree of intrinsic motivation and efficacy and have the necessary technology proficiency skills necessary for the task, then teachers are ready to integrate technology into their curriculum in innovative ways. What cannot be determined at this time is what constitutes technology innovation. Further studies would be necessary to establish and define early use of technology to more expert ways such as those found in innovation.

In summary, self-determination theory affects decisions teachers make and influences the development of integrating technology into the classroom curriculum. As the results previously indicated, teachers were found to be intrinsically motivated to integrate technology, and self-determination became integral to the valued task or activity. According to the evidence, teachers decide to integrate technology, when they have (a) acquired the necessary technology skills necessary to complete the task, (b) a strong desire to learn and grow, (c) a sense of connectedness to others, and (d) have a of autonomy or power of choice.

Evidence of Quality

To verify the trustworthiness or accuracy of the findings, several strategies were used to support the validity and the credibility of the data. These strategies included piloting the case study research questions, triangulating different data sources, using rich, thick descriptions, and creating a case study database (Creswell, 2003; Tashakkori & Teddlie, 1998; Yin, 2003). The first strategy used was to establish construct validity and reliability by piloting the case study research questions. Prior to interviewing each individual case study, the pilot case tested the essential questions within the Interview Protocol (Appendix B). The purpose of the pilot test was to elicit the rich responses needed for the study. Once the data from the pilot test was analyzed, modifications were found to be necessary and changes were made directly to the interview protocol. A pilot case study report was then created within this section of the study to describe those changes made. Each individual case study interview then proceeded using the modified interview protocol.

The next strategy used was the triangulation of the different data sources, which allowed for the convergence of data and further triangulated through cross case analysis (Creswell, 1998). The various sources included 10 in-depth case study interviews, a focus group, integrated technology lesson plans, and the archival data as found in the district's strategic plan. The data gathered measured the same phenomenon through corroboration, which improved the quality to support construct validity of various data sources (Yin, 2003). As the interviews, focus group, integrated technology lesson plans, and archival data was received they were then transcribed verbatim and imported into the NVivo8 software program (QSR International, Inc., 2008). Each transcription was coded based on the participant's identifier i.e., T1, T2, T3, etc. The lesson plans and the district's strategic plan were imported directly from Microsoft Word into NVivo8 for further coding. Each question was then identified within a theme or set of themes. These themes included:

- motivation to integrate;
- variables that support motivation;
- variables that hinder or stifle motivation;
- technology proficiency skills;
- decisions to integrate; and
- success in integrating.

Once these themes were identified, a node was created for each within the NVivo8 software program (QSR International, Inc., 2008). A case study transcript was then opened and chunking of the data commenced by highlighting keywords and/or phrases that applied to each individual theme. Chunking of the data continued throughout the 10 case study transcripts, the focus group, and the district's strategic plan. Once the initial chunking was completed, each theme was further analyzed as in Glaser and Strauss's constant comparative analysis: (a) unitizing or breaking the text into units of information, and (b) categorizing or bringing together into provisional categories those units that relate to the same content (as cited in Tashakkori & Teddlie, 1998, p. 123). The integrated technology lesson plans were completed in a similar fashion but the themes were constructed based on Bloom's Taxonomy found in Figure 6. The objectives or the verbs used within the objective were highlighted and identified within each category of Bloom's Taxonomy to determine the level of critical thinking. The lesson plans were also analyzed for the type of approach used in the lesson: teacher directed or student-centered.

The next strategy included rich, thick descriptions, which supported drawing inferences or conclusions for interpretation. Interpretations included: (a) identifying contexts and meaning of the data, (b) recognizing similarities and differences within contexts, and (c) judging relevance of theories to the data (Hatch, 2002). In this study, each research subquestion as well as the main research question was the main focus for analysis. Within each question, thick descriptions were used to make judgments, identified meaning within the data, and to recognize similarities and differences within contexts. Examples were also given from the data sources so the reader may be able to make their own judgments for trustworthiness.

The final strategy used was the case study database. The purpose of the database was to house all of the relevant data for each individual case study and to provide adequate data for reporting. The practice of developing a formal and presentable database was also for the intent of other investigators to view if necessary which increases the reliability of the entire case study (Yin, 2003). The raw data was imported into the NVivo8 software for ease of use and included in-depth interviews, focus group, integrated technology lesson plans, district's strategic plan, and all of the demographic data necessary for this study.

The following section will provide an overview of the study to include a review of the research questions and a brief summary of the findings. Interpretation of the findings will include a discussion concerning the conclusions that address the research questions and the relationship within the literature. Implications for change will also include a discussion to provide teachers, administrators, and the community at large an opportunity to consider other professional development options as well as suggestions for implementation.

Section 5: Conclusions and Discussions

Overview

Researchers expressed that even with the abundance of hardware in our classrooms, computers are not being used effectively within the curriculum. The intent of this study was to better understand teachers' proficiencies in technology use and to determine whether motivation factors played a role in their decision making processes to integrate technology into the curriculum. This study was based on the assumption that simply providing all the necessary hardware, software, training, instructional, and technical support cannot guarantee successful use and incorporation of educational technology. What was necessary to this study was to understand the motivation of teachers to integrate technology and their willingness to take risks, their willingness to alter their beliefs in teaching, and to believe that technology has a purpose in the classroom and will benefit the future of their students.

This study was used to explore the technology proficiencies teachers need in order to integrate technology into their classroom curriculums as well as identified the key motivation factors that impeded or sustained the decision making to integrate technology. Qualitative research methods were used to better understand the following research questions:

1. How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms?
    a. What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson?

b. How does teachers' perceived technology competence affect their decision to integrate technology into their classroom curriculum?

c. How do teachers determine their success when integrating technology?

Section 4 presented rich narratives within each research question from the data collected from the 10 technology-using elementary teachers as the multiple case studies. The data collected included a combination of semistructured interviews, a focus group session, an integrated technology lesson plan, and the district's strategic plan. The study took place during the months of June, July, and August of 2010. A pilot case study was conducted prior to the actual interviews to test the research questions for the richness in response. The interview protocol was then modified based on the results of the pilot test. Interviews were conducted and the data was then imported and transcribed into the NVivo8 software program to begin the coding and analyzing process.

Each research question was identified within a theme or set of themes and further categorized as a node within the software application. These themes or nodes included:

- motivation to integrate;
- variables that supported motivation;
- variables that hindered or stifled motivation;
- technology proficiency skills;
- decisions to integrate; and
- success in integrating.

Coding and analyzing took place to uncover word frequency patterns throughout the various data collected. Each node was then further triangulated to confirm the findings.

Interpretation of Findings

The overall research question was answered and explained through the three subquestion findings. The data revealed that teacher participants were intrinsically motivated by: (a) their high interest value when using technology in their classrooms, (b) the benefits and successes within their daily instructional practices, (c) the recurring staff development they receive because of their need to learn and know more, and (d) the importance of ready-made technology projects provided within the curriculum guides. Teachers were highly motivated by specific variables found to be most indicative of supporting technology integration were based on the social constructs within the school and district. The support included the CIT, the campus/grade level team, as well as the district's overall support. According to Ryan and Deci (2000), those individuals who possess "intrinsic motivational tendencies" have a need for supportive conditions as found in their social constructs (p. 70). Intrinsic motivation requires feelings of competence or efficacy and a sense of autonomy along with their relatedness to others. As teachers related and connected to others for support, existing teaching practices conformed to the pressures of existing norms of the school culture by: (a) not differing too much from current acceptable practices, (b) lack of time and planning on their own, and (c) not valuing the benefits of constructivist practices versus traditional ones. Zhao and Frank confirmed that technology innovation was less likely to take place if it deviated too much from the existing values, beliefs, and practices of the teachers and administrators of the school (as cited in Ertmer & Ottenbreit-Leftwich, 2010). These beliefs and practices can change with school-wide efforts and support for the growth and development of pedagogical and technological innovation. Other variables were also found that impeded teacher efforts to integrate technology. These variables included time for planning, implementation, and training as well as lab scheduling and lack of computers in the classroom, which were consistent with the literature.

Teachers' perceived technology proficiency skills are commonly overstated through self-reporting and are inconsistent with practice in the classroom (Cuban 2001; Knezek et al., 2005). Self-reporting was necessary to determine teachers' self-efficacy as they made decisions to integrate technology. Teachers were found to be efficacious and believed their actions could produce the desired results no matter the level of the skill. Bandura (2006) and Bandura and Locke (2003) indicated that personal efficacy regulates human functioning through motivation, cognition, affective, and decision making processes. When comparing the data of teacher participants' value of motivation to their value of technology proficiency skills, they were more willing and motivated to use technology in the classroom than their value for technology proficiency skills, which confirmed that teachers are more willing and motivated to use technology in the classroom than their proficiency skills enable them to. Cuban (2001) explained that as teachers begin to use technology in their practice, they use it to support their current instructional goals. Likewise, Ertmer et al. (1999) noted that as teachers gain experience, uses of classroom technology evolve over time as they move from novice to expert user. Because teachers were found to be efficacious, researchers tell us that the one of the greatest predictors of teachers' technology use was their confidence in achieving their instructional goals through the use of technology (Wozney et al., 2006). In addition, when teachers are "willingly immersed in innovation; change is slow and sometimes includes temporary regression" (Sandholtz et al., 1997, p. 181).

The findings also showed that teachers' decisions to integrate technology were varied but were central to the theme of becoming a better teacher. Because teachers were highly supported through training, their decisions were based strictly on instructional outcomes and the success for teaching. When measuring the success of technology integration, teachers prioritized their successes based on (a) the level of student involvement, (b) the final product or outcome, and (c) teacher's growth in technology proficiency. Teachers' overall success when integrating technology was indicative of the intrinsic value found in meeting their instructional and curricular goals as well as the motivational value they found when using technology with their students.

This study found that self-determination theory affected decisions teachers made and influenced them when deciding to integrate technology into the classroom curriculum. Teachers were found to be intrinsically motivated when (a) they believed that they have the necessary skills to perform the task, (b) a strong desire to learn and grow, (c) a sense of connectedness to others, and (d) have a sense of autonomy or a power of choice. However, this study found no evidence to support innovative ways of teaching through constructivist practices but found that teachers adjusted and conformed to the norms situated by their schools.

Implications for Social Change

The findings in this study are indicative of teachers' desires to learn and grow in their daily practices as well as to become more aware of the technology skills needed to improve practice. Common to the literature were the many variables found that either supported or hindered teacher efforts to integrate technology into the curriculum. When considering changes to teacher practice, all variables must be considered in order to effect change over time. To consider changes to practice, current professional development programs must be altered to coincide with 21st century learning. As noted in the literature, change in practice must include change in beliefs, culture, and knowledge about teaching before teachers can succumb to innovative practice. To achieve change would be to approach professional development where teachers study their current beliefs and practices and reflecting on what constitutes best practice when integrating technology and what can be identified as technology innovation. Helping teachers to gather into collegial groups to pursue, over time, questions about practice can be effective and used in many different formats school-wide (Weinbaum et al., 2004). The importance relies on the consistency and the long-term planning for professional development to effect change. Weinbaum et al. (2004) noted that this process would help teachers make decisions based on targeted action to fulfill their instructional practices.

Teachers, when given an opportunity to examine practice, have the potential to effect change about teaching and learning not only in their schools but the educational community at large. In order to allow for significant changes to be made to teaching and learning, teacher-training opportunities need to swiftly move into opportunities where teachers study, discuss, reflect, and implement new and innovative ways. In knowing this, school administrators and classroom teachers alike need to work cohesively together to find the most appropriate professional development experiences for their schools. A need to develop a clear and concise 21st century professional development plan to support 21st century school improvement goals will help to provide the support needed to further the understanding of best practices in teaching using innovative technologies.

Recommendations for Further Action

Professional development opportunities allowing teachers to study and reflect upon their own instructional practices may afford them the benefit of spending time and taking ownership of their own decision making. Through this training, teachers will need to incorporate the following ideas into their learning:

- provide opportunities for discussion and reflection on classroom practice and how this aligns with their current beliefs and knowledge about teaching;
- study and reflect on traditional, teacher-directed approaches to teaching versus student-centered, constructivist approaches to teaching;
- provide opportunities to observe classrooms where technology innovation is taking place;
- provide opportunities for discussion and reflection on lessons integrating technology into best practices and on lessons using technology innovatively to understand the difference between the two;
- provide opportunities for practice and experimentation using technology innovation; and
- provide opportunities for teachers to have access to a Campus Instructional Technologist for both instructional and technological support.

Integrating technology into the curriculum takes time and practice to perfect the skill of teaching when using technology as well as mastering the use of technology in itself. Two distinct skills needed when using technology efficiently and effectively. As teachers move from novice users to expert use, significant changes need to take place, changes in knowledge and skills when using technology, changes in pedagogical beliefs, and changes in school culture. Providing appropriate professional development where teachers study practice in collaborative ways may lead to greater innovative success in the classroom. Because of the lack of professional development a gap will continue to exist between the availability of technologies in the classroom and their use.

Recommendations for Further Study

As established in the literature review, teachers who demonstrate exemplary technology use are those teachers who possess a constructivist teaching philosophy hence, technology-use can influence teachers to change their current instructional practices toward a more student-centered approach to learning and teaching (Ertmer et al., 2001). As concluded within this study, through self-determination, teachers were intrinsically motivated to use technology in their classroom curriculum and were willing to further their knowledge and skills to improve upon their own teaching practices to further their students learning. What this study did not disclose, however, was evidence of innovative practice: teachers going above and beyond their professional practice to use technology in constructivist ways. There remains a need to further explore existing innovative technology practices as well as constructivist approaches used when using technology. Questions still remain unanswered and will require further investigation. Some of these questions include:

- How do curriculum guides effect teacher's efforts in their search to be more innovative and creative within their lesson planning?
- How do ready-made technology projects within curriculum guides, support or hinder teacher efforts to integrate technology innovation within their practice?
- What professional development opportunities would be needed to help teachers change their current traditional practices to more innovative ones?
- Are teachers still motivated to integrate technology into their curriculum even though support may flounder?
- What cultural and contextual factors need to be present for teachers to use technology in more innovative ways within their curriculum?

To answer these questions, new studies involving qualitative and quantitative methodology will be needed to extend the discussion of what needs to take place for change to occur within classroom practice. Qualitative studies involving longitudinal data where interviews and observations of teachers in practice can be compared to existing data to provide evidence of effective practice in action. Quantitative studies can provide a wide array of data to include a larger sampling of the teacher population to gain a better perspective of teachers' knowledge and skills, pedagogical beliefs, and cultural beliefs when using computer technology. The more evidence found the more influence can be exerted toward a more appropriate professional development focus. School administrators, classroom teachers, technology facilitators, district staff development personnel, and the education community at large will benefit from the research found in this study as well as adding to the body of research.

The amount of evidence found in this study revealed that teachers are more concerned with instructional outcomes and their overall success for teaching. A successful integrated technology lesson motivated teachers in meeting their instructional and curricular goals and therefore promoted a high value for successful outcomes for students. The motivation and desire to integrate technology was valued higher than their technology proficiency skills allowed them, consequently the willingness to acquire more skills and gain more confidence with time. Knowing this, the necessity to take advantage of those highly defined professional development opportunities would afford teachers with critical learning to support shifts toward more effective and innovative practices. To help them become more critical and reflective of their own pedagogy as they move toward understanding teaching within a student-centered environment. Thus, teachers acknowledged and were motivated by the success of their students when using technology; however, they still needed to realize that modifications would be necessary to improve their practice. More attention should be given to what happens during instructional time. Making observations, using self-reflection, and discussing what constitutes effective practice may lead toward more innovative practices within the classroom. With the amount of evidence collected, the focus of social change may not be found within the use of technology itself, but found within the best and innovative practices that exist within a classroom. The question then becomes, how do educators start making these changes?

Researcher's Reflection

As a qualitative researcher, I strive to understand and find meaning of what these technology-using teachers have constructed about their classroom experiences and try to describe and build an understanding toward sense making (Merriam & Associates, 2002). Because of my level of understanding of what traditional classroom practice looks like and what the possibilities of constructivist teaching practices would lend themselves to, I have a well-rounded perspective of what technology-based teaching should look like and how it can support student achievement. However, realizing the current district goals for technology, improvements can always be made to redefine what successful teaching practices as well as innovative practices look like when integrating technology into the curriculum.

As a former Campus Instructional Technologist (CIT) with this school district, assertions can be made of any personal biases I have brought to this study, but because of this, I consciously worked toward keeping objectivity and ensuring the data was measured and carefully analyzed based on current qualitative methods. Due to my experience with defining and redefining the essential questions to this study and moving toward data collection, and proceeding to analyzing the data, allowed me to overcome any personal biases by allowing the data to speak for itself. Always reflecting on what the data is saying and drawing conclusions from this data, has provided me with concerted introspection of my responsibility as a researcher. I had a well-defined purpose for this study allowing me as a researcher to search further for the answers and truths to teaching.

Summary

This study raised concerns regarding the integration of technology into the classroom curriculum and the amount of innovative success taking place. Even though innovative use was not apparent, teachers showed a high degree of desire and motivation to use technology in the classroom. In view of the fact that teachers are motivated by successful teaching and positive student outcomes, establishing these early beliefs is a big first step toward making good teaching practices better.

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Appendix A: SBEC's Standards for Teachers

Standard I. All teachers use technology-related terms, concepts, data input strategies, and ethical practices to make informed decisions about current technologies and their applications.

Standard II. All teachers identify task requirements, apply search strategies, and use current technology to efficiently acquire, analyze, and evaluate a variety of electronic information.

Standard III. All teachers use task-appropriate tools to synthesize knowledge, create and modify solutions, and evaluate results in a way that supports the work of individuals and groups in problem-solving situations.

Standard IV. All teachers communicate information in different formats and for diverse audiences.

Standard V. All teachers know how to plan, organize, deliver, and evaluate instruction for all students that incorporates the effective use of current technology for teaching and integrating the Technology Applications Texas Essential Knowledge and Skills (TEKS) into the curriculum.

Standard VI. The computer science teacher has the knowledge and skills needed to teach the Foundations, Information Acquisition, Work in Solving Problems, and Communication strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in computer science, in addition to the content described in Technology Applications Standards I–V.

Standard VII. The desktop publishing teacher has the knowledge and skills needed to teach the Foundations, Information Acquisition, Work in Solving Problems, and Communication strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in desktop publishing, in addition to the content described in Technology Applications Standards I–V.

Standard VIII. The digital graphics/animation teacher has the knowledge and skills needed to teach the Foundations, Information Acquisition, Work in Solving Problems, and Communication strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in digital graphics/animation, in addition to the content described in Technology Applications Standards I–V.

Standard IX. The multimedia teacher has the knowledge and skills needed to teach the Foundations, Information Acquisition, Work in Solving Problems, and Communication strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in multimedia, in addition to the content described in Technology Applications Standards I–V.

Standard X. The video technology teacher has the knowledge and skills needed to teach the Foundations, Information Acquisition, Work in Solving Problems, and Communication strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in video technology, in addition to the content described in Technology Applications Standards I–V.

Standard XI. The Web mastering teacher has the knowledge and skills needed to teach the Foundations, Information Acquisition, Work in Solving Problems, and Communication strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in Web mastering, in addition to the content described in Technology Applications Standards I–V.

Appendix B: Interview Protocol

Date:	**Types of Questions Added**
Time:	C - Clarifying
Place:	P - Probing
Participant:	F – Follow-up

Opening:

1. Thank the participant for participating in the interview.
2. Clarify the objective of the interview.
3. Review the project for the participant.
4. Discuss that this is totally voluntary.
5. Discuss that you will be note taking and digitally voice recording for transcription. Participant agrees and acknowledges being digitally voice recorded during this interview. ____
(Participant Signature)
6. This interview will be strictly anonymous and at no time will this be published publicly. With respect to your time and schedule, this will be a 60 minute interview and I want to stay within that time frame.
7. **Turn on the recorder!**

Research Questions

1. How does self-determination affect the way teachers choose to integrate technology innovation in their classrooms?

    a. What motivation factors can be identified during the planning and preparation process for a technology-integrated lesson?

    b. How does teachers' perceived technology competence affect their decision to integrate technology into their classroom curriculum?

    c. How do teachers determine their success when integrating technology?

Interview Questions

Background questions and demographics:

Why don't you start telling me about yourself? Where are you from? How long have you been teaching? What grade levels have you taught?

Item	Responses				
Demographics					
1. What is your age group?	**20-29 years**	**30-39 years**	**40-49 years**	**50-59 years**	**60 and above**
2. What is your gender?	**Male**	**Female**			
3. What is your highest level of education?	**Bachelors**	**Masters**	**Doctorate**		
4. How many years of experience do you have in education?	**0-5 years**	**6-10 years**	**7-15 years**	**16-25 years**	**26 years or more**
5. Which category best describes your primary grade level?	**PK-K**	**1-3**	**4-5**	**6-8**	

Essential questions:

1. Describe what integrating computer technology in your classroom looks like?
2. How do you decide to integrate computer technology in your classroom?
3. How do you determine when you are successful when integrating computer technology?
4. What motivates you to want to integrate computer technology in the classroom?
5. What do you believe your technology proficiency/competency to be and how does this effect your motivation to integrate technology?
    a. On a scale of 1 to 5, with 5 being the highest, rate your technology proficiency skills? Using this same scale, rate your motivation to use technology in the classroom?
    b. What do you think either stifles you to use computer technology in the classroom or supports you?

Closing:
I want to respect your time and I want to give you an opportunity to…

1. Is there anything you wish to add to our conversation today?

2. Is there anything I have forgotten to ask that you feel is important?

Thank the participant for their participation in the interview. (Assure him/her of confidentiality of responses and a future focus-group interview.)

Field Notes – Reflective Journaling

Notes to Self *Include your own concurrent thoughts, reflections, biases to overcome, distractions, insights, etc.*	Reflective Notes *Include notes about the process and summary conclusions for later theme development.*

Appendix C: In-Depth Interview Questions

Background question:

Why don't you start telling me about yourself? Where are you from? How long have you been teaching? What grade levels have you taught?

Essential questions:

1. Describe what integrating computer technology in your classroom looks like?
2. How do you decide to integrate computer technology in your classroom?
3. How do you determine when you are successful when integrating computer technology?
4. What motivates you to want to integrate computer technology in the classroom?
5. What do you believe your technology proficiency/competency to be and how does this effect your motivation to integrate technology?

Appendix D: Focus Group Questions

Background question:

Why don't you start telling us who you are and what school you are from? What grade level do you teach? How long have you been teaching?

Essential questions:

1. Describe what integrating computer technology in your school looks like?
2. How does your grade level team decide to integrate computer technology in the classroom or lab?
3. How do you determine when you are successful when integrating computer technology?
4. What motivates you to want to integrate computer technology in the classroom?
5. What do you believe your technology proficiency/competency skills to be?
    - How does this effect your motivation to integrate technology?

Appendix E: Technology Integrated Lesson Plan

Teacher:	**Date:**
Subject:	**Grade Level:**
Content TEKS and Standards: **Technology TEKS and Standards:**	
Objective and purpose:	
Rationale:	
Materials:	
Lesson Steps:	
Evaluation:	
Extension:	

Curriculum Vitae

Laura C. Karl

Education:

Doctor of Education – Teacher Leadership — Expected 2011
Walden University, Minneapolis, Minnesota

Master of Education – Instructional Technology — 1997
University of Texas, El Paso, Texas

Bachelor of Interdisciplinary Studies – English — 1993
University of Texas, El Paso, Texas

Relevant Professional Experience:

Course/Curriculum Developer — 2011-present
Laureate Education, Inc., San Antonio, TX
Creating and delivering university-level course content for online degree programs in P-20 Education. Involved in a highly collaborative team during all phases of online course development, including media production with the assurance of high integrity and excellence of the final product.

Adjunct Faculty/Student Teaching Supervisor — 2007-2011
University of Texas at San Antonio, San Antonio, TX
Provide effective instruction and deliver effective research-based strategies as deemed necessary for pre-service teachers in the teacher education program. Provide clinical supervision for pre-service teachers in the certification area of EC-6 and 4-8 Generalist, Math/Science, and Language Arts/Social Studies.

Director, Center for Teaching Excellence (CTE) — 2006-2007
The American School Foundation, A.C., Mexico City, Mexico
Provided PK-12 faculty professional development opportunities in the use and assessment of effective instructional and curricular strategies involving instructional technology as well as assistance in faculty's pursuit of their professional goals in workshops, conferences, graduate study, and research.

Campus Instructional Technologist (PK-5) — 1999-2004
Northside Independent School District, San Antonio, TX

Provided faculty support in the integration of technology into the content areas. Provided staff development opportunities in training and planning to achieve integration between content objectives and technology.

OnSite Coordinator/Instructor/Facilitator 2000-2002
Houston Baptist University and Masters Online
Facilitated online and face-to-face instruction for teachers seeking a Masters in Curriculum and Instruction with an Instructional Technology specialization. Recorded attendance, graded assignments, responded and interacted with students during asynchronous activity and face-to-face sessions to clarify and discuss.

Technology Instructional Specialist (PK-5) 1996-1998
Socorro Independent School District, El Paso, TX
Provided faculty support in the integration of technology into the content areas. Provided staff development opportunities in training and planning to achieve integration between content objectives and technology.

First Grade Teacher 1993-1996
Socorro Independent School District, El Paso, TX

Fourth Grade Student Teacher/Teacher 1992-1993
Socorro Independent School District, El Paso, TX

Other Experience:

Administrative Loan Officer 1988-1989
Surety Federal Savings Association, El Paso, TX
Managed and maintained a loan portfolio of $1,000,000 consisting of commercial/real estate and consumer loans. Processed and closed commercial/residential loans.

Construction loans closer processor 1987-1988
Maritime Bank of California, Los Angeles, CA
Processed loan documentation and funded all interim construction loans for commercial properties.

Commercial Loan Processor Closer
InterFirst Bank of El Paso, N.A., El Paso, TX 1981-1987
Processed loan document for commercial, commercial real estate, and real estate/residential loans. Closed commercial and real estate Transactions.

Community Service:

Secretary, Charities and Activities Committee, U.S. Embassy, Mexico City, Mexico — 2005-2006

Chairman, Hurricane Katrina Relief Fund Committee, U.S. Embassy, Mexico City, Mexico — 2005-2006

PTA Member, Greengates International School, Mexico City, Mexico — 2004-2007

American Committee Member, Greengates International Fair, Mexico City, Mexico — 2004-2006

PTA Member, Hardy Oak Elementary, Northeast ISD — 2001-2004

PTA Member, W.Z. "Doc" Burke Elementary, Northside ISD — 2001-2004

Licenses and Certifications:

Texas, Life Provisional Elementary English Grades 1-8 — Licensed/Certified

Texas, Life Provisional Elementary Self-Contained Grades 1-8 — Licensed/Certified

Professional Presentations and Papers:

Karl, L. (2007). *Using Discovery Education's United Streaming Effectively in the Classroom*. A workshop presented for The American School Foundation, A.C. at the annual campus-wide staff development session. Spring 2007.

Karl, L. (2006-2007). *Creating Your Classroom Course Content with Blackboard for PK-12*. A series of workshops/training sessions for the faculty at The American School Foundation, A.C. 2006-2007.

Karl, L. (2007). *Creating Your ePortfolio*. A series of workshops/training sessions for the faculty at The American School Foundation, A.C. Fall and Spring 2007.

Karl, L. (2007). *Middle Years Programme (MYP) Technology Assessment.* A presentation presented for The American School Foundation, A.C., Middle School meeting. Spring 2007.

Karl, L. (2000-2004). *Using the Internet for Effective Instruction: WebQuests, Scavenger/Treasure Hunts, Hotlists, and Subject Samplers*. A series of workshops for Northside ISD district-wide technology integration. 2000-2004.

Karl, L. (2003). *The (1) Campus Instructional Technologist/(1) Elementary Computer Technologist Model.* A presentation presented for the Northside ISD's Instructional Technology Department. Summer 2003.

Karl, L. (2003). *Best Practices in Instructional Technology and Technology Integration Activities*. A 4-day professional development workshop for LaPorte ISD, Houston, TX, Academic Computer Educational Specialists (ACES). June 2003.

Karl, L. (2000). *Overview of Levels of Technology Integration (LoTi)*. A presentation presented for the W.Z. "Doc" Burke Elementary faculty meeting. Fall 2000.

Karl, L. (2002). *Overview of the Elementary Internet Driver's License.* A presentation presented for the TCEA Area 20 Regional Technology Conference "Breaking New Ground". January 2002.

Karl, L. (2002). *Overview of the Elementary Internet Driver's License*. A presentation presented for the TCEA Area 20 Regional Technology Conference. November 2002.

Karl, L. (2002*). Do the LoTi Motion*. A series of workshops/training for the faculty of Northside ISD's W.Z. "Doc" Burke Elementary. Fall and Spring 2002.

Karl, L. (2001). *How to Devise Scavenger/Treasure Hunts for K-12 over the Web.* A presentation presented for the Dreamweaver Educational Technology Conference. January 2001.

Karl, L. (2000). *How to Devise Scavenger/Treasure Hunts for K-12 over the Web.* A presentation presented for the TAET Educational Technology Conference. November 2000.

Karl, L. (1997-1998). *Benchmark Curriculum Alignment Framework*. A presentation presented for Region 19 Service Center's Administrators and Instructional Specialists. Spring & Fall 1997-1998.

Karl, L. (1998). *Benchmarks & TEKS*. A presentation presented for Canutillo ISD's, Damian Elementary through Region 19 Service Center. April 1998.

Karl, L. (1998). *Technology TEKS*. A presentation presented for Region 19 Service Center's area districts. February 1998.

Karl, L. (1997). *Benchmark Curriculum Alignment*. A presentation presented for the Curriculum Advisory Council of Region 19 Service Center. September 1997.

Karl, L. (1997). *Integrating Technology into the Writing Process*. A presentation presented for the Parent/Teacher Conference at Socorro ISD's Helen Ball Elementary. February 1997.

Karl, L. (1997). *Macintosh Basics for Parents*. A presentation presented for the Parent/Teacher Conference at Socorro ISD's Escontrias Elementary. April 1997.

Karl, L. (1997). *Whole Language Teaching for the K-1 Teacher*. A workshop for the K-1 Teachers of Socorro ISD's, H.D. Hilley Elementary. August 1997.

Karl, L. (1997-1998). Hyperstudio Multimedia PC/Mac. A series of multimedia workshops for Socorro ISD's L.I.N.K. Technology. 1997-1998.

Karl, L. (1996). *Reading and Writing for the PreK-1 Classroom*. A workshop for the PreK-1 Teachers of of Socorro ISD's, H.D. Hilley Elementary. Spring 1996.

Karl, L. (1995). *Hyperstudio Multimedia*. A presentation presented for the Parent/Teacher Conference at Socorro ISD's Sierra Vista Elementary. November 1995.

Moreno, M. & Karl, L. (1998). *Discovery into eMates*. A presentation presented for the 1st Annual Socorro Independent School District's Technology Conference. March 1998.

Norton, S. & Karl, L. (2002). *Exploring Math in Real Life*. A presentation presented for the TCEA State Technology Conference. February 2002.

Norton, S. & Karl, L. (2001). *Scheduling Computer Time in the Lab.* A presentation presented for the Dreamweaver Educational Technology Conference. January 2001.

Honors and Awards:

Northside ISD Educator Spotlight of the month of November 2002
Nominated Teacher of the Year 2000-2001 W.Z. "Doc" Burke Elementary, Northside ISD

Professional Affiliations:

Member, Association for the Advancement of Computing in Education (AACE)
Member, International Society of Technology Education ((ISTE))
Member, Special Interest Group (SIG, ISTE) – Teacher Educators

Member, Texas Computer Education Association (TCEA)
Member, Texas Association for Educational Technology (TAET)
Member, Association for Supervision and Curriculum Development (ASCD)

Grants:

Northside Education Foundation (NEF) Grant
$2,000
Spring 2002
"Laptop for WZB TV Broadcasting"
Role: Project Coordinator

SMART Technologies, Inc. Grant
$1,000
Fall 2000
"SMARTBoard for Instruction: W.Z. Burke Elementary"
Role: Project Coordinator

SMART Technologies, Inc. Grant
$1,000
Fall 1997
"SMARTBoard for Instruction: Elfida P. Chavez Elementary"
Role: Project Coordinator