A STUDY OF PRE-SERVICE TEACHERS' ATTITUDES CONCERNING THE USE OF TECHNOLOGY IN THE CLASSROOM

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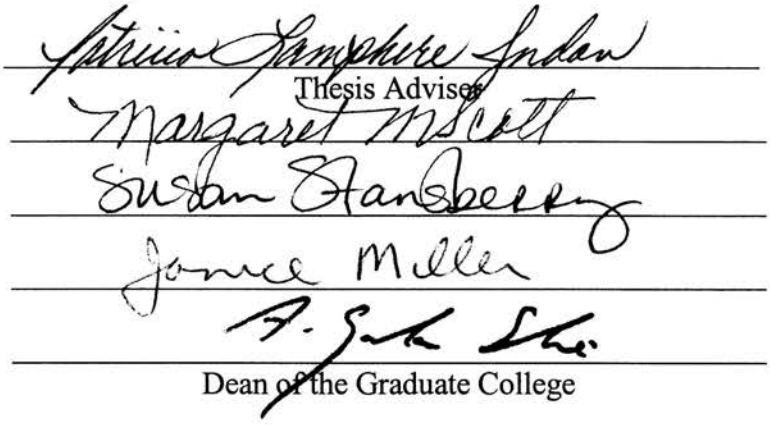

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Fifteen minutes after the Hubble telescope's first transmission arrived at NASA, those same pictures arrived on a classroom computer screen where 30 students were silently staring at the projection screen mesmerized by the sight of places they know exist in the universe, but they may never see with their own eyes. A group of students studying the Amazon Rainforest suddenly became activists against a corporation wishing to purchase thousands of acres of the rainforest for their personal gain. Letter writing via the Internet to their congresspersons, to presidents of a variety of organizations working toward their same cause, and to the president of that corporation were never in the teachers lesson plans on the study of the Amazon Rainforest. Neither was the spontaneous celebration that occurred weeks later when students discovered the corporation withdrew the bid to purchase acres of the rainforest while they were continuing research using the Internet. The teacher, a veteran of many years experience, had never used the Internet before that school year. What would have been missed in that learning situation if the computer that was in the classroom remained hidden under the desk because she did not know how to access the Internet and did not want to be embarrassed in front of her students?

Today the benefits of technology can be seen throughout our society. Students are able to sit at a computer and download music, games, movies, read their favorite magazines, and keep up with their favorite television shows with a simple click of a mouse. They are able to communicate with instant messages to their friends for hours at a

time with access to the Internet or even a wireless phone. Parents fill their gas tanks and never go into the store because they can simply swipe their credit card and pump the gas. Writing checks for purchases seems such a hassle when you can simply swipe a card and the amount is withdrawn from your checking account. Global Positioning Satellite devices replace the necessity of driving maps and written directions when families take their annual vacation. The children who are living in this society are the same children who come into our classrooms ready to increase their knowledge of the world around them, and what do they experience?

STATEMENT OF PROBLEM

The Office of Technology Assessment (1995b) estimated that the number of computers in K-12 schools has increased by 300,000 to 400,000 a year during the past decade. The total number of computers in schools was estimated to reach 5.8 million during 1995, which translates to one computer for every nine students (OTA, 1995b). In 2001, The National Center for Educational Statistics reported that the ratio of computers to children in the classroom is now one computer for every six students (NCES, 2001). The National Center for Educational Statistics indicates that 99% of all elementary school in the United States have at least one computer in the school and 62% of all elementary classrooms have at least one computer (NCES, 2001).

Classroom teachers, in order to meet the needs of their students, need to be prepared to provide opportunities for their students to use technology and to support their learning with technology (ISTE, 2002). With the increase in technology available in society and our schools today it is important that pre-service teachers leave the university setting with

positive feelings about technology. This positive attitude and feelings of expertise could translate into these teachers facilitating the use of technology in their classrooms.

Despite this growth, a number of investigations into computer use in K-12 classrooms have concluded that computer-based technologies are not fully exploited by the majority of teachers. The literature suggests that:

- few teachers routinely use computer-based technologies for instructional purposes (Bohlin & Hunt, 1995);
- 99 percent of teachers have access to computers or the Internet at school, but not all of them have the skills to use it effectively (NCES, 2001)
- when computers are used, they are generally used for low-level tasks such as drills and word processing (Office of Technology Assessment, 1995b); and
- computers are not sufficiently integrated across the K-12 curriculum (Office of Technology Assessment, 1995b). 99% of elementary schools have assess to computers and the Internet but only 62% of the classrooms where teaching takes place have computers with Internet access.
- there are several barriers that hinder the integration of technology into the classrooms including, time, resources, training, support and the one that is ignored most often, reluctance to change (Dias, 1999).
- despite the great potential of technology for classroom instruction, many of these pre-service teachers have not been adequately prepared to use technology in their teaching, yet these new educators will be responsible for preparing children and young people to be successful citizens and members of a society that is increasingly being altered by technology (The Milken Foundation, 2001b).

In a 1997-1998 nationwide study by Moursund and Bielfeldt (1999) concluded that one of the major factors of whether student teachers effectively used technology was their cooperating teacher. Research indicates that technology is widely available in today's public schools. Even though the technology is available, cooperating teachers, who have a high degree of influence on the practice of pre-service teachers, are not utilizing these tools to increase student learning. The attitudes, beliefs, and actual use of technology by cooperating teachers may greatly impact the pre-service teachers' attitudes, beliefs, and use of technology in the classroom.

PURPOSE OF STUDY

The purpose of this study was to explore the attitudes of pre-service teachers and their cooperating teachers concerning the use of computers and technology in the classroom during the student teaching experience. Another aspect of the study explored what impact the cooperating teachers' attitudes had on the pre-service teachers' attitudes about the use of technology in the classroom and the pre-service teachers' beliefs about how they will use technology in the future. All of these quandaries ultimately affect the student in the classrooms and the quality of education that is possible with the support of technology in schools, homes, and society in general.

After reading the literature, talking with pre-service teachers, talking with administrators, visiting the classrooms, seeing computers collecting dust and worksheets stacked everywhere, wrestling with the following research questions hopefully will help bring some new information to light. Perhaps grappling with these research questions will help the researcher gain some new understanding about the use of technology in the

classroom and this new understanding will ultimately help the children in the public school classrooms utilize the technology that is available to them.

Research Questions

1. What are the attitudes of the pre-service teachers and cooperating teachers concerning the use of technology in the classroom?
2. How do the pre-service teachers perceive they will use the technology in the classroom?
3. What impact do the attitudes about technology and the use of technology by the cooperating teachers have on the attitudes of the pre-service teachers concerning future use of technology?
4. What are the impediments that prevent the use of technology in these classrooms where higher education faculty currently place pre-service teachers?

CONCEPTUAL FRAMEWORK

The design of the study was what Creswell (1994) refers to as the "dominate-less dominate" design (p.177). The "dominate" design of this study encompassed quantitative measures consisting of surveys completed by the pre-service teachers and the cooperating teachers before and after the student teaching experience. The "less dominate" component included open-ended questions as well as unsolicited comments from the pre-service teachers. Open-ended questions asked the pre-service teachers to glean their assessment of their attitudes about the use of technology in the classrooms where they

were carrying out their student teaching assignment. their assessment of their change in attitudes about the use of technology and what experience they had using technology.

Procedures

There were 50 pre-service teachers from a Midwestern university of about 20,000 students who participated in the study. The cooperating teachers included in the study were experienced teachers with at least three years of teaching experience. These teachers volunteered to serve as mentor teachers for the pre-service teachers during their student teaching experience.

The instruments used in this study were the *Pre-Service Teachers Pre-Student Teaching Survey, Cooperating Teachers Pre-Student Teaching Survey, Pre-Service Teachers Post-Student Teaching Survey, Cooperating Teachers Post-Student Teaching Survey.* These instruments were designed by the researcher after studying a variety of available surveys.

The methods of data analysis used for the study included quantative measures of: paired t-tests, frequencies and correlations. Statistics were generated in SPSS version 10, a statistical program. The qualitative measures included open-ended questions and unsolicited interviews with pre-service teachers. These data were analyzed by reading and grouping similar responses to the open-ended questions.

Significance of Study

First, the results of this study could help higher education faculty in making decisions concerning the placement of pre-service teachers in school systems where technology is integrated into the curriculum. Ellsworth and Bowman (1982) found that

students who were exposed to computers were more likely to develop positive attitudes about them. In turn, Ardnt, Clevenger, and Meiskey (1985) found that those students who were more experienced in the use of technology and computers were more positive toward computers. If the pre-service teachers are exposed to technology and experience the technology modeled both in the university classroom and in the elementary classrooms where they student teach, then they will leave the university setting and move to their own classrooms with a more positive attitude concerning the use of technology.

This study could further enhance research on the reasons technology is not being utilized more effectively in the schools and perhaps provide new insights about ways higher education faculty could assist classroom teachers to integrate technology into the classroom. Through the results of this study, university faculty who work with pre-service teachers may see the importance of and be encouraged to develop the necessary skills to model the integration of technology in the methods classes. When classroom teachers are supported in their quest to utilize technology and pre-service teachers experience the modeling of technology use in the teaching learning situation, technology and computer may be utilized more in the elementary classrooms.

Limitations

- This study focused on early childhood and elementary school teachers. Therefore, the results may not be generalizable to teachers at other levels.
- Due to the fact the teachers were not randomly selected from the population of teachers, the results may not be generalizable to all teacher populations.
- The study looked at a specific group of pre-service teachers and their cooperating teachers. This may limit the generalization of the study throughout the United States.

- The success of the study was dependent upon the cooperating teacher and pre-service teacher providing accurate information concerning their attitudes, expertise and use of technology.
- The small sample size for the cooperating teachers is a limitation as this prevents the use of multiple regression for analysis.

Definition of terms

For the purpose of this study the following definitions apply:

appropriate training - instruction that includes the ability to use the computer for professional productivity as well as student exploration and learning activities

cooperating teachers- teachers in a public school system with three or more years of experience who supervise the pre-service teachers

effective training - instruction that has been demonstrated to have a positive impact

pre-service teachers- students in a teacher education preparation program who are engaging in a long term field experience

teacher professional development - continuing education to develop professional knowledge and/or skills

technology - includes technical tools used in the support of teaching and learning. This can include traditional tools such as overheads and VCR to computer applications and communication tools such as e-mail and Internet resources

technology integration education - instruction in how to use information technology to enhance classroom curricula

ORGANIZATION OF THIS STUDY

With the increase in technology available in society and our schools today it is important that pre-service teachers leave the university setting with positive feelings about technology. This positive attitude and feelings of expertise could translate into these teachers facilitating the use of technology in their classrooms. In Chapter 1, the problem, purpose, research questions, significance, and limitations were presented.

In Chapter 2, the review of the literature concentrates on attitudes, perceptions, impediments concerning the use of technology in the classroom and the relationships between cooperating teachers and pre-service teachers.

Chapter 3 will present the demographics of the subjects, an explanation of the instruments used in the study and the methodology used for answering each research question.

Chapter 4 will present the results of the data analysis and Chapter 5 will present the discussion of the results and recommendations for future research.

CHAPTER 2

REVIEW OF LITERATURE

In an effort to explore the attitudes of pre-service teachers and their cooperating teachers concerning the use of technology in the classroom during the student teaching experience, literature was reviewed regarding access to technology, teacher attitudes and beliefs about technology, learning theory, constructivist theory and technology, and pre-service teachers and technology.

Access to Technology

In recent years, there has been a proliferation of computers in society and in schools. In 1985 there were approximately 630,000 computers in schools. The Office of Technology Assessment (1995b) estimated that the number of computers in kindergarten through twelfth grade schools increased by approximately 400,000 annually during the past decade. The total number of computers in schools reached over 8 million in 1995, one for every nine students (NCES). According to The National Center for Education Statistics during the period between 1994 and 2001, the number of schools having access to the Internet increased from 34 percent to 99 percent (NCES).

Due to the increase in the number of accessible computers and the Internet not only in schools but in society as well, students entering the classrooms today have grown up in the midst of a technological revolution. Today, the world in which we live allows us to have information immediately. Children have become accustomed to instant access of information and control, whether it is through a video game, multimedia centers in the

family home, an information kiosk at the mall or the simple click of a mouse. When children enter the classroom, however, those technological changes to which they are accustomed have yet to affect the educational system and, therefore, the process of teaching and learning have remained unchanged and the classrooms do not look much different than they did twenty years ago (Strommen & Bruce, 1992).

Teacher Attitudes and Beliefs About Technology

The Reform movement in American education calling for a shift from teacher-centered classrooms to student-centered classrooms has not happened because the attitudes and beliefs that the teachers carry with them shape what they do in their classrooms. Despite the repeated efforts to integrate technology into the classrooms, the shift to learner-centered instruction is not widespread. There are several barriers that hinder the integration of technology into the classrooms including, time, resources, training, support and the one that is ignored most often, reluctance to change (Dias,1999). Change is never easy or painless. This barrier to the use of technology in the classroom contributes to teacher attitudes being less than positive (Guha, 2000). When computers are installed in the classroom, an immediate change must occur. The classroom teacher is faced with giving the computer priority in the classroom organization, as the electrical outlets, phone line, and chalkboard are all factors in the placement of the computers within the teachers' classroom space. The classroom, in which the teacher has found comfort and solace, often times for many years, must now be rearranged to accommodate this new educational tool (Guha, 2000). For any change to take hold, the teacher must work through these issues and then decide how the use of technology fits within the

classroom system (Dexter, Anderson, & Becker, 1999). Most teachers want to learn about technology and the use of technology but do not want to be pressured to use them in a classroom setting (Krochmal, 2003).

Time is an important factor that must be considered when beginning the process of integrating technology into the classroom. Lessons designed to include technology use require more time, thought, creativity, and effort than traditional lessons. Course development takes time and there is often no release time from the classroom for teachers to be trained to make this change happen (Rogers, 2000; Guha, 2000). Loyd and Gressard (1986) found that teachers' positive attitudes toward computers are correlated with their experiences. The researchers further noted that when teachers are not given time to become familiar with the technology, the confidence needed to integrate the technology into the curriculum decreases. Summers (1990) stated that one of the most common reasons for teachers' negative attitudes toward technology is the lack of knowledge and experience in this area.

There is nothing worse than having worked hard to develop plans to integrate the use of computers into the curriculum only to find that there is some technical glitch in the system and the computer is not working or access to the Internet is denied. Often, the technical support staff may be employed district wide and service to remedy the problem is days away. By that time frustration sets in and the confidence of the teacher to integrate technology disappears (Dexter, Anderson, & Becker, 1999). Clustering computers into a lab places limits on the classroom teacher and says to the teacher that computers are not central to the instructional activities in the classroom and, often times,

teachers choose to believe that statement and no effort is made to integrate the technology to enhance student learning (Loveless, 1996).

Teacher beliefs about the roles technology plays in the education of children greatly affect their use of technology. Technology is often used as a strategy for classroom management. When children in the classroom finish their work or avoid an unacceptable behavior they are rewarded with minutes on the classroom computer (Etmer, Addison, Lane, Ross &Woods, 1999). Technology is viewed as a resource to support the curriculum that has already been taught by the classroom teacher and some use it for the purpose of reinforcement and drill of basic skills (Fulton & Torney-Purta, 2000). Many teachers believe that technology has been a motivator for students and enjoy watching the students become excited about learning on the computer (Fulton & Torney-Purta, 2000).

Learning Theory

Caprio (1994) presented a unique comparison of two models of learning: the constructivist model and the behaviorism model. Caprio (1994) believed current public school classrooms are similar to a one-person show with a comatose audience that is held captive by closed doors. He alluded to the fact that teachers are dependent upon textbooks for the structure of their courses. Behaviorism is certainly not new and has been present in classrooms for centuries (Sechez, 1997). Reinforcement is one of the basic tenets of behaviorism, along with making children behave and changing their behavior so that each child becomes dependent upon the teacher and is conditioned to perform in uniform ways (Sechez, 1997). Educating these K-12 students to become the

21st century leaders requires a change in the current teaching and learning relationships. Classroom teachers must work toward avoiding a division between the children, their schools, and the society in which they live (Strommen & Lincoln, 1992). These K-12 children have increased access to computers and the Internet in society. Students entering the classrooms today have grown up in the midst of a technological revolution. Today, the world in which we live allows us to have information immediately. Strommen and Lincoln (1992) think the philosophy of constructivism offers the promise for educating all students and avoid the divisions between children, school and society.

The term constructivism has been used to describe philosophies of education, curriculum theory, instructional practice, and theories of learning with varying degrees of success. In recent years, constructivism has become increasingly popular with many educators accepting the view that much of what is learned originates from the inside of the learner (Kamii & Ewing, 1996). Constructivism is an epistemology - a learning or meaning-making theory - that explains the nature of knowledge and how human beings learn. Constructivism maintains that individuals create or construct their own new understanding or knowledge through the interaction of what they already know and believe (Abdal-Hagg, 1998).

Fundamentally, constructivism means that as we experience something new, we internalize it through our past experiences or the knowledge we have previously established. Resnick (1983) stated, "meaning is constructed by the cognitive apparatus of the learner" (p. 477). Saunders (1992) explained and agreed with Watzawick (1984) that

> Constructivism can be defined as that philosophical position which holds that any so-called reality is, in the most immediate and concrete sense, the mental construction of those who believe they have discovered and investigated it. In other words, what is supposedly found is an invention

> whose inventor is unaware of his act of invention and who considers it as something that exists independently of him; the invention then becomes the basis of his worldview and actions (p. 137)

A basic tenet of most approaches to constructivism is the notion that the learner is an active participant in the learning process who constructs personal meaning from the situation. This personal meaning is shaped based on the learner's prior knowledge. The learner has a great deal of control in the learning environment. From a constructivist perspective, the learner is goal-oriented, autonomous, and constructs personal understandings (O'Donnell, 1997). Clements and Battista (1990) have defined the basic tenets of constructivism as the following:

1. Knowledge is actively created or invented by the child, not passively received from the environment.
2. Children create new knowledge by reflecting on their physical and mental actions.
3. No one true reality exists, only individual interpretation of the world.
4. Learning is a social process in which children grow into the intellectual life of those around them.
5. When teachers demand that students use specific methods, the sense-making activity of students is seriously curtailed (p. 34-35).

In Constructivist theory, which has its roots in the work of Piaget, the emphasis is placed on the learner rather than on the instructor. Such theories rest on epistemological assumptions as both Cobb (1994) and Phillips (1995) noted. The learner is the one who interacts with objects and events and thereby gains an understanding of the features held by such objects or events. The learner, therefore, constructs his/her own conceptualizations and develops personal solutions to problems. According to constructivist theory, children learn whole-to-part, not incrementally. The ideas and interests of children drive the learning process. Teachers are flexible; at times, they are the giver of knowledge, but frequently they become the facilitator of knowledge (Strommen & Lincoln, 1992). In constructivist teaching and learning learner autonomy

and initiative is accepted and encouraged. Constructivists view learning as the result of mental construction whereby students learn by fitting new information together with their existing knowledge. People learn best when they actively construct their own understanding (Howland & Moore, 2002).

Constructivist Theory and Technology

Educators today are faced with two major challenges in classrooms. The first challenge comes from the changing perception of what learning is about (Salomon, 1991). The theory of constructivism encourages educators to examine their means of presenting information and to move from the imparting of knowledge to the facilitation of learning (Resnick, 1989). The second challenge comes from the introduction of technology into the classroom where the shift can be from knowledge-as-possession to knowledge-as-construction (Salomon, 1991). This shift allows students to become self-guided and self-motivated learners. With the influx of computers into the classroom, teachers have to find ways of integrating technology into their classroom activities. These computers bring with them new ways of teaching as well as new ways of learning. Teachers will need to reconstruct their methods of teaching to include these technologies (Akyurekoglu, 2000).

Much has been written about the potential of technology to significantly improve the quality of education (Clements, 1995; Laney, 1990; Rothenberg, 1998). Technology has the potential to change the structure of education from an emphasis on classroom lectures to an emphasis on individual exploration, from the teacher being the holder of wisdom to the teacher being a facilitator of students' learning

(Caprio, 1994; Reinhardt, 1995). Technology can change the way children think, what they learn, how they interact, and how educators assess them. Children become engaged learners who are responsible for their own learning, energized by learning, strategic, and collaborative (Jones, Valdez, Nowakowski, & Rasmussen, 1995). The use of new technologies in an educational setting has caused constructivist learning theory to receive new attention. Researchers have suggested the role of technology in education is so important that it will force the issue of instructive versus constructivist teaching. Using a constructivist approach in a technology-rich environment will no longer be a choice for teachers but a requirement (LeBaron & Bragg, 1994; Mann, 1994).

Given the emphasis on engaged learners, it is not surprising that the language of constructivism pervades the technology literature (Reed & McNergney, 2000). Technology is a tool that can help teachers and students become co-learners who collaboratively construct knowledge. Constructivism provides the framework for recognizing the need to embed learning into authentic and meaningful contexts (Tam, 2000). Therefore, technology use that results in student engagement is characterized as successful.

Engaged learning is a personal as well as a social event and is another implication of constructivism. When technology is introduced into learning environments, there turns out to be an influence on how learning takes place. At times it appears that students are engaged with the computer rather than with other students, yet the technology allows for a more diversified and socially rich learning context, such as peer tutoring via the computer, computer networks, e-mail, and telecommunications (Tam, 2000). In the classroom it is important that technology is thought of as an invisible tool that can be

used in a multitude of ways. Computers alone can be used as tools to enhance writing, to make possible instant exchange of information between students in different cultures, to provide access to informational data bases, and to provide interactive audio and video (Strommen & Lincoln, 1992).

The adaptation to constructivism can transpire in every teaching situation and every educational level. When considering technology for integrating technology, the World Wide Web (WWW) contains three key elements of educational value: hypertext, the delivery of multimedia, and true interactivity (Starr, 1997). These values can be seen in the classroom through such applications as graphics, sound and video which bring to life world events, museum tours, library visits, world visits, and up-to-date weather maps. Using the Internet, a constructivist instructional model advances higher-level instruction, such as problem solving and increased learner control. The WWW becomes a necessary tool for student-centered discovery and research (Quinlan, 1997).

Higher Education Teacher Education Programs and Technology

The federal government has estimated that as many as 2.2 million new teachers will be required for the education system in the next 10 years, based on the increase in student population and the call for smaller class sizes. Many of these new teachers will be graduates of colleges of education (The Milken Foundation, 2001a). Despite the great potential of technology for classroom instruction, many of these pre-service teachers have not been adequately prepared to use technology in their teaching, yet these new educators will be responsible for preparing children and young people to be successful citizens and

members of a society that is increasingly being altered by technology.

(The Milken Foundation, 2001b).

A study of teacher education programs initiated by the Milken Exchange on Educational Technology and carried out by the International Society for Technology in Education (ISTE) suggested that the teacher training programs at the level of higher education should increase pre-service teachers' exposure to appropriate technology if professors are to adequately prepare future teachers for today's classrooms (The Milken Exchange & ISTE, 1999). Unfortunately, many graduates of teacher education programs have had little opportunity to learn about technology and even less about teaching with technology (Margerum-Leys & Marx, 1999). While many pre-service teachers have been trained to evaluate software and hardware, only about 10 to 20 hours have been devoted to hands-on computer training (Byrum & Cashman, 1993). This situation was no more promising for those just entering the teaching profession than for in-service teachers who have reported their technology training is about computers, not learning with computers (Hasselbring, 1991).

The National Council for the Accreditation of Teacher Education (NCATE) and ISTE have adopted a set of pre-service teacher competencies for technology education, standards designed to prepare teachers to use technology (Wetzel, 1993), but colleges and universities must make their own decisions concerning the integration of technology into the teacher education curriculum (Munday, Windham, & Stamper, 1991). The ISTE survey (1999), entitled "Information Technology in Teacher Education," determined that most pre-service faculty believed that future teachers do not receive adequate training or effective modeling. It is important, therefore, that colleges of education widen their

offerings to prepare pre-service teachers to use technology effectively and begin modeling proper applications of technology and teaching strategies in the learning process (Fawson & Smellie, 1990). In order to accomplish this pre-service teachers need to have positive computer attitudes and feel self-confident in using them (Kinzie, 2000).

In a study of 436 education students enrolled at a Midwestern University, Byrum and Cashman, (1993) found that outside of required technology courses there was little exposure to the role of technology. This technological separation further reduced pre-service teachers' opportunities to develop the concept of curriculum integration. Teaching computer operations in a stand-alone course may be appropriate, but all faculty members, particularly those who teach in schools of education, should model the uses of computers for teaching and learning. A vital component of integrating technology into the educational curriculum is the training of the educators who will eventually use the technology (Byrum & Cashman, 1993). The ISTE (1999) study found much the same situation in today's teacher education programs: most faculty-members do not, in fact, practice or model effective technology use in their classrooms.

Although the integration of technology into the curriculum has been called for by national accreditation organizations such as the National Council for Accreditation of Teacher Educators (NCATE), Vannatta and Beyerbach (2000) indicated that the lack of technology training is still a problem in teacher education programs. Even though the majority of teacher education programs provide some computer education for pre-service educators, many do not have state of the art equipment or faculty with technology expertise.

Technology in pre-service teacher education, as well as in society at large, is a powerful vehicle for change. Technology education has become a catalyst for challenging attitudes, long held beliefs about the way things have always been done, classroom practices, and the way students learn (Brown, 2000; Tapscott, 1998). Future teachers will be in classrooms full of the "N-Gen" (Internet Generation) that have grown up digital (Tapscott, 1998). Therefore, beginning teachers no longer have a choice about using technology in their classrooms of tomorrow if they hope to understand and reach this generation of students who have learned technology as a second language.

Most teacher education programs have operated as loose collections of program elements: foundations, methods, student teaching, liberal arts core, and content area courses. In this process, technology has often been treated as a separate element, often represented in a single course taught by the "technology" faculty. This style has many flaws but it is a commonplace approach to technology in teacher education. A report by the Office of Technology Assessment (OTA, 1995) concluded that "technology is not central to the teacher preparation experience" (p. 165) and that teacher education programs tended to treat technology as an add-on to the curriculum that was not integrated across the entire teacher education curriculum. Pre-service teachers involved in the study voiced frustration that the higher education faculty had someone else do the technology for them or implemented technology as the add-on assignment (Vannatta, 2000).

Technology should be integrated across the entire curriculum, and participants in all areas of teacher education should help to develop and implement an integrated plan that provides students with the models, mentors, content, practice, and experiences

needed. If teacher education students are to graduate with strong skills, positive attitudes, including the idea of lifelong learning, and a thoughtful approach to using technology in their classrooms, it will be necessary for them to experience technology at all levels of their preparation. Teaching pre-service students basic computer literacy—the traditional topics of operating system, word processor, spreadsheet, database, and telecommunications topics—is not enough (Tapscott, 1998).

When the NCATE Task Force on Technology and Teacher Education (1997) published their report, *Technology and the New Professional Teacher: Preparing for the 21st Century Classroom*, it unambiguously made this point:

> To what degree are higher education institutions meeting their responsibility for preparing tomorrow's classroom teachers? Bluntly, a majority of teacher preparation programs are falling far short of what needs to be done. Not using technology much in their own research and teaching, teacher education faculty have insufficient understanding of the demands on classroom teachers to incorporate technology into their teaching. Many do not fully appreciate the impact technology is having on the way work is accomplished. They undervalue the significance of technology and treat it as merely another topic about which teachers should be informed. As a result, colleges and universities are making the same mistake that was made by K-12 schools; they treat "technology" as a special addition to the teacher education curriculum—requiring specially prepared faculty and specially equipped classrooms—but not a topic that needs to be incorporated across the entire teacher education program (NCATE).

Pre-service teachers are provided instruction in "computer literacy" and are shown examples of computer software, but they rarely are required to apply technology in their courses and are denied role models of faculty employing technology in their own work.

As with any profession, in education there is a level of literacy beyond general computer literacy. This more specific, or professional literacy, involves learning to use

technology to foster the educational growth of students. To develop that professional expertise, students will have to see instructors model appropriate uses, have opportunities to learn how to use technology to support learning, see technology used appropriately in schools, and have many opportunities to develop and teach technology-supported lessons themselves under circumstances that support professional growth.

Strommen and Lincoln (1992) chastised teacher-training programs by stating that because of a lack of training in the uses of technology, student teachers are "more like their predecessors who graduated decades earlier than they are like today's children" (p. 467). The result is that there exists an estrangement of schools from both societies in general and from the children who attend these schools.

Pre-service Teachers and Technology

Willis Copeland (1979) conducted a series of research projects with the Teacher Preparation Program of the University of California and concluded that:

> Student teachers' ability to use many skills they learn during their university training depends not only on the quality of the initial training they receive but also on the environment in which they must practice use of those skills, their student teaching classrooms. (p. 194)

Literature has shown us that despite the efforts of teacher educators to present alternative philosophies of teaching to their students, most pre-service teachers revert to "traditional notions" regarding schools during their student teaching experience (Yost, Sentner, & Forlenza-Bailey, 2000). In the preparation of student teachers, cooperating teachers play a momentous role as approximately 33% of the student teacher's experience in the teacher education program is spent with one cooperating teacher (Osunde, 1996). In his research, Osunde found that cooperating teachers

influenced the teaching behaviors of the student teachers not only during the student teaching experience, but they also continued to influence the decisions the student teachers made as they moved forward in their teaching careers.

Student teachers take their cues from the observations in classrooms during student teaching and internships. If student teachers are instructed to use the latest technology as part of their teacher education programs, but don't see effective technology practices in the schools, it is doubtful they will incorporate technology use in their own teaching (NCATE, 2001). Schools are powerful socializing agencies that greatly affect new teachers' perceptions about what does and what doesn't work in practice.

In a 1997-1998 nationwide study, Moursund and Bielfeldt (1999) concluded that one of the major factors of whether student teachers effectively used technology was their cooperating teacher. Zeichner (1992) also stated that the traditional model of student teaching depicts the student teacher imitating the practices of the cooperating teacher (p.7). If this is the case, then there is major concern developing as to where student teachers are placed for their student teaching experience and into what environment they are placed for that all-important part of the teacher education program. Along with that goes the issue of what role the integration of technology plays in the classroom where student teachers will model the preparation of leaders of the twenty-first century.

In reading the literature and taking note of the various issues involved in the integration of technology, it is evident that the skills needed by cooperating teachers have yet to be delivered in a way that is allows the teachers to be successful and therefore afford the students in the classrooms their full opportunity for learning. As the reviewed

literature indicates, technology is widely accessible in schools, yet, teachers' attitudes and beliefs about technology are barriers preventing movement toward more student-centered pedagogies that fit well with technology. To add to this body of literature several perplexing questions surfaced and were expanded which became the basis of this study.

CHAPTER 3

METHOD

The purpose of this research was to study the attitudes of pre-service teachers and their cooperating teachers concerning the use of computers and technology in the classroom during the student teaching experience. Another aspect of the study explored the impact the cooperating teachers' attitudes had on the pre-service teachers' attitudes regarding the use of technology in the classroom and the pre-service teachers' beliefs about how they will use technology in the future. A final section addressed the impediments that could prevent the use of technology in these classrooms where pre-service teachers are completing their student teaching experience.

The design of the study was what Creswell (1994) referred to as the "dominate-less dominate design (p.177). The "dominate" design of this study encompassed quantitative measures consisting of surveys completed by the pre-service teachers and the cooperating teachers before and after the student teaching experience. The "less dominate" component included open-ended questions as well as unsolicited comments from the pre-service teachers. Open-ended questions asked the pre-service teachers to evaluate the use of technology in the classrooms where they were carrying out their student teaching assignment, their change in attitudes about the use of technology and what experience they had using technology. A section of the *Cooperating Teachers Survey* included a series of seven open-ended questions that solicited information concerning the number of classes or workshops and type of computer training the cooperating teachers had completed in the past three years.

Description of the Sample

The pre-service teacher participants in the study were from a Midwestern university of about 20,000 students. Of the 50 pre-service teachers eligible to participate in the study, 45 were females and 5 males. Of the participants, 32 were elementary education majors and 18 were early childhood education majors. All of these pre-service teachers were accepted into the university's professional education unit and were enrolled in the last semester of their undergraduate study, which included the student teaching experience. Not surprisingly, 92% of the pre-service teachers were under the age of 25, and, of the total number of pre-service teachers that participated, 88% were Caucasian, 8% Native American and 2% were Asian. The researcher chose to use only the pre-service teachers in elementary education and early childhood education programs since the majority of these pre-service teachers teach in self-contained classrooms or have more than one subject for which they are responsible during the daily instruction time. The return rate of the *Pre-Service Teachers Survey* was 100% pre-student teaching and 98% for the *Post-Student Teaching Survey*.

Elementary education pre-service teachers requested a specific grade level for their placement into student teaching and had some say in the community where they completed their student teaching. All of these placements were dependent upon meeting the diversity requirements established by the state in which the study took place. Elementary education pre-service teachers were qualified to obtain certification to teach in first through eighth grades, so their placements in the schools were somewhat diverse. The early childhood pre-service teachers at the time of the survey were in their second student teaching experience. These students were placed only in first through third grade

classrooms. These pre-service teachers completed their first student teaching experience in the Pre-Kindergarten or Kindergarten classrooms on campus or in community childcare centers. At the completion of their student teaching, early childhood pre-service teachers can obtain certification to teach pre-kindergarten through the third grade. Table 1 gives a summary of the placement by grade level of pre-service teachers.

The cooperating teachers included in the study were experienced teachers with at least three years of teaching experience who volunteered to serve as mentor teachers for the university students during their student teaching experience. Of the 50 cooperating teachers eligible to participate in the study, 26 (52%) completed the pre-student teaching survey and only 13 (26%) returned the *Cooperating Teachers Post-Student Teaching Survey*. The cooperating teachers had a variety of teaching experience as well as broad educational backgrounds. Of these cooperating teachers, 38% hold a Bachelor's degree in education, 12% possess a Master's degree, and 2% have earned doctorates in Elementary Education. Approximately one-third of the cooperating teachers had less than 10 years experience and one-third had more than 30 years teaching experience. The data indicated very little variability in ethnicity with 92 % of the cooperating teachers Caucasian, 4 % Native American, and the same percentage Latino. Forty-six percent of the schools in the study were located in rural communities and 54% were located in urban or suburban areas.

Table 1

Grade Levels Where Pre-Service Teachers Are Assigned

Grade Level	n	Total %	% Early Childhood education majors	% Elementary Education majors
			n=18	n=32
Pre-K	0	0	0	0
Kindergarten	0	0	0	0
1st	16	32	66.7	12.5
2nd	7	14	27.8	6.3
3rd	12	24	5.6	34.4
4th	6	12	0	18.8
5th	4	8	0	12.5
6th	1	2	0	3.1
7th	4	8	0	12.5

The information from the returned *Cooperating Teachers Survey* indicated that about 87% of the classrooms were self-contained, meaning that the classroom teacher was responsible for teaching the majority of subjects. The remaining 13% of cooperating teachers were team teaching or participating in departmentalized education. About 47% of the classrooms reported between 16 and 21 students and about 53% had between 22 and 28 students in their classroom. Only about seven percent of the classrooms had a part-time teacher aide. The remainder of the cooperating teachers indicated there was no teacher aide available in the classroom.

Data Collection

The researcher met with the designated coordinators of field experiences from the elementary education and the early childhood programs who were responsible for the student teaching experiences to explain the questions utilized in the study and seek their assistance in recruiting the pre-service teachers and the cooperating teachers. The representatives from each college wanted participation solicitation handled in different ways. What follows is a description of the data collection process for each of the programs.

Early Childhood Education. A letter explaining the study (Appendix A) and the informed consent forms (Appendix B) with a self-addressed envelope included in a packet was sent by the early childhood education coordinator of field experiences to the cooperating teachers who had been assigned pre-service teachers with a specialization in early childhood. The coordinator of field experiences wanted this information to go to the cooperating teachers at the same time they received their confirmation and the name of the pre-service teacher assigned to their classroom for the semester. There is only one pre-service teacher assigned to each cooperating teacher. The cooperating teachers were encouraged to participate in the study; however, their participation was optional.

The researcher met with the early childhood pre-service student teachers during the first week of their final preparation classes before they reported to their student teaching assignments. After receiving a brief explanation of the intended research, the pre-service teachers indicated their agreement to participate in the study by completing the informed consent form. After returning the consent forms, the *Pre-Student Teaching*

Surveys (Appendix C) were completed by the pre-service teachers during their class time. A packet with the *Cooperating Teachers Survey* (Appendix D) and a self-addressed stamped envelope for returning the survey to the researcher was given to the pre-service teachers to distribute to their cooperating teachers when they reported to their assigned schools the following Monday. Additional forms for informed consent were included in the event the cooperating teachers misplaced the initial forms.

Elementary Education. The researcher met with the elementary education pre-service teachers during the first week of their on-campus or "senior seminar" classes. At that time, the pre-service teachers listened to a brief explanation of the proposed research and indicated their agreement to participate in the study by completing the informed consent agreement (Appendix B). *The Pre-Student Teaching Surveys* (Appendix C) were distributed and completed by the pre-service teachers during the senior seminar class. A packet containing the letter explaining the study (Appendix A), the informed consent form (Appendix B), the *Cooperating Teachers Survey* (Appendix D), and a self-addressed stamped envelope for returning the survey to the researcher was given to each pre-service teacher to distribute to her/his cooperating teacher on the following Monday.

The cooperating teachers agreed to participate in the study by signing the informed consent and returning it in the self-addressed stamped envelope to the researcher. Participation in the study was optional and the return rate for this phase for the cooperating teachers was 50%. Throughout the study, the researcher followed all recommendations of the Oklahoma State University Internal Review Board regarding research (Appendix G).

Instrumentation

Pre-Service Teacher's Pre-Student Teaching Survey. The instruments used for the study included surveys (Appendix C & D) that were adapted from the Oswego Public Schools, Oswego, New York, from the North Central Regional Educational Laboratory (NCREL), and from The South East Initiatives Regional Technology in Education Consortium (SIRTEC). None of the instruments that were included were used in their entirety. The researcher perused these surveys to obtain information about the use of technology in the classroom by teachers, by elementary students, by pre-service teachers in higher education, and by higher education faculty and gleaned ways of obtaining the information that was sought. From these surveys, the researcher developed a survey to provide the information necessary to answer the proposed research questions.

The first part of the *Pre-Service Teachers-Pre-Student Teaching Survey* (See Appendix C) was designed to collect basic demographic information from each pre-service teacher including age, gender, ethnicity, college, and major. Questions about the subjects' technology background, including the number of computers in their home and which resources they have used in the last year to learn more about technology were included with the demographic information.

Part of the second section of the *Pre-Service Teachers Pre-Student Teaching Survey* included seven questions designed to specifically answer the second research question of the study: What are the attitudes of the pre-service teachers about their use of technology in the classroom? These seven items, adapted from the Oswego, NCREL, and

SEIRTEC measures, direct the pre-service teachers to select one level of agreement from strongly disagree to strongly agree to indicate how they felt about statements concerning the use of technology in the classroom. The results were scored along a Likert-type scale with the response strongly disagree assigned a 1, disagree assigned a 2, undecided assigned a 3, agree assigned a 4, and strongly agree was assigned a 5.

The third section of the *Pre-Service Teachers Pre-Student Teaching Survey* included items to address the third question: How do the pre-service teachers perceive they will use the technology in classroom? These 4 items, adapted from the Oswego, NCREL, and SEIRTEC measures, directed the pre-service teachers to select one level of agreement (from strongly disagree to strongly agree) to indicate how they believe they will use technology in their future classrooms. The results were scored with a Likert-type scale with the response strongly disagree assigned a 1, disagree assigned a 2, undecided assigned a 3, agree assigned a 4, and strongly agree was assigned a 5.

The Cooperating Teachers Pre-student Teaching Survey. The first part of the *Cooperating Teachers' Pre-Student Teaching Survey* was designed to collect basic demographic information including age, gender, ethnicity, as well as the number of years that the cooperating teacher had been teaching in the classroom (Appendix D). Questions about the cooperating teachers' technology background, including the number of computers in their home and sources they have used in the last year to learn more about technology were included with the demographics. An additional section asked the cooperating teacher seven open-ended questions that solicited information concerning the number of classes or workshops and type of computer training the cooperating teacher had completed during the past three years. These open-ended questions provided the

researcher specific information about the cooperating teacher's university training as well as training they received from in-service presentations and workshops held in their school district.

The second section of the *Cooperating Teachers Pre-Student Teaching Survey* asked the cooperating teachers to rate their expertise in the use of 21 listed technology items. A Likert-type scale was used with 0 = have not used to 5 = high expertise. In the pilot study, the responses on these 21 items were totaled to create a "technology expertise" score with the reliability rating of .87 using Cronbach alpha. The high value suggests that the subjects answered the questions in a consistent way and indicated the responses were internally consistent and reliable.

For the purpose of analysis in this study, the expertise items were separated into two additional subscales, one dealing with the expertise of hardware and the other the expertise of utilizing software. There were 13 objects that were targeted to be hardware items and the list included the three computer platforms: Windows, Apple/Macintosh, and DOS. Other hardware items included objects the researcher would expect to be in a classroom such as a printer and VCR, as well as other objects that were available for use in the classroom but are not seen as frequently such as laser disk players and scanners. The alpha value .87 for this subscale revealed high interval consistency reliability. Of the original 21 items 8 objects were designated to be software as they were application type items that would be found in classrooms. These items included functions that would be basic operations on the computer including word processing, e-mail, access to the Internet, presentation software including PowerPoint and HyperStudio, and utilizating CD-ROM (alpha = .86). The objects were scored with a Likert-type scale where 0 =

haven't used, 1= low expertise, 2 = moderately low expertise, 3 = moderate expertise, 4 = moderately high expertise, and 5 = high expertise.

The third section of the *Cooperating Teachers Pre-Student Teaching Survey* included questions designed to assess their use of technology within the classroom setting and the use of technology by the children in the cooperating teacher's classroom. In this section, the cooperating teachers self-reported their use of technology and the use of technology by the children in the classroom using the same list of 21 items compiled by the researcher to represent the types of technology that could be available in the classrooms today. Evidence for the reliability of this 21-item subscale was determined as alpha = .86.

As previously noted there were 13 items identified as hardware and that list included all three platforms for computers as there is a variety of computers available in the classrooms (alpha for this item set was .87). Of the original 21 technology items, 8 of the items were classified as software as they were application type of items that would be found in classrooms. These items included functions that would be basic operations on the computer including word processing, e-mail, accessing the Internet, presentation software including PowerPoint and HyperStudio, and utilizing CD-ROM (alpha = .86). Both the hardware and software "use" items were scaled in the same manner as the "expertise" items.

Pre-Service Teachers-Post-Student Teaching Survey. The *Pre-Service Teachers Post-Student Teaching Survey* can be found in (Appendix E). The pre-service teachers responded to the question; "Do you believe your attitude about the use of technology in the curriculum has changed during your student teaching experience?" Pre-service

teachers were asked to briefly explain their answer. The asking of this question aided in the examination of what differences there were between these written responses which were of the less-dominate qualitative component and the responses indicated by the pre-service teachers on the dominant component, the survey.

Cooperating Teachers'-Post-Student Teaching Survey. The *Cooperating Teachers'-Post-Student Teaching Survey* (Appendix F) collected identical information as that on the pre-student teaching survey for cooperating teachers excluding the demographics. A section of the instrument listed twenty-one types of technology items that could be available for use in a classroom. The cooperating teachers indicated their own use of these twenty-one items, the use by the children in the classroom, and the use of these items by their pre-service teachers during their student teaching experience. This Likert-type scale included: 1=Never used, 2=Very little use, 3=Some use, and 4=Great deal of use. Additional demographic information concerning the kind of classroom, class size, and the availability of a teacher's aide was also collected. The final section sought information concerning the amount and kind of in-service training available to the cooperating teacher as well as the availability of technology support in their school.

Subscales Formed to Answer Research Questions.

The seven attitude statements appearing on all four surveys *(Student Teachers' Pre- and Post-Student Teaching Surveys, Cooperating Teachers Pre- and Post-Student Teaching Surveys*) were combined into a "pre-student teaching total attitude score" and a "post-student teaching total attitude score." This procedure was used for both pre-service teachers and cooperating teachers. These total scores were then used to examine research

question one, "What are the attitudes of the pre-service teachers and cooperating teachers concerning the use of technology in the classroom." Data were analyzed with a paired t-test to determine whether statistically significant differences existed between the average attitudes from pre to post for pre-service teachers, and from pre to post for cooperating teachers. Further, an independent t-test was utilized to compare the total attitude scores between the pre-service teacher's and their cooperating teacher's both pre and post student teaching. Comparisons were also conducted between these groups and each of the seven separate items (Tables 2, 3, & 4).

The four belief statements from the pre-service teachers' pre and post student teaching surveys were combined into a "pre-service teachers' total belief score." The total belief score was computed for all pre-service teachers, and then used to answer research question two "How do the pre-service teachers perceive they will use technology in the classroom?" Total belief scores were compared with a paired t-test from pre to post student teaching and scores on all of the four separate items were compared (Table 5).

Five subscales were created to answer research question three "What impact do the attitudes about technology and the use of technology by the cooperating teacher have on the attitudes of the pre-service teacher concerning the future use of technology?" The first subscale used was the cooperating teachers' total attitude score. The second subscale was the cooperating teachers' 13-item use of hardware set while the third subscale was the 8-item software set. The fourth subscale (basic computer use subscale) was obtained from the 21 technology use items. All items where cooperating teachers indicated any use were retained for this subscale. This set of 9 items was used to generate a total cooperating teachers' basic computer use score. The fifth subscale was

constructed in a manner consistent with the cooperating teacher basic computer use score. but this subscale was determined for the children in the classroom of the cooperating teacher. The children's basic computer use subscale score total consisted of 6 items. Data to answer research question three included the five computed subscale totals and the "pre-service teachers' total belief statement." Five Pearson product-moment correlation coefficients were computed using the five total subscale scores and the pre-service teachers' total belief statement.

To answer research question four "What are the impediments that prevent the use of technology in these classrooms where the university places pre-service teachers?" specific survey items were targeted for analysis. Descriptive indices were obtained for the five items comprising the "professional development" area. the five items for the "cooperating teachers' information" area, and the 13 "school related" items. All items appeared on the cooperating teachers' pre- or post-student teaching survey.

Data Analyses

Statistics used to address the research questions noted above were generated with SPSS version 10 (SPSS. 1999). These research questions formed the dominate component of the design of the study. The less-dominate portion of the study focused on the open-ended survey questions. Responses from pre-service students both pre-and post student teaching. as well as unsolicited comments from the student teachers concerning their cooperating teachers use of technology in the classroom, were summarized to support the dominate portion of the study.

CHAPTER 4

RESULTS

The purpose of this study was to explore the attitudes of student teachers and their cooperating teachers concerning the use of computers and technology in the classroom during the student teaching experience. Another aspect of the study looked at what impact the cooperating teachers' attitudes have on the student teachers' attitudes about the use of technology in the classroom and the student teachers' beliefs about how they will use technology in the future.

The dominate design of this study encompassed quantitative measures obtained from surveys completed by the pre-service teachers and the cooperating teachers before and after the student teaching experience. The less-dominate qualitative component of the study included a series of open-ended questions that solicited information concerning the number of classes or workshops attended, types of computer training and a belief statement for pre-service teachers about their experience of technology in the classroom.

Question 1: *What are the attitudes of the pre-service teachers and cooperating teachers concerning the use of technology in the classroom?*

On each of the pre-student teaching and post-student teaching surveys for the pre-service teachers and the cooperating teachers seven items were chosen to assess their attitudes about the use of technology in the classroom. The results of paired t-tests indicated a non-significant difference between the pre-service teachers' attitudes concerning the use of technology pre-student teaching (mean 4.55) and post-student teaching (mean 4.54) $t(47)=.267$, $p=.79$. Results are reported in Table 2.

Table 2

Pre-service Teachers' Attitudes Concerning The Use Of Technology Pre and Post Student Teaching

Statement	*Pre student teaching (n=25)* Mean(SD)	Post student teaching (n=15) Mean(SD)	Sig.
It is important for students to learn about computers in order to be informed citizens.	4.50(.62)	4.63(.53)	t(47)=-1.52, p=.14
All students should have the opportunity to learn about computers at school.	4.79(.87)	4.60(.49)	t(47)=-1.46, p=.15
Computers are necessary tools in both educational and work settings.	4.69(.47)	4.56(.74)	t(47)=-1.18, p=.24
Computers can be useful instructional aids in almost all subject areas.	4. 71(.46)	4.67(.48)	t(47)=47, p=64
If there was a computer in my classroom, it would help me be a better teacher.	4.40(1.09)	4.42(.94)	t(47)=-.12 p=.91
Computers could enhance remedial instruction.	4.35(.56)	4.40(.76)	t(47)=.33, p=.74
Computers will improve education	4.44(.74)	4.48(.71)	t(47)=-.41, p=.69
Total	4.55(.42)	4.54(.49)	t(47)=-.267, p=.79

Strongly disagree=1, disagree=2, undecided=3, agree=4, strongly agree=5.

The results of the cooperating teachers' attitudes reported in Table 3 indicated the same non- significant difference was observed with a pre-student teaching mean of 4.16 and post-student teaching mean of 4.28.

Table 3

Cooperating Teachers' Attitudes Concerning the Use Of Technology Pre- and Post-Student Teaching

Statement	Pre-student teaching (n=25) Mean(SD)	Post-student teaching (n=15) Mean(SD)	Sig.
It is important for students to learn about computers in order to be informed citizens.	3.93(.96)	4.40(.83)	t(14)=-1.52, p=.15
All students should have the opportunity to learn about computers at school.	4.20(1.08)	4.67(.49)	t(14)=-1.61, p=.13
Computers are necessary tools in both educational and work settings.	4.33(1.05)	4.53(.52)	t(14)=-.82, p=.42
Computers can be useful instructional aids in almost all subject areas.	4.27(.88)	4.47(.64)	t(14)=-1.15, p=.27
If there was a computer in my classroom, it would help me be a better teacher.	3.53(1.30)	3.67(1.23)	t(14)=-.435 p=.67
Computers could enhance remedial instruction.	4.07(1.03)	3.93(1.16)	t(14)=.381, p=.71
Computers will improve education	4.0(1.07)	4.33(.62)	t(14)=-1.78, p=.10
Total	4.04(.94)	4.28(.49)	t(14)=-1.22, p=.25

Strongly disagree=1, disagree=2, undecided=3, agree=4, strongly agree=5.

When comparing the means of the pre-service teachers' and the cooperating teachers' attitudes about the use of technology in the classroom there were statistically significant results (Table 4). In examining the responses to the statement, "*If there was a computer in my classroom, it would help me be a better teacher*" the pre-service teachers (mean, 4.40) gave a stronger response than did the cooperating teachers (mean, 3.68) resulting in a statistical significant difference. For responses to the statement *"Computers could enhance remedial instruction,"* the student teachers' mean score was 4.38 and the cooperating teachers' mean score was 4.04, a significant difference. The total attitude score also reached statistical significance as the pre-service teachers' mean score was 4.57 and the cooperating teachers' mean score was 4.17.

As noted in Table 4, the pre-service teachers held stronger attitudes about using technology in the classroom than the cooperating teachers. For example, in response to the survey item, "*Computers can be useful instructional aids in almost all subject areas.*" the pre-service teachers' mean score was 4.72 while the cooperating teachers' mean score was 4.31. It should be noted, that although the mean difference failed to reach statistical significance, this finding was of theoretical interest to the researcher.

Table 4

Comparison Of Pre-Service Teachers' And Cooperating Teachers' Total Attitude Score

Statement	Pre-service Teachers n=50 Mean(SD)	Cooperating Teachers n=26 Mean(SD)	Sig
It is important for students to learn about computers in order to be informed citizens.	4.50(.61)	4.27(.92)	t(74)=1.30, p=.20
All students should have the opportunity to learn about computers at school.	4.78(.42)	4.46(.90)	t(30.68)=1.7, p=.10
Computers are necessary tools in both educational and work settings.	4.70(.46)	4. 42(.90)	t(32.0)=1.45, p=.15
Computers can be useful instructional aids in almost all subject areas.	4.72(.45)	4.31(.79)	t(74)=2.46, p=.20
If there was a computer in my classroom, it would help me be a better teacher.	4.40(1.07)	3.68(1.18)	t(73)=2.66, p=.01**
Computers could enhance remedial instruction.	4.38(.57)	4.04(.92)	t(74)=2.00, p=.05*
Computers will improve education	4.44(.73)	4.08(.93)	t(74)=1.86, p=.07
Total	4.57(.41)	4.17(.82)	t(30.28)=2.28, p=.03*

**Result is significant at the 0.01 level.
*Result is significant an the 0.05 level.

Question 2: *How do the pre-service teachers perceive they will use the technology in the classroom?*

As indicated in Table 5, non-significant differences existed for all four statements when comparing the pre-service teachers' belief statements, pre- and post student teaching. However, the means for all four statements were between the scale values of 4 and 5, which indicated a strong desire to use technology in their future classrooms.

Table 5

Pre-Service Teachers' Belief Statements Regarding Their Future Use Of Technology Pre-(N=50) And Post (N=48) Student Teaching

Statement	Pre-student teaching Mean(SD)	Post-student teaching Mean(SD)	Sig.
I would like to have a computer for class preparation.	4.79(.41)	4.90(.42)	t(47)=-1.53, p=.13
It will be important to integrate instruction with technology.	4.63(.53)	4.63(.53)	t(47)=.00, p=1.0
Students will be able to use technology for learning.	4.65(.53)	4.63(.53)	t(47)=.26, p=.80
I want to have access to technology for classroom presentations.	4.60(.70)	4.56(.71)	t(47)=.29, p=.78
Total belief score	4.67(.43)	5.83(.57)	

Strongly disagree=1, disagree=2, undecided=3, agree=4, strongly agree =5

Question 3: *What impact do the attitudes about technology and the use of technology by the cooperating teachers have on the attitudes of the pre-service teachers concerning their future use of technology?*

The associations between pre-service teachers future use of technology and the cooperating teachers' attitudes toward the use of technology are reported in Table 6.

This indicates that the pre-service teachers expected future use of technology was not associated with any of the variables shown in shown in Table 6. All coefficients failed to reach statistical significance. The correlation indices are of limited range (***r*** values from .01 to .12; an average ***r*** of .09)

Table 6

Association between Pre-Service Teachers' (n=48) Future Use of Technology and Cooperating Teachers' (n=25) Attitudes toward the Use of Technology

	Pre-Service Teachers' Belief about Future Use of Technology
	r
Cooperating teachers' attitudes towards use of technology	.12
Cooperating teachers' use of hardware subscale	.12
Cooperating teachers' use of software subscale	.11
Cooperating teachers' basic computer use subscale	.08
Children's basic computer use subscale	.01

Pre-service teachers reflected on the question "*Do you think your attitudes about the use of technology in the classroom have changed during your student teaching experience?*" In examining the responses of the open-ended questions, the majority of pre-service teachers responded that their attitudes about the use of technology in the classroom did not change and they would still use technology in their future classrooms. Thirteen pre-service teachers explained that during their student teaching experience they had little exposure to the use of technology in the classrooms and yet their attitudes about the use of technology did not change and they still believed technology was important and a valuable tool in the classroom. Thirteen pre-service teachers stated there was no

change in their attitude about using technology since they have always believed technology use was important in the classroom, and they did use it during the student teaching experience just as they anticipated they would.

Thirteen pre-service teachers were of the opinion their attitudes had changed during the student teaching experience and they would use technology more than they had previously thought. These pre-service teachers realized how important technology was based on what they observed in their classrooms. Seven pre-service teachers mentioned they could tell how much the children in the classroom enjoyed using the technology. Four pre-service teachers replied that their attitudes changed because of the opportunities they had for using the technology as a tool in the classroom, and they were able to see the importance and value of technology in the classroom.

Question 4: *What are the impediments that prevent the use of technology in these classrooms where pre-service teachers are placed for student teaching?* Descriptive statistics (Table 7) and correlations (Table 8) were used to answer this question. As noted in Table 8 several bivariate correlations reached statistical significance. More specifically, children's use of basic technology in the classroom was significantly associated with cooperating teachers' use of basic technology in the classroom ($\mathbf{r}$ =.81; $p<.01$). These two variables shared about 66% of the response variability. Children's use of basic technology in the classroom was also related to cooperating teachers' software expertise ($\mathbf{r}$ = .60; $p<.01$; 36% shared variability) and to cooperating teachers' hardware expertise ($\mathbf{r}$ =.66; $p<.01$; 44% shared variability). Cooperating teachers' use of basic technology in the classroom was significantly associated with cooperating teachers' software expertise ($\mathbf{r}$ =.68; $p<.01$; 46% shared variability) and to

their hardware expertise (**r** = .78; p<.01; 61% shared variability). Finally, cooperating teachers' software expertise was related to their hardware expertise (**r** = .65; p<.01; 42% shared variability).

Table 7

Potential Impediments to the Use of Technology in the Classroom

Statement	n	%	Mean	SD
Professional Development				
Cooperating teachers that utilized workshops.	23	88.5		
Number of college courses on use of computers by cooperating teachers.			.73	.92
Number of technology related conferences attended by cooperating teacher.			2.08	2.97
Number of technology related workshops attended by cooperating teacher.			4.0	2.61
Number of professional development opportunities provided by school district cooperating teacher attended .			3.28	2.49
Cooperating Teacher Information				
Cooperating teachers' self-reported software expertise.			2.52	1.03
Cooperating teachers' self-reported hardware expertise.			2.34	.91
Cooperating teachers' attitude about use of technology.			4.54	.49
Number of years cooperating teachers has taught.				
4-6 years	3	11.5		
7-10 years	5	19.2		
11-15 years	9	34.6		
16-20	1	3.8		
More than 20 years	8	30.8		

Statement	n	%	Mean	SD
School Related Items				
Schools with technology support person	15	100.0		
Schools with full-time technology support person	7	46.7		
Schools with technology support person providing in-service opportunities	8	53.3		
Schools with full time teacher aide in the classroom.	1	6.7		
Class size				
16-21	7	46.7		
22-28	8	53.3		
Professional development workshops provided by the district.			3.28	2.49
Number of computers in the classroom.			2.19	2.12
Number of computers in the classroom that have Internet access.			1.81	2.02
Number of computers in the school labs.			26.88	11.35
Professional development workshops provided by the district.			3.28	2.49
Number of computers in the classroom.			2.19	2.12
Number of computers in the classroom that have Internet access.			1.81	2.02
Number of computers in the school labs.			26.88	11.35

The descriptive indices shown in Table 7 suggest that the cooperating teachers' expertise, experience, attitude and number of years they have taught in the classroom are also possible impediments to technology being utilized in the classroom. Further, while analyzing and examining the data to ascertain the impediments that might prevent the use of technology in the classroom, it appeared that there were positive associations between the children's use of technology in the classroom as reported by the cooperating teacher and three of the cooperating teachers' self-reported variables as previously noted.

Table 8

Correlation Between Children's Use Of Basic Technology And Cooperating Teacher Variables.

	1	2	3	4	5	6
1. Children's' use of basic technology in the classroom.	1.0	.81**	.60**	.66**	-.29	.458
2. Cooperating teachers' use of basic technology in the classroom.		1.0	.68**	.78**	.15	.39
3. Cooperating teachers' software expertise			1.0	.65**	-.18	.37
4. Cooperating teachers' hardware expertise				1.0	-.13	.08
5. Cooperating teachers' years taught					1.0	.18
6. Cooperating teachers' attitude about use of technology						1.0

**Correlation is significant at the 0.01 level (2-tailed)

In order for teachers to become comfortable using technology in their classrooms, a certain amount of continuing education appears to be necessary. An overwhelming 92% of the cooperating teachers reported that they believed on-going instructional support for the use of technology was important. Table 9 presents correlations which indicate the types of training the cooperating teachers had participated in during a three year period and the children's use of technology in the classroom. The children's use of basic technology in the classroom was significantly associated with the number of conferences attended by the cooperating teachers (r =.47; p<.01; 22% shared variability).

The number of conferences attended by the cooperating teachers was significantly associated with the number of workshops they attended in the past 3 years

(r = .69; p<. 01: 48% shared variability) and the professional development opportunities provided by their school district (r = .69; p<. 01; 48% shared variability).

Table 9

Correlation Between Children's Use Of Technology And Cooperating Teachers' Professional Development. *N=26*

	1	2	3	4	5	6
1. Children's classroom use of basic technology.	1.0	.22	-.02	.47*	.24	.07
2. Cooperating teachers' utilization of workshops.		1.0	.16	.13	.48*	.24
3. Cooperating teachers' number of college courses.			1.0	-.08	-.09	-.22
4. Cooperating teachers' conferences attended.				1.0	.69**	.69**
5. Cooperating teachers' workshops attended.					1.0	.83*
6. Cooperating teachers' professional development by school district.						1.0

**Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

The researcher examined the data to analyze the items controlled by the school principal or the school district superintendent and student's use of technology in the classroom. The variables used for this analysis are all items that the school would have control over including class size and the number of computers available to the cooperating teacher and the children's use of technology in the classrooms as well as computers available in school lab settings. The children's use of basic technology in the classroom was significantly associated with the number of computers in the classroom

(***r*** = .59; p<. 01; 35% shared variability) and the number of computers in the classroom with Internet access (***r*** = .48; p<. 01; 23% shared variability). There is a significant association between the number of computers in the classroom (***r*** = .59; p<. 01; 35% shared variability) and the number of those computers with Internet access (***r*** = .90; p<. 01; 81% shared variability) (Table 10).

Table 10

Correlation between School Controlled Variables and Children's Use of Technology in the Classroom

	1	2	3	4	5	6	7	8	9
Children's use of basic technology in the classroom.	1.0	-.04	.04	.09	.59**	.48*	.01	.22	-.11
Technology support person in school full time.		1.0	.34	-.13	-.11	-.44	.12	.07	.29
Technology support person provides in-service.			1.0	.23	.11	-.22	.33	.46	.25
Professional development provided by school.				1.0	.22	.20	.21	.13	-.08
Number of computers in the classroom.					1.0	.90**	.13	.21	-.15
Number of computers with Internet access.						1.0	-.03	-.09	-.35
Number of computers in Lab.							1.0	.30	.93
Class size.								1.0	.25
Presence of a teacher aide.									1.0

**Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

In interpreting the less-dominate responses to questions concerning the kind of training the cooperating teachers had received. The researcher discovered that approximately 80% of the cooperating teachers received training on how to operate the

computer. About 60% of the cooperating teachers received training on how to navigate the Windows platform. The analysis also showed that only 53% of the cooperating teachers received any training on how to integrate technology into the curriculum.

CHAPTER 5

DISCUSSION

Over the past decade, school systems have invested millions of dollars in computers and related technologies. These technologies play a vital role in the education of millions of American children, but the truth is that you can place computers in every classroom but you cannot make teachers turn them on and use them for instructional purposes. In order to discuss the results of this study, the researcher has decided to use the following format to examine each of the research questions. The results of each research question will be discussed including expected and unexpected results; discussion of any implications for teaching, research, or service that might come about from the results of the research question; any limitations that might have affected the results; and a description of future research endeavors.

The purpose of this study was to explore the attitudes of pre-service teachers and their cooperating teachers concerning the use of computers and technology in the classroom during the student teaching experience. Another aspect of the study examined the impact the cooperating teachers' attitudes have on the pre-service teachers' attitudes about the use of technology in the classroom and the pre-service teachers belief about how they will use technology in the future. A final section addressed the impediments that prevent the use of technology in these classrooms where pre-service teachers are completing their student teaching experience.

Question 1: *What are the attitudes of the pre-service teachers and cooperating teachers concerning the use of technology in the classroom?*

When examining the attitudes about the use of use of technology in the classroom, the researcher was surprised to discover that the results indicated the pre-service teachers' attitudes about the use of technology in the classroom had not changed during their student teaching experience. When comparing the results of the pre-service teachers' and cooperating teachers' attitudes there were three significant results that were of interest to the researcher. The first was the response to the statement: *If there was a computer in my classroom, it would help me be a better teacher.* The pre-service teachers indicated they believe they would be better teachers if they utilized technology in the classroom. The researcher found this to be a very positive development toward the influx of teachers into the school system who believe that the use of technology in the classroom is an important tool to enhance the education of the children in their classrooms today.

The second point of interest were the responses to the statement: *Computers could enhance remedial instruction.* Both groups responded they either agreed or strongly agreed with this statement. There have been many long discussions concerning the elementary pre-service program and the number of credit hours dedicated to classes that focus on the inclusion of special needs children and on technology training. From the responses given in this study, it seems that the pre-service teachers are at least leaving the under-graduate program with an understanding that technology can enhance learning, an idea reinforced in the required technology course. The students thought that classroom students who need remediation would benefit from an opportunity to utilize the technology to better meet their needs. Responses to follow-up questions with a specific

focus on technology use with special needs students in their future classrooms would also be interesting for the researcher to investigate. Interviews with the pre-service teachers concerning their responses and how they see technology enhancing the education of special need students might provide valuable information in the discussions of where to make changes and place the emphasis for elementary pre-service programs.

The third point of interest in the responses relating to research question 1was the significant difference in the total attitude scores of the pre-service teachers and the cooperating teachers. This result was not unexpected based on the lack of evidence in the research that technology is being used to enhance the education of the children in the classroom. Most teachers want to learn about technology and the use of technology, but do not want to be pressured to use the technology for instruction in the classroom setting (Krochmal, 2003).

A fascinating and unexpected discussion happened when one of the pre-service teachers explained there was not a computer in the entire school where she was student teaching, and her cooperating teacher wanted nothing to do with technology and computers so the cooperating teacher was not going to bother with the survey. The pre-service teacher was exasperated with the cooperating teacher for not caring enough to fill out the survey, but more exasperated by the fact the teacher was not allowing the children in the classroom the opportunity to experience learning with technology. If the cooperating teachers who did not return the survey are the teachers in today's schools who do not use the technology in the classroom and have the poor attitudes about the use of technology in the classroom, then an accurate picture of the use of technology in the classroom has yet to be portrayed.

In 1988 the Office of Technology Assessment reported that the attitudes of the classroom teacher toward technology had a direct influence on the utilization of technology in the classroom. The results of this study continue to support those initial findings. The cooperating teachers' attitudes correlated with the amount of technology used in the classroom by the children. This is the discovery that causes the researcher the most distress. There are many ways technology enhances learning and technology is not being utilized by the teachers or by the children. Perhaps some hands-on workshops, in the teachers' classroom, would help cooperating teachers see what is available and how to utilize the technology to enhance the leaning of their students.

More questions to ascertain attitudes of the cooperating teachers need to be included in the survey. There were too few questions for a pattern of attitudes, either positive or negative, to emerge causing an incomplete and possibly a distorted picture of the attitudes toward the use of technology in the classroom. There are several additional surveys that could be included in a future study. Two possible choices are: The Teacher's Attitudes Towards Computers by Rhonda Christensen (1997) and The Computer Attitude Scale by Loyd & Gressard (1986), being the most popular. In the future, utilizing one of these surveys would most likely give a more complete picture of the attitudes of cooperating teachers about the use of technology in the classroom. These questions from Loyd & Gressard (1986) might enhance the survey: Computers make me feel uneasy and confused, I feel aggressive and hostile towards computers, and I would feel at ease in a computer class.

Much more research needs to be initiated to discover why the cooperating teachers do not use the technology. To get to the answer "why," the researcher might spend time in the classrooms observing and initiating discussions with the cooperating teachers. Only after much observing, watching, and listening could the researcher address these questions. What needs to be researched further are the barriers that keep the cooperating teachers from using technology in the classroom. Meeting with the cooperating teachers on-site and conducting informal interviews trying to ascertain what the cooperating teachers believe are the reasons technology is not being utilized more in the classrooms to enhance student learning would add to the current research. Also beneficial, would be classroom observations to establish times during classroom instruction when technology would have enhanced student learning and, then to identify circumstances which barred the integration of technology.

Question 2: How do the pre-service teachers perceive they will use the technology in the classroom? Although there were non-significant results between the pre-and post-student teaching experiences, the pre-service teachers indicated they had a strong desire to use the technology when they are in their own classrooms. In looking at the pre-service teachers' beliefs concerning their future use of technology in the classroom, there was not a significant change between the pre and post student teaching. In discussing attitudes and beliefs of pre-service teachers, Eagly and Chaiken (1995) indicated once a student has acquired a belief it is often difficult to change that belief and that it will affect the remainder of their teacher education preparation. These same beliefs carry into the decisions that they make during their own teaching experience. The researcher expected the beliefs of the pre-service teacher to have a negative change, thus explaining why we

do not see more technology used in the schools. One goal of the current elementary pre-service program is for students to leave the teacher education program with a positive attitude about the use of technology in the classroom. From the results of this study, it appears the pre-service teachers have the desire to use technology and that is a positive result of the study. During their student teaching experience the pre-service teachers were exposed to a variety of barriers to the use of technology in the classroom. That kind of exposure could impose negative attitudes about using technology in their future classroom but, after their experiences they still believe in the value of technology in the classroom and intend to utilize computers in their future classrooms.

Question 3: *What impact do the attitudes about technology and the use of technology by the cooperating teachers have on the attitudes of the pre-service teachers concerning their future use of technology?* When examining the results of this question there were no correlations that indicated that the attitudes of the cooperating teacher had any real affect on the pre-service teacher. The most interesting aspect of this question came when perusing the open-ended responses that made up the less dominate component of the study. The researcher found it surprising that the pre-service teachers believed that their attitudes did not change or when they did, the pre-service teachers realized even more the importance of technology in the classroom. These comments, once again, give hope that things can change in the classrooms. One comment that was repeated several times indicated the pre-service teachers were aware of when the use of technology would have made a lesson better or when using a computer would have added a positive dimension to the classroom learning situation. When the researcher met with the pre-service teachers to distribute the *Pre-Service Teachers-Post-Student Teaching*

Survey, the researcher was met with many comments by the pre-service teachers about incidents in their classrooms that they felt the researcher would be interested in knowing. The comments that reinforced the lack of technology use were the ones that indicated such situations as computers in the classrooms were under blankets in the back of the room, or in boxes behind the teacher's desk, or on the teacher's desk where it was unavailable to students. One pre-service teacher reported that her cooperating teacher had put a sheet over the computer which was still in the box, it was located in the corner, and used it as a table for a lamp and plant. In another classroom, three computers were set up in the back of the room. Although computer user signs were around the area, the computers were never used by the children the entire time the pre-service teacher was in the classroom. When the pre-service teacher asked the cooperating teacher why the computers were not utilized, the cooperating teacher replied they were broken. Upon further investigation, the pre-service teacher discovered that the computers were unplugged and, once reconnected to electricity, they worked just fine. This caused the researcher to question the validity of the statistics released by the National Center for Educational Statistics reporting the total number of computers in schools reached over 8 million in 1995, one for every nine students (NCES). Perhaps the statistic is correct, there are computers in the classrooms; however, how the computers are being used is another question that needs much more research. To delve into this question, more than a survey will be needed. Researchers will need to go into the classrooms, observe the students and teachers, collect evidence of student learning, make recommendations for training in that classroom, and then go back and conduct follow-up data collection.

Question 4: *What are the impediments that prevent the use of technology in these classrooms where pre-service teachers are placed for the student teaching experience?* The development of three sections to look at this data was extremely helpful to the researcher. The *Professional Development* section was made up of variables looking at the cooperating teachers' college courses on technology, attendance at conferences, attendance at workshops, and attendance at professional development opportunities provided by the school districts.

When asked how many college courses the cooperating teachers had on the use of computers the mean score for the group was 0.73, which indicated the group average was less than one college course. About 50% of the cooperating teachers had not taken a single college course in computers, 35% had taken one course, and 8% had taken two or three college classes. This supports the Milken study that indicates the teachers are not using the technology to enhance the education of children because they don't have the appropriate training to make this a reality (The Milken Foundation, 2001b). When asked about the professional development opportunities concerning the use of technology the cooperating teachers have attended in the past three years, it was surprising that 16% indicated they had attended none of the technology training opportunities provided by their school districts, 4 % had not attended any workshops, and 53% had not attended a conference. This seemed to contradict the fact that 92% of the cooperating teachers believed on-going professional development concerning the use of technology was important. This relates back to Byrum's and Cashman's (1993) findings indicating although many pre-service teachers have been trained to evaluate software and hardware, only about 10 to 20 hours have been devoted to actual hands-on computer training.

When looking at the category of *Cooperating Teacher Information* the results were expected by the researcher. The cooperating teachers' self-reported expertise scores were in the moderate range. There was no difference in the expertise score between the use of hardware and software. When teachers feel that they are not able to utilize the technology well, they have less confidence in attempting to try to integrate technology into the curriculum. This is an impediment toward the utilization of technology because in order to accomplish integration of technology into the curriculum, the cooperating teachers need to have positive computer attitudes and feel self-confident in using them (Kinzie, 2000). This area needs more research due to the contradictions by the cooperating teachers that appear among the value that is placed on professional development, the lack of attendance at professional development opportunities, and the self-reported low to moderate expertise in using the components of technology.

Several responses to statements categorized in the *School Related Items* were surprising to the researcher. The first being the fact that 100% of the cooperating teachers indicated there was a technology support person in their school and about 47% of the technology support people are in the school full-time. The researcher would have expected the number of technology support persons to be much lower based on her own experience with technology and with the experience of listening to teachers voice their displeasure concerning the computers not working or the frequency the network is not accessible. The researcher was puzzled by the fact that cooperating teachers are not utilizing the computers and yet, there are full-time technology support people in the schools to help them with problems. Perhaps the cooperating teachers that responded to the surveys are in the minority as far as technology use in the classroom. Not surprising

to the researcher was the fact that the expertise at using software and hardware by the cooperating teacher does affect the amount the technology used by the children in the classrooms. If the teachers are not comfortable using the technology on a personal level they will be reluctant to utilize technology in the classroom.

In examining the questions and analysis of this study, the researcher believes that there could have been more statistically significant results if the sample size, most notably for the cooperating teachers, had been larger and consistent. Although the return rate for the pre-service teacher surveys were high, the return rate for the cooperating teachers was 50% for the pre-student teaching survey and only 25% for the post-student teaching survey. In the future, it would be more beneficial to follow the six- week process to increase the return rate of surveys mailed recommended by Creswell (1994). In the future, the letter of explanation, the informed consent form, and the initial survey to the cooperating teachers would be mailed rather than using the pre-service teachers to be couriers. Personal contact from the researcher might have had a positive impact on the return rate of the survey. The researcher could have followed-up the initial return of surveys with an e-mail or phone call to remind the cooperating teachers to return the survey. This would have been beneficial when collecting the post-student teaching data. In about two weeks from the time the initial survey was mailed, the same materials would be sent to any cooperating teacher that had yet to respond to the initial mailing. In another week a post-card would be sent reminding those who had yet to respond that the deadline was approaching and encourage their participation even if they do not like computers or have access to computers in their schools. Although the student teachers were reminded to encourage the supervising teachers when they were on campus and

e-mailed during the last week of their student teaching experience, it was not their responsibility to guarantee success of the study.

RECOMMENDATIONS FOR FUTURE RESEARCH

As stated in the discussion, many factors contributed to the non-significant difference in the attitudes of the pre-service teachers during the student teaching experience. The most important factor may be the limited amount of time they were in the classroom. For future research, a longitudinal study should be designed to follow these same pre-service teachers into their first year of teaching. This study might help establish patterns of use of the technology in the classroom as well as the attitudes of the teachers about the use of technology and value of technology once they have their own classrooms. Another component of the study would be to establish ways in which the university could collaborate with these teachers and continue to assist the education community in incorporating technology into classroom instruction.

Another interesting research study would be to begin a longitudinal study when the pre-service teachers were admitted into the professional education unit at the university. At the time of admission, a survey could be completed and an interview could be conducted to obtain baseline information. At the time of admission into the professional education unit, the pre-service teachers will be beginning the required methods of teaching courses and the researcher would be able to ascertain the influence higher education faculty might have in the formation of attitudes about the use of technology in the classroom. By following these pre-service teachers into their student teaching and on into the first two years of teaching, the researcher could have a very detailed and complete picture of their attitudes about and their use of technology. Within

this data there would be patterns of success in using technology by the pre-service teachers and patterns that would indicate the roadblocks they encounter toward the use of technology. The data would hold information that would help decipher what variables affected the formation of the teacher's attitudes and beliefs about the use of technology as well as ways they implement the technology into the classroom.

This study indicated that 31% of the cooperating teachers reported they are not comfortable with the use of the computer, 69% of the teachers indicated they were somewhat comfortable with the use of technology, and none of the cooperating teachers indicated they were comfortable with the use of technology in the classroom. More research needs to undertaken to establish why this situation is present and what can be done to help classroom teachers become more comfortable with the technology in the classroom. From personal experience, the researcher is aware that many educators would appreciate having a person with them in the room with them when the technology is first introduced to students to assist and increase the success of the venture.

In looking at the use of technology in the classroom, the cooperating teachers and the pre-service teachers self-reported their use of technology on several hardware and software objects that are available for use in the classroom. The pre-service teachers reported the use of technology in the classroom by the cooperating teacher and the cooperating teacher reported the use of technology in the classroom by the pre-service teacher. An interesting addition to the study would have been to have the children in the classroom also report on their perception of the use of technology in their classroom. The children would have the opportunity to report their use of technology in the classroom, use of technology by the pre-service teachers, and the use of technology by the

cooperating teachers. Children can impart the same information but use surveys designed with appropriate vocabulary and a rating scale that includes pictures, smiles, and simple Likert-type scales. The researcher would be interested in discovering how the children in the classroom self-rate their expertise at using technology. This could provide the revelation that reluctant cooperating teachers might need to start them on the road of change toward facilitating children's learning in a new and meaningful way. Interviewing the children in the classroom and obtaining some samples of their work before and after the teachers implement the technology in the classroom would also be informative.

An additional limitation of the study comes in looking at the items in which the cooperating teachers self-reported their expertise. On this list were items that the researcher knew could be available for use in the classroom by the teachers and by the children. Nowhere did the researcher inquire which of these items were actually available in the classrooms where the pre-service teachers are placed for their student teaching. By having a more accurate list of available technology items there might have been different results in the expertise and use scores of the cooperating teachers.

SUMMARY

In 1999, Rotunda indicated a number of factors influenced computer use in the classrooms including the attitudes, beliefs, and perceptions of the role of technology confidence by the classroom teacher and the amount of technological support available to the classroom teachers. These same areas have been addressed in this study and the outcomes indicated many similarities between the two studies. The all important factor that still needs to be considered and researched is the fact that the children in the

classroom are not given the opportunity to utilize the available tools to enhance their learning.

Classroom teachers, in order to meet the needs of their students, need to be prepared to provide opportunities for their students to use technology and to support their learning with technology (ISTE, 2002). With the increase in technology available in society and in our schools today, it is important that pre-service teachers leave the university setting with positive feelings about technology. This positive attitude and feelings of expertise could translate into these teachers facilitating the use of technology in their own classrooms. Despite this growth, a number of investigations into computer use in K-12 classrooms have concluded that computer-based technologies are not fully exploited by the majority of teachers.

Research shows that technology is widely available in today's public schools. Even though the technology is available, cooperating teachers, who have a high degree of influence on the practice of pre-service teachers, are not utilizing these tools to increase student learning. The attitudes, beliefs, and actual use of technology by cooperating teachers may greatly influence the pre-service teachers' attitudes, beliefs, and actual use of technology in the classroom. The purpose of this study was to explore the attitudes of pre-service teachers and their cooperating teachers concerning the use of computers and technology in the classroom during the student teaching experience

The design of the study was what Creswell (1994) referred to as the "dominate-less dominate design (p.177). The "dominate" design of this study encompassed quantitative measures consisting of surveys completed by the pre-service teachers and the cooperating teachers before and after the student teaching experience. The "less dominate"

component included open-ended questions as well as unsolicited comments from the pre-service teachers. Four instruments were designed by the researcher to be used in data collection. These instruments were: *Pre-Service Teachers' Pre- And Post-Student Teaching Survey* and *Cooperating Teachers' Pre- And Post-Student Teaching Survey*. Analysis of the data was generated by descriptive statistics, frequencies, paired t-tests, t-tests and evaluating the open-ended questions. When comparing the means of the pre-service teachers and the cooperating teachers' attitudes about the use of technology in the classroom there were statistically significant results. Many analyses were non-significant believed to be caused by small sample size, which prevents the study from being generalizable. More study needs to be performed with a larger sample before viable conclusions can be drawn about the impact of cooperating teacher

A few statistically significant results were obtained but the valuable results came in evidence that the pre-service teachers were showing a positive trend toward using the technology in their future classrooms. This brings hope that with these pre-service teachers entering the teaching field children in the classroom will begin to have access to technology that will enhance their education.

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APPENDIX

APPENDIX A

Linda R. Sheeran
225 Willard Hall
Oklahoma State University
Stillwater, Oklahoma

Dear Cooperating Teachers,

Thank you so much for participating in the project to fulfill my dissertation requirements during this fall semester. I have received your pre-student teaching survey and I am enclosing the survey for you to complete at the end of the student teaching experience.

The survey will take about 30 minutes of your time to complete at the conclusion of the student teaching experience. All information gleaned from the surveys will remain confidential and the results reported in a general manner.

I am asking you to complete the survey as soon as possible and return in to me in the self-addressed, stamped envelope enclosed with this packet. I would like to have the returned surveys before the semester break, December 13, 2002 as the University will remain closed until well into January.

I am very grateful for your assistance with this project. Please feel free to contact me with any questions you may have. I can be reached at 405-744-7963 (office) or 405-377-5418 (home).

Thank you,

Linda Sheeran

APPENDIX B

INFORMED CONSENT

GENERAL INFORMATION

This project is to fulfill the dissertation requirements for the Ed.D in Curriculum and Instruction at Oklahoma State University being completed by Linda R. Sheeran during the Fall semester 2002. This project is under the direction of Dr. Patricia Lamphere-Jordan from the School of Curriculum and Educational Leadership. The project is entitled Technology Integration: Attitudes concerning the use of technology in the classroom pre and post student teaching.

DESCRIPTION OF RESEARCH

The purpose of this study is to explore the attitudes of student teachers and their cooperating teachers concerning the use of computers and technology in the classroom during the student teaching experience. Another aspect of the study will look at what impact the cooperating teacher's attitudes have on the student teacher's attitudes about the use of technology in the classroom and the student teacher's belief about how they will use technology in the future.

STATEMENT OF CONFIDENTIALITY

Every effort will be made to insure the confidentiality of the student teachers and cooperating teachers that agree to participate in the study. A master list of student teachers and their cooperating teachers will be developed for the purpose of assigning subject numbers. Each student teacher will be assigned a subject number and his/her cooperating teacher will be assigned a corresponding number with a "C" beside the number. (Student teacher ID # 1 and Cooperating teacher ID # 1C) This is to match the teachers and also be able to evaluate pre and post survey results. The master list of names will not be attached to the data once the initial subject numbers are made. The list will be kept in a locked file drawer in 225 Willard Hall. There will be no mention of names nor schools in any reporting of the data and neither the student teachers nor the cooperating teachers will be given access to the surveys that are completed.

PROCEDURE

Both the student teacher and the cooperating teacher will complete a survey at the beginning of the student teaching experience and again at the end of the student teaching experience. The survey will take about 20 minutes to complete. This project will last only one semester.

CONTACT INFORMATION

If you have further questions or need more information you can contact Linda R. Sheeran, 405-744-7964, sheeran@okstate.edu. Dr. Patricia Lamphere-Jordan, 405-744-8142, lampher@okstate.edu, or Carol Olson, Director University Research Compliance,

405.744.6501.colson@okstate.edu.

VOLUNTARY PARTICIPATION

Participation is voluntary and there will be no penalty if I choose not to participate. The participant is free to withdraw their consent and end their participation in this project at any time without penalty after notification is given to Linda R. Sheeran.

CONSENT DOCUMENTATION FOR WRITTEN INFORMED CONSENT

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: _____ Time: (a.m./p.m.)

_____

Name (typed) Signature

I certify that I have explained all elements of this form to the subject or his/her representative before requesting the subject or his/her representative to sign it.

Signed: _____

Project director or authorized representative

APPENDIX C

STUDENT TEACHER SURVEY (PRE STUDENT TEACHING)

Please circle the best response to the following items

College: Education Human & Environmental Sciences Other

Gender: Male Female

Ethnicity: Caucasian Latino Native American Asian Other

Please fill in the blanks below

Age:_____

Program: **Major:**_____ **Minor:**_____

In the box below, please define what technology means to you. When you hear the word technology what does that mean to you?

(*Technology background)
Please circle the best response.

1.	Do you have at least one computer at home?	Yes	No	
	If yes, indicate how many of each kind in the box provided.	Apple/Mac ☐	PC ☐	Not sure ☐
2.	I would like to improve my computer skills.	No	Somewhat	A Lot
3	I am comfortable using technology.	Not comfortable	Somewhat	Very Comfortable
4.	Have you utilized the following resources in the past year to learn more about technology? **(Mark all that apply.)**			
	Workshops	Yes	No	
	Courses	Yes	No	
	Other students	Yes	No	
	Magazines	Yes	No	
	Books	Yes	No	
	Internet	Yes	No	

*(*Expertise Items)*

Please rate your expertise in the following areas by marking the appropriate response below. Use 0 (Haven't used) for those topics that do not apply to you.

0=Haven't used 1=Low expertise 3=Moderate Expertise 5=High Expertise

	Using an Apple computer (IIc, IIe, IIgs)	0	1	2	3	4	5
	Using a Macintosh computer	0	1	2	3	4	5
	Using a DOS based computer	0	1	2	3	4	5
	Using a Windows based computer	0	1	2	3	4	5
	Word Processing	0	1	2	3	4	5
	Spreadsheet	0	1	2	3	4	5
	Database	0	1	2	3	4	5
	Presentation Software (PowerPoint, HyperStudio etc.)	0	1	2	3	4	5
	Subject Area Instructional Software	0	1	2	3	4	5
	Internet	0	1	2	3	4	5
	CD-ROM	0	1	2	3	4	5
	Laser disc	0	1	2	3	4	5
	Scanner	0	1	2	3	4	5
	Digital camera	0	1	2	3	4	5
	Printer	0	1	2	3	4	5
	FAX	0	1	2	3	4	5
	VCR	0	1	2	3	4	5
	DVD Player	0	1	2	3	4	5
	Cam-corder	0	1	2	3	4	5
	Quick Cams	0	1	2	3	4	5

*(*Attitude Statements)*

Instructions: Circle one level of agreement for each statement to indicate how you feel.
SD=Strongly Disagree, D= Disagree, U= Undecided, A= Agree, SA= Strongly Agree

1.	It is important for students to learn about computers in order to be informed citizens.	**SD**	**D**	**U**	**A**	**SA**
2.	All students should have an opportunity to learn about computers at school.	**SD**	**D**	**U**	**A**	**SA**
3.	Computers are necessary tools in both educational and work settings.	**SD**	**D**	**U**	**A**	**SA**
4.	Computers can be useful instructional aids in almost all subject areas.	**SD**	**D**	**U**	**A**	**SA**

5.	If there were a computer in my classroom, it would help me be a better teacher.	**SD**	**D**	**U**	**A**	**SA**
6.	Computers could enhance remedial instruction.	**SD**	**D**	**U**	**A**	**SA**
7.	Computers will improve education.	**SD**	**D**	**U**	**A**	**SA**
	*(*Belief Statements)* **When I am a classroom teacher, I believe that:**					
1.	I would like to have a computer in my classroom for class preparation	**SD**	**D**	**U**	**A**	**SA**
2.	It will be important to integrate instruction with technology.	**SD**	**D**	**U**	**A**	**SA**
3.	Students will be able to use technology for learning.	**SD**	**D**	**U**	**A**	**SA**
4.	I want to have access to technology for classroom presentations.	**SD**	**D**	**U**	**A**	**SA**
5.	It is important for me to receive on-going instructional support for the use of technology.	**SD**	**D**	**U**	**A**	**SA**

*(*Use of technology statements)*
Please mark in the column to the left of the statement ONLY ONE statement that best indicates your overall level of use of technology in the classroom.

	I have little or no knowledge of technology in education, no involvement with technology, and I am doing nothing toward becoming involved.
	I am seeking or acquiring information about the use of technology in education.
	I am preparing for the first use of technology in my classroom.
	I focus most effort on the short-term, day-to-day use of technology with little time for reflection. My effort is primarily directed toward mastering tasks required to use the technology.
	I feel comfortable using technology in education. However, I am putting forth little effort and thought to improve technology in education or its consequences.
	I vary the use of technology in education to increase the expected benefits within the classroom. I am working on using technology to maximize the effect with my students.
	I am combining my own effort with related activities of other teachers and colleagues to achieve impact in the classroom.

*(*Perceptions of Impediments to use of technology)*

Instructions: Select one level of agreement for each statement to indicate how you feel.
SD=Strongly Disagree, D= Disagree, U= Undecided, A= Agree, SA= Strongly Agree

1.	Teachers need more training with curriculum to better incorporate the technology.	**SD**	**D**	**U**	**A**	**SA**
2.	Teachers need access to more computers in the classroom for the students.					
3.	Teachers need access to the Internet.					
4.	Teachers need more technical support to keep the computers working.					
5.	Teachers receive enough opportunities for professional development in technology.					
6.	Teachers need to attend technology conferences to see what other schools are doing to implement technology into the curriculum.					
7.	Computers are valuable tools that can be used to improve the quality of education.					
8.	Teachers see technology modeled by the school administration.					

Have you used technology with students in a classroom setting? If so, how?

*** These identifying heading did not appear on the survey sent to the subjects but they are provided for the information of the dissertation readers.**

APPENDIX D

COOPERATING TEACHER SURVEY (PRE STUDENT TEACHER)

Please circle the best response to the following items

Highest degree earned Bachelors Masters Doctorate

Gender: Male Female

Ethnicity: Caucasian Latino Native American Asian Other

Please read and answer the following questions.

1. **How many years you have been teaching?** _____

2. **What is the size of the community in which you teach?** Rural Urban Suburban Other

3. **What grade are you teaching this year?**

	Pre-Kindergarten
	Kindergarten
	1st grade
	2nd grade
	3rd grade
	4th grade
	5th grade
	6th grade
	7th grade
	8th grade

4. **How many college classes have you had on the use of computers?** _____

5. **How many conferences have you attended in the last three years that dealt with computers and/or the use of computers in the classroom?** _____

6. **How many workshops (short experiences) have you attended in the last three years that dealt with computers and/or the use of computers in the classroom?** _____

7. **How many professional development opportunities provided by the school district have you attended in the last three years that dealt with computers and/or the use of computers in the classroom?** _____

8. **How many computers are available for student use in your classroom not in school lab?** _____

9. How many of these computers are able to access the Internet? _____

10. How many computers are available in the computer lab in the school? _____

In the box below please define what technology means to you. When you hear the word technology what does that mean to you?

*(*Technology background)*
Please answer the following questions by circling the best response.

1.	Do you have at least one computer at home?	Yes	No
	If yes, Indicate how many of each type	Apple/Mac ☐	PC/IBM ☐
2.	I would like to improve my computer skills.	Yes	No
3	I am comfortable using technology.	Yes	No
4	Have you utilized the following resources in the past year to learn more about technology? **(Mark all that apply.)**		
	Workshops/Professional Development	Yes	No
	Courses	Yes	No
	Students/Peers	Yes	No
	Magazines	Yes	No
	Books	Yes	No
	Other	Yes	No

*(*Expertise Items)*

Please rate your expertise in the following areas by marking the appropriate response below. Use 0 (Haven't used) for those topics that do not apply to you.

0=Haven't used 1=Low expertise 3=Moderate Expertise 5=High Expertise

	Using an Apple computer (IIc, IIe, IIgs)	0	1	2	3	4	5
	Using a Macintosh computer	0	1	2	3	4	5
	Using a DOS based computer	0	1	2	3	4	5
	Using a Windows based computer	0	1	2	3	4	5
	Word Processing	0	1	2	3	4	5
	E-mail	0	1	2	3	4	5
	Spreadsheet	0	1	2	3	4	5
	Database	0	1	2	3	4	5
	Presentation Software (PowerPoint, HyperStudio etc.)	0	1	2	3	4	5
	Subject Area Instructional Software	0	1	2	3	4	5
	Internet	0	1	2	3	4	5
	CD-ROM	0	1	2	3	4	5
	Laser disc	0	1	2	3	4	5
	Scanner	0	1	2	3	4	5
	Digital camera	0	1	2	3	4	5
	Printer	0	1	2	3	4	5
	FAX	0	1	2	3	4	5
	VCR	0	1	2	3	4	5
	DVD Player	0	1	2	3	4	5
	Cam-corder	0	1	2	3	4	5
	Quick Cams	0	1	2	3	4	5

*(*Self-reporting technology use items)*

Please indicate the amount the following technologies are used by you and your students in your classroom.

N=Never used VL=Very little use S=Some use GD=Great deal of use

Your use in the classroom					Student use in your classroom			
N	VL	S	GD	Using an Apple computer (IIc, IIe, IIgs)	N	VL	S	GD
N	VL	S	GD	Using a Macintosh computer	N	VL	S	GD
N	VL	S	GD	Using a DOS based computer	N	VL	S	GD
N	VL	S	GD	Using a Windows based computer	N	VL	S	GD
N	VL	S	GD	Word Processing	N	VL	S	GD
N	VL	S	GD	E-mail	N	VL	S	GD
N	VL	S	GD	Spreadsheet	N	VL	S	GD
N	VL	S	GD	Database	N	VL	S	GD
N	VL	S	GD	Presentation Software (PowerPoint, HyperStudio etc.)	N	VL	S	GD
N	VL	S	GD	Subject Area Instructional Software	N	VL	S	GD
N	VL	S	GD	Internet	N	VL	S	GD
N	VL	S	GD	CD-ROM	N	VL	S	GD
N	VL	S	GD	Laser disc	N	VL	S	GD
N	VL	S	GD	Scanner	N	VL	S	GD
N	VL	S	GD	Digital camera	N	VL	S	GD
N	VL	S	GD	Printer	N	VL	S	GD
N	VL	S	GD	FAX	N	VL	S	GD
N	VL	S	GD	VCR	N	VL	S	GD
N	VL	S	GD	DVD Player	N	VL	S	GD
N	VL	S	GD	Cam-corder	N	VL	S	GD
N	VL	S	GD	Quick Cams	N	VL	S	GD

*(*Use of technology statements)*

Please mark only one statement below that best indicates your overall level of use of technology in the classroom.

	I have little or no knowledge of technology in education, no involvement with, and I am doing nothing toward becoming involved.
	I am seeking or acquiring information about technology in education.
	I am preparing for the first use of technology in education.
	I focus most effort on the short-term, day-to-day use of technology with little time for reflection. My effort is primarily directed toward mastering tasks required to use the technology.
	I feel comfortable using technology in education. However, I am putting forth little effort and thought to improve technology in education or its consequences.
	I vary the use of technology in education to increase the expected benefits within the classroom. I am working on using technology to maximize the effect with my students.
	I am combining my own effort with related activities of other teachers and colleagues to achieve impact in the classroom.

*(*Attitude Statements)*

Instructions: Select one level of agreement for each statement to indicate how you feel.
SD=Strongly Disagree, D= Disagree, U= Undecided, A= Agree, SA= Strongly Agree

1.	It is important for students to learn about computers in order to be informed citizens.	**SD**	**D**	**U**	**A**	**SA**
2.	All students should have an opportunity to learn about computers at school.	**SD**	**D**	**U**	**A**	**SA**
3.	Computers are necessary tools in both educational and work settings.	**SD**	**D**	**U**	**A**	**SA**
4.	Computers can be useful instructional aids in almost all subject areas.	**SD**	**D**	**U**	**A**	**SA**
5.	If there were a computer in my classroom, it would help me be a better teacher.	**SD**	**D**	**U**	**A**	**SA**
6.	Computers could enhance remedial instruction.	**SD**	**D**	**U**	**A**	**SA**
7.	Computers will improve education.	**SD**	**D**	**U**	**A**	**SA**

	*(*Belief Statements)* **In the classroom, I believe that:**					
1.	I would like to have a computer in my classroom for class preparation	**SD**	**D**	**U**	**A**	**SA**
2	Technology will change my role as a teacher.	**SD**	**D**	**U**	**A**	**SA**
3.	Even with technology in the classroom the teacher should maintain the primary role.	**SD**	**D**	**U**	**A**	**SA**
4.	It will be important to integrate instruction with technology.	**SD**	**D**	**U**	**A**	**SA**
5.	Students will be able to use technology for learning.	**SD**	**D**	**U**	**A**	**SA**
6.	I want to have access to technology for classroom presentations.	**SD**	**D**	**U**	**A**	**SA**
7.	It is important for me to receive on-going instructional support for the use of technology.	**SD**	**D**	**U**	**A**	**SA**

*** These identifying heading did not appear on the survey sent to the subjects but they are provided for the information of the dissertation readers.**

APPENDIX E

POST-STUDENT TEACHING SURVEY FOR PRE-SERVICE TEACHERS

*(*Self-reporting technology use items)*
Please indicate the amount the following technologies are used by you, your cooperating teacher and your students in your classroom during the student teaching experience.

N=Never used VL=Very little use S=Some use GD=Great deal of use

Your cooperating teachers use in your classroom					Student use in your classroom					Your use in classroom			
N	VL	S	GD	Using an Apple computer (IIe, IIgs)	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Using a Macintosh computer	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Using a DOS based computer	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Using a Windows based computer	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Word Processing	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	E-mail	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Spreadsheet	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Database	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Presentation Software (PowerPoint, HyperStudio etc.)	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Subject Area Instructional Software	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Internet	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	CD-ROM	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Laser disc	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Scanner	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Digital camera	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Printer	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	FAX	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	VCR	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	DVD Player	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Cam-corder	N	VL	S	GD		N	VL	S	G
N	VL	S	GD	Quick Cams	N	VL	S	GD		N	VL	S	G

Do you believe your attitude about the use of technology in the curriculum has changed during your student teaching experience? Please briefly explain your answer.

*(*Attitude Statements)*

Instructions: Select one level of agreement for each statement to indicate how you feel.
SD=Strongly Disagree, D= Disagree, U= Undecided, A= Agree, SA= Strongly Agree

1.	It is important for students to learn about computers in order to be informed citizens.	**SD**	**D**	**U**	**A**	**SA**
2.	All students should have an opportunity to learn about computers at school.	**SD**	D	U	A	SA
3.	Computers are necessary tools in both educational and work settings.	**SD**	D	U	A	SA
4.	Computers can be useful instructional aids in almost all subject areas.	**SD**	D	U	A	SA
5.	If there were a computer in my classroom, it would help me be a better teacher.	**SD**	D	U	A	SA
6.	Computers could enhance remedial instruction.	**SD**	D	U	A	SA
7.	Computers can improve education.	**SD**	D	U	A	SA
	*(*Belief Statements)* **I believe that:**					
1.	I would like to have a computer in my classroom for class preparation	**SD**	D	U	A	SA
2	Technology will change my role as a teacher.	**SD**	D	U	A	SA
3.	Even with technology in the classroom the teacher should maintain the primary responsibility of instruction.	**SD**	D	U	A	SA
4.	Integrating instruction with technology is important.	**SD**	D	U	A	SA
5.	Students will be able to use technology for learning.	**SD**	D	U	A	SA
6.	I want to have access to technology for classroom presentations.	**SD**	D	U	A	SA

*(*Technology in-service information)*

Please circle the answer that best matches your experience

Did your course work training/ opportunities in technology include:		
Instructions on how to use the computer?	**Yes**	**No**
Instructions on how to navigate the format (Windows)?	**Yes**	**No**
Instructions on how to integrate the technology into instruction?	**Yes**	**No**
Instruction on how to manage the computer in your classroom?	**Yes**	**No**

*(*Use of technology statements)*

Please mark one category that best indicate your overall level of use of technology in the classroom.

	I have little or no knowledge of technology in education, no involvement with technology in education, and I am doing nothing toward becoming involved.
	I am seeking or acquiring information about technology in education.
	I am preparing for my first use of technology in education.
	I focus most effort on the short-term, day-to-day use of technology with little time for reflection. My effort is primarily directed toward mastering tasks required to use the technology efficiently.
	I feel comfortable using technology in education. However, I am putting forth little effort and thought to improve technology in education or its consequences.
	I vary the use of technology in education to increase the expected benefits within the classroom. I am working on using technology to maximize learning with my students.
	I am combining my own effort with related activities of other teachers and colleagues to achieve a measurable impact in the classroom.

*** These identifying heading did not appear on the survey sent to the subjects but they are provided for the information of the dissertation readers.**

APPENDIX F

POST-STUDENT TEACHING SURVEY FOR COOPERATING TEACHERS

Please circle the option that best fits your situation

Classroom Information:

Self-Contained	**Team Teaching**	**Departmental Elementary K-5**	**Departmental Middle School**	**Departmental Junior High**
Class size	**10-15**	**16-21**	**22-28**	**Other**
Do you have a teacher aide?	**No**	**Yes, full time**	**Yes, Part time**	

*(*Attitude Statements)*

Instructions: Select one level of agreement for each statement to indicate how you feel.

SD=Strongly Disagree, D= Disagree, U= Undecided, A= Agree, SA= Strongly Agree

1.	It is important for students to learn about computers in order to be informed citizens.	**SD**	**D**	**U**	**A**	**SA**
2.	All students should have an opportunity to learn about computers at school.	**SD**	**D**	**U**	**A**	**SA**
3.	Computers are necessary tools in both educational and work settings.	**SD**	**D**	**U**	**A**	**SA**
4.	Computers can be useful instructional aids in almost all subject areas.	**SD**	**D**	**U**	**A**	**SA**
5.	If there were a computer in my classroom, it would help me be a better teacher.	**SD**	**D**	**U**	**A**	**SA**
6.	Computers could enhance remedial instruction.	**SD**	**D**	**U**	**A**	**SA**
7.	Computers can improve education.	**SD**	**D**	**U**	**A**	**SA**
	*(*Belief Statements)* **I believe that:**					
1.	I would like to have a computer in my classroom for class preparation	**SD**	**D**	**U**	**A**	**SA**
2	Technology will change my role as a teacher.	**SD**	**D**	**U**	**A**	**SA**
3.	Even with technology in the classroom the teacher should maintain the primary responsibility of instruction.	**SD**	**D**	**U**	**A**	**SA**
4.	Integrating instruction with technology is important.	**SD**	**D**	**U**	**A**	**SA**
5.	Students will be able to use technology for learning.	**SD**	**D**	**U**	**A**	**SA**
6.	I want to have access to technology for classroom presentations.	**SD**	**D**	**U**	**A**	**SA**

*(*Use of technology statements)*

Please mark one category that best indicate your overall level of use of technology in the classroom.

	I have little or no knowledge of technology in education, no involvement with technology in education, and I am doing nothing toward becoming involved.
	I am seeking or acquiring information about technology in education.
	I am preparing for my first use of technology in education.
	I focus most effort on the short-term, day-to-day use of technology with little time for reflection. My effort is primarily directed toward mastering tasks required to use the technology efficiently.
	I feel comfortable using technology in education. However, I am putting forth little effort and thought to improve technology in education or its consequences.
	I vary the use of technology in education to increase the expected benefits within the classroom. I am working on using technology to maximize learning with my students.
	I am combining my own effort with related activities of other teachers and colleagues to achieve a measurable impact in the classroom.

Please circle the answer that best matches your experience

Did your in-service training/professional development opportunities in technology include:		
Instructions on how to use the computer?	**Yes**	**No**
Instructions on how to navigate the format (Windows)?	**Yes**	**No**
Instructions on how to integrate the technology into instruction?	**Yes**	**No**
Instruction on how to manage the computer in your classroom?	**Yes**	**No**
Do you have a technology support person available to your school?	**Yes**	**No**
Is the technology support person full time in your school?	**Yes**	**No**
Does the technology support person provide in-service for your school?	**Yes**	**No**

Please indicate the amount the following technologies are used by you, your student teacher and your students in your classroom during the student teaching experience.
(*Self-reporting technology use items)

N=Never used VL=Very little use S=Some use GD=Great deal of use

Your use in your classroom					Student use in your classroom				Student teacher use in your classroom			
N	VL	S	GD	Using an Apple computer (IIe, IIgs)	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Using a Macintosh computer	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Using a DOS based computer	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Using a Windows based computer	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Word Processing	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	E-mail	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Spreadsheet	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Database	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Presentation Software (PowerPoint, HyperStudio etc.)	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Subject Area Instructional Software	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Internet	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	CD-ROM	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Laser disc	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Scanner	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Digital camera	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Printer	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	FAX	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	VCR	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	DVD Player	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Cam-corder	N	VL	S	GD	N	VL	S	G
N	VL	S	GD	Quick Cams	N	VL	S	GD	N	VL	S	G

*** These identifying heading did not appear on the survey sent to the subjects but they are provided for the information of the dissertation readers.**

APPENDIX G

Oklahoma State University
Institutional Review Board

Protocol Expires: 5/30/03

Date Friday, May 31, 2002 IRB Application No ED02122

Proposal Title TECHNOLOGY INTEGRATION: ATTITUDES CONCERNING TECHNOLOGY IN THE CLASSROOM PRE AND POST STUDENT TEACHING

Principal Investigator(s):

Linda Sheeran
249 Willard
Stillwater, OK 74078

Dr. Patricia Lamphere-Jordan
247 Willard
Stillwater, OK 74078

Reviewed and Processed as Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI:

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson

Carol Olson, Chair
Institutional Review Board

VITA

Linda Rae Sheeran

Candidate for the Degree of

Doctor of Education

Thesis: A STUDY OF PRE-SERVICE TEACHERS ATTITUDES CONCERNING THE USE OF TECHNOLOGY IN THE CLASSROOM

Major Field: Curriculum and Instruction

Biographical:

Personal Data: Born in Denver, Colorado, on August 23, 1949, the daughter of Raymond and Virginia Sheeran

Education: Graduated from North High School, Denver, Colorado in June 1967; received Bachelor of Arts degree in Elementary Education from Western State College, Gunnison, Colorado in June 1971. Received Master of Science degree in Education Administration: Fort Hays State University, Hays, Kansas in May 1986. Completed the requirements for the Doctor of Education degree with a major in Curriculum and Instruction: Elementary Education at Oklahoma State University in May, 2003.

Experience: Employed as a Elementary Education teacher at Holy Trinity Catholic School, Westminster, Colorado, September, 1971 to May, 1974; Elementary Education teacher St. Dominic Grade School, Garden City, Kansas, September, 1975 to May, 1982. Employed as an Elementary Principal at St. Dominic Grade School, Grade School, Garden City, Kansas, September, 1982 to May, 1985. Employed as Elementary Education teacher at St. John's Elementary School in Hoisington, Kansas, August, 1985 to May, 1986; employed as Elementary Education teacher at St. Mary's Grade School in Walsenburg, Colorado, August, 1986 to May, 1987. Employed as School Administrator at Manhattan Catholic Schools, Manhattan, Kansas July, 1987 to June, 1990. Employed as Substitute Teacher, Los Angeles, California, September, 1990 to June, 1991. Employed as Elementary Education teacher at St. Paul the Apostle School, Los Angeles, California, August 1991 to July 1996. Employed as an Elementary Principal at Our Lady of Guadalupe School, Oxnard, California, July 1996, to June, 1997.

Employed as Substitute Teacher, Stillwater Public Schools, Stillwater, Oklahoma, September, 1997 to May, 1998. Employed as Instructor for the College of Education at Oklahoma State University, August, 1998 to present.