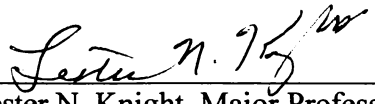


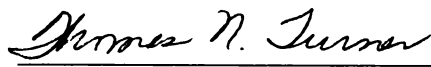
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I am submitting herewith a dissertation written by Pamela White Petty entitled "Stakeholder Perceptions of the Use and Value of Computers and Technology in an Elementary School Setting: A Case Study of the Vision and Reality of Educational Technology." I have examined the final paper copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Education.

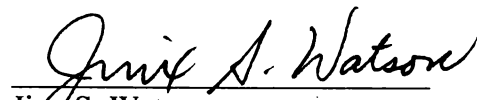


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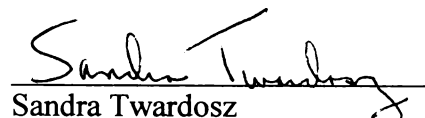
We have read this dissertation
and recommend its acceptance:



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**STAKEHOLDER PERCEPTIONS OF THE USE AND VALUE OF
COMPUTERS AND TECHNOLOGY IN AN ELEMENTARY
SCHOOL SETTING:
A CASE STUDY OF THE VISION AND REALITY OF EDUCATIONAL TECHNOLOGY**

**A Dissertation
Presented for the
Doctor of Education Degree
The University of Tennessee, Knoxville**

**PAMELA WHITE PETTY
May 2002**

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DEDICATION

This dissertation is dedicated to my husband, Sam and my children, Matt and Lindsey. It is also dedicated to my father, William Edward White, my mother, Shelby Jean Helton White, my sisters Angela W. Brown, and Debbie W. DeJean, their husbands and children, and my grandparents, Walter and Elease Mitchell White. Thank you all for your support and for helping me appreciate the value of *family*.

"If you limit your choices only to what seems possible or reasonable, you disconnect yourself from what you truly want, and all that is left is a compromise."

- Robert Fritz

ACKNOWLEDGEMENTS

This study would not have been possible without the love and support from my husband, Sam. He cooked meals, washed clothes, planted flowers, and tolerated the slow conversion of our house from a home to “dissertation central.” He stayed up late waiting for me to come home and kept things running when I could not make it home. He taped my favorite television shows when I was in class, attended functions alone because I was coding data, and listened patiently, endlessly, as I sought his assurances regarding this journey. And he did all this, every bit of it, without one word of complaint, without one time suggesting that I give up this dream, without one time looking at me as though I would not achieve my goal. I probably could have made this trip alone, but the rewards would not have been as rich, the trip not as smooth, and the memories not as sweet.

To my children Matt and Lindsey, I say thank you for never making me feel guilty when I missed ballgames, band competitions, art exhibits, and other important events in your lives. Thank you for giving me confidence, inspiration, and time to follow this dream. You are my heroes and my best accomplishments.

I vigorously acknowledge Dr. Lester Knight, the chair of my committee and the best advocate any candidate could have. His relentless accepting attitude and positive reassurances helped me through many times when I was discouraged, confused, and overwhelmed. I would also like to thank Dr. Thomas Turner who always took time to visit with me, always told me funny stories, and who gave me sound and much needed advice; or as Sally Fields’ put it, “You liked me!” I would like to credit *any* ability that I might have to be able to express my thoughts in print to Dr. Jinx Watson. She taught me

by example, by her stringent standards, and by helping me understand how to think like a writer. For the person who took a big “chance” on me, Dr. Sandra Twardosz, I will always be thankful for the telephone call in which she said “yes” when she had every legitimate reason in the world to say “no.” Without her as the fourth person on my committee, I might have ended my quest for this degree at that point. I also wish all future doctoral candidates the good fortune I had when selecting a committee; these four outstanding professors have been steadfast throughout and taught me much about the type of professor I want to be.

My sincere gratitude to my friend and mentor, Dr. Elinor P. Ross who introduced me to what I wanted to do with my life in her undergraduate reading methods and children’s literature classes. She taught me how to share my love of books with others, provided me with opportunities to grow, and guided me toward being my very best. I would truly never have embarked upon this quest without her support, guidance, encouragement, and her friendship. For every student whose life I touch in some positive way, a part of Elinor will be there with me.

Lastly, I find myself at a loss of words – rare indeed – to explain what a difference a best friend has made in my life. Kandy, you have been a cheerleader, a taskmaster, an inspiration, an example, and a friend in the purest sense of the word. Thank you for the hours you dedicated to this effort, for saying what you thought, and for making me believe I really could do this. I share this degree with you.

ABSTRACT

The new millennium brings with it the evolution of technology-supported teaching and learning and also the incredible potential for educators to take advantage of incorporating that technology into their teaching. The purpose of this study was to describe the status of classroom computer use at an elementary (K-6) school with a population of 676 students in a rural county in the mid-south. A further purpose of the study included examining and describing the patterns of beliefs or attitudes toward the use of technology in education and the skill levels necessary for use. Teachers, administrators, and parents within one school were observed and surveyed offering qualitative and quantitative data in order to make recommendations regarding the direction of technological development for the school and determining the types of training needed. Results of this study indicate that discrepancies in beliefs regarding the use of technology as a teaching and learning tool exist among the various stakeholders at the participating school in the following area: 1) type/amount of use; 2) teacher training; 3) availability of technology; and 4) purpose of technology use. Results also point to areas of common goals regarding present and future technology use. Implications exist for future technology plans, professional development for teachers, and ways to remove barriers that presently exist to the use of technology as a teaching and learning tool.

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Chapter 1

Introduction

Our Technological Society

As we enter the twenty-first century, technology continues as a constant and ever growing part of our culture. A growing number of machines extend human capabilities and figure into almost all aspects of our life. Access to electronic information sources both at home and school grows more and more essential as our society's reliance on these information sources increases. Data from the Census Bureau's Current Population Surveys (CPS) conducted in repeated fashion in the years 1984, 1989, 1994, 1997, and 1998 provide us with a look at the growing numbers of computers, email accounts, and Internet access in United States' households. During the years from 1984 through 1998, computer ownership and Internet access increased across all age and educational groups in the United States.

Schoolrooms in the United States reflect current trends in technological growth with the acquisition and implementation of computers, multi-media applications, and electronic information systems. The percentage of schools in the United States connected to the Internet increased from 35 percent in 1994 to 89 percent in 1998 (National Center for Educational Statistics 1999-017). This rapid rate of growth continues as reported by the NCES in 1999, with 95 percent of all public schools connected to the Internet, providing at least one instructional computer for every nine students (NCES 2000-086).

However, even with the rapid advancement of computer technology incorporated into classrooms in the United States, the Congressional Office of Technology Assessment (1988) states:

In general, classrooms today resemble their ancestors of 50 and 100 years ago much more closely than do today's assembly plants, scientific laboratories, and operating rooms. A number of information technologists point out that if business organizations today evolved at the same rate as the schools, they would still be using quill pens instead of electronic word processors. (p. 187)

As schools push forward and attempt to catch up with other facets of society, Bennett (1999) warned that merely adding wiring to schools and incorporating computers will not magically improve the quality of education. The author continued to pose that, "Unfortunately for students, under present conditions computers don't make much difference in learning. Education remains unchanged and frequently impoverished" (p. 36). One critical element that must preside for computers and technology to improve teaching and student learning stems from the individual teacher's attitudes toward computers and the skills necessary for using technology as a learning tool. In a nationwide poll of teachers, the National Center for Educational Statistics (NCES 2000-102) found that only one-third of our nation's teachers reported feeling well-prepared or very well-prepared to use computers and the Internet for classroom instruction. President Clinton's announcement on June 2, 2000 to provide \$128 million in federal grants to provide computer training to America's teachers offered one indication of the need for teachers to receive more instruction in technology (Clinton).

While Internet access in K-12 schools increased to 65% in 1994, up from 35% in 1990, only 14% of the schools surveyed provided mandatory staff development to train

teachers in using the new technology (Heaviside, Riggins, Farris, 1997). Burniske (1998) suggested that teachers “are left to train themselves . . . ” (p. 157). The National Center for Educational Statistics confirmed this assumption as it indicated that 93 percent of teachers polled cite “independent learning” as their most frequent preparation for the use of technology in their classrooms (NCES 2000-102). How does this lack of training in technology affect teachers’ perceptions of computers as viable learning tools in the classroom? Without a cohesive plan for implementing the technology skills in mandated state curricula, teachers may simply feel left to their own accord to acquire needed technology skills. These questions and many more need to be addressed as more and more money is spent each year on educational technology.

Teachers represent only one facet of people who must concern themselves with the success of using technology in the classroom. Administrators, supervisors of instruction, technology coordinators and parents comprise other groups of stakeholders who have a vested interest in the success of technology implementation in an elementary setting. Without consensus of the involved parties relating to expectations held toward the use of technology, feelings of frustration and blame might develop, hampering existing and future technology programs or implementations.

Statement of the Problem

School systems must constantly appropriate funds and make plans for implementing new technology into classrooms. Technology expenditures often represent a large portion of allocated monies earmarked within schools. Societal trends lean toward embracing new technological advances in all aspects of our lives, including in the

classroom. This is evidenced in the rapid growth of computer ownership and Internet access over the last few years.

Carter (1998) suggested that taxpayers and investors who donate money to education systems for technological advances wanted to know if a “return” exists for their investment. Teachers who apply for and receive grant money for technology must report levels of success to the grant appropriators. School boards, superintendents, technology coordinators, administrators, and the public in general need to know how effectively teachers use computers and whether students leave school with the skills and interest to function in our technological society. Concern for this effectiveness may be noted in a report from the Congressional Office of Technology Assessment (1995) as it commented on the “lack of expertise of many education school faculty” (p. 115) in using technology in their classrooms.

The National Center for Educational Statistics (NCES 2000-102) reported “certain characteristics of classrooms and schools, such as equipment, time, technical assistance, and leadership may act as either barriers to or facilitators of technology use” (p. 4). By examining one school as a case study, one may probe such barriers and facilitators. To understand the strengths that support effective technology use in education, and learn about the weaknesses that may inhibit the effective use of technology as a learning and teaching tool, one might examine a school’s expenditures on technology, technology use by teachers, and attitudes of parents, teachers, administrators, supervisors of instruction, and technology coordinators regarding technology use. Do teachers feel adequately prepared to integrate technology in the state-mandated curriculums? What effects do

teachers' beliefs regarding the importance of technology have on the way they use technology in the classroom? What similarities or differences appear in expectations relating to technology use in the classroom held by teachers, by administrators, and by parents and how might these similarities or differences effect present or future uses of technology in the classrooms?

Purpose of the Study

The purpose of this study was to describe the status of classroom computer use at an elementary (K-6) school with a population of 676 students in a rural county in the mid-south. A further purpose of the study included examining and describing the patterns of beliefs or attitudes toward the use of technology in education and the skill levels necessary for use. Teachers, administrators, and parents within one school were observed and surveyed offering qualitative and quantitative data, in order to make recommendations regarding the direction of technological development for the school and determining the types of training needed.

Need for the Study

Schools systems and administrators need to know the amount and type of computer utilization in their school buildings as a means of appropriating money for technology expenditures and for providing appropriate staff development. The U.S. Department of Education (1998), through the Office of Educational Research and Improvement, listed the following purposes for evaluating a school's technology program:

- To provide information to program personnel and others on aspects of the program that work well and potential problems.
- To catch potential problems early in the program so they can be corrected before more serious problems occur.

- To guide future evaluation efforts. For instance, an evaluation may bring to light issues that need to be examined in greater detail or an initial evaluation of program implementation may be used, in part, to guide a later evaluation of long-term impact.
- To provide information on what technical assistance may be needed.
- To determine what impact the program is having on participants (p. 3)

State and county monies, Parent Teacher Organizations, grant appropriations, and fund-raising activities all played a part in the build-up of computer and technology ownership at the participating school – with continuing requests from teachers for more equipment and software. By merely looking at the expenditures and the amount of technology on-hand at the school, it *appeared* that technology played a major role in the education process; a closer look might confirm or negate that appearance. If teachers continued to request computers for their classrooms but neglected to use those computers for educational purposes, how did students benefit from this expenditure? What did teachers say regarding the reasons they did or did not use technology in their state-mandated curricula?

Perhaps the most significant aspects of this study related to the comparisons of feedback on issues regarding the use of technology in education from the primary stakeholders at the participating elementary school, i.e., teachers, parents, administrators, supervisors of instruction, and technology coordinators. Much published documentation exists dealing with the benefits and barriers schools encounter in their attempts to integrate technology; however, the extensive body of research reviewed for this study did not explicitly provide findings comparing and contrasting the expectations each group of stakeholders hold for the use of technology in an elementary school setting. This study added to the literature a discussion of views and beliefs of the stakeholders in one such

elementary school and shed light on how a school might more efficiently and effectively plan for future technology expenditures and integrative programs.

Limitations and Delimitations

The site of this research may not have represented most counties and/or public school districts in many ways because of the large rural population, the size of the school, and the relatively short duration of the study. The school involved in this study had a population of 676 students in kindergarten through sixth grade. The free and reduced lunch population measured forty-eight percent of the school's total population. Ethnic populations composed approximately three percent of the total student body.

Furthermore, one cannot generalize findings to a larger or different population with the case study of only one school. Nevertheless, although transferability is not possible, readers may continue to raise new questions and perceive patterns worthy of further investigating.

The focus of this study was to determine how teachers, parents, and administrators in one school viewed and perceived the role of technology in classroom use. A further focus of this study was to report the status of current technology use, expenditures, and perceived needs, as perceptions, points of view, and attitudes were gathered and assessed. This study did not attempt to address the impact of technology on student learning.

Definitions of Terms and Abbreviations

Case Study

“An intensive, detailed description and analysis of a single project, program, or instructional material in the context of its environment” (Sanders, 1994. p. 203).

Electronic mail (Email)

“Transmission of messages over a network. Users can send Email to a single recipient or broadcast it to multiple people. Mailing lists are used to manage high-volume traffic. When employed in a classroom environment, Email is used to send and receive learning logs, post questions, distribute grades, disseminate assignments, etc.” (Tomei, 1997, p. 57).

Hardware

“The physical components, such as a computer and keypunch machine, of a data processing system, as opposed to the instructional (content-related) components” (Sanders, 1994, p. 206).

Internet

“A massive network of computers panning the entire world. It is actually a collection of smaller networks. Each local network is connected to one or more other local networks, usually over high-speed digital phone lines. The Internet is made up of more than 100,000 interconnected networks in over 100 countries, comprised of commercial, academic and government networks. It’s also called the Information Super Highway or the World Wide Web, although the Web is actually a subset of the Internet” (Tomei, 1997, p. 57).

Pilot Test (study)

“A brief and simplified preliminary study designed to try out methods to learn whether a proposed project or program seems likely to yield valuable results” (Sanders, 1994, p. 208).

Stakeholders

“... those who should be affected by a program evaluation ... typical stakeholders include the individuals and groups whose work is being studied, those who will be affected by the results ...” (Sanders, 1994, p. 25).

Technological Literacy

“Technological literacy is viewed ... as one’s ability to use, manage, assess, and understand technology” (Dugger & Rose, 2002).

Technology

“Technology is the technical means people use to improve their surroundings. It is also a knowledge of using tools and machines to do tasks efficiently” Bergen County Technical Schools (2002).

Technology Integration

“Using computers effectively and efficiently in the general content areas to allow students to learn how to apply computer skills in meaningful ways” (Dockstader, 1999)

Technology Plan

“Written document that represents the very best thinking accumulated in a particular environment (school building, district, state, etc.) for the purpose of studying technology infusion, then recommending direction for the future” (Anderson & Perry, 1994)

Note: In this paper, “Educational technology,” “technology in education,” “computers in the classroom,” appear interchangeably in discussing machines, software, electronic information systems and communication capabilities used in an educational classroom setting.

Organization of Study

The organization of this paper consists of five chapters. Chapter One provides an introduction to the study including a brief description of the status of technology in the United States and the application for the use of technology as a teaching and learning tool. This chapter also presents a brief overview of this study's statement of the problem, purpose, need, limitations and delimitations, definitions of terms and abbreviations, and overall organization. Chapter Two provides a review of the literature focusing on six general areas: technology in our society; current status of U.S. classroom technology; teachers and technology; training future teachers; changing roles of teachers and schools; and technology planning. Chapter Three explains the organization of the study; methodologies for data collection, participant selection, and analysis of data; descriptions of survey instruments; risks to participants; and a brief overview of sites and participants. Chapter Four provides results from surveys with some discussion of field notes and observations; demographics for the setting and the participants; and a brief summary of data collection and analysis. Chapter Five offers thematic summaries and conclusions drawn from this study, reflections, possible implications of this study, and recommendations for further study or investigations in the area of technology in education based on the findings of this study.

This study combined both quantitative and qualitative data derived from primary and secondary surveys. The secondary surveys were administered by the elementary school in the spring of 2000 in preparation for reaccreditation with the Southern Association of Colleges and Schools (SACS) and for development of a School Improvement Plan.

Teachers from the participating school and parents of children in the school served as participants in these surveys. Collection of data for this study utilized a variety of methodologies including: observation notes, individual surveys, and field notes from pilot studies related to this study. This accumulation of data reflected Patton's (1990) notions of qualitative research by "finding out what people do, know, think, and feel by observing, interviewing, and analyzing documents" (p. 94).

The first course of action for this study began in January 2000, by initiating two pilot studies: 1) training for parents interested in the use of technology in teaching and learning; and 2) training for teachers interested in increasing their skills in using technology as a teaching and learning tool in their respective classrooms. Every parent in grades Kindergarten through second grade received a letter explaining the purposes for the computer training, when and where the sessions would meet, and what they needed to do to reserve a space in the training sessions. These sessions lasted approximately eight weeks, meeting once weekly from 6:00 p.m. until 8:30 p.m. As demand for hands-on computer time increased, the school library hours were extended from 3:00 p.m. until 9:00 p.m. to accommodate parents who did not have home access to a computer. Parents attending these training sessions completed both pre and post-surveys examining demographic information, technology skill levels and interests, and beliefs regarding the use of various technologies as teaching and learning tools. Field notes from these sessions reflected parent motivations, concerns, visions, and anecdotes relating to experiences their children incurred in the context of using computers in the classroom during the time they attended the participating school.

The second pilot involved training teachers interested in expanding or improving their skills in using technology as a teaching and learning tool. Twelve teachers participated in these training sessions that met two evenings per week for a period of eight weeks. The sessions lasted approximately two and one-half to three hours each. Teachers brainstormed a variety of topics relating to computer use in the classroom and prioritized the order in which the topics would be offered. Teachers attending these training sessions completed both pre and post-surveys examining demographic information, technology skill levels and interests, and beliefs regarding the use of various technologies as teaching and learning tools. Field notes from these sessions reflected teacher motivations, concerns, visions, and anecdotes relating to experiences with students while using computers in the classroom.

A group of teachers from these training sessions served as an “expert panel” in reviewing the questions on the surveys. This panel discussed each item on the survey and viewed its relevance in relation to understanding the status quo of technology use and beliefs held by the stakeholders at the participating elementary school. Using teacher recommendations of survey items and Patton’s (1990) definition of process evaluations which “are aimed at elucidating and understanding the internal dynamics of how a program, organization, or relationship operates” (p. 95), the researcher developed or adapted surveys for teachers, parents, administrators, supervisors of instruction, and technology coordinators associated with the participating school. Those surveys served as primary research for this study and were conducted in the fall of 2000.

All faculty members, administrators, parents, supervisors of instruction, and technology coordinators associated with the participating school received surveys and consent forms. Patton's (1990) *Qualitative Evaluation and Research Methods* served as a guide for the design of the study and for data analysis. The notion of a "case study" follows the basic premise of qualitative research as it allows for in-depth, detailed information from a relatively small sample of people who are selected for purposes that serve the focus of a study (Patton, 1990).

In this study, the focus was to "draw a picture" of the dynamics and beliefs that shape the use of educational technology at one elementary school based on information gathered from the previously identified stakeholders. Lawrence-Lightfoot and Davis (1997) referred to this process as "social science portraiture." The authors described this process as "a method of qualitative research that blurs boundaries of aesthetics and empiricism in an effort to capture the complexity, dynamics, and subtlety of human experience and organizational life" (p. xv). This type of research allows investigators to "seek to record and interpret the perspectives and experience of the people they are studying, documenting their voices and their visions – their authority, knowledge, and wisdom" (p. xv). The primary and secondary surveys combined with observation notes and field notes allowed a portraiture to be drawn of the participating elementary school. Chapter three elaborates and provides specific details on the research methods and procedures used in this study.

Chapter Two

Review of the Literature

Technology in our Society

In identifying 54 jobs with the highest growth potential, the U. S. Department of labor indicated that 45 of those jobs will require technological fluency (Rosenthal, 1999).

Zuckerman (1994) further reported that only about 22 percent of people currently entering the work force possessed the technology skills necessary for 60 percent of the jobs. “The proliferation of new technologies, combined with new directions being taken by government, is transforming our economic system and leading to demands for an entirely different kind of worker” (Jukes, Dosaj, Macdonald, 1999, p. 27). The authors suggested that skills and behaviors traditionally taught in schools during the Industrial Age were not preparing students to thrive in the 21st century growth industries. Papert (1993b) pointed out “mega changes” in many facets of our society such as telecommunications, medicine, and transportation, but indicated that comparable changes in education do not exist.

According to a report from the U. S. Department of Commerce (1999), Americans used the Internet for a variety of tasks. Findings indicated that 77.9 percent of those accessing the Internet at home used it for electronic mail applications; 59.8 percent of home users searched the Internet to gain information; 53.9 percent of unemployed persons used the Internet at home to search for jobs on-line; and 36.1 of home Internet users took on-line courses. The report indicated that not only did Americans use the Internet for varied reasons, but also the sheer numbers of people accessing the Internet

soared over the last few years. Sculley, (2000) as quoted in Electronic-School also emphasized the importance of students gaining useful technology skills as he indicated that, “People in school today can expect to live in a world where the Internet will become an indispensable part of their lives” (p. 3).

Americans also access the Internet outside the home. In a report on Internet use outside the home done by the U. S. Department of Commerce (1999), 56.3 percent of the people surveyed indicated using the Internet at work, while 21.8 percent accessed the Internet in a Kindergarten – 12th grade school setting. Public libraries accounted for 8.2 percent of outside of the home Internet access. These data showed interest in utilizing public resources for Internet access and possibly suggested a method for helping close the gap between the “haves” and “have-not’s” relative to computer and telecommunications accessibility.

Thornburg (2000) suggested that the abundance of information in our society makes the traditional learning model -- learning in school that provides needed skills for the work force -- obsolete. Instead, the author believed that the sheer amount of information accessible through technology dictates a model of continuous or life-long learning. Expecting what students learn in school to be sufficient learning to keep them competitive and knowledgeable citizens would be nearly impossible in our society today. Thornburg provided us with data reflecting that approximately 400,000 jobs in the information technology section of our job force remained vacant due to the lack of sufficient numbers of qualified workers to fill them. These jobs provided an average salary of \$53,000, well above the U.S. national average of \$30,000 per year (p. 4).

Many believed any discussion of literacy in the 21st century must include a component of technological literacy due to our cultural reliance on technology (Fleming, 1989; Wedemeyer, 1991). Waggoner (1992) suggested that our future dependence on the Internet will compare to our present-day reliance on televisions, radios, and telephones and that students must leave and enter the workforce with the abilities to use the tools of telecommunications. This concurred with Dixon-Krauss' (1996) belief that "Perhaps the most promising development in literacy education is that of telecommunications" (p. 185). The author provided examples of students using electronic mail to communicate with peers around the world, emphasizing reading and writing for authentic purposes.

Turkle (1997) suggested even greater impacts of technology in our society as she posed questions about how people change due to our interactions with computers. "We make our technologies, our objects, but then the objects of our lives shape us in turn" (p. 11). Turkle (1995) took a hard look at how our use of technology causes us to reevaluate ourselves in terms of our relationships, gender, and our sense of identity. The author's views addressed how we conceptualize the role of computers in education as she stated, "... computers are affecting how today's children think, influencing how they construct such concepts as animate and inanimate, conscious and not conscious" (1984, p. 16). This thinking aligned with Papert's (1993a, 1993b) beliefs that when children manipulate technology to produce "something" reinforcement of mathematical concepts and thinking occurs.

Hesketh & Selwyn (1999) emphasized the power of the Internet in connecting schools and students to others around the world. Students could share ideas, learn from people in

other cultures, and get feedback on their writing (Guhlin, 1996) all through the use of increasingly sophisticated telecommunications technologies.

Current Status of U.S. Classroom Technology

When asked how digital technologies will change the nature of teaching and learning in U. S. schools, Rheingold (2000) as quoted in *Electronic-School* stated, “Educational institutions are in need of reform, and computer technology is both a component of contemporary life and a potentially powerful educational tool” (p. 13). Schools in the U.S. continue to reflect society’s quest for competency in technology. Expenditures for computers and related technology in United States’ schools over the past few years ranged into the billions (Rosenthal, 1999). American schools boasted over 1.6 million computers in public school classrooms. The latest report from the National Center for Educational Statistics (NCES), based on surveys in years 1994 through 1999, indicated that 95 percent of U. S. public schools had Internet access. Instructional rooms with Internet access numbered 63 percent of U. S. public schools with a ratio of students per instructional computer with Internet access at 9 percent (NCES 2000-086).

Thanks to programs like the Federal Communications Commission’s (FCC’s) Universal Service Fund, which provided \$1.7 billion in 1998 to help telecommunications carriers provide service to consumers in rural areas of the U. S., many low-income families now have Internet access through the Lifeline Assistance program (helps low-income families pay monthly service bills) and the Up-Link America program (helps low-income families pay Internet installation costs). President Clinton and the U. S. Congress worked together to enact the E-rate program ensuring that schools, libraries,

and rural health care providers receive discounts on telecommunications services (U. S. Department of Commerce, 1999). At the time of this report, the E-rate initiative had connected over 80,000 schools and libraries to the Internet. "With the financial support provided by the E-rate, many rural schools and libraries will be able to provide students and others with access to the Information Superhighway, which is rapidly changing the way the world communicates and does business," stated Thompson (1999), U. S. Department of Agriculture's Under Secretary for Rural Development. "This helps rural students to be competitive in the job marketplace and makes rural communities attractive places for new businesses to locate" (U. S. Department of Agriculture Press Release, 1999.)

How do current public school teachers use the technology available to them? The U.S. Department of Education in an NCES publication provided information on the use of computers and the Internet in public schools. Surveys conducted by NCES in 1999 showed that 39 percent of all public school teachers with access to computers or the Internet at school used the technology to create instructional materials; 34 percent used technology for administrative record-keeping; 23 percent to communicate with colleagues; 16 percent to gather information for planning lessons; 8 percent for multi-media classroom presentations; 7 percent used technology to access research and best practices for teaching; 7 percent to communicate with parents or students and 6 percent of public school teachers used technology to access model lesson plans (NCES 2000-090).

A report from the Office of Technology Assessment to the U. S. Congress (1995) further encouraged teachers to incorporate technology into instruction and criticized the

common use of computers in the classroom for drills in the format of instructional video games. Harvey Barnett, senior research associate in the Technology in Education group at WestEd (regional education laboratory for Arizona, California, Nevada, and Utah), in an interview with Poflak (1999) stated, “Moving drill-and-kill from paper to the computer doesn’t help” (p. 40). Instead, Barnett suggested that students use technology to gather information and share what they know, calling on teachers to employ many different approaches to instruction.

In recognizing the need for better preparation of teachers to meet the demands of today’s classrooms, U.S. Secretary of Education Richard W. Riley announced \$33 million for 25 grants on September 7, 1999. One of the aspects of this grant program insured integration of technology “in the training program so that the new teachers will use it more effectively as classroom teachers” (U. S. Newswire, 1999). This initiative reflected a need indicated by a statewide report by researchers at the University of Kentucky (1997) who found huge disparity between buying technology equipment and using it well.

Dixon-Krauss (1996) contended that “Computers and other technology must be presented as the mainstay of current classroom practice, just like the literature available for whole language activities, the manipulatives associated with mathematics, or the equipment provided for science experimentation” (p. 187). Puma, Chaplin & Pape (2000) proclaimed computers as essential components of our classrooms, not just additional tools. While some held that computers may not significantly improve student learning (Cormack, 1995), others believed that well designed instruction integrated and

supported by technology improves students' learning performance, students' attitudes toward learning, and decreases the amount of time it takes to learn certain concepts and skills (Dusic, 1998).

Teachers and Technology

Research indicated that teachers must use computers competently in their classrooms, both as vehicles of pedagogically sound instruction and for classroom management. They must have knowledge of hardware and software applications (Hardy, 1998; McNamara, 1995; Siegel, 1995; Walters, 1992). However, Rosenthal (1999) cited a survey done by the National Center for Education Statistics (NCES 2000-003) finding that only 20 percent of the nation's 2.5 million public school teachers felt comfortable using technology in their classrooms. Another recent NCES brief (2000-090) elaborated that 13 percent of all public school teachers with access to computers or the Internet at school felt not at all prepared; 53 percent felt somewhat prepared; 23 percent felt well prepared and 10 percent felt very well prepared. These findings underscored other research (Siegel, 1995; Schrum, 1999; Strudler & Wetzel, 1999) which indicated that even if teachers hold positive attitudes toward technology, the lack of time, access and support needed for teachers to feel competent in using technology in instruction may keep teachers from becoming comfortable with technology in their classrooms.

Poole & Moran (1998) suggested that limited and/or inadequate staff development prevents teachers from utilizing existing technology in their teaching. The authors continued stating, "One-shot workshops, added expense of training, lack of continued support, isolated knowledge, unawareness of school needs, lack of knowledge and

support from leadership all contribute to the ineffectiveness of technology staff development” (p. 60). Studies showed that most teachers do not learn to use computers from taking college courses, attending seminars or workshops, or through traditional in-service programs (Galloway, 1997). More continuous training (Hardy, 1998) in the use of technology in education over the course of seven years may provide teachers with the experience, comfort, and confidence to successfully incorporate technology into instruction.

Braun (1993) underscored the types of training in technology teachers need as he reported conclusions drawn from research done by the International Society for Technology in Education (ISTE), “Teachers need training in the uses of technology in their curricula; time to develop these uses; and support from their administrators in a risk-free environment – and they need these on a continuing, long-term basis” (p. 67). While many people recognize the need for staff development related to technology, Bailey (1997) stated, “Even though there is considerable information about the general characteristics of effective staff-development practices, there have been minimal amounts of information specific to technology staff-development programs” (p. 58).

Wang (2000) utilized a model published by Lloyd and Welliver (1989) denoting familiarization, utilization, and integration as three phases that provide a framework for computer training for teachers. The focus of the familiarization phase rests on acquainting teachers with computer equipment and terminologies. The utilization phase of instruction involves teachers using computers as personal production tools. Direct integration of technology into the curriculum occurs in the final phase of training.

McNamara & Pedigo (1995) discussed a similar training model that follows three basic levels: awareness level, which provides basic knowledge about computers; development of skills level, actual use of equipment and computer software; and application level, integration of computers into curriculum.

“Technology integration,” as defined by Dockstader (1999), “is using computers effectively and efficiently in the general content areas to allow students to learn how to apply computer skills in meaningful ways” (p. 73). The author went on to suggest that teachers should receive the type of training that helps them to organize and coordinate the goals of both the curriculum and the use of technology. Among other benefits, the author enumerated several advantages of teachers integrating technology into the curriculum:

- 1) more depth into the content-area curriculum is possible
- 2) students have an intrinsic need to learn technology
- 3) students are motivated by technology
- 4) students move beyond knowledge and comprehension to application and analysis
- 5) students learn where to locate information
- 6) computer skills are not developed in isolation
- 7) students develop computer literacy by applying various skills as part of the learning process (p. 73)

Teachers need models to follow when integrating technology into the curriculum.

Sherry, Billig, Tavalin, & Gibson (2000) suggested that teachers need mentors, specialists who help guide their understanding of technology, and on-line resources available to them as they attempt to use technology in curriculum integration. This support structure for teachers provides a level of empowerment to the teachers both as learners and as users of technology.

Other noted researchers in the field of educational technology addressed the types of training teachers need. Thornburg (2000) stated,

Staff development should be moved to the number-one position in any dialog of technology in education, and it needs to focus on the effective use of technology in support of pedagogical and curricular issues appropriate to a redefined concept of schooling needs to be completely overhauled around the new skills that educators will need to operate in an educational setting appropriate to the next century. (abstract)

Thornburg went on to make another interesting observation as he noted, “Technology is not the point – learning is” (p. 5). In the author’s reference to “technological fluency,” he suggested teachers should not stop with students merely knowing how to use computers, but teachers should set examples of how to use computers as tools for learning. Soloway, (2000) as quoted in Electronic-School defended teachers as he suggested that daily and routine use of computers in teaching won’t take place until technology reaches a level of dependence, stability, and ease of use that allows teachers to utilize technology effectively.

Poole and Moran (1998) suggested a staff development model called “Teachers Teaching Teachers Technology” (T-4). The plan works on the premise that a team effort toward technology training can promote effective technology learning by teachers. Teachers obtain release time for working to integrate technology into their curriculum and in developing personal technology skills. A team of “experts” from within the school survey teachers for training needs, develop a training schedule of classes, and serve as instructors in those classes. The teachers trained at the initial classes serve as the next level of “experts” when the training session appears next on the schedule. This plan allows for continual growth and teacher-to-teacher support and agreed with Rheingold’s

(2000) as quoted in Electronic-School notion that teachers should receive monetary compensation for the time they spend learning how to incorporate technology into their own teaching practices.

By contrast, Saul Rockman, (2000) as quoted in Electronic-School believed that teachers should only learn enough about computers to get their work accomplished. He indicated that students would take the lead in using technology if teachers would move aside and give them permission to do so. The technology gap that exists between students and teachers indicates, "... students may know more about how to use the technology than adults" (Watson, 1998, p. 1035). Watson, in her research on the how students use information technologies, suggested the need for more research into how best to assist teachers in using technology to facilitate student learning. The U. S. Office of Technology Assessment (1995) indicated everyone benefits from student and teacher collaborations in using technology as "the K-12 students themselves learn the technology and help their teachers find ways to use it" p. 8. This notion underscored a recent survey (National School Boards Foundations, 2000) which indicated that three out of four teenagers used on-line resources via the Internet.

Weiner (2000) indicated that, based on a survey conducted by Market Data Retrieval, funding spent on teacher training in technology constitutes only a minimal amount of the total budget for technology in public schools in the United States. Of the estimated \$5.67 billion spent on technology in public schools during the 1999-2000 school year, only 17 percent went to teacher training.

Training Future Teachers

In reference to encouraging teachers to integrate technology into their classrooms, Roberts, as quoted in Rosenthal (1999) stated, “If you can get teachers to use technology effectively in their own lives, you have won 90 percent of the battle” (p. 22). Rosenthal continued to describe how the National Council for the Accreditation of Teacher Education (NCATE) requires all colleges and universities to train pre-service teachers in how to effectively integrate technology into their curricula as opposed to only offering separate courses about technology. Brush (1998) concurred with this notion as he called for integrated technology training throughout the teacher education program. Computing instruction integrated throughout the teacher education program, according to Moursund & Bielefeldt (1999) reigns superior over isolated computer classes. Students who receive computer instruction in an integrated manner more naturally integrate technology into the school curriculum as in-service teachers.

Preparing Tomorrow's Teachers to Use Technology, a program developed by the U.S. Department of Education provides funding to help colleges prepare technology-proficient teachers. These programs and others speak to the national agenda to improve teacher training in technology. The task to train teachers seems even more monumental based on a U. S. Department of Education report indicating the hiring of 2.2 million new teachers in the next 10 years. Will these new teachers enter the workforce with the technology skills necessary to meet the new teacher technology standards of most states? A report by Market Data Retrieval (1999) indicated that new teachers were no better prepared to use technology than their older colleagues. While these new teachers used word

processing software, presentation software, or other types of general technology skills, they did not know how to integrate these skills into the curriculum in their classrooms.

Agreement may not exist about the methodologies for training teachers in the use of technology. New computer software, hardware components, and Internet applications continue to provide daily challenges to teachers calling for the augmentation of instructional technology skills of teachers already in the classroom and those in preservice programs (Hill & Somers, 1996; Northrup & Little, 1996). The 1997 *Report to the President on the Use of Technology to Strengthen K-12 Education in the United States* concluded that while teachers need to master many powerful technology tools, learn to build lesson plans that incorporate technology, learn how to teach their technology-based lessons with a very limited number of computers, and determine their new role in the classroom, they received little training in how to accomplish any of those goals. Strudler & Wetzel (1999) and Schrum (1999) concurred that training preservice and practicing teachers to enhance instruction through technology poses many challenges and that many preservice teachers enter the classroom with only minimum exposure to technology.

Wang (2000) indicated that preservice teachers placed in practicum settings with teachers who view efforts to integrate technology into the classroom as hindrances to routine work will not appreciate the value of computers in education. While much research exists relating to understanding preservice teacher perceptions of technology (Diegmueller, 1992; Downes, 1993; Savenye, 1992), their perceptions of good teaching practices reflected an obsolete educational system (Reigeluth, 1993). In a study of pre-

service teacher perceptions on changing teacher roles and technology, Carr-Chellman & Dyer (2000) asked pre-service teachers to respond to a reading on the future vision of education. Results showed that many respondents preferred traditional teacher roles that reflected the same types of teaching methods as they experienced as students. The researchers credited much of this to the notion of “change” in general, independent of the use of technology in education.

Changing Roles of Teachers and Schools

How will the role of “teacher” change as a result of the growing fields of technology and our society’s dependence on the information technology provides? Bossert (1997) stated, “Learning is at its heart and soul about information and communication, and learning is being transformed by the electronic media whether the schools choose to recognize this or not” (p. 15). The author described the solution for schools as trying to understand the newly defined roles of the classroom, teachers, and the curriculum instead of continually purchasing new technologies. Thornburg (2000) suggested that a teacher’s role would be that of “co-learner – an expert guide who helps students navigate the subjects being explored, but who is open to new discoveries and pathways along the journey.” Anderson (2000) as quoted in *Electronic-School* referred to this change of teacher status as “role-blurring” (p. 9). He suggested that identifying the traditional learners and teachers in this particular scenario might be practically impossible.

The potential to empower the learner through the use of integrated technology exists in research (Labbo & Kuhn, 1998). Teachers must recognize that students participate in independent discovery of information through on-line resources. Schwab & Foa (2001)

indicated that teachers need to appreciate that students find learning through technology more logical and organized as compared to traditional methods of instruction. The authors continued to suggest that teachers recognize the need for helping students to analyze, synthesize, and communicate knowledge as opposed to simply recalling information transmitted in class.

Director of the Institute for the Learning Sciences at Northwestern University, Schank expressed futuristic ideas on the role of education based on his work in the field of artificial intelligence and multimedia-based interactive training. Schank (2000) predicted that technology will reshape three critical areas of our present educational system. First, teachers will shift from roles of direct teaching of academic subjects to facilitating students as they complete on-line courses developed by leading experts in all curricular areas. Schank expressed the belief that this shift will allow teachers to emphasize the social and interpersonal skills students need to become useful citizens. Dede, (2000) as quoted in *Electronic-School* concurs with Schank as he stated, “Children also need to master higher-order cognitive, affective, and social skills not central to mature industrial societies but vital in a knowledge-based economy” (p. 15).

Secondly, Schank predicted the role of the school in the community will evolve into a “student or community center” and function as a central point for all citizens in a community. Lastly, Schank envisioned a centralized curriculum developed by experts in individual academic fields. This curriculum would allow students to self-pace and would thrust the role of teacher into that of tutor. Certainly Schank’s ideas seem radical for today’s culture and would necessitate a restructuring and redefining of educational

systems in the U.S.

Electronic-School, an on-line electronic magazine, asked nearly 100 leaders in the field of educational technology to make predictions about how digital technologies will change the future of teaching and learning in the new millennium (January, 2000). This query prompted both positive and negative comments regarding the role of technology in teaching and learning. John Sculley, (2000) former CEO of Apple Computer, stated, “It is inevitable that the role of teachers will change as Internet-based curriculum becomes more important”(p. 3). Tapscott, (2000) as quoted in Electronic-School stated “Computers vs. basics is not an either/or proposition. Computers *are* the basics. Students don’t study basics *instead* of computing; students study basics *using* computing technology”(p. 7). Each of these suggestions alters the way students, parents, administrators, the general public and educators perceive the role of “teacher.” If technology brings with it a redefining of roles, perceptions must also change to reflect the new status quo. Practical applications of technology to enhance curriculum may mean that teachers no longer serve as the “sage on the stage” but as the “guide on the side” (Puma et al., 2000). However, some researchers indicated that present use of technology in the classroom still fits the traditional molds of drill and practice activities, educational games and tutorials, and word processing applications which do not address higher-level thinking skills (Strudler & Wetzel, 1999; Willis, Thompson, & Sadera, 1999).

Technology Planning

A 1991 policy statement generated from the Council of Chief State School Officers requires that all states develop and maintain written plans for integrating technology in

the education curriculum (Improving Student Performance through Learning Technologies, 1991). Anderson (1996) explained that states develop technology plans of a more general nature than district or local school technology plans. The state plans deal more with non-specific principles, financial support, and issues of district accountability of state funding. District technology plans address the specific needs of a school system and include an overview of local school technology goals. District plans provide broad outlines of the many aspects of the use of technology in education including administrative concerns, public relations, and other facets of the school system as a whole. Local or building level technology plans focus on curriculum concerns, teachers, and learners. These plans usually included vision statements and set goals for the use of technology to support the curriculum.

Anderson (1996) applied the term “dovetail” to describe the relationship between state, district, and local school technology plans. In this concept, the state fashions technology plans and asks the school districts within the state to follow state guidelines in developing their own technology plans. Local schools systems then fashion their own technology plans and vision statements to “fit” into the district plan and therefore the state’s plan as well.

Financial, technical, human resources, architectural, and legal aspects serve as major components of technology planning for state, district, and local schools (Anderson, 1996). “Although technology planning occurs at multiple ‘levels,’ many principles are identical. Planners need to engage the services, creativity, and assistance of all stakeholders” (Anderson, 1996, p. 3). The magnitude of this planning requires people to

establish timelines, delegate responsibilities, and constantly evaluate the plans during the building and implementation phases. Peterson (1989) indicated that school board members and district administrators may not know the steps to take in planning for technology in their school systems.

Summary

The new millennium brings with it the evolution of technology-supported teaching and learning and also the incredible potential for educators to take advantage of incorporating that technology into their teaching. A review of the literature indicated that our society will continue to rely more and more on technology, and future generations must possess the skills to use that technology in the workforce as well as their personal lives. Governmental, private, and business sectors of our society recognize the need for schools to help train students and continue to aid schools financially in their quest for computers and other aspects of technology. Teachers suddenly presented with new and unfamiliar types of technology may or may not readily integrate it into the curriculum as they struggle with inadequate or insufficient staff development. Perhaps Donald Norman (2000) said it best when he stated, "Technology is not the answer, but proper technology coupled with informed pedagogy, coupled with teachers who are coaches, guides, and mentors, can lead the way" (p. 9). The review of this literature underscored the concerns that parents maintain regarding their children entering the work force prepared to successfully handle the necessary technology.

Current literature related to the use of technology in education provides us with information about how traditional teaching models change with the introduction of

computers and other technology. These changes affect technology planning for a school or a school system. Teacher training and professional development for teachers in the use of technology compose the subjects of several research projects. To date no consensus exists regarding the most effective model for such training. While the literature provided agreement that integration of technology into the curriculum is paramount, the methods for training teachers to integrate technology and the methods for adopting appropriate pedagogy remain random with a “hit or miss” approach. Colleges and universities face similar challenges in preparing new teachers to readily integrate technology in their teaching. These readings related to the current study in regard to teacher training, professional development in technology integration, and implications for teacher education programs as they prepare future teachers to enter the classroom with the necessary technology skills and integration strategies.

The literature also indicated that the people responsible for making critical decisions regarding the implementation and use of technology in classrooms make those decisions without the proper information or background knowledge. States and local school districts must make vital and pressing decisions regarding the implementation of technology into classrooms. These decisions must take into account all the stakeholders affected, i.e., teachers, students, parents, administrators, and the community.

Understanding the current status of technology use in a school (or school system) constitutes the first step in making these important decisions (U. S. Department of Education, 1998). This literature tied directly into the current study highlighting the need for common goals and visions among the stakeholders at any elementary school.

This review of the literature focused on many issues paramount to an investigation into the use of technology in education. Previous research studies and findings aided the principal investigator in this study by providing a framework of the crucial elements of technology use which included teacher technology skills, issues related to integration into content areas of instruction, attitudes held by teachers, parents, and administrators, and the overall perceptions from all stakeholders of the value of technology in education.

Chapter 3

Research Methods and Procedures

Organization of Study

In explaining methodologies for evaluating technology programs, Rockman (1998) recommended collecting baseline information on as many aspects of computer and technology use in classrooms as possible. The author further suggested that information regarding the numbers of computers and the numbers of Internet connections in a particular school might provide useful data in evaluating a technology program.

Carter (1998) advocated using surveys as a means of providing qualitative information relating to opinions, preferences, and beliefs. These types of data allowed researchers to look for patterns that might guide future decisions about technology expenditures and staff development topics. Analysis of these data provided researchers with quantitative information including totals, percentages, and averages. Data analysis provided documentation that confirmed or refuted already held beliefs regarding aspects of technology, i.e., the age of computers, lack of training, time constraints, etc.

The U. S. Department of Education (1998) encouraged those evaluating technology programs to allow the purpose of the evaluation to guide the overall design of the evaluation. In this research, the evaluation served four purposes:

- To provide quantitative data regarding numbers of computer, numbers of on-line computers, numbers of other related technology components, numbers of computers (or other components) needing repair, student/computer ratios in each classroom, amount and type of technology training teachers have received, state-mandated technology curriculum skills taught by individual teachers (reported by grade level), numbers of households represented by student population that have computers at home, numbers of households represented by student population that have

Internet and email capabilities at home, average income of households represented by student population, average educational level of parents and guardians represented by student population, and other demographic information regarding parents and guardians including marital status and age.

- To provide qualitative data regarding comfort levels of parents and teachers with technology, beliefs regarding the person/people primarily responsible for teaching children about technology, beliefs regarding the value of technology in education, the amount of priority placed on learning about technology, teachers' self-assessed competency levels in working with technology, and belief statements from teachers regarding perceived enthusiasm of using technology by teachers, parents, and students.
- To provide the school with useful data highlighting areas of strengths and needs in technology. This data could serve as documentation for grant applications and as a means for planning future technology implementations.
- To look for patterns that might be of interest to other educators, technology coordinators, superintendents, and school systems as they search to implement technology programs or to improve existing programs.

The stakeholders in the participating school held similar purposes for this evaluation: the best possible instruction for students including access to technology and the necessary skills to use technology for learning, as a source of information, and as a means of functioning in our society. The surveys and checklists provided a volume of information relating to technology use, expectations, concerns, and perceptions of teachers, parents, and administrators. Categorized and interpreted data aided understanding of the current status of technology in education in the school and of the types of plans this school might make for future technology initiatives, including staff development.

The National Center for Educational Statistics (NCES 2000-102), in framing the critical topics for research into the use of educational technology, suggested “. . . a useful model for studying educational technology would begin with examining whether

and how teachers use (technology) and then explore the teacher preparation and training, and the school and classroom contexts that characterize where technology is used and where it is not used” (p. 6). To address these three identified areas of interest, a qualitative study supported and enhanced by quantitative data helped to capture and describe the attitudes and technology skill levels that shape the use of classroom technology.

Patton (1990) stated, “Qualitative methods consist of three kinds of data collection: (1) in-depth, open-ended interviews; (2) direct observation; and (3) written documents” (p. 10). This research project focused on written documentation in the form of surveys and checklists. Notes taken during training sessions with parents, teacher training sessions, and classroom visits provided documentation based on direct observation.

This research project sought to gather and interpret data from surveys administered to teachers, parents, and administrators on the use of technology in education, describing the status of technology use and related attitudes during the 1999-2000 school year.

“Qualitative methods permit the evaluator to study selected issues in depth and detail” (Patton, 1990, p. 13). In-depth examination of data gathered via surveys allowed the researcher to isolate and investigate key issues related to the perspectives of the stakeholders regarding educational technology. The Joint Committee on Standards for Educational Evaluation (1994) suggested researchers “Allow for emergent questions to shape evaluation and analytic processes” (p. 172). Many of the surveys used to gather data were adapted from existing instruments to provide a more direct focus on the specified intentions of this body of research.

The participants in this study met the definition of “criterion sampling” (Patton, 1990). The participants included administrators, teachers, a technology coordinator, a supervisor of instruction, and parents of students at the participating elementary school. Patton indicated, “The point of criterion sampling is to be sure to understand cases that are likely to be information-rich because they reveal major system weaknesses that become targets of opportunity for program or system improvement” (p. 176-177). Most stakeholders expressed an interest in the use of technology in education and their attitudes and technology skills help to shape the implementation of technology at the school.

Data Collection

This research study included surveys administered by the school during the spring of 2000. The participating school administered these surveys in preparation for reaccreditation with the Southern Association of Schools and Colleges (SACS) and for development of a School Improvement Plan. Teachers from the participating school and parents of children in the school served as participants in these surveys. Administrators, teachers, parents of children in the school, the school system’s technology coordinator, and the supervisor of instruction for the county school system also participated in the fall of 2000 by responding to surveys administered by the researcher. The qualitative surveys allowed for open-ended responses of participants reflecting Patton’s (1990) research methodology as he stated, “Qualitative methods permit the evaluator to study selected issues in depth and detail” (p. 13). Further examination of data gathered via surveys allowed the researcher to isolate and investigate key issues related to the perspectives of the stakeholders regarding educational technology. Focusing on key issues indicated by

the surveys allowed the researcher to follow guidelines set by the Joint Committee on Standards for Educational Evaluation, Sanders (1994) as they suggested researchers “Allow for emergent questions to shape evaluation and analytic processes (p. 172).

The participants in this research project met the definition of “criterion sampling.” The participants included administrators, teachers, a technology coordinator, a supervisor of instruction, and parents of children in the elementary school. Patton (1990) indicated, “The point of criterion sampling is to be sure to understand cases that are likely to be information-rich because they reveal major system weaknesses that become targets of opportunity for program or system improvement” (p. 176-177). All stakeholders who participated shared an interest in and knowledge of the use of technology in education at this particular school, and their attitudes and skill levels in technology helped to shape the progress at the school.

Collection of data utilized a variety of methodologies including: observation notes, individual surveys, and field notes from related pilot studies. This accumulation of data reflected Patton’s (1990) notions of qualitative research by “finding out what people do, know, think, and feel by observing, interviewing, and analyzing documents” (p. 94). Observation notes provided the researcher with opportunities “to write down feelings, work out problems, jot down ideas and impressions, clarify earlier interpretations, speculate about what is going on, and make flexible short – and long-term plans for the days to come” (Glesne and Peshkin, 1992, p. 49). Pilot studies and one-on-one interactions with participants provided the principal investigator with opportunities to document observations.

Two pilot studies helped the principal investigator form research questions that emerged during the studies. Glesne and Peshkin (1992) recommended, “pilot study participants should be drawn from your target population” (p. 30). They also suggested the use of pilot studies to test observation techniques. For this research, the first pilot study involved training for parents interested in the use of technology in teaching and learning, and the second involved training for teachers interested in increasing their skills in using technology as a teaching and learning tool in their respective classrooms. Every parent in grades Kindergarten through second grade received a letter explaining the purposes for the computer training, when and where the sessions would meet, and what they needed to do to reserve a space in the training sessions. These sessions lasted approximately seven weeks (January 20, 2000 – March 2, 2000), meeting once weekly from 6:00 p.m. until 8:30 p.m. As demand for hands-on computer time increased, the school library hours extended from 3:00 p.m. until 9:00 p.m. on training nights to accommodate parents who did not have home or work access to a computer. Parents attending these training sessions completed both pre and post-surveys examining demographic information, technology skill levels and interests, and beliefs regarding the use of various technologies as teaching and learning tools. Field notes from these sessions reflected parent motivations, concerns, visions, and anecdotes relating to experiences their children incurred relating to the use of computers in the classroom during the time they attended the participating school. Twenty parents attended at least one of the training sessions over the seven-week period.

The second pilot study involved training teachers interested in expanding or improving their skills in using technology as a teaching and learning tool. Sixteen faculty members and other employees attended at least two of the twelve training sessions. Those attending included, one assistant-principal, one secretary, one Title One assistant, one music teacher, one speech pathologist, one physical education teacher, three kindergarten teachers, one first grade teacher, one second grade teacher, one third grade teacher, one fourth grade teacher, two fifth grade teachers, and one sixth grade teacher. Ten teachers attended all training sessions that met twelve evenings from March 6, 2000 through April 12, 2000. The sessions lasted approximately two and one-half to three hours each. Many of the same teachers attended these training sessions. Teachers brainstormed a variety of topics relating to computer use in the classroom and prioritized the order in which the topics would be discussed. Teachers attending these training sessions completed both pre and post-surveys examining demographic information, technology skill levels and interests, and beliefs regarding the use of various technologies as teaching and learning tools. Beyond the evening training sessions, four full-day Saturday training sessions allowed teachers to receive training on writing and implementing Technology Literacy Grants. Field notes from these sessions reflected teacher motivations, concerns, visions, and anecdotes relating to experiences with students while using computers and related technology in the classroom.

A group of four teachers from these training sessions served as an “expert panel” in reviewing the questions on the surveys. This panel discussed each item on the survey and viewed its relevance in relation to understanding the status quo of technology use and

beliefs held by the stakeholders at the participating elementary school. Using teacher recommendations of survey items and Patton's (1990) definition of process evaluations which "are aimed at elucidating and understanding the internal dynamics of how a program, organization, or relationship operates" (p. 95), the researcher developed or adapted surveys for teachers, parents, administrators, supervisors of instruction, and technology coordinators associated with the participating school. Those surveys served as primary research conducted in the fall of 2000.

All faculty members, administrators, parents, supervisors of instruction, and technology coordinators associated with the participating school received primary surveys developed by the principal investigator. Patton's (1990) *Qualitative Evaluation and Research Methods* served as a guide for the design of the study and for data analysis. The notion of a "case study" follows the basic premise of qualitative research as it allows for in-depth, detailed information from a relatively small sample of people who are selected for purposes that serve the focus of a study (Patton, 1990).

This study focused on "drawing a picture" of the dynamics and beliefs that shape the use of educational technology at one elementary school based on information gathered from the previously identified stakeholders. Lawrence-Lightfoot and Davis (1997) referred to this process as "social science portraiture." The authors described this process as "a method of qualitative research that blurs boundaries of aesthetics and empiricism in an effort to capture the complexity, dynamics, and subtlety of human experience and organizational life" (p. xv). This type of research allows investigators to "seek to record and interpret the perspectives and experience of the people they are studying,

documenting their voices and their visions – their authority, knowledge, and wisdom” (p. xv). Primary and secondary surveys along with observation notes provided the principal investigator with data for drawing a portraiture of technology use at the participating elementary school.

English (2000) suggested that a possible flaw in portraiture as a qualitative methodology rested in the heavy reliance on the researcher’s own interpretation. The principal investigator attempted to depict patterns as they presented themselves in the survey instruments and from observation notes. Glesne and Peshkin (1992) addressed the fine line that a researcher must walk in relation to the researcher’s own participation in a study. The authors stated, “The more you function as a member of the everyday world of the researched, the more you risk losing the eye of the uninvolved outsider; yet, the more you participate, the greater your opportunity to learn” (p. 40). The principal investigator in this study believes that involvement with participants in the pilot studies and subsequent interactions in the participating school allowed for greater opportunities to learn. Ethnographic research of this nature allows the researcher to stay in the targeted setting long enough to understand the participants’ point of view and to learn from people as opposed to studying them as an outsider (Hymes, 1982; Spradley, 1979).

Survey Instruments

Table 1 outlines the primary surveys (administered by the principal investigator) and the secondary surveys (administered by the elementary school). Table 1 provides information on the title, purpose, and source of each survey. Table 1 also includes who administered the survey and who participated in each survey.

Table 1: Primary and Secondary Surveys

Appendix	Administered By	Title	Purpose	Participants	Source
D – Part 1	Principal Investigator	Request for Information from Technology Coordinator	Gather data reflecting physical technology aspects; programs in place; beliefs/attitudes and visions	Technology Coordinator for the County School System	U. S. Dept. of Education; open-ended questions added by principal investigator
D – Part 2	Principal Investigator	Request for Technology Expenditures at Participating School	Gather data reflecting the expenditures on technology at the school	Technology Coordinator for the School System	Principal Investigator – Criterion-based
E	Principal Investigator	Teacher Survey	Gather data reflecting general technology use and attitudes /beliefs that might effect that use; quantitative/ qualitative	All teachers at participating school	Designed by principal investigator with input from 4 teachers from pilot study; criterion-based
F	Elementary School (spring 2000)	Staff Use of Technology 1999-2000 Self-Evaluation Rubrics	Reflects teacher self-assessed competences in the use of technology	All teachers at participating school	Bellingham Public Schools, available on-line
G	Elementary School (spring 2000)	Teacher Survey	Reflects items addressed by teachers on state mandated technology curriculum (K-2, 3-5); Section II addressed attitudes/beliefs	All K-5 classroom teachers at participating school	State Curriculum Guide for Technology; Section II developed by school committee

Table 1: Primary and Secondary Surveys Continued

Appendix	Administered By	Title	Purpose	Participants	Source
H	Principal investigator	Request for Information from Supervisor of Instruction	Gather data reflecting professional development in technology; beliefs/attitudes and visions	Supervisor of Instruction for County School System	Principal Investigator – criterion-based
I	Principal Investigator	Parent/Guardian Survey	Gather data Reflecting beliefs/attitudes and knowledge of the use of technology at participating school	Parents and guardians of children at participating elementary school	Criterion-based follow-up of qualitative survey
J	Elementary School (spring 2000)	Parent/Guardian Survey	Gather demographic information; beliefs/attitudes	Parents and guardians of children at participating school	School Improvement Plan Committee
K	Principal Investigator	Request for Information from School Administrators	Gather data reflecting physical technology aspects; beliefs/attitudes and visions	Principal; Assistant Principal	U. S. Dept. of Education; open-ended questions added by principal investigator
L	Principal Investigator	Survey of Technology Training Attendees – Teachers/Parents Pilot Study	Gather demographic information; beliefs/attitudes and technology skills	Parents and Teachers attending Pilot Studies for technology training	Principal Investigator

Narrative on Survey Instruments

The surveys originated from several sources. The following paragraphs describe the origin of the surveys, the purposes of each survey, the participants, the administration of surveys, and analysis of surveys.

The “Teacher Survey” (Appendix E) emerged as a result of a qualitative pilot study conducted prior to the beginning of this research project. The pilot study involved training teachers interested in expanding or improving their skills in using technology as a teaching and learning tool. Twelve teachers participated in these training sessions that met two evenings per week for a period of eight weeks. The sessions lasted approximately two and one-half to three hours each. Teachers brainstormed a variety of topics relating to computer use in the classroom and prioritized the order in which the topics would be discussed. Teachers attending these training sessions completed both pre and post-surveys examining demographic information, technology skill levels and interests, and beliefs regarding the use of various technologies as teaching and learning tools. A group of four teachers from these training sessions served as an “expert panel” in reviewing the questions on the surveys (Appendix L). This panel discussed each item on the survey and viewed its relevance in relation to understanding the status quo of technology use and beliefs held by the stakeholders at the participating elementary school. Using teacher recommendations of survey items and Patton’s (1990) definition of process evaluations which “are aimed at elucidating and understanding the internal dynamics of how a program, organization, or relationship operates” (p. 95), the researcher developed the Teacher Survey.

The purposes of the Teacher Survey (Appendix E) included gathering demographic information relating to grade levels or student population taught and years of experience in education. Other topics of the survey included the history of each teacher's general computer use, the history of each teacher's Internet use, and attitudes and beliefs relating to technology use that reflect their own personal experiences including the role of technology in teaching and learning, perceived attitudes of administrators and parents, and issues related to technology training and skill levels. Questions included in this survey reflected both open-ended queries that allowed for teachers to use their own words and elaborate freely, and questions that fit the Likert Scaling model.

The Teacher Survey sought to gather information from all regular classroom teachers, special education teachers, speech teachers, art teachers, music teachers, physical education teachers, librarians, and guidance counselors at the participating elementary school. Color-coding of these surveys according to grade level or classification of instruction, i.e., blue surveys for K-3, yellow surveys for 4-6, and white for all other categories of teachers provided the principal investigator ease of analysis of completed surveys. Teachers at the participating school received these surveys in their personal mailboxes located in the teachers' lounge. Teachers placed completed surveys in a designated box in the office of the school. The principal investigator returned to the school once a week for two weeks to gather completed surveys. As a token of appreciation for taking the time to respond to a lengthy survey, teachers received a free book provided by the principal investigator. Teachers received one reminder notice at the end of the first week.

At the end of the two-week period of time, the principal investigator recorded the number of completed surveys and embarked upon analysis of the surveys. The principal investigator removed the staple on each survey separating the open-ended questions from the remainder of the pages. The color-coded surveys allowed for analysis of information based on grade level or type of instruction, i.e., music, art, special education, etc. The principal investigator read the surveys looking for patterns that emerged from the qualitative data and made notes of specific insights teachers shared. SPSS 10.0 Statistical Analysis Program provided analysis of all quantitative data obtained from the Likert Scale questions. Descriptive data in the form of tables and graphs indicating percentages emerged from this analysis helping to explain some of the parameters related to technology use at the participating school.

The principal investigator developed the “Qualitative Parent Survey” (Appendix I) as a follow-up to the quantitative survey administered by the participating school in the spring of 2000. This survey allowed for open-ended questions that gave parents an opportunity to elaborate and respond in their own words to the questions.

The questions in the Qualitative Parent Survey addressed some of the same issues as the teacher surveys, i.e., the amount of priority placed on technology at the participating school, the roles of parents and teachers in preparing children to use computers and related technology, and parent attitudes and beliefs relating to the use of technology in an elementary school as a teaching and learning tool. The primary purposes of this survey included expanding and extending the information gathered by the elementary school in

the spring of 2000 and comparing and contrasting commonly held beliefs of parents with those of teachers and administrators at the school.

Parents and guardians of students at the participating school comprised the participants in the Qualitative Parent Survey (Appendix I). Approximately 504 different households represented the students enrolled at the participating school in the spring of 2000. Teachers distributed these surveys to their students with instructions to give the surveys to parents or guardians, ask the parents or guardians to read the directions, and then return completed surveys to school the following day. Teachers reminded students over the next five days to bring completed surveys to school. Teachers placed all completed surveys in a designated box in the office set up for that purpose. The principal investigator gathered completed surveys from the box in the office over a two-week period of time.

At the end of the two-week period, the principal investigator counted the number of returned surveys and began reading the surveys to discern patterns of beliefs or specific insights that illuminate the research questions. SPSS 10.0 Statistical Analysis Program provided analysis of all quantitative data gathered in this survey. The principal investigator compared responses to this survey to similar questions posed to teachers and administrators.

“The Evaluation of the Technology Literacy Challenge Fund,” a document developed by the U. S. Department of Education (1998) served as the principal source of the “Request for Information from School Administrators” survey (Appendix K). Questions one through twenty remained intact from the original on-line document. The principal

investigator developed questions twenty-one through twenty-five to give administrators open-ended questions that provided administrators with opportunities to elaborate and respond in their own words to the questions. These six qualitative questions reflected the same topics as asked teachers and parents in subsequent surveys and laid the foundation for comparing and contrasting responses among different groups of stakeholders.

Purposes of this survey included gathering information relating to physical technology resources found at the school, the types of software available on-site, technology training and professional development for teachers, and information regarding attitudes, beliefs, and visions pertaining to technology at the school. The school principal and assistant principal comprised the intended participants of this survey. Both administrators served on committees and helped plan and shape technology expenditures, programs, training, projects, and future implementations at the participating school.

The principal and assistant principal completed the survey and returned it to the principal investigator during one of the visits the investigator made to collect teacher and parent surveys. Analysis of this survey included quantitative elements of analysis performed in SPSS 10.0 Statistical Analysis Program. The principal investigator compared the six open-ended questions with questions related to the same topics as asked teachers, supervisors of instruction, technology coordinators, and parents in subsequent surveys.

“The Evaluation of the Technology Literacy Challenge Fund,” a document developed by the U. S. Department of Education (1998) served as the primary source for the “Request for Information from Technology Coordinator” survey (Appendix D).

Questions one through nine remained intact from the original on-line document. The principal investigator developed questions ten through twelve to give the technology coordinator open-ended questions that provided opportunities to elaborate and respond in his own words to the questions. These three qualitative questions reflected the same topics as asked teachers, parents, administrators, and supervisors of instruction in subsequent surveys and laid the foundation for comparing and contrasting responses among different groups of stakeholders.

The purposes of this survey included gathering information relating to physical technology resources found at the school, the total expenditures for technology at the participating school, the types of operating systems available on-site, certain policies that might be in place in the county school system related to technology use, and information regarding attitudes, beliefs, and visions pertaining to technology at the school.

The county technology coordinator completed the survey and returned it to the principal investigator by way of return mail. The technology coordinator used a self-addressed, stamped envelope for that purpose. Analysis of this survey included quantitative elements of analysis performed in SPSS 10.0 Statistical Analysis Program. The principal investigator used the six open-ended questions to compare questions related to the same topics as asked teachers, supervisors of instruction, administrators, and parents in subsequent surveys.

The principal investigator developed the “Request for Information from Supervisor of Instruction” survey (Appendix H). This survey included criterion-based questions

designed to gather the same types of qualitative information as requested on surveys from teachers, administrators, parents, and technology coordinators.

The purposes of this survey included gathering information on past professional development in the area of technology for teachers at the participating school and sharing attitudes, beliefs, and visions relating to the use of technology as a teaching and learning tool at the elementary school. This survey laid the foundation for comparing and contrasting responses among different groups of stakeholders.

The principal investigator requested that the supervisor of instruction for the county in which the participating school resides participate in this survey. She completed the survey and returned it to the principal investigator by way of return mail. The supervisor of instruction used a self-addressed, stamped envelope for that purpose. The principal investigator used the three open-ended questions to compare with questions related to the same topics as asked teachers, technology coordinators, administrators, and parents in subsequent surveys.

The “Staff Use of Technology 1999-2000 Self-Evaluation Rubrics” survey (Appendix F) represents secondary data. The participating elementary school administered this survey in the spring of 2000 in preparation for reaccreditation in the Southern Association of Schools and Colleges (SACS).

The purpose of this survey included expanding the data collection for an upcoming visit from the Southern Association of Schools and Colleges (SACS). The National Study of School Evaluation (NSSE) surveys given by the participating school indicated a need for improving teacher’s competencies in technology. To further identify areas of

need in teacher technology-related skills, a committee of four people at the participating school previewed this survey and determined that it would help define “levels” of expertise in technology and possibly show areas of need for future training.

The forty-three teachers at the participating school comprised the population for this survey. Teachers received a copy of the survey in their school mailboxes located in the teacher’s lounge. Teachers returned the completed surveys to a labeled folder in the office. SACS committee members received binders of information based on SPSS 10.0 Statistical Analysis Program analysis of data from these surveys. This information also helped to shape the School Improvement Plan where technology was selected as one of the three key areas of need for the school to address in the 2000-2001 school year.

The “Teacher Survey” (Appendix G) represents secondary data. Developed by a committee of four people at the elementary school, this survey attempted to discern which areas of the state mandated technology curriculum were being addressed and in which grades. The participating elementary school administered this survey in the spring of 2000 in preparation for reaccreditation in the Southern Association of Schools and Colleges (SACS).

The purpose of this survey included expanding the data collection for an upcoming visit from the Southern Association of Schools and Colleges (SACS). The National Study of School Evaluation (NSSE) surveys given by the participating school indicated a need for improving teacher’s competencies in technology. To further identify areas of need in teacher technology-related skills, a committee of four people at the participating school took the state curriculum guide and outlined, in the form of a checklist, the state

mandated technology curriculum for grades K-2 and 3-5. Section II of this instrument addressed teacher beliefs and attitudes toward technology use in the classroom.

Kindergarten through fifth teachers at the school served as participants in this survey. Teachers received a copy of the survey in their school mailboxes located in the teacher's lounge. Teachers returned the completed surveys to a labeled folder in the office. SACS committee members received binders of information based on SPSS 10.0 Statistical Analysis Program analysis of data from these surveys. This information also helped to shape the School Improvement Plan where technology was selected as one of the three key areas of need for the school to address in the 2000-2001 school year.

The "Parent/Guardian Survey" (Appendix J) represents secondary data. Developed by a committee of four people at the elementary school, this survey attempted to discern parent and guardian views regarding the use of technology in education and demographic information representative by those completing the survey. The participating elementary school administered this survey in the spring of 2000 in preparation for reaccreditation in the Southern Association of Schools and Colleges (SACS).

The purpose of this survey included expanding the data collection for an upcoming visit from the Southern Association of Schools and Colleges (SACS). The National Study of School Evaluation (NSSE) surveys given by the participating school indicated a need for understanding circumstances surrounding technology use at the elementary use. To further identify parental interests in the use of technology at the elementary school, a committee of four people at the school developed this survey for parents and guardians of students at the school.

Parents of students at this school served as participants in this survey. Teachers gave students the “take-home” survey and asked them to give the surveys to their parents and then return the completed surveys to school the next day. Teachers placed completed surveys in the office in a labeled folder. SACS committee members received binders of information based on SPSS 10.0 Statistical Analysis Program analysis of data from these surveys. This information also helped to shape the School Improvement Plan where technology was selected as one of the three key areas of need for the school to address in the 2000-2001 school year.

Other data available for synthesis and interpretation included results from Opinion Inventories developed by the National Study of School Evaluation (NSSE) administered to teachers, parents, and community members administered by the participating school in the spring of 2000. These inventories addressed a series of issues of particular concern to the school, and provided valuable data to guide decision making relative to program development, policy formulation, administrative organization, staff development and community services (NSSE: School Improvement: Focusing on Student Performance, 1997).

Specific Risks and Protection Measures

There were no expected risks for the participating school, the administrators, or any of the parents and teachers who were surveyed. Access to consent forms, surveys, data output from SPSS 10.0, and other written materials was restricted to the principal investigator’s committee chairperson and the principal investigator. All materials including consent forms, surveys, data output from SPSS 10.0 and other written materials

will be kept in a locked file in Claxton Complex 415 at the University of Tennessee for three years upon the completion of this study at which time they will be destroyed.

At no time will the name of the school be identified in writing and only the investigator and committee chairperson will be privy to that information. The participating school will be referred to only as an “elementary school in the southeastern United States.”

Overview of Sites and Participants

The participating elementary school was located in a rural town in the Southeast United States. The school serves kindergarten through sixth grade with an approximate enrollment of 676 students. Twenty-nine regular classroom teachers served as faculty members; also on faculty were six special education teachers, one Title One teacher, one physical education teacher, one librarian, one speech pathologist, one guidance counselor, one music teacher, and one part-time art teacher. The 676 students represented approximately 504 different households. One principal and one assistant principal served as administrators of the school. The free and reduced lunch population measured forty-eight percent of the school’s total population. Ethnic populations composed approximately three percent of the total student body.

Chapter Four

Results

This study represented information gathered through primary and secondary surveys and checklists administered to teachers, administrators, a technology coordinator, a supervisor of instruction, and parents of students at the participating elementary school. This population fit Patton's (1990) description of purposefully selected, information-rich participants in a research project.

The Setting

The 2000 census (U. S. Census, 2000) described the rural county in which the participating school resided with a population of 17,712, denoting 95.4% of the population as white. Blacks (2.5%), American Indian and Alaska Natives (.4%), and Asian persons (.2%) accounted for the remainder of the population. The census further reported the median household income for this county at \$32, 077. Children living below the poverty level constituted 17.5% of the total population of children in this county.

The participating elementary school was located in a rural town in the Southeast United States. The school served kindergarten through sixth grade with an approximate enrollment of 676 students. The free and reduced lunch population measured 48% of the school's total population. Ethnic populations composed approximately three percent of the total student body. The 676 students in this school represented approximately 504 different households. One principal and one assistant principal served as administrators of the school.

Data Collection and Analysis

Data collected provided means for a qualitative study supported and enhanced by quantitative statistics. The purposes of this data gathering stemmed around capturing and describing the attitudes of stakeholders and teachers' technology skills levels that shaped the use of classroom technology at the participating school. This research project sought to gather and interpret data from surveys administered to teachers, parents, and administrators on the use of technology in education, describing the status of technology use and related attitudes, during the 1999-2000 school year. Concerned with data analysis that would address the questions guiding this study and to establish redundancy in my observations, principal investigator used triangulation of data and analysis techniques as recommended by Patton (1990). According to Patton, naturalistic inquiry provides for collecting both quantitative and qualitative data for analysis. Surveys provided quantitative data further subjected to statistical analysis (SPSS 10.0 Statistical Analysis Program). Field notes from the pilot study, observation notes from informal meetings with teacher, parents, and administrators, and open-ended survey questions provided qualitative data further subjected to content analysis.

The participants, stakeholders in the participating school, served as "information rich" members of the population (Patton, 1990). For the purposes of this study, stakeholders included teachers, parents, administrators at the participating school, and the Supervisor of Instruction and Technology Coordinator from the county school system. Six surveys served as primary instruments of research (Appendices D, D-Part 2, E, H, I, K). Participants responded to these surveys in the fall of 2000. Three surveys served as

secondary instruments of research (Appendices F, G, J). The participating school administered these surveys in the spring of 2000 in preparation for Southern Association of Schools and Colleges (SACS) reaccreditation and to develop a School Improvement Plan.

The returns for the Teacher Survey (Appendix E) totaled 83.3%. To further elaborate on percentages of returns on the Teacher Survey, the return for Kindergarten through grade three equaled, 88.2%; the return for fourth grade through sixth grade equaled 75%; and the return for “other” (special education teachers, Title One teachers, physical education teacher, librarian, speech pathologist, guidance counselor, music teacher, part-time art teacher) equaled 84.6%. The principal investigator attributed the length of the survey as the reason for not receiving more participation from the teachers at the participating school. Other factors included a teacher on maternity leave and the fact that the lowest responding category of teachers, “other,” included teachers who travel around the county school system and work at other schools so they may not have received the survey prior to the deadline for submission.

Two pilot studies, one with teachers and one with parents, provided opportunities for questions to emerge and served to shape the focus of this research (The Joint Committee on Standards for Educational Evaluation, Sanders, 1994). Chapter 3 details the structure and execution of the pilot studies.

To document information from the pilot studies and from other opportunities to interact with teachers, parents, and administrators at the participating school, the principal investigator took extensive notes and administered pre and post surveys. Comments and

behaviors by participants served as opportunities for me to develop questions, theories, and hypothesis regarding the role of technology at this school. During this phase of the study, the principal investigator also acted as participant and learner. Participant observation in qualitative research “simultaneously combines document analysis, interviewing of respondents and informants, direct participation and observation, and introspection” (Denzin, 1978, p. 183, as cited in Patton, 1990). Glesne & Peshkin (1992) stated that, in contrast to a general tendency of spending only a short amount of time with participants, “the ethnographic researcher means to stay long enough to get the native’s point of view,” allowing the participant observer to “understand the research setting, its participants, and their behaviors” (p. 42). The principal investigator categorized field notes, observation notes, and personal notes from the pilot studies and other informal interactions with teachers and parents. Results of surveys administered prior to beginning the technology training sessions (pre) and after technology training sessions ended (post) also helped to provide baseline data for the focus of this research project. This categorization or “coding” of data consisted of what Glesne & Peshkin (1992) referred to as a “process of sorting and defining and defining and sorting those scraps of collected data” (p. 133).

Based on Lincoln and Guba’s (1985) recommendation that researchers acquire impartial feedback from people not directly involved in the study, a group of three knowledgeable consultants reviewed and discussed the categories that emerged from the pilot studies. Four main ideas surfaced from this process. These questions served as the organizational framework of the study:

- What technology skills do teachers already have, and how are those skills demonstrated in the classroom?
- What role do teacher beliefs regarding educational technology play in technology use at this school?
- What technologies do parents expect their children to be provided at school?
- Do teachers, parents, administrators, supervisors of instruction, and technology coordinators share common goals for the role of technology in education at the participating school?

The principal investigator worked to locate, modify, and develop surveys that addressed the four main ideas that emerged from categorizing the pilot study data. A group of four teachers from these training sessions served as an “expert panel” in reviewing the questions on the surveys. The panel reviewed the surveys, making suggestions about which questions to keep, which questions to discard, and which questions we might want to add. The resulting teacher, parent and administrative survey documents, administered in the fall of 2000, included many more open-ended questions than did the pilot study surveys.

Portraiture, a qualitative research methodology developed by Lawrence-Lightfoot and Davis (1997), served to guide me in “drawing a picture” of technology use and beliefs held by stakeholders at the participating school, particularly in interpreting the open-ended survey questions. The authors described the process of identifying emergent themes found in holistic studies as the portraiture “gathers, organizes, and scrutinizes the data, searching for convergent threads, illuminating metaphors, and overarching symbols, and often constructing a coherence out of themes ...” (p. 185). The following outlines the five steps Lawrence-Lightfoot and Davis suggested as modes of synthesis:

- listen for repetitive refrains
- listen for resonant metaphors

- listen for themes expressed through cultural institutional rituals
- use triangulation to weave together threads of data converging from a variety of sources
- construct themes and reveal patterns among perspectives (p. 193)

To implement this mode of data analysis and synthesis, the principal investigator separated the surveys into stacks with like questions in each. The principal investigator read and categorized responses based on “pattern codes” (Miles and Huberman, 1994). The authors defined pattern codes as, “ ... explanatory or inferential codes, ones that identify an emergent theme, configuration, or explanation” (p. 149). The principal investigator identified themes and then asked a panel of four knowledgeable consultants (Lincoln and Guba, 1985) to take the same survey responses, use Lawrence-Lightfoot’s and Davis’ recommendations for identifying themes, and categorize the responses according to their best judgment. The principal investigator took the notes from the consultants and compared those with the notes made earlier as the principal investigator identified emerging themes, recording similarities and differences.

SPSS 10.0 Statistical Analysis Program served as the primary method for analyzing quantitative data. The researcher entered data from each survey into the statistical program to provide descriptive statistics in the form of frequencies, means, percentages, and to search for correlations among factors.

The Participants – Stakeholders

Carter (1994) described Stakeholders as “ ... those who should be affected by a program evaluation ... typical stakeholders include the individuals and groups whose work is being studied, those who will be affected by the results ...” (p. 25). For the purposes of this study, the stakeholders included the teachers, parents, and administrators

at the targeted elementary school. Additionally, the Supervisor of Instruction and the Technology Coordinator for the county school system in which the elementary school resided qualified as stakeholders and participated by responding to surveys and through interactions during the pilot studies. Below, the principal investigator describe the participants in this study.

Twenty-nine teachers served as regular K-6 classroom teachers at the participating school. Additional faculty included six special education teachers, one Title One teacher, one physical education teacher, one media specialist, one speech pathologist, one guidance counselor, one music teacher, and one part-time art teacher. All forty-two teachers listed “white” in reference to ethnicity. Female faculty members outnumbered male faculty members by a ratio of 40:2. Thirty-five of the forty-two faculty members voluntarily participated in the primary research survey for teachers (Appendix E).

Teaching experience of the faculty members who participated ranked as follows: 28.6% eleven to twenty years teaching experience; 25.7% over twenty years teaching experience; 20% six to ten years teaching experience; 17.1% three to five years teaching experience; 5.7% one to two years teaching experience; and 2.7% were first-year teachers. Classroom teachers constituted twenty-four (68.3%) of the participants; special education teachers accounted for six teachers (17.1%) participating; and five (14.3%) of the teachers fell into the “other” category composed of music, art, media specialist, physical education, speech teacher and guidance counselor. Table 2 provides a summary of the teacher demographics.

Table 2: Teacher Demographics								
Demographics	Numbers of Teachers	Male/ Female/ Race	Teaching Exp 1 st yrs	Teaching Exp 1-2 yrs	Teaching Exp 3-5 yrs	Teaching Exp 6-10 yrs	Teaching Exp 11-20 yrs	Teaching Exp > 20 yrs
K-6 Classroom Teachers	29							
Special Education	6							
Title One	1							
Physical Education	1							
Media Specialist	1							
Speech Pathologist	1							
Guidance Counselor	1							
Music Teacher	1							
Art Teacher (part time)	1							
Female		40; white						
Male		2; white						
Teaching Experience			2.7%	5.7%	17.1%	20.0%	28.6%	25.7%

The principal at the participating school ended her fourth year in this position at the end of the 1999-2000 school year; the assistant principal ended her first year; the supervisor of instruction ended her tenth year in that position; and the technology coordinator ended his fifth year. The principal, assistant principal and supervisor of instruction all listed previous classroom experience as teachers. The principal, assistant principal, supervisor of instruction, and technology coordinator indicated they place an emphasis on the role of technology in education. All participants in this category possessed home computers and Internet access (Appendices D, H, K).

Parents of students who attended this school also participated by responding to surveys. Students at the school received a survey from their teachers who asked them to give the survey to their parents and then to return the completed surveys in a sealed envelope (provided by the researcher). The class who returned the most completed surveys won a book provided by the researcher.

Description of Current Technology Available at School

For the purpose of this study, “technology” was defined as “the technical means people use to improve their surroundings. It is also a knowledge of using tools and machines to do tasks efficiently on-line” (Bergan Country Technical Schools, 2002). In February 2000 the participating elementary school conducted an inventory of computers in preparation for a reaccreditation visit by the Southern Association of Colleges and Schools (SACS). The Technology Coordinator provided the results of this survey in his response to the “Request for Technology Expenditures at Elementary School” (Appendix D – Part 2). The Technology Inventory indicated a total of 127 school computers – 122

purchased by county school funds, grant funds, e-rate funding, PTO funds, school fund-raising efforts, or donations and five purchased privately by teachers (Appendix D.2 – 10). This total included computers in all regular K-6 classrooms, special education classrooms, and the library. Personal Computers (PC's) accounted for all computers at the school (IBM-compatible). No computer lab existed at this school.

Teachers indicated that the 127 computers include those of questionable use. Teachers included annotations on some of the inventory sheets describing some of these computers as “very old” (Appendix D.2.8, 15), “very slow” (Appendix D.2,10), and “two not working” (Appendix D.2.17). One teacher (Appendix D.2.11) stated, “This computer does not have an updated version of the Internet. The memory cannot hold the full Internet program. There are also activity centers that this computer cannot run for the children. I have not been able to send or receive email.” Another teacher (Appendix D.2.10) listed 17 computers for her classroom, but noted that she obtained three Apple IIe's from the “trash,” two which presently do not work along with another Macintosh LC presently not working. The teacher included in a handwritten message attached to the inventory sheet, “Not counting grants and winnings ... I have probably spent over \$2,000 on computers in my classroom. I can never afford new or good, but I take in anything and buy used models. Therefore most of my computers are slow and outdated.”

Each K-6 classroom and special education classroom in the participating school indicated at least one computer with Internet access. Six regular education classrooms had multiple on-line computers, some with as many as four computers with Internet access. All teachers in the building except two indicated they would like to increase the

number of on-line computers in their classrooms (Field Notes, 3-6-00). All teachers except five specified that grant writing accounted for some of the technology in their classrooms.

The Technology Inventory showed 54 printers of various makes and models throughout the regular and special education classrooms - 52 purchased by county school funds, grant funds, e-rate funding, PTO funds, school fund-raising efforts, or donations and two purchased privately by teachers (Appendix D.2.10). Of those 54, teachers indicated four as “not working” (Appendix D.2.10).

Other forms of technology and multimedia equipment numbered few. Only one scanner existed anywhere in the school (Appendix D.2.28). Teachers reported nine laser disc players (Appendix D.2.6, 11, 15, 16, 17, 24, 26, 40, 40), and three digital cameras (Appendix D.2.10, 17, 40). The inventory indicated no CD burners or zip drives. Video technology seemed present in all classrooms with a total of 30 televisions and 29 videocassette recorders. However, no video cameras or editing machines existed in the school.

An analysis of the data indicated the ratio of students-to-computers falls at 5.32 students for every computer. A large fluctuation of numbers of computers per classroom made this ratio misleading. As Table 2 indicates, one classroom listed as many as 13 computers (Appendix D.2.10) and another, 17 computers (Appendix D.2.37). The actual mean of computers per classroom fell at 3.4. Forty-two percent of the classrooms indicated only two computers making the student-to-computer ratio in those classrooms approximately 11 to 1. The ratio of students-to-on-line-computers in K-6 classrooms

showed a drastic change in proportion: school average of 20 students to every on-line computer. These figures ranked well below the national average of 4.9 students per computer and 7.9 students per on-line computer as indicated by Market Data Retrieval's (2000) recent nationwide survey of all public schools.

Funding for technology purchases at this school came from 21st Century Classroom grants, Title One funding, special education funding, the Parent Teacher Organization at the school, grant writing, and from fund raising efforts at the school. \$109,343.32 worth of computers, monitors, and printers accounted for the technology purchases at the participating school from July 1, 1992 through February 18, 2000. Of that amount, the 21st Century Classroom grants provided \$74,038.32 for the purchase of computers, monitors, and printers. The alternate funding sources mentioned above accounted for the balance of the technology expenditures.

When asked to respond to a survey prompt (Appendix E.13), 57.1% of teachers indicated that the school **does not possess an adequate amount of computers/technology** to produce students who are technologically literate. The principal reiterated the need for more computers in response to identifying weaknesses in computer and technology use in the classroom (Appendix K.22.1).

However, the Supervisor of Instruction for the county in which the participating school resided indicated, "The first noticeable strength is availability of computers and other types of technology," when asked to identify the strengths in computer and technology use in the classrooms (Appendix H.4). The Technology Coordinator for the county concurred as he responded to what he sees as strengths in computer and

technology use in the classrooms stating, “Availability of technology in the classrooms. There is an average of almost three pc’s [personal computers] per classroom and 2/3 of the classrooms have a pc connected to a large screen TV. All classrooms have at least one pc connected to the Internet, most have 2 or more” (Appendix D.10). It appeared that some discrepancy existed between what teachers and administrators viewed as adequate technology and what the Supervisor of Instruction and the Technology Coordinator viewed as adequate technology.

Baseline Data on Participating Teachers

Length and Type of Computer Use

Background information gained from the surveys and field notes helped to describe the population of teachers at the participating school. Teachers participating in the primary teacher survey indicated the **length of time using computer technology in the classroom** as: three to five years, 32.4%; more than 5 years, 26.5%; two years, 26.5%; one year, 11.8%, and not yet started, 2.9% (Appendix E.4). Field notes taken by the researcher during the pilot study with teachers indicated a wide definition of what it means to “use” a computer in the classroom. When describing daily computer use three teachers gave the following responses: Teacher One: “I turn it on and bring up the AR [Accelerated Reader] program when I get to my classroom each morning. My students know when they can go over and take an AR test. Before AR, I hardly ever turned it on” (Field Notes, 3-14-00). Teacher Two:

I spent some money on programs for my students to practice math and reading last year. Students know how to get into those programs and I let them use it everyday. They also do AR. I think the programs really help some students because they think it is like playing a video game. (Field Notes, 3-14-00)

Teacher Three:

I have an email account on Hotmail and I check that here and at home. I have some favorite teachers sites where I get good lesson plans and ideas. I learned how to do PowerPoint and now all my students do at least one PowerPoint presentation each year. I have announcements on PowerPoint each morning when my students come in the room. I am teaching my students how to use the Internet to search for topics we are studying. (Field Notes, 3-14-00)

These responses reflected teachers who indicated satisfaction with the current use of technology in their classrooms even though the function technology served appeared very different in each classroom.

Weekly Hours of Personal Computer Use

The Teacher Survey (Appendix E.8) prompted teachers to respond to **how many hours per week they used computers for personal purposes** (i.e., games, shopping, news, weather, current events, bookkeeping, learning, etc.). Teachers included both time on the computer at home and at school. Results indicated 54.3% of teachers spend less than one hour per week using the computer for personal purposes; 28.6% spend between one and five hours per week; and 17.1% spend between ten and twenty hours per week using the computer for personal purposes. Field notes from the pilot study with teachers indicated that fifteen of the sixteen people attending the teacher training sessions maintained that the technology skills they possess stem primarily from using the computer “a lot” and self-teaching. One teacher defined “self-teaching” as:

Just hours and hours of being at the computer and trying things until I figured out what worked. I almost never looked at the manuals ... I did buy one of those “Idiot” books for the Internet, and it was some help. (Field Notes: 3-20-00)

Only one person indicated college courses as a means of learning to use computers and technology. Another teacher stated that she attended Twenty-First Century Classroom training six years prior, but that the training she received there provided little value to her now as technological advancements rendered her skills obsolete.

Weekly Hours of School-Related Computer Use

Question nine (Appendix E.9) asked a similar question: **How many hours per week do you use your computer for school purposes** (this might include lesson planning, research, chatting with other teachers for educational purposes, word processing, etc.)? Teachers included time on their computers at home (elsewhere) and school. Results showed that 71.4% of teachers use the computer for school purposes one to five hours per week; 20.0% report computer use for school purposes 10 to 20 hours per week; 5.7% of teachers use the computer for school purposes less than one hour per week; and 2.9% of teachers indicate that they use computers for school purposes 21 to 40 hours per week.

Field notes throughout the pilot study with teachers indicated that lack of time appeared as a common theme among teachers when discussing computer usage (Field Notes, 3-6-2000 through 4-12-00). A common consensus that emerged specified that if teachers *had* more time they would use the computer more for both personal and professional purposes. One teacher recounted:

With me it is use it or lose it. I can go to some training or have someone show me something I want to learn to do on my computer, but then if I don't get a chance to use it soon I forget how to do it. It makes me feel like what is the use of knowing how to do things with technology if I don't have time to do it. (Field Notes, 4-5-2000)

Another teacher commented that interruptions during the day in her classroom made even approaching the computer impossible and her after school time centered around grading

and preparing for the next day, leaving no time to work on the computer. She continued to explain that she had tried using her “planning time” while students were involved in physical education classes or library time to work on the computer, but that 30 minutes was not enough time at one sitting at the computer to accomplish anything (Field Notes: 4-5-2000).

Field Notes further indicated that some teachers addressed the “time” problem by using home computers for both personal and school-related work. When responding to **how many personal computers are in your household** (Appendix E.12), only five teachers (14.3%) out of the thirty-five who participated indicated they have no computer at home (Table 3).

Teacher Skills in Using Technology

This section addresses a range of factors relating to teacher skill levels in using technology as a teaching and learning tool in the classroom. The range of factors extends from comfort levels to specific skills and abilities as they related to the use of technology. Primary survey instrument, “Teacher Survey” (Appendix E), secondary survey instrument, “Staff Use of Technology” (Appendix F), and field notes from pilot studies provided data for this discussion of teacher skills in using technology.

Table 3: Teacher Home Computers- Teacher Survey: Appendix E.7

# Of home computers	Frequency	Percent	Valid Percent	Cumulative Percent
0	5	14.3	14.3	14.3
1	19	54.3	54.3	68.6
2	8	22.9	22.9	91.4
3	2	5.7	5.7	97.1
4 or more	1	2.9	2.9	100.0
Total	35	100.0	100.0	

Comfort Zones in Using Computers

When responding to **how comfortable they are with computers in general** (Appendix E.5), fourteen teachers (40%) indicated they were somewhat comfortable; eleven teachers (31.4%) indicated they were very comfortable; seven teachers (20%) indicated they were neither comfortable nor uncomfortable; and three teachers (8.6%) indicated they were somewhat uncomfortable. Teachers responded to an open-ended question allowing them to elaborate on this topic (Appendix E.6). Table 4 communicates the elements or features of using computers with which teachers considered themselves comfortable.

Most teachers who responded to this question simply listed different computer applications. However, two teachers made the following comments regarding the elements or features of using computers that they felt comfortable using. One teacher wrote, “Most everything – Especially the fact that I now realize computers are machines – don’t be afraid of tearing them up, you probably won’t – What is broken can be fixed. Use them!” (Appendix E.6.34). This response related to how the affective domain influences this teacher’s perception of computer-related comfort levels. Once the fear of “tearing them up” was conquered, this teacher felt comfortable enough to risk a comfort level of “most everything.” Another teacher indicated, “I feel comfortable if I can do a task quickly” (Appendix E.6.35) and then went on to list several applications as examples. This response suggested “automaticity,” a term often used in literacy instruction to indicate skills performed automatically or without intense cognitive processing; usually a result of repetition. Or this comment might simply relate to the

Table 4: Comfort Elements/Features of Computer Use

Elements/Features of Computer Use	Percentage of Teachers
Internet	71.4
Word Processing	51.4
Software Applications	37.1
Email	34.3
Accelerated Reading Program	17.1
Printing	14.3
Microsoft Windows	11.4
PowerPoint	8.6
Publishing (cards, etc)	5.7
Scanners	5.7
Teacher Toolbox	5.7
Grade book	5.7
Turning the Computer On	5.7
Digital Cameras	2.9
Touch screen	2.9
Spreadsheets	2.9
Research	2.9
Microsoft Office Applications	2.9

discomfort that came from participating in time-consuming computer applications in an already busy schedule.

Elements/Features of Computers that Cause Discomfort

Teachers also identified elements/features of computers that made them **feel uncomfortable when using technology** (Appendix E.7). Some of the same identified features listed as “comfort” zones also appeared in the list of features that caused discomfort to others. This indicated the individual differences that exist among teachers and the many different levels of expertise in using technology. As shown in Table 5, only a few features of using computers emerged as common elements of discomfort among teachers. Teachers noted the following as frequent elements of discomfort: technical problems with hardware or system (22.9%); software problems (14.3%); Internet (14.3%); and files management (11.4%).

Some teachers merely listed elements of using computers that made them comfortable or uncomfortable without specific comments and others gave detailed scenarios. When recounting uncomfortable features of using computers, one teacher related a common experience to anyone who produces work on computers as she wrote:

Sometimes I will accidentally push a key while typing and my screen will go off. I never know what I pushed or touched, so I don't know what to be careful of. Then, I don't know how to pull my information back up. Sometimes I will have to go out of what I'm working on and re-enter to get my information back. That is frustrating to me. (Appendix E.7.8)

Another teacher voiced a similar feeling when confronted with error messages as she wrote, "I hate it when they give those error messages. I get all freaked out" (Appendix E.7.9).

Table 5: Elements/Features of Computer Use Causing Discomfort

Elements/Features of Computer Use	Percentage of Teachers
Technical Problems (hardware/system)	22.9
Software Problems	14.3
Internet	14.3
Files Management	11.4
Cutting and Pasting	8.6
Error Messages	8.6
Microsoft Word	8.6
Time	8.6
PowerPoint	8.6
Network Problems	5.7
Scanners	5.7
Web Design	5.7
Clipboard	2.9
Setting Up Computers, etc.	2.9
Need of a Support Person	2.9
Differences in Computers	2.9
Email	2.9
Programming	2.9
Graphics	2.9
Keyboard Shortcuts	2.9
Losing Documents or other Work	2.9
Chatting On-Line	2.9
Purchasing On-Line	2.9
Server Problems	2.9
Installing New Programs	2.9
Digital Cameras	2.9

Field notes from the technology training sessions with teachers reflected that even teachers who claimed to feel *comfortable* with computers did not feel *confident* in their abilities. Teachers repeatedly shied away from assuming leadership roles in the training sessions. Even teachers who routinely performed certain tasks (i.e., Microsoft Word capabilities) hesitated to show another teacher. When asked why they appeared hesitant to assist others, one teacher replied, “I just figured this stuff out on my own ... I don’t know if it is the right way or not. It just works for me. I’m not sure I understand it enough to tell someone else how to do it” (Field Notes, 3-15-00).

Another common complaint from teachers regarding comfort levels centered around how “things” appeared different on different computers. Field notes from March 6, 2000 indicated that teachers complained that what they see on the screen in the library during the training did not look exactly like what they see on the computer(s) in their classrooms. Web pages, for example, did not appear exactly the same on different computers based on “Internet Options” settings. These settings dictated the type and size of the fonts, color settings, and the web page identified as the “home page,” or the site that opened when the Internet first comes up. Differences in the “desktop” arrangements (the opening screen on a computer that displays icons for various programs on the computer) caused confusion for several teachers.

During the pilot study with teachers, teachers trained in the school library and at the vocational school located about three miles from the elementary school. The computers in both locations provided teachers with the latest technological advancements offering new computers and up-to-date versions of software. In many cases, once the teachers

returned to the classroom to practice the skills learned in the training sessions, they had to adapt what they learned to fit older hardware and out-of-date software. One teacher noted on the survey:

I do not like the lack of standard placement for on/off buttons and other switches – keys. On a piano middle C is always in the same place. Computers vary from model to model – manufacturers or year. There needs to be some standard features on every computer that are in the same place. There needs to be room for creativity as well, but locate the keys in standard locations. (Appendix E.7.11)

This conundrum left us with a no-win situation ... if we trained in the facilities best suited for small group training, then teachers had to try to reconcile the new skills with the older equipment and software in their respective classrooms. Since the age of the computers and software versions differed from classroom to classroom, no common denominator existed that facilitated all teachers. We continued to train with the newer equipment and software, supporting teachers on a one-on-one basis as much as possible. Many times our training sessions went through exhausting versions of, “If you have version 3.0 of Word, then you will find the dropdown menu by clicking on ‘edit’ ... if you have 4.0 or higher, you will find the dropdown menu by clicking on ‘format’ ... for those of you using Works ...” and on and on. This scenario not only exhausted the trainer but also the participants.

The principal investigator noted that even small differences in the appearance of the computer screen caused anxiety in novice users of technology. Transfer of learned skills from the training sessions to the teachers’ own computers appeared hampered when things did not appear exactly or very nearly the same as in the training situation.

Internet and Email Use

Along with basic computer usage, teachers responded to **how long they have been using the Internet, including email** (Appendix E.10). This use included both using the Internet for personal and for school use. Results indicated that 62.9% of teachers who responded have been using the Internet for one to three years; 22.9% for four to six years or more; and 2.9% have been using the Internet for less than six months.

Field notes from a discussion with the assistant principal indicated that the school first received Internet access in 1994 in conjunction with the Twenty-First Century Classroom initiative. At that time, one on-line computer was placed in the library and one in a fifth-grade classroom. In 1995, two more classrooms received Twenty-First Century Classroom technology equipment bringing the total of on-line computers in the building to four. In 1996, the school received one more Twenty-First Century Classroom and funding from multiple sources to dramatically increase the number of on-line computers available to teachers and students. By the time of this research project (2000) all classrooms possessed at least one Internet-connected computer (Field Notes, September, 2000).

When teachers responded to a prompt for **how satisfied they were with their current skills for using the Internet** (Appendix E.11), 57.1% indicated they were somewhat satisfied (can do most things they want to do); 22.9% indicated they were somewhat dissatisfied (can't do many things they would like to do); 11.4% indicated they were very satisfied (can do everything they want to do); 5.7% indicated they were neither satisfied

of dissatisfied; and 2.9% indicated they were very dissatisfied (can't do most things they would like to do).

Surveys, field notes, and observations from the pilot study provided some insight into Internet use by teachers at the participating school. The pilot study included training sessions on using the Internet and electronic mail capabilities. During these sessions teachers discussed their purposes for using the Internet, the types of activities most frequently performed on-line, and the functions they would like to be able to do.

Pilot study survey (Appendix L.19) results indicated that all teachers in the pilot study used the Internet for educational purposes. Teachers described those purposes as finding on-line resources for classroom instruction, locating lesson plans, checking the state's homepage for updates and information, and visiting content-specific websites (i.e., NASA's site for ideas and materials for a unit on space). Further, teachers indicated via the pilot study survey that they also used the Internet to gain information for personal needs (75.0%); for shopping and gathering product information (62.5%); and for entertainment purposes (62.5%). Field Notes (3-20-00) expanded on the topic of Internet usage as the principal investigator noted that each teacher proclaimed his or her own *favorite* sites that they used often and relied upon. When questioned about how they found new sites the most common response indicated that people they knew, usually other teachers, sometimes recommended websites. The survey (Appendix L.17) indicated that 62.5% of these teachers' book marked Internet sites or "favorites" list on their computer numbered between 11 and 50.

The results of the pilot study mimicked the results from the primary teacher survey (Appendix E) administered in the fall of 2000. These teachers gave specific examples of Internet use both in the classroom and for personal use. One teacher described her on-line experiences as:

Personally I enjoy looking at things of interest to me such as gardening, cooking, inspirational sites, and health. I also enjoy looking at other teachers' ideas on my teaching level. They are on the same track as I and are very interesting as many use the same techniques as me with some ideas that are useful. It's inspiring to learn new ideas or a fresh look at some tried and true techniques. I have used the Internet also to download items such as puppets from Jan Brett and certificates, etc., for classroom rewards. (Appendix E.16.26)

Teachers gave many more personal uses for the Internet than classroom applications.

One teacher explained her classroom versus personal use as such:

For my classroom, I am guilty of not using it for the resource that it is. I could be getting a lot more out of it than I am on a professional level. On a personal level, I use it to send and receive email from family and close friends who live all over. I print recipes from various sites ... Sometimes I'll search for information regarding health issues. My husband and I are looking into buying a new car. We've logged on to Chevrolet.com, kellysbluebook.com, and so on. He looks at Nascar.com frequently. (Appendix E.16.2)

Observation notes from March 2000 reflected that many teachers demonstrated the necessary skills to search for and locate information for personal purposes, not always taking the most direct route, but finding useful information nonetheless. Teachers talked about favorite sites, shared URL addresses, and gave tips for finding bargains on-line. These discussions were highly energized with many teachers talking at once, people writing down URLs with a flurry, and rushing to show someone a favorite on-line site. When we shifted to sharing resources for classroom use the momentum waned. A few teachers named popular sites like Scholastic.com and the Busy Teacher's Website, but

teachers seemed less sure of themselves or of the purposes the sites were to fulfill. Many qualified their responses with comments like, “I don’t know if anyone else will think this is a good site, but ...” (Field Notes: 3-6-00). This scenario improved over time as teachers worked on the Technology Literacy Grant applications, a training component of the pilot study. The Technology Literacy Grant (TLG) required teachers to identify a curricular objective from the state mandated reading and language arts standards and then locate five websites to help teach the concepts related to the objective. Teachers received grant money in the amount of \$500 for the first unit and \$200 for each additional unit with a maximum number of four units per teacher. Thirty-eight teachers from this school participated receiving a total of \$24,800 used for technology expenditures as requested by teachers. Once teachers engaged themselves in *purposefully* searching for on-line resources for use in the Technology Literacy Grant applications the casual conversations during the training sessions included more enthusiastic sharing of classroom and content related websites. A theoretical note included in the principal investigator’s observation journal (4-5-00) read as follows:

A shift has taken place in teachers’ reactions to on-line resources. Teachers are beginning to see the connection between their content and on-line resources. I believe the practical application of actually using the websites in instruction for the purposes of the TLG [Technology Literacy Grant] has lead to this change. Teachers stop me in the hallways to tell me of ‘fabulous’ websites they have found that I just MUST look at. A common response from teachers is that they have located MANY more websites they are going to use in other content areas outside the ones mandated by this grant. This denotes a breakthrough from previous attitudes.

All sixteen teachers in the pilot study acknowledged they previously performed on-line searches with varying degrees of success. According to the pilot study survey, (Appendix L.15) 75% of teachers indicated that *most* of the time that they searched on-line, they

were attempting to locate *specific* information. In response to this question on the primary teacher survey, one teacher wrote, “When I use the Internet, I am normally looking for unit/lesson plans or more information on a particular subject for my class” (Appendix E.16.13). A common complaint centered on searches that did not yield the information the teachers needed. Several teachers indicated that on-line searches were “a waste of time” or, as one teacher said, “the black hole of time” (Field Notes: 3-20-00). When asked which search engines they commonly used, most teachers named only one with a couple of teachers naming two. The majority of the search engines identified only search one databank instead of multiple sources such as *metasearch* engines perform. Teachers also expressed frustration and a lack of expertise in selecting search terms that widen or limit the search to produce results that provide the information needed.

Telecommunications, or electronic mail (email) capabilities accounted for other “connected” or on-line applications teachers used. Field Notes from March 20 - 22, 2000 reflected teacher comments regarding the use of email. Teachers seemed more confident in their abilities to use email than in other Internet applications. One teacher described her use of email by saying:

I check my email through my school account every day. Most of it is not really to ‘me,’ just to everyone on the list, so I just click ‘delete’ a lot. I did have an account with Hotmail, but I forgot my password. I would like to get email from people who know me, but our state email address is so long I can’t remember it when I try to give it to people.

Another teacher indicated that she uses email to correspond with family, but not for purposes related to school. “My account at home is much easier than what we have at school. I don’t even know my address here [at school].”

In the primary teacher survey (Appendix E.14), when asked to respond to **how they learned to use the Internet, email and searching capabilities** 64.7% of teachers specified “on my own” or “trial and error.” Several comments by teachers on the survey resembled this one, “I learned by getting a computer and doing it myself” (Appendix E.14.33). Other teachers (32.4%) noted “college courses” as providing the most training for their current Internet skills. A few teachers referenced undergraduate courses as a part of their program of study that included technology training. One teacher shared how she learned to use the Internet in a college course as she stated, “I had to! A class in college required all work to be e-mailed. It was a science class of all things! I had to learn, and a friend showed me how and [then] it was trial and error” (Appendix E.14.21). The majority of teachers enrolled in post-graduate courses as a means of recertification or specifically to improve technology skills.

Survey results further indicated teachers’ spouses and children also helped to train them in using the Internet (23.5%). One teacher related:

My husband is really “into” computers. He taught himself and my daughters – and, finally, me. He enjoyed teaching me, but I am somewhat of a “slow computer learner.” Therefore, he would have to go over and over the same thing for me to remember what to do. I just kept trying. Now that I can do it on my own, I really enjoy using the computer. (Appendix E.14.8)

Another teacher explained her Internet skills by stating, “My daughter is my best teacher” (Appendix E.14.11). Other teachers (14.7%), friends outside the workplace (11.8%), and previous jobs (5.9%) accounted for added means of teachers learning to use the Internet. One teacher shared, “My former roommate had a brand new computer when

she moved in. I was fascinated by it ... I “played” on it for hours at a time. She showed me a few things, but I mostly learned on my own” (Appendix E.14.2).

This scenario underscored a recurring theme of someone “jumpstarting” teachers with *minimal* training followed by teachers learning through many hours of hands-on computer time and independent exploration. This same theme extended throughout the surveys and the field notes gathered.

Training

In-service training focused on using the Internet and email accounted for only 8.8% of the teachers responding to this question. The assistant principal listed a “Lack of training for all teachers and students” as a weakness in computer and technology use in the classrooms (Appendix K.22.2). The Supervisor of Instruction reported receiving 50 to 60 requests for professional development sessions in technology from teachers in the county school system over the last five years (1995-2000). Further, she indicated providing only five such professional development sessions for teachers during that same five-year period (Appendix H.1, H.2). The five sessions covered the following topics: beginning computer skills, use of Internet in the classroom, Grade book software program, word processing, and use of PowerPoint, scanners, and digital cameras. The Supervisor of Instruction warned that the 50 to 60 estimate of requests for technology training sessions included the same people making multiple requests and that her overall impression remained that technology training sessions are not in high demand by teachers at this school, nor are they well attended when provided. However, in describing the weaknesses in computer and technology use in the classroom, the Supervisor of

Instruction commented, “Probably the lack of continued training hampers the use of existing technology more than anything” (Appendix H.5).

The Technology Coordinator concurred with the Supervisor of Instruction as he stated, in response to weaknesses in computer and technology use in classrooms at the participating school, “Most teachers have minimal technology expertise. Based upon surveys, teachers feel they are knowledgeable in only a few areas of technology, yet the demand for technology classes is somewhat low” (Appendix D.11). Field notes from March 1, 2000 indicated that teachers lacked a common consensus of the type of technology training they wanted. One teacher commented:

We all need different things. No one is at the same place. I don’t want to sit through stuff I already know how to do and I feel dumb when I am in a class where everyone else knows how to do something and I don’t.

Another teacher added, “I don’t know enough about what technology can do to know *what* I need to know or ask for. Teachers also expressed frustration at attending training sessions when the materials presented did not match their expectations. “I have been to training sessions on resources to find on-line, but that doesn’t show me how to teach with them,” expressed one teacher (Field Notes: 3-1-00).

Table 6 represents teacher responses for the **number of hours of basic technology training they received within the past 12 months**. Sixty percent of teachers who responded indicated they received five hours or less of technology skills training within the past 12 months, with 25.7% indicating no hours. The school system provided no technology training in-service sessions over this same 12-month period of time so the training hours that teachers accumulated came from other sources. Teachers named the

Table 6: Hours of Basic Technology Skills Training Frequencies - Appendix E.28

about how many hours of basic technology skills training did you receive within the past 12 months?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid none	9	25.7	25.7	25.7
1-5 hours	12	34.3	34.3	60.0
6-10 hours	6	17.1	17.1	77.1
11-20 hours	4	11.4	11.4	88.6
> 20 hours	4	11.4	11.4	100.0
Total	35	100.0	100.0	

pilot study associated with this research and college coursework for formal technology skills training opportunities (Appendix E.32). One teacher described her previous experiences with technology in college courses stating:

I took an introduction college class to learn the computer basics during one summer. Last summer, as part of a class in special education training included computer instruction. I have not had very much training in using the software that is available now. (Appendix E.32.8)

Another teacher's only comment to the types of computer and technology skills training she received was, "So much [training] that I should be able to do more" (Appendix E.32.27). Other teachers throughout the pilot study posed similar scenarios. This comment related to field notes (3-1-00) indicating teacher frustration at the futility of learning to use technology. Common sentiments regarded the constant changes in technology. Just as teachers developed comfort levels with one computer, one operating system, or one version of software, an update occurred. The principal referred to this as a

“catch 22” stating, “We update the technology – which is a good thing, but then we are faced with having to learn to use it so we start over again with more training” (Field Notes: Faculty meeting 3-2-00).

When asked to respond to **how many hours of training they received on integrating technology into the curriculum within the past 12 months**, the following data was generated (Table 7). These results indicated 45.7% of teachers participated in between one and five hours of technology-integration training opportunities, with 28.6 indicating no hours. Compared to the hours spent on basic computer training it appeared that teachers spent even fewer hours of training (about 14% less) centered on integrating technology. Survey item nine (Appendix G.9) prompted teachers to respond to **whether or not they would like to have more training provided on how teachers can use technology in the curriculum**. An analysis of responses indicated a mean of 4.0 on a scale of one to five, with five meaning “yes” and one meaning “no.” This mean reflected a strong desire of most teachers to receive more training in integrating technology into the curriculum.

When teachers responded to whether or not they **feel better prepared today to integrate technology into their classroom lessons than they did a year ago** 48.6% responded that they were *somewhat* better prepared today; 40% indicated yes, they were much better prepared today; and 11.4% said no, they are no better prepared today (Appendix E.30). One teacher wrote, “We need more teacher training with ideas for classroom instruction and with new areas such as PowerPoint and Excel, etc. – free to the teacher who is really interested” (Appendix E.32.26).

Table 7: Hours of Training on Technology Integration Frequencies Appendix E.29

About how many hours of training did you receive on integrating technology into the curriculum within the past 12 months?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	none	10	28.6	28.6	28.6
	1-5 hours	16	45.7	45.7	74.3
	6-10 hours	4	11.4	11.4	85.7
	11-20 hours	4	11.4	11.4	97.1
	>20 hours	1	2.9	2.9	100.0
	Total	35	100.0	100.0	

Many presentation methods exist for professional development for teachers. One question that resounded from the field notes involved the “best” method or methods for providing professional development for teachers in the area of technology. Can teachers be effectively trained to use technology through *traditional* modes of professional development? In the county where the participating school resided, the traditional method of professional development was a three-hour or six-hour in-service where teachers listened and occasionally participated as a speaker presented information. Most in-service presentations occurred as “single shot” opportunities to learn – the presenters shared information and little or no follow up occurred. Does this model fit what teachers want or need to become technologically competent?

The following table (Table 8) provides the results of teacher responses to **what methods of training best provide them with the skills they need** [to use technology]. According to these results, teachers preferred one-on-one training that provides hands-on

Table 8: Teacher Preferred Method of Training

Methods of Training	Percentage of Teacher Responses
One-on-one training at a computer terminal.	80.0
Short training sessions limited to one topic.	71.4
Multi-session training that requires teachers to use the skills being presented.	57.1
College-Based courses in technology.	17.1
Manuals.	14.3
On-Line training.	11.4
Other (see below)	8.6
Daylong sessions that cover a variety of skills.	5.7
Video training.	0

computer practice (80%), followed closely by short training sessions limited to one topic (71.4%). Over half (57.1%) of the teachers surveyed indicated they would learn best at multi-session training that required them to use the skills presented. Teachers suggested other methods of training that would work well for them listing peer tutors and books on DC ROM. One teacher wrote, “I really need to do the skills being presented, not just watch someone else. I need ‘hands-on’ training with notes to refer back to when I try on my own” (Appendix E.19.11). Another teacher explained her training needs as she noted, “I need one-on-one training, then practice to learn the skills with something to refer to as I practice, such as a manual or notes” (Appendix E.19.26). All these models diverted from the traditional professional development model used in this county. This suggested a needed alteration in the presentation methods of professional development sessions provided for technology skill development for teachers at this particular school.

Technology Use in the Classroom

In the spring of 2000, the participating elementary school conducted a survey (Appendix F) of staff use of technology in preparation for reaccreditation by the Southern Association of Colleges and Schools (SACS). The results of those surveys provided by the participating school to the researcher represent a secondary research instrument. The survey, developed by Bellingham Public Schools asked teachers to rank the following technology competencies on a scale of Level 1 to Level 4, with Level 4 indicating the highest level of competency category of technology use.

Survey results entered into SPSS 10.0 Statistical Analysis Program produced frequencies and percentages that helped synthesize the data (Table 9). Teachers indicated the greatest competencies in word processing with 66.7% of respondents indicating that they use a word processing program for nearly all written professional work (Level 3). Internet use also received high competencies levels with 46.4% of teachers indicating they use lists of Internet resources and make profitable use of search engines to explore educational resources (Level 3) and 46.4% of teachers indicating they access school and district websites to find information (Level 2), a total of 92.8% of respondents indicating either a Level 2 or 3 in competency in this category. Although Level 4 competency percentages ranked rather low compared to other levels, 23.1% of teachers indicated basic computer operation at Level 4, followed by 11.1% of teachers who professed Level 4 competencies in word processing. All other Level 4 competencies ranged in single digit percentages.

Table 9: Staff Technology Use – Appendix F

Question #	Prompt	Level 1	Level 2	Level 3	Level 4
1	Basic Computer Operation	0.0%	57.7%	19.2%	23.1%
2	File Management	7.7%	69.2%	19.2%	3.8%
3	Word Processing	0.0%	22.2%	66.7%	11.1%
4	Spreadsheet Use	66.7%	25.9%	7.4%	0.0%
5	Database Use	77.8%	11.1%	7.4%	3.7%
6	Graphic Use	53.8%	34.6%	11.5%	0.0%
7	Internet Use	3.6%	46.4%	46.4%	3.6%
8	Telecommunications Use (E-Mail)	35.7%	46.4%	14.3%	3.6%
9	Ethical Use Understanding	14.3%	64.3%	14.3%	7.1%
10	Information Searching	36.9%	46.2%	23.1%	3.8%
11	Video Production	28.0%	68.0%	4.0%	0.0%
12	Presentation Skills	73.1%	26.9%	0.0%	0.0%
13	Technology Integration	29.6%	59.3%	11.1%	0.0%

The highest percentages of Level 2 competencies included file management (select, open and save documents on different drives – 69.2%); video production (create original video tapes for home or school projects – 68.0%); ethical use understanding (know that some copyright restrictions apply to computer software – 64.3%); technology integration (understand the district technology plan supports integration of technology into classroom activities, but still learning about what strategies will work and how to do it – 59.3%); basic computer operation (use computer to run a few specific, pre-loaded programs – 57.7%); telecommunications (send messages using email mostly to district colleagues, friends, and family – 46.4%); and information searching (conduct simple searches with the electronic encyclopedia and library software for major topics – 46.2%).

Readers should note that 29.6% of teachers indicated Level 1 competency in technology integration (does not blend the use of computer-based technologies into classroom learning activities) bringing the percentage of teachers at Level 1 or 2 in this category to 88.9%. Readers should also note that 35.7% of teachers responding to the use of telecommunications indicated they have an email account but rarely use it (Level 1), bringing the total percentage of Level 1 and 2 in this category to 82.1%. Therefore, both percentages of competencies in technology integration and in the use of telecommunications signified need for improvement.

Level 1 represented the lowest level of competency in each survey prompt. The highest percentages of Level 1 responses included using databases (do not use a database – 77.8%); presentation skills (do not use computer presentation programs – 73.1%); spreadsheets (do not use a spreadsheet – 66.7%); and graphics (do not use graphics in my word processing or presentations – 53.8%).

Many of these percentages underscored findings from a primary survey (Appendix E) the principal investigator administered to teachers in the fall of 2000. Teacher comments and discussions during the pilot study also reflected in these results. Field notes (3-14-00) indicated teachers expressing confidence in using word processing applications. Teachers noted that they used Microsoft Word or Microsoft Works to accomplish many tasks in their classrooms and gave the following examples: letters and memos to parents, flyers announcing special events or field trips, exams, practice pages for students, and documentation for the office or special education teachers/meetings. Most teachers requested help in managing files rather than instruction in *how* to use word processing

software. One teacher explained this need as she said, “I save things – I think – but then I don’t know where they are. Sometimes I can find them again and sometimes I can’t” (Field Notes: 3-14-00). The other area of need in using word processing programs centered around keyboard shortcuts – using the control key in combination with the letters c (copy), e (center), v (paste), l (left align), r (right align), x (cut), etc.

Summary/Discussion

The United States Department of Education and various other agencies provide information on how schools can determine the current use of technology so as to better plan for future technology initiatives. Few studies examine the views of stakeholders regarding a shared vision of the role of technology for educational purposes at an elementary school. This research project identified differences and commonalities of beliefs regarding the role of technology in an educational setting. The research findings may serve a useful purpose to other elementary schools evaluating their present technology use and their plans for future technology initiatives.

Because the results stem from looking at only one elementary school in the rural south, readers need to consider the limitations of this study. This research project reflected only one population of stakeholders and it may not be appropriate to generalize these findings to other schools of different sizes, locations, or other ethnographic differences. Further investigations by other schools examining these same, or similar, belief systems would help to clarify if these results are common or if they are unique to this particular school.

This research project does corroborate other investigations relating to teacher beliefs and needs in regard to using technology as a teaching and learning tool.

Teacher Attitudes toward Technology at the Participating School

This section addresses a range of factors relating to teacher attitudes in using technology as a teaching and learning tool in the classroom. Primary survey instrument, “Teacher Survey” (Appendix E), section two of the secondary survey labeled “Appendix G,” field notes, and observation notes from pilot studies provided data for this discussion of teacher attitudes in using technology.

Attitudes toward the use of technology in education affect technology use by teachers (Siegel, 1995; Schrum, 1999; Strudler & Wetzel, 1999). Teacher feelings, whether positive or negative ran deeply and often overshadowed aptitudes in the use of technology. Field notes reflected one teacher’s emotional and physical reaction to participating in the technology grant training conducted at the school during the spring of 2000. The teacher participated in an individual training on her own computer in her classroom and made remarkable progress. The next day she approached the principal investigator and reported that she was experiencing “emotional and physical” problems and would not be able to continue working with the technology grant. The teacher elaborated saying that it made her “sick” to try to use a computer, she felt she would go “crazy” if she continued, and she had developed a stomach ailment that she associated with the stress of trying to learn new technology applications (Field Notes, 3-7-01).

The above example was an extreme one compared to what other teachers experienced during the pilot studies, but was certainly not the only instance of hearing teachers

express sentiments about computer use making them “nervous” and fears of “breaking something” (Field Notes, 3/01 – 5/01). When asked to respond to **what apprehensions they remember having when first faced with using computers in instruction**

(Appendix E.21) one teacher listed several concerns:

If something goes wrong, I don’t know what to do. This [computer] isn’t mine and I don’t want to mess it up. How do I hook it up? I don’t want my students to see any inappropriate material on the Internet in my classroom. Does the filter really work? What if the kids or I mess something up? (Appendix E.21.2)

Complete survey analysis indicates that 35.3% of teachers expressed initial concern over breaking the computer or “tearing up” software programs (Appendix E.21). One teacher worried that she would be asked to pay for the computer if it got broken (Appendix E.21.14).

Time (17.6%) and training (23.5%) also ranked as common concerns. One teacher described her situation as:

I had no training ... just had it [computer] put into my class – I was afraid of it. I thought I might tear it up. I was and am fearful that my knowledge isn’t utilizing the computer to its maximum potential. (Appendix E.21.9)

Another teacher addressed the issue of time, writing:

Using the Internet in class take too much time. It is slow moving from website to website. Students are not familiar with keyboards when typing. They must hunt and peck the letters. This is time consuming. 1 – 3 computers is not enough to have every one of your students work independently. There isn’t enough school time to do all 6 subjects and include computer training. (Appendix E.21.32)

Individual teachers explained that, “It was hard to make the transition from students using computers to ‘play games’ to an actual instructional tool. It was also hard to include all students,” (Appendix E.21.4) and listed “becoming familiar with equipment, if they [computers] would be effective tools for learning, maintaining equipment, being

kept up to date, and funds for materials/resources” as principal concerns (Appendix E.21.35). Clearly each of these figured as legitimate concerns of teachers when first faced with using computers in an instructional setting.

Not all initial reactions were negative. Survey item twenty of Appendix E prompted teachers to **describe what most excited them about the possibility of having technology in the classroom**. Seventy-nine percent (79%) of teachers responding to this prompt named the potential for “student learning” as the thing that excited them most. One teacher noted, “I expected students who tired of drills, worksheets, games, etc., for math, phonics, etc., would find a new path for learning” (Appendix E.20.2). Another teacher described her excitement as she wrote:

I had some wonderful software programs that I could not use. When I got my first computer I was very happy to be able to use the software. It gives me a progress report on each child. Also, some children had never seen a computer and I loved letting them learn something new. I had other students that had home computers and already knew a great deal about the computer. What excited me most was it was a new and fun way to reach some children that may not be reached any other way. (Appendix E.20.33)

Several teachers (29.4%) indicated that access to the Internet excited them most. One teacher stated:

What excites me most about computers in the classroom is the access to the Internet. The possibilities are endless – tours of Ancient Egypt, 50states.com, volcanoes, any subject. Today we researched exactly how many minutes are in a NFL quarter versus arena football. (Appendix E.20.19)

Another teacher elaborated on her expectations noting:

I was most excited about being able to teach my students how to find information on a topic. It is difficult for some students with disabilities to find information in the library on their reading level. They can find information easier on the Internet – once they learn how. Also, our world is using more and more technology and all students will need computer knowledge to function. By the time my second or third graders

graduate from high school, probably they will need computer skills to even get a job most places. I want them to learn skills that will help them later in life. (Appendix E.20.8)

Other teachers listed a variety of potential uses for technology:

I was very excited as I saw many possibilities for teaching with the computer and with many areas that would help make my job easier. I have made notes to parents, labels for children's things such as portfolios and report card covers, name tags for field trips, and class pictures for our activities. (Appendix E.20.26)

Even though most teachers expressed high expectations for technology applications in their classrooms when first presented with computers, not all indicated that they set computer and technology literacy as a high priority for their students. The following table (Table 10) represents teacher responses regarding the **degree of emphasis they place on computer and technology literacy** (Appendix E.15).

As indicated in the Table 10, only eleven teachers (31.4%) set computer and technology literacy for their students as a high or very high priority. Most teachers (57.1%) rated computer and technology literacy for their students as a "medium" priority. They gave several reasons for this ranking. One special education teacher who responded with "medium" to this prompt noted:

As a special education teacher, there is no time to use the computers. The students are in the room for one hour or less and then they have to leave. Sometime, we do manage to get some computer work done. However, we really don't have enough software to work with. (Appendix E.15.1)

By contrast, another special education teacher who responded that she sets computer and technology literacy as a "high" priority for her students wrote the following comments:

Table 10: Teacher Emphasis on Technology Literacy

	Frequency	Percent
Very High Priority	2	5.7
High Priority	9	25.7
Medium Priority	20	57.1
Low Priority	3	8.6
No Priority	1	2.9
Total	35	100.0

I refuse to limit my students because they are special education. I believe in them and want them to believe in themselves. For a child to succeed in the job market today and in the future, they must have good computer skills. I teach them as much as possible – and a little more – than they “need to know.” My Internet/computer use varies from student to student, based on IEP goals, needs and interests. Students explore the web, utilize CD-ROM’S and disks, work on academics, and play games. We are not networked so the kids can’t take AR [Accelerated Reader] tests right now. (Appendix E.15.2)

A follow up conversation with the principal indicated that each of these special education teachers see their students close to the same amount of time each day, each have access to the same numbers of computers, and basically the same software. Whereas *time* seemed the constraining factor for the first teacher, the second teacher’s feelings toward the importance of technology skills seemed to overshadow the obstacles holding the first teacher back.

Some teachers viewed the advancement of computer and technology literacy as competition against other curricular areas. One teacher wrote, “It isn’t that technology is not a priority in the classroom. It is important. Other areas are just as important. The

ability to read would be the first priority in my classroom” (Appendix E.15.20). Another teacher reiterated these sentiments:

I feel reading, writing, and math are the most important things in elementary school. If there is a way, I use the computer to help teach these things. Most children have a computer at home now. They learn by using it. (Appendix. E.15.32)

On the same theme, one teacher stated:

I feel that young students should be taught basic alphabet/number recognition before computer use. Also, many games on the computer require clicking on certain objects for the answers. Young children, unless monitored very closely, will sometimes click on anything and not really be learning a skill. (Appendix E.15.22)

These sentiments underscored the way teachers responded when asked to **list all the curricular areas they view as basic to a child’s elementary education** (Appendix E.25). Math (80%) and reading (77.1%) ranked as the most common responses.

Technological or computer literacy signified as “basic” to only 34.3% of teachers who responded.

A few teachers indicated that they recognize the value of computer and technology literacy, but they are “waiting” either for more training or more computers. “I need more computer training in order to be able to do what I want to do with student lessons” (Appendix E.15.8). Another teacher who set a “high” priority on computer and technology literacy stated, “I am trying to learn more so that I can use more technology in instruction” (Appendix E.15.16).

The desire for more computers resounded through many of the teacher responses to this prompt. A teacher who ranked her emphasis as “no” priority for computer and technology literacy justified her response with the following comments:

I realize students are needing more technology training. I also realize that they need it earlier in their educational careers. I feel that I am not qualified to teach the children in the appropriate manner that they need to be taught. Most things, too I feel, need to be taught as a group. When we have enough computers that we can have 2 [students] to a computer and we can teach a “lesson,” that will be when it will receive a top priority in my classroom. (Appendix E.15.14)

Not only the lack of computers but also the lack of properly *functioning* computers figured in teacher comments. “At present, the computers in my classroom do not work accurately. I don’t feel I have the computers to put technology very high on the list” (Appendix E.15.13). One teacher stated she would make her “medium” rating a “high” if the school had a computer lab (Appendix E.15.23).

Another teacher expressing a desire for more computers wrote:

I don’t feel that I have enough updated equipment to teach computer literacy effectively. I believe that computer skills should be acquired through hands on training. It is very difficult to allow *time* for all students to practice skills on only 2 computers. (Appendix E.15.29)

Other teachers also commented on the “time” factor in relation to computer and technology literacy for their students:

I would love to set it at a higher priority if I had the time. Maybe a parent helper could come in and free up some of my time. Computers are here – children need to know what to do with them. (Appendix E.15.21)

Teachers continued to address and expound on these issues as they responded to **what they presently see as obstacles in fully utilizing technology as a teaching and learning tool** (Appendix E.24). The more common themes, lack of computers (41.2%) and lack of time (38.2%), again played major roles in teacher responses. One teacher addressed both obstacles as she wrote:

Even with 3-4 computers per classroom, we still need a lab or computer teacher to have actual lessons to teach students how to use the computer. I also think time is a

big obstacle. We don't have time to do what we do now, much less try to teach computers too. I don't have enough time to learn what I need to learn to help my students with the computer. (Appendix E.24.14)

Other teachers also denoted a computer lab as a remedy for too few computers in classrooms. "I would like to see a school-wide lab with a full-time instructor. I would like to see each class attend lab every week with full time instruction" (Appendix E.24.28).

While the majority of the responses for this survey item prompted teachers to write in large letters the words "TIME!!" or "MORE computers!" a few teachers addressed other issues related to training and support. One teacher wrote:

One obstacle for me is not being familiar with the software we already have on our class computers. It will take me several hours to "catch up." Also, when I have \$\$ to buy software, I will not know which ones to get. An in-service where teachers bring software that "works" with their students would be very helpful for people like me. We could try the ones we think would work with our students, then we would know what to buy. (Appendix E.24.8)

Although many teachers expressed frustration at utilizing the technology in their classrooms for teaching and learning purposes, students in most classrooms did use the computer for various functions. When asked to respond to **how many hours per week their students spend using computers in the classroom**, 51.5% of teachers indicated "one hour or less" per week (Appendix E.31). Survey item seventeen of Appendix E prompted teachers to **identify ways in which students use computers in their classrooms**. Software applications ranked as the number one use of computer technology (77.1% of classrooms) with Accelerated Reader exams a close second at 68.6%. Two other common applications included word processing (42.9%) and Internet use for research and on-line learning activities (37.1%). Observation notes supported the

evidence of software application use in classrooms. Computer “centers” in many classrooms provided students with opportunities to “play” learning games and to take Accelerated Reader tests. These centers usually provided two to four computers for student use. Software was preloaded and access to the centers varied from classroom to classroom. The principal investigator noted that five teachers used sign-up sheets to keep a record of which students used the computers on each day. In other classrooms the computer centers were used for rewards for good work or good behavior (Observation Notes: 1/00 – 5/00).

Internet applications varied from classroom to classroom. One teacher wrote: Access to the Internet is great! We do use this quite a bit. If a topic comes up during a class, a student can look it up on the Internet and get information before class the next day. Then we discuss the new information. (Appendix E. 23.8)

Another teacher addressed the use of technology to improve instruction by stating:

English has [been] one of the most exciting areas for my class. We are in the process of setting up an Internet pen-pal network. I will require that letters be sent alternately scanned, handwritten, and typed on the computer. Vocabulary skills are strengthened by the use of Discovery.com. Most importantly, all students are relatively comfortable at a computer. (Appendix E.23.16)

As these teachers look toward the future, **what expectations do they hold for the use of technology in their classrooms?** Teacher responses to this prompt ranged from the general to the specific. Many teachers indicated broad-spectrum goals suggesting that they “would like to make more time for computers” (Appendix E.22.12) and hoping “for students to use technology to enhance their learning” (Appendix E.22.29). A few teachers used terminology like “independent learning” (Appendix E.22.4, 29) and increasing student “comfort levels” (Appendix E.22.6) with using computers.

Other teachers held very specific expectations for the use of technology in their classrooms. One teacher made a list that included using “the Internet to find out more about my children’s disorders; [to] confer with other professionals on listservs; correspondence; and for teaching skills and literacy” (Appendix E.22.9). Another teacher focused on goals for her students as she wrote, “I would like every child to be able to independently start, use and then close a program” and “for students to be comfortable with getting in and out of different programs” (Appendix E.22.29).

It appeared clear that some teachers held clear expectations that encompass many levels of technology use:

I expect the children to use word processing and project presentations involving computers. I want the children to learn to log onto the Internet and go to teacher-marked sites. Some should be able to use searches and locate information on their own. I hope to set up key-pals again so they will be exposed to email. All children will use computers for AR [Accelerated Reader] testing. Learning software will be incorporated into our educational program as well as optional free time choices. (Appendix E.22.34)

Another teacher expressed a detailed vision of what she expected from future technology use:

I want the students who can read on a second grade level or better to do a short-term research project on the Internet. The assignment will be typed, double-spaced, and have a cover sheet. The students who struggle with academics, are on a first-grade level or below, and lack in hand-eye/fine motor coordination can do educational CD-ROMS, Internet games, etc. The children who are “Internet savvy” can be a peer tutor for other kids. The same for CD-ROMS or other programs. Older children can show younger children how [to] turn on the computer, choose a selection, turn the computer off after shutting it down, etc. Eventually I’d like to be networked with the other teachers in our school. We need all our computers on the Internet. And, of course, it goes without saying that the children [will] reinforce previous learning with educational CD-ROMS and Internet sites. (Appendix E.22.2)

Two teachers described goals they presently hold for *their own* use of technology.

One teacher wrote:

I have learned computers cannot be messed up. Anything you do can be undone. Because of this I can install programs on my computer. Not being afraid of computers has encouraged me to allow my students to have freedom to explore various programs installed. We try to use our computers daily in the classroom to enhance other activities we are doing in the classroom. (Appendix E.22.7)

Another teacher shared a very specific list of technology goals she set for herself to enhance classroom technology applications. She indicated expectations to, “become familiar with use of scanner and applications for classroom use, become familiar with camera and its applications for use in the classroom,” and to “locate more/newer bookmarks on [the] Internet to refresh subject material” (Appendix E.22.35).

Parent/Guardian Perspectives of Technology Use at the Participating School

Parents and guardians certainly qualify as stakeholders regarding the progress of technology use at any school. Schools need parental support for any initiatives including those that involve technology. Teachers at the participating school recognized the need for a partnership with parents as they responded to a prompt about **who they feel is primarily responsible for children learning about technology**. Almost sixty-three percent (62.9%) of teachers responding to this prompt indicated that *both* parents and teachers are primarily responsible for children learning about technology. The outcome of this analysis of data was contrasted with teacher comments regarding the amount of parental support they received in using technology as a teaching and learning tool.

One-half (50%) of teachers responding to **whether or not parents support their attempts to use technology as a teaching and learning tool** marked, “I am not sure if parents are supportive or non-supportive” (Appendix E.26). Teachers provided various insights into this reasoning. “I’ve had no comments from parents one way or the other. Despite repeated invitations, no one shows for open houses, PTO meetings, Parent-

Teacher conferences or even M-Teams most of the time” (Appendix E.26.2). These sentiments appeared again in another teacher’s comments, “Parents this year do not respond to me in any way – negative or positive” (Appendix E.26.16). One teacher wrote, “I’ve never made it a priority to talk to my parents about technology” (Appendix E.26.14). Another teacher responded:

When I had new computers parents were very excited. They came to school to see them and watched their child do activities to demonstrate the programs. They [computers] are very common now and parents are grateful for them, but not overly excited. (Appendix E.26.35)

Another 17.6% of teachers saw definite support and 26.5% saw *some* support from parents in using technology as a teaching and learning tool. One teacher wrote, “The Internet permission slips were the first things returned on time. Parents have commented to me at various places outside of school about how much their children enjoy the computers” (Appendix E.26.19).

One teacher who noticed some evidence of support from parents noted: Parents are very positive and helpful in our money raisers to buy more computers. They are very supportive of our Accelerated Reading program. They often talk of their children reading everywhere for AR. One parent donated a CD encyclopedia to my classroom. (Appendix E.26.32)

Another teacher recognized the same sort of support and commented, “Some [parents] have said ‘thanks’ for having computers in my classroom. Some parents have come to me for suggestions for using technology with their children at home” (Appendix E.16.34).

Insights into parents’ thoughts regarding technology use in education in general, and at this school in particular, presented themselves in the Parent Survey (Appendix I).

When asked to share their perception of the **level of attention on the use of computers**

and technology for learning at the participating school, 40.3% of parents responding included negative comments in their written statements (Appendix I.1). One parent wrote:

I cannot recall anytime when my children have told me about anything they have learned on a computer at [this school]. In my personal opinion, I do not think [this school] is as up-to-date as they should be. (Appendix I.1.1)

Another parent shared even stronger feeling as he/she responded:

My child's computer experience since we have been in this school is a joke. Prior to moving to this town my children had daily computer classes in [another state], plenty of computers for the entire class and [they] were on their way to being computer savvy. I am quite sure the experience has been hindered by the lack of technology at this school. (Appendix I.1.24)

Still another parent in responding to the level of attention placed on using computers and technology for learning at this school responded succinctly, "Little to none. There are not enough computers" (Appendix I.1.127). These remarks referring to the "lack of technology at this school" contrasted with written statements from the Supervisor of Instruction, Technology Coordinator, and the school administrators who all listed volume and availability of computers and technology at the school as strengths (Appendix H.4; Appendix D.10; Appendix K1. 21; Appendix K2.21). However, parent and teacher surveys both underscored a lack of adequate technology at the school (Appendix E; Appendix I).

The abovementioned parent survey comments reflected some of the same sentiments expressed in the Parent Training Pilot Study (January – February, 2000). Field notes from the first training session indicated that many of the parents attending the technology training sessions were doing so because they did not feel that the school was providing

enough technology in the classroom and they wanted to be able to support their children with technology learning at home (Field Notes, 1-20-00). One parent described her situation as wanting to learn to use the computer to help her youngest child who was just starting to kindergarten because her oldest child, now in the fifth grade, had been promised computer use year after year, but had learned very little about using the computer. This parent indicated that she did not know enough about computers to even purchase one.

One pilot study training session focused on Internet resources for parents and students. During this session many parents indicated that they had no idea these resources were available. One parent wondered aloud why these resources were not routinely used in the classroom because they were so much more current than textbooks or library reference books. This prompted a discussion where several parents brainstormed what could be done at the school to improve and increase the use of technology. One parent recounted that each year parents working with the PTO raise money exclusively for the purchase of technology for the school. A question was raised as to why parents are continually asked to help raise money for technology when they do not see their children using the computers for learning purposes (Field Notes, 1-27-00).

The amount of “time” their children spent using computers figured into many comments from parents on the survey. One parent noted:

If I had to rate it [level of emphasis on computers at the school] from 1 – 10, I would rate it about a 4. Not enough time is spend on the computers to get them [students] ready for the time that they will have to use them in high school. I believe an hour a day should be set aside just for a computer class. My child has not had much involvement with a computer for any amount of time to

get a good “feel” of how one works and what all can be done on a computer.
(Appendix I.1.103)

Another parent expressed frustration as he or she described assignments that required the use of technology:

As far as my child using the computer, she talks about it very little. If they are supposed to type a report for class ... they only have 10 minutes to do this in. Now get real, what students at [this school] could do this? (Appendix I.1.118)

Still other parents expressed discontent related to the amount of computer time allowed students. A parent of a fifth-grader stated:

My child is in 5th grade and this is the first time he has been allowed to use a computer much at all. Use is still limited. One child does check a daily weather report and they were encouraged to type a school paper (at home – time was not allotted at school).
(Appendix I.1.7)

Besides the issue of time, another prominent theme emerged from the parent surveys: **how the computers were used by students**. The following table (Table 11) illustrates the parent responses that specifically named computer/technology applications they knew their children participated in.

In elaborating on the types of technology applications students participate in, one parent wrote:

My child has primarily used computers for AR [Accelerated Reading] testing only. In first grade the students did take turns using the computer for learning games and

Table 11: Parent Identified Technology Use

Technology Application	Percentage of Parent Responses Naming this Technology Application
Accelerated Reading	31.2%
Typing (word processing)	8.5%
Games	7.1%
Internet	6.4%
Math	2.1%

interactive books. I think the school has put an emphasis on computers and technology, but I think the primary use has been for AR testing. I do not think at my children's grade level they are using technology as the resource it could be. I would like my children to learn more about using computer programs for gaining knowledge. (Appendix I.1.75)

Similar observations appeared in this parent's comments, "The only thing my child has done on the computers in school is AR. No learning things or programs have been used – only taking reading tests" (Appendix I.1.141).

Another parent expressed frustration over the types of computer utilization as he/she indicated:

In first grade my child used computers several times a week for educational purposes at school. In third grade once a week the class did math and a few other things on the computer. Most of the time the only comments I hear about the computer is for taking AR tests. If our school is going to spend the money to supply each room with computers, I would hope my child would be able to do more than take an AR test on them. (Appendix I.1.101)

As absence of curricular substance seemed to trouble another parent as he/she stated:

Other than the knowledge that there are computers in our schools, I see only a moderate emphasis on learning, but more toward just having fun. Getting on the Internet and 'surfing the net' is what I hear [from] the kids. (Appendix I.1.104)

Another concerned parent expressed anxiety over her child's future as she wrote:

I am unaware if my child has spent much time with computers during her 7 years at [this school]. She has not been in a 21st Century class. Accelerated Reading Program has been used to score comprehension, but this is limited and quick use. I believe most of her classes have had one or two computers max and mostly used with Accelerated Reading. Occasionally the teacher might have researched on one, but a computer time has not been offered on a regular interval for her to learn technology to prepare for beyond graduation. (Appendix I.1.31)

A theoretical note included in my observation journal (2-3-00) reads as follows:

Parents attending the training sessions seem dissatisfied with the amount and

types of computer use their children are getting at this school, but don't really know what they want their children to be doing. They mention seeing so much "potential" in the use of technology for teaching and learning, but are not able to communicate exactly what they would like to see teachers and students doing with computers. Many times the parents referred to wanting more projects in the 'main subject' areas of reading, math, science, and social studies. Parents were careful not to mention teachers by name or to refer directly to a grade level, but kept coming back to wishing there was more use of computers and technology for learning. It may be that without an understanding of content standards and theories related to teaching and learning that parents are left without a basis with which to frame their discontent or their desires.

One parent expressed a different concern relating to which students receive the most hands-on computer time as he/she responded:

In the second grade, in [name withheld] room there was a lot of emphasis and every child had computer time during the week. Since that time we have had less time. The children who seem to need the computer most (either have learning problems or no access at home) get less computer time than the brighter children or those who do have a computer at home. When computer time is given to children who get through with their work first, then the same 4 or 5 children get the computers. (Appendix I.1.11)

Of course, not all parent survey responses reflected negative feelings about computer and technology use at the school. Positive responses to this prompt figured at 25.6% of those parents who participated:

I've noticed that my children have learned a lot about computers and technology. My children have even learned how to get on the Internet. They've even taught me some things. They also use the computer for projects. They use it a lot of times for typing. (Appendix I.1.124)

Other positive comments included this one:

My child has evidently had extensive experience with computers while attending [this school]. The greatest enthusiasm was shown during kindergarten and first grade. My child is still very enthusiastic about working with computers even in the upper grades. (Appendix I.1.54)

Still another parent wrote:

I think [this school] has done a wonderful thing about putting computers in classrooms. I hope all of the classrooms get computers. My child enjoys looking up things on computers in [the] classroom. The teachers all are good teachers and help my child learn a lot too. He tries real hard. He loves going to school at [this school]. He don't have a computer at home right now. We are working on getting one at home real soon. He really likes to learn on computers at school and do projects, looking up things. (Appendix I.1.80)

Other parents seemed unsure of how to respond to this prompt. One parent wrote, "The only thing I know that my child has done with a computer is test. I truly don't know what is being taught in school and how computers are being used" (Appendix I.1.99). Another similarly dismayed parent wrote:

My child is in kindergarten and she hasn't mentioned using a computer to me. I know there is one in her classroom, but I don't know if or when she gets to use it. She does kindergarten level activity learning things on our computer at home, but I don't know about what she does on the computer at school. I hope her teacher does let her use it this year some. They should get computer time once a week at least. (Appendix I.1.111)

Still other parents who looked for evidence of computer use could not find any. "My child has never mentioned using computers, nor has it ever been on any of her class schedules or calendars that I have received" (Appendix I.1.34). These comments may speak more to the amount and type of communication between parents and teachers than about the lack of computer use at the school.

In contrast to the small number of positive responses received on the parent survey question related to level of attention placed on computers and technology for learning at the participating school, 84.7% of parents expressed positive comments when responding to the **amount and types of emphasis they would like to see placed on learning with computers and technology** (Appendix I.2). This high percentage of positive comments on this subject underscored similar sentiments expressed by parents during the pilot study

with parent technology training. The parents who attended the training sessions held strong commitments to more and higher quality use of technology at the participating school. Parents shared long-term visions for the school as they suggested “computer labs, individual student laptop computers, technology fairs” and initiatives that would provide for students without access to computers at home (Field Notes: 1-20-00; 1-27-00).

In responding to the survey one parent remarked:

It is the most important “new subject” that students can be offered. Computers are now being used in every job. If we could afford to place a computer at every child’s desk to be used daily our children would be prepared for any new technology the work place has. This is not just a high tech job issue anymore. Cargo truck drivers even now have computers in the trucks. (Appendix I.2.106)

Many parents suggested the addition of a computer lab in responding to the survey. A very clear vision of a computer lab appeared as one parent wrote:

I think there should be a computer lab equipped with about 30 networked computers. The children as a class should have 2 or more 30-minute sessions weekly. They should be learning keyboarding skill by 2nd grade. (Appendix I.2.11)

Another parent stated their desires thusly, “It would be great to have a computer lab and have a one hour class each week not for games but how to use the computer” (Appendix I.2.129). One parent addressed teacher expertise and time issues as he/she wrote, “[I] would like to see more emphasis on computers but don’t see where teachers would have the time – perhaps a class w/a teacher skilled in computers once a week like p.e.” (Appendix I.2.97). These requests and justifications by parents for a computer lab mirrored the types of responses found in Field Notes (1-20-00 through 3-2-00) from the parent training pilot study.

Teacher survey (Appendix E) and Field Notes indicated that several teachers also favored the idea of a computer lab, though the justifications appeared quite different. The most common reason teachers gave included comments about “how if the parents and administrators wanted students to learn about computers they should get the funding for a computer lab so that a computer expert could be hired” (Field Notes: 3-14-00). During the same discussion, another teacher used the reasoning that all “big schools” and “large city schools” have computer labs, whereas small county schools have to “push everything on the classroom teachers”. When asked about the “integration of technology into class work,” teachers reached a consensus that “if the students learned everything about computers in the lab, then the teachers could make assignments that used computers.”

A theoretical note included in the principal investigator’s observation journal (2-3-00) read as follows:

An almost circular type reasoning is seen as teachers discuss the need for a computer lab. If the school would get a computer lab, then teachers would consider incorporating technology into their class work, but if the school is not willing (or cannot for some reason) get a computer lab then teachers do not feel obliged to take on the responsibility of using computers and technology as teaching and learning tools. A further conundrum exists as teachers seem almost angry that the school does not have a computer lab as they really *believe* that students need that exposure to technology, but easily dismiss that need when explaining that teachers cannot be held responsible for providing that exposure to technology.

The parents’ and teachers’ discussions of the addition of a computer lab at the school contrasted with the visions of other stakeholders surveyed. Neither the principal, assistant principal, Supervisor of Instruction for the county, nor the county’s Technology Coordinator listed or in any way referred to needing or wanting a computer lab at this school (Appendix H.6, Appendix D.12, Appendix K.1.22, Appendix K.2.22). Field

Notes (3-2-00) reflected a conversation with the principal regarding requests for a computer lab. The principal indicated that at one time a number of computers were placed in the school's library and students had access to those computers during regularly scheduled visits to the library. At some point teachers voted to place those computers in regular classrooms. The justification for this move indicated that computer use could revolved more around curricular areas if the computers were in the classrooms. The principal also noted that a lack of space in the school further prohibited the addition of a computer lab. The principal remarked that even if space existed for a computer lab, she would be hesitant to add one because her goal for the school was to have technology actively used in teaching reading, math, science, social studies, language arts, music, and art within the classroom settings.

While an overwhelming percentage of parents responded with positive comments regarding the amount and type of emphasis they would like see placed on learning with computers and technology, a few parents (10.5%) expressed concern over the amount and type of emphasis placed on learning with computers and technology. One parent spoke very directly regarding this as he/she stated, "I do not want all emphasis on computers – would like for kids to learn how to do things for themselves instead of pushing buttons all the time" (Appendix I.2.3). Another parent raised good questions with these comments:

I would like to see an increased emphasis on computers and technology, but not before the basics of reading, writing, and mathematics. I also have some concern about how much has been squeezed into a school day. Art, music, PE, and guidance are wonderful, but with the school day and year the same what happens to recess and fun? Social intelligence is a major part of a successful, productive, and happy life. How can we add anything else without short changing something else? (Appendix I.2.75)

Similar sentiments emanated from this parent's comments:

I think it is wonderful at any rate to learn computers, but I really think that while in elementary school we need to buckle down on the basics since computers come with higher grades (jr. high, high school). I know many high school seniors who can access the internet but can they divide fractions, percentages, or even show you on the map where Washington, DC is located. (Appendix I.2.107)

Almost all parent responses to this survey item characterized as “negative” still acknowledged the value of computers in education in some form. The main concerns parents seemed to display focused on the amount and type of computer use. Parents also expressed desires that traditional “subjects” (reading, writing, mathematics, science, social studies, etc.) remain the educational thrust of the curriculum and that students be encouraged to learn to think for themselves as opposed to letting computers think for them.

Parents further responded to what they see as the **school’s role in preparing their children for using computers and technology**. In accord with previous responses regarding this topic, 90.5 percent of parents indicated that schools should play a major role in this endeavor. Access and equity issues appeared in several parent responses (Appendix I.3.50; 66; 68; 81; 86; 95; 97). One parent concerned about children without access to computers at home wrote:

It would be good if the schools could provide access time and instruction on [computer]uses, how to research, etc., for children to enhance school projects. Some families are unable to purchase computers due to finances and these children are left behind in these technologies. (Appendix I.3.4)

Access at school also concerned some parents:

I think each classroom in each grade level should have the same number of computers. I do not think a teacher should give an assignment that must require using a computer unless that teacher can provide each student access to one. (Appendix I.3.40)

Other concerns focused on families who provided computer access at home but who were not computer literate themselves. One parent addressing equity relating to the abilities of some parents to aid their children in using computers and technology for learning wrote:

I think the school [should] play a big role in computer technology. The grade school age child will not be able to function in society without computer knowledge. Many parents are not computer users and do not have the skills to teach their children so if they do not learn in school many will not have a chance to learn. (Appendix I.3.26)

This prediction rang true as another parent confessed, “The school’s role is the most important because computers are the present and future. I am a computer dummy. I just can’t get it or help my children” (Appendix I.3.38). These same sentiments appeared in another response, “Since parents are often not computer literate, I feel the schools must step up and prepare this generation to work in a technology based society as computers become more a part of our daily lives” (Appendix I.3.7). One straightforward parent wrote, “The school has the money to be my child’s main computer teacher. I can’t afford it” (Appendix I.3.100).

Several parents categorized computer and technology skills with basic educational needs. A concerned parent wrote, “My children spend most of their day at school and I believe it is in the school’s responsibility to prepare and educate them for the future” (Appendix I.3.18). “Computers are a must in this day and time. All children should be taught [just] like English and math or other studies,” voiced another parent (Appendix I.3.12).

While an overwhelming majority of the parents surveyed indicated that the school should play a major role in preparing their children to use computers and technology,

exactly *what* the parents expected their children to learn varied widely. Examples of the differences in parent expectations and beliefs regarding what types and how much computer expertise their children should gain in elementary school is exemplified in the following quotes:

Computers are apart of many jobs after school. I would like to see my child learn general typing skills, know how to locate information using the Internet, and know basic functions using the computer to do financial and correspondence tasks.
(Appendix I.3.31)

By contrast, other parents acknowledge the value of computers in education, but differ in the types of experiences they think students need, “I think it’s a okay learning tool, but I rather they learn with their brains on paper” (Appendix I.3.59).

Students should only learn how to use the keyboards and some programs ... just the minimum. So many kids can’t read that I don’t think they should be spending time doing a lot of technical stuff until they can work at the grade level they are at.
(Appendix I.3.64)

Again in responding to what parents say as **their role in preparing children to use computers and technology**, an overwhelming number of the parents who responded (86.3%) made positive comments regarding their role. While most parents made only general comments on the positive aspects of computer use at home and the support that parents could give their children, some parents expressed specific opinions and goals:

I have always felt that I needed to supplement and provide the extra things myself. At this point arts education (music, art, drama) and technology education in the public school do not meet the needs of our children in the public school. Parents need to provide computers for their children at home, monitor internet service, keyboarding skills, instruction via games, mouse drill via games, word processing and document programs – hands-on exploration time. The schools cannot expect to do it alone at this time. By the time my grandchildren go to school a computer screen will be a

requirement at every desk. At this point however I feel computer time is provided more by the parents than the school. (Appendix I.4.10)

Several parents emphasized the need for a partnership between parents and school in an effort to provide computer and technology training for students. One parent stated it like this, “I have my child use the computer an hour a day. I think the school and parents should use a joint effort” (Appendix I.4.25). Another parent described her expectations for home and school technology experiences as:

... at our house, our P.C. is used mainly for learning purposes (for games pictures, coloring, etc.). I have very limited knowledge about computers so I depend on the school to teach my child how to operate and take advantage of all computers have to offer. (Appendix I.4.34)

Other parents voiced the balance of school and parents in technology training by describing the roles that each might play. One parent included the important aspect of “attitudes” toward technology that parents could effect:

Parents should have as big a role as the school in preparing children to use computers. The role may not be as large in teaching skills but in having an open mind about technology and its uses. (Appendix I.4.54)

Another parent provided thoughtful commentary on the parents’ role and included a reference to attitudes as she wrote:

A parent’s role is to provide opportunities for use of technology by showing children how helpful and fun technology can be. I feel it is my responsibility as a parent to encourage and guide my child in technology use. We as parents need to provide software at home that is engaging and informative. When our child uses the Internet or the PC for games we are encouraging development and confidence. It amazes me how children do not fear these machines. They seem to be the persons these machines were built for. It would be a shame not to encourage their development. (Appendix I.4.81)

Numerous parents made reference to issues of access and equity at home. Parents suggested alternatives to home computers by pointing to access at public libraries

(Appendix I.4.16; 40; 74; 75; 95; 107; 120), workplaces, and the homes of other family members and friends (Appendix I.4.60; 64). One parent shared several ideas as he wrote:

I think parents should encourage children to become familiar with computers. By example would be a wonderful way. I think parents should feel comfortable in local libraries and schools to come in and work with children together on the computer (at appropriate times). Drive out fear on both sides. Home computers are great, but I know everyone cannot afford one. Parents are afraid of the Internet and too much time in front of a computer. As parents learn more about technology, they will be comfortable setting limits and not afraid of what they are not sure about. The school and teachers could be a great resource in this area. I would also like to see communication between teachers and parents improve with Email. I would love to see attendance and grades, problems and praise on my screen. It would not take the place of face-to-face conferences but I think it would be a useful tool. (Appendix I.4.75)

Yet another parent called for a possible solution for parents who cannot afford home computers, but who value the use of technology in education:

Parents should encourage children to learn how to use computers as learning tools. Computers should be made more affordable for working parents, so that children could use them at home also. This could be done through more help from the government, such as grants or interest free loans. (Appendix I.4.114)

Not all parents who expressed beliefs that parents needed to play an important role in technology training with their children did so in a positive manner. One parent indicated their participation more by default than by design:

I guess it all falls at home because the schools are certainly not doing it. Computers are the future so I guess I will need to learn more so I can teach them myself. I feel there should be a "computer lab." Why spend all this money trying to get computers in every room when some of the teachers don't know enough to teach them anything? If there was a computer lab and a computer teacher, everyone would be better off. I mean how are they supposed to learn computers when the regular teacher may not know enough? I mean we have a music teacher, PE teacher, etc. They specialize in these fields and are more qualified for that class – why not computers? (Appendix I.4.141)

Administrators' Surveys

Administrators in this study included the principal and assistant principal of the elementary school, the supervisor of instruction and the technology coordinator for the county in which the elementary school resides. The principal survey (Appendix K.1) provided for open-ended responses regarding several aspects of technology use at the school. When asked to identify strengths in computer and technology use in the classroom the principal responded with the following:

- Numbers of computers available
- Teacher knowledge increasing
- Many children learning – becoming proficient (Appendix K.1.21)

Other comments from the principal regarding strengths included:

Approximately 75% of the Professional Growth Plans submitted by teachers this year included some reference to using technology to increase student achievement. I would say that probably 30% of our teachers seem genuinely interested in learning more about using technology and actively pursue that interest. The teachers who are making the greatest strides seem to be the ones who are working on Masters or other advanced degrees. They not only know how to use technology but they actually use it in their classrooms with their students.

We work hard to make sure that computers and other technologies are kept up-to-date and in good working order. The county Technology Coordinator responds quickly to our requests and is always thinking about how we can get funds for new computers. I try to always be aware of grant opportunities and I read to find out what other elementary schools around the nation are doing with technology. One thing I always try to do is to highlight teacher successes with the technology they are using in their classrooms ... no matter how big or how small. I know that many of these teachers have to learn this on their own time while juggling many other things. I try to set school-wide goals for helping teachers learn to use many different types of computer functions ... I would like to implement a system whereby teachers email daily reports (lunch count, absentees, etc.) to the office instead of our running papers back and forth all morning. I would also like to use email to make daily announcements and send out agendas for our faculty meetings. Those are things I have on my "to do" list for next year. For many of our teachers just learning to use email (manage folders, addresses, etc.) will be a big step. Also, in bringing new faculty into the school I make sure that any applicants bring with them adequate

technology skills and have a personal philosophy of education that values the use of technology in teaching and learning.(Appendix K.21.1)

When asked to identify weaknesses in computer and technology use in the classrooms of the school, the principal wrote:

- Lack of teacher knowledge in how to use computers in general, and specifically how to use computers and technology in their teaching
- Lack of teacher flexibility in scheduling to allow for computer time for students on a daily basis
- While we have made concerted efforts to provide computers for every classroom, we still don't have enough computers so that students have ready access (Appendix K.22.1)

The principal continued with a narrative describing other weaknesses and observations she noted related to computer and technology use in the school:

I don't get a 'feel' for technology being a priority for many of my teachers. In more than one instance new technology initiatives have been met with opposition. Many teachers express that there is already so much to do in their classrooms that anything else is just too much. I rarely get teachers coming to me with articles that highlight some sort of technology application or software that they want for their classrooms ... teachers will ask for more computers, but almost never identify what plans they have for the new computers. I know that accelerated Reader has probably been the impetus for many teachers using their computers more and that it may be the reason for so many more requests for new computers. Still I don't get teacher requests for training or lab facilities ... though lack of space would make that a moot point. About the only time parents mention technology to me is if they are just moving into our town. Even during fundraisers for technology no one seems particularly concerned about what will be purchased or how it will be used ... no real 'game plan' in place. We do have a county-wide technology plan, but it is not specific for our school and is very general in nature regarding what we are trying to accomplish ... if I am not sure what the overall plan is then I am not surprised that teachers and parents are pretty much in the dark about it. In trying to identify which teachers gravitate toward using technology in their classrooms, it is difficult to find a common denominator. I can't really see much difference in technology use and expertise between experienced teachers and new teachers or between younger and older teachers. I have noticed that those going back to school or who have registered for college courses that focus on the integration of technology in teaching are doing more and their students are doing more. I have also noticed that teachers who have computers (and the Internet) at home are my best and most capable technology users. Many of these teachers have husbands or children who help them learn new applications ... these teachers are also

the ones who know how to use things like scanners, digital cameras, and to burn their own CD's. Our school days are so full that if teachers don't have access to computers and the Internet at night, it makes sense that it would be more difficult for those teachers to progress. (Appendix K.22.1)

The principal also shared her vision for the use of computers and technology in the school:

I really want to see a day at [this school] when children are able to access information anytime by themselves with the help of technology. I would like to see teachers using technology to enhance the curriculum – PowerPoint presentations, Internet usage, all handouts computer generated. I would like to see our sixth graders have access to computer notebooks/laptops. I would like to see more computer-generated student work. I would like to see networking that would allow us to email information to teachers and have them email info. to us. I think it would be exciting if each teacher had his or her own classroom webpage where she could post calendars, announcements, assignments, feature certain student work, and really involve parents. I would like to see my teachers take a personal interest in setting professional development goals to further their own knowledge about and expertise in using technology in their classrooms. (Appendix K.23.1)

The assistant principal responded to the same survey as the principal. In many instances their responses were similar, however new issues appeared in each. When asked to identify the strengths in computer and technology use in the classrooms of the school, the assistant principal wrote:

The members of our faculty are willing to learn how to use the computers and technology. Several have used their own personal time to gain more knowledge and understanding. We are very fortunate to have multiple computers in each classroom and teachers who spend extra time creating activities for students to learn while using technology. (Appendix K.21.2)

In responding to the weaknesses in computer and technology use in the classrooms, the assistant principal's response reflected sentiments made by the principal:

- No set curriculum for technology
- County-wide technology coordinator can't possibly answer all questions and solve the technology problems.

- Lack of training for all teachers and students (Appendix K.22.2)

The Supervisor of Instruction responded to a survey item asking her to identify the strengths in computer and technology use in the classroom. She wrote:

The first noticeable strength is availability of computers and other types of technology. Another strength is the willingness on behalf of the principal to provide and support the use of technology. (Appendix H.4)

When asked to respond to the weaknesses in computer and technology use in the classrooms the Supervisor of Instruction described the following:

Probably, a lack of continued training hampers the use of existing technology more than anything. Many of the “older” teachers here are still hesitant when it comes to using technology for instruction. Another weakness I have observed is that existing computers are not used on a daily basis. (Appendix H.5)

These comments underscored similar sentiments expressed by the principal regarding the frequency of computer use in the classrooms. Observations notes from the pilot study indicated that entering a classroom with “dark” computers was a common occurrence (Field Notes: March 25, 2000). Theoretical notes (April 20, 2000) by the researcher included in the field notes also addressed the issue of “use”:

Teachers seem genuinely interested in learning more about technology. Many stop me in the hall to tell me of a recent discovery or success, or to discuss when we can get together to work on a problem they are having. They smile, seem excited ... I get my hopes up that all they needed was support to be able to make the leap to really using technology in their classrooms. But when I actually go INTO the classrooms the computer screens are usually dark. I see the teacher in front of the room, students in their assigned seats, and traditional instruction being done ... no overheads, no multi-media applications of any kind. I see students taking AR [Accelerated Reader] tests at computers more often than anything else. Why no leap? If teachers are excited by the technology and they have the skills and the hardware/software/ telecommunications/ Internet they need, what is missing? I believe that without a shift in pedagogy relating to teaching and learning then there is still no significant difference in computer and

technology use in the classroom. Do teachers notice that nothing much has changed, or are they unaware that another level even exists? I do not detect frustration levels in what they say to me indicating that they are displeased with the amount of computer and technology use in their classrooms ... instead they talk to me more about how they can get MORE computers.

The Supervisor of Instruction shared her vision for technology use at this school by writing the following:

My vision:

- all teachers have their own workstation
- all classrooms are networked
- communications to teachers from the office (& teachers to office) is done through the computer
- absences, lunch reports, etc., sent directly to office via computer
- every student uses the computer in some way everyday
- textbooks become less of a focus for instruction and are replaced by technology (Appendix H.6)

The Technology Coordinator for the county in which the participating school resided also contributed to this study by responding to a survey (Appendix D). At the time of this study the Technology Coordinator's position entailed ordering and maintaining the computers and related technology for all the county's schools. The Technology Coordinator's job also included providing technical support for teachers, administrators, and staff persons. Grant writing and taking advantage of other opportunities to procure technology for the county constituted other aspects of the Technology Coordinator's responsibilities. In identifying the top instructional support services **not** adequately provided in the school district, the Technology Coordinator offered the following:

- 1) Technology staff development
- 2) Curriculum for integration support
- 3) Grant writing and administration
- 4) Webpage development and support
- 5) Distance learning

- 6) Basic sw [software] instructions
- 7) Technology specifications, definitions and standards
- 8) Expanding server uses
- 9) Automatization of administrative activities (teachers & staff)
- 10) Implementation of technology security against viruses, hackers, student tampering (Appendix H.8)

The Technology Coordinator also identified strengths in computer and technology use in the classrooms:

- 1) Availability of technology in classrooms. There is an average of almost 3 pc's per classroom and 2/3 of the classrooms have a pc connected to a large screen TV. All classrooms have at least one pc connected to the Internet, most have 2 or more.
- 2) Tremendously successful Accelerated Reading Program due to 100% participation of all students in all classrooms for 3rd through 6th grades. [The school] had to almost double the number of books in the library within the last 2 years, since students were running out of books to read.
- 3) Team effort on school wide technology themes. Direction, encouragement, and support from the top provided and enthusiastic support from most teachers. This has been demonstrated in the Around the World and Hooked on Reading year long themes. Also, 37 of 42 teachers participated in the Technology Literacy Grant 2000 program.
- 4) Considerable use of drill and practice software. Students individually use these type programs in the areas of language arts and math, especially in the five 21st Century classrooms. (Appendix D.10)

Along with strengths, the Technology Coordinator also identified weaknesses he discerned in the participating school:

- 1) Very low utilization of technology in the classrooms. No specific analysis performed, but I would estimate that much less than 25% of the time - probably 10-15%. Lots of times students do what they want to do on the computer, except for Accelerated Reader and in 21st Century classrooms.
Very little use of the technology by the teacher to teach. There are very few student team, group, or cooperative learning activities in the classroom.
- 2) Most teachers have minimal technology expertise. Based upon surveys, teachers feel they are knowledgeable in only a few areas of technology, yet the demand for technology classes is somewhat low.
- 3) Few, if any, teachers understand how to integrate technology into the curriculum. This is based upon observation and the opinions expressed by teachers. Staff development is not provided or requested in this area. The technology is being implemented in bits and pieces! TLG [Technology Literacy

Grant] and school wide themes and programs are helping to show how to utilize technology. The 21st Century classroom teachers seem to be making the most progress, which may point out the more you use it the more you learn how to use it. Most learning is teacher directed and taught with very little independent or group/team learning. (Appendix D.11)

The Technology Coordinator shared his vision for the use of computers and technology in the classrooms at this school by responding in the survey with the following:

Teachers should teach, and teach using technology. Students should increase their understanding of 1) the technology, 2) how to use the technology, and 3) how the technology can help them learn as they progress from grade to grade as a foundation for lifelong learning.

Technology is only a tool to be used. The more effectively teachers and students utilize technology the more progress will be made. There is never enough money to provide the quantity of up-to-date technology; however, when teachers learn how to be good coaches and students understand how to be independent and team learners the accomplishments will justify considerable expenditures. (Appendix D.12)

Summary

This chapter sought to report the findings and to share the comments of the stakeholders who participated in this study. Six surveys (Appendix D - H) served to provide much of the data for this chapter. Other information sources included reports developed by the school for Southern School Association reaccreditation; Field Notes from the pilot studies which chronicled all technology training sessions and social interactions with teachers, administrators, and parents; and Theoretical Notes from the pilot studies which served to provide the primary researcher's interpretations of events and interactions.

Descriptions of the setting, data collection and analysis, and the participants at the onset of chapter four laid the foundation for reporting the results of this study. A

description of the current technology available at the school was provided for use in comparing this elementary with other school settings and to help the reader develop a mental picture of the technology demographics of the school. This data indicated that the participating school ranks within the 95 percent of U. S. public schools with Internet access (National Center for Educational Statistics, 1999), while falling well below the national average of students per on-line computer.

The baseline data on participating teachers included the length and type of computer use, the number of hours teachers use computers for personal use, and the number of hours teachers use computers for school-related uses. Based on Rosenthal's (1999) book as referenced in chapter two of this document, personal use of computers by teachers facilitates their use of technology in the classroom providing implications for data gathered in survey documents reporting that 54.3% of teachers at this school used computers for personal purposes less than one hour per week.

The next section of this chapter highlighted teacher aptitudes in using technology including information on teacher "comfort zones" in using computers, elements of computers that cause discomfort, Internet and email use, training, and commonly used technology applications. Sharp contrasts were drawn between Rosenthal's (1999) quote of only 20% of the nation's teachers indicating that they feel comfortable using technology in their classrooms and the self-reported statistics of teachers at this school with 71.4% indicating a somewhat or very comfortable level of computer use. What Dillman (1978) termed as "social desirability bias" may account for the responses of teachers at the participating school as their responses reflected what they thought they

should say to be within educational norms. Few if any of the other data gathered either in the form of quantitative or qualitative modes reflected this degree of positive comfort levels with using computers.

As suggested in the literature, teacher attitudes relating to the use of technology in education affected many aspects of the use of computers and other technologies in the classroom (Siegel, 1995; Schrum, 1999; Strudler & Wetzel, 1999). Teachers discussed fears, feeling unprepared to use technology, time constraints, and the overall value of technology in education.

Parent views also comprised part of the survey results reported in chapter four. Bossert's (1997) contention that schools focus more on learning than on purchasing new technology echoed sentiments expressed by some parents. However, the majority of parents contended that students must leave the elementary school setting with strong technology skills. Many cited the job market as a primary reason that technology skills are important. This reference to our technology-based society underscored findings by Rosenthal (1999), Zuckerman (1994), and Jukes, et al (1999).

Other insights included in this chapter encompassed those from the principal, assistant principal, supervisor of instruction, and technology coordinator. While each participant noted different strengths and weaknesses, sometimes contrasting with those of teachers and parents, all provided strong support for the use of technology in education.

Chapter Five

Conclusions, Implications, and Recommendations

“If you don’t know where you’re going, you’re likely to wind up somewhere else.”

– Yogi Berra

The purpose of this study focused on describing the status of classroom computer use at an elementary (K-6) school. A further purpose of the study included examining and describing the patterns of beliefs or attitudes toward the use of technology in education and the skill levels necessary for use. Surveys of teachers, administrators, and parents within one school, pilot studies, and observations provided qualitative and quantitative data. Analysis and interpretation of the data allowed the principal investigator to “paint a picture” of the status of technology use at the school, to make recommendations regarding the direction of technological development for the school, and to determine the types of training needed.

Several questions served to guide the scope of this study:

- What technology skills do teachers already have, and how are those skills demonstrated in the classroom?
- What role do teacher beliefs regarding educational technology play in technology use at this school?
- What technologies do parents expect their children to be provided at school?
- Do teachers, parents, administrators, supervisors of instruction, and technology coordinators share common goals for the role of technology in education at the participating school?

The first section of this chapter included conclusions for each of these questions based on survey results. An attempt to make sense of the survey results necessitated an interweaving of the principal investigator’s own reflections and interpretations. This

section also includes references to current literature directly related to these topics. The next section outlines implications of these findings and recommendations for teachers, administrators, technology planning teams, parents, teacher educators, and others interested in promoting successful implementation of technology as a teaching and learning tool.

Key Findings

The particular problem at this school lay in the skills-based, sequential, teacher-as-expert models of instruction found in most, if not all, classrooms to varying degrees. Since these teachers viewed themselves as the providers of knowledge and information, the fact that they felt incompetent in technology removed technology integration from the realm of instruction. These teachers perceived learning as skills-based. Under that premise, they viewed their *own* learning as skills-based ... not in a social-constructivist multi-path method. As a result they wanted skills-based, sequential, teacher-centered instruction in technology that would make them “experts” in their own classrooms. Then they would feel confident enough to provide skill-based, sequential, teacher-centered technology training for *their* students. This would all occur without any regard for integration or pedagogical change. Nowhere in the literature that the principal investigator reviewed existed evidence to support that such an approach to teacher training in classroom use of technology would be successful (Poole & Moran, 1998; Hardy, 1998; Braun, 1993; Bailey, 1997; Wang, 2000; Lloyd & Welliver, 1989; McNamara & Pedigo, 1995; Dockstrader, 1999; Sherry, Billig, Travalin, & Gibson,

2000; Thornburg, 2000; Rheingold, 2000; Rosenthal, 1999; Brush, 1998; Moursund & Bielefeldt, 1999; Strudler & Wetzel, 1999; Schrum, 1999).

What readers witnessed in this study was a school full of teachers trying to do what they were asked to do: by-and-large a school of genuinely caring teachers who tried their best to comply with what was asked of them by administrators, parents, school board members, and the school superintendent. In many ways their hands, and keyboards as the case may be, were tied. Teachers received pressure to integrate technology and new teaching philosophies into classrooms where a true mismatch of practices existed – very much like trying to insert a square peg in a round hole – no amount of force will make it a good fit and they will exhaust themselves in the process of trying. For teachers to find a level of comfort with technology integration they must align practice so they will have a place to “plug in” new innovations that move teachers and students into an arena where authentic, constructivist learning is central.

Conclusions

What technology skills do teachers already have and how are those skills demonstrated in the classroom?

Teachers enter the classroom with certain technology skills they acquired from a variety of places. Most teachers acquired their present levels of technology skills from trial and error and from family members or friends, reflecting trends found in other elementary schools (Cuban, 2001). Teachers in this study both self-reported their technology skills and gave examples of computer/technology use. Discrepancies existed

in how teachers said they used technology in some of the survey items and how they, parents, and administrators responded in other survey items. For example,

- teachers expressed a 71.4% (Appendix E.6) comfort level in using the Internet;
- 92.8% of teachers ranked their Internet use at a level 2 (can access school and district websites to find information) or level 3 (use lists of Internet resources and make profitable use of search engines to explore educational resources);
- however, only 11.4% (Appendix E.11) of teachers indicated they were very satisfied with their current level of using the Internet.

While teacher responses toward Internet use seemed strong, parents indicated very little knowledge (6.4%) of Internet use in the classroom (Appendix I.1). Administrators noted that each classroom contained at least one on-line computer, but Internet utilization (if at all) remained unclear to them. This scenario may fit Cuban's (2001) observations that "Teachers tend to overestimate frequency of computer use" (p. 201). This situation appeared further complicated by the differing definitions of the word "use," discussed later in this chapter.

The teachers who used technology in this school included those with technology in their homes, those who spent extra amounts of time learning to use technology, those who appeared self-motivated to learn on their own, those who took advantage of training opportunities, and those who participated in graduate work at a university. The principal estimated that only about 30% of the faculty appeared "genuinely interested" in learning more about using technology (Appendix K.1.21). Parent surveys made reference to their children's participation in learning activities using technology in some manner, and the assistant principal underscored the fact that some teachers in the building showed strengths in using technology:

The members of our faculty are willing to learn how to use the computers and technology. Several have used their own personal time to gain more knowledge and understanding. We are very fortunate to have multiple computers in each classroom and teachers who spend extra time creating activities for students to learn while using technology. (Appendix K.2.21)

While 71.4% of teachers responding to questions about their degree of comfort with computers in general indicated a *somewhat* comfortable or *very* comfortable rating, this level of *comfort* failed to appear in their written responses, in field notes, or observations. Perhaps a semantic dissonance existed, revolving around the word “comfort,” and teachers will need to answer further questions before any real understanding or inferences occurs based on their responses. However, based on teacher written responses, field notes, and observations, readers can determine that their definition of the word “comfort” did not equate to “confident.” Also, the repetitive requests for training seem to signify that teachers felt their technology skills are deficient.

Asked about using present technology skills in the classroom, teachers provided examples of classroom use focused primarily on Internet searches to locate resources (lesson plans, information), practice with specific educational software (primarily drill and skill math and language arts applications, Accelerated Reading tests), word processing, and in a few cases, using email communications; one teacher also mentioned PowerPoint. While Cuban’s (2001) research findings indicated that “less than 5 percent of teachers integrated computer technology into their regular curricular and instructional routines” (p.133), no responses or observations of teachers at this school indicated any regular curricular and instructional routines in integrated computer technology. The

primary mention of student learning associated with technology use related to curricular-based “games” and Accelerated Reading tests.

Many teacher behaviors as characterized by the findings in this study seemed to fall within what Evans-Andris (1996) coined as the *distancing* stage. Examples of technology use that teachers shared molded into already existing classroom structures. In other words, if the primary method of instruction consisted of workbooks and skill sheets, then a readily available computer application involved skill-and-drill software. Students got hands-on computer time but without any shift in pedagogy from the teacher and without any true integration into content areas of instruction. Also, teachers within the distancing stage continued to avoid computer use and identified barriers to such use. Evidence of this existed in this study as teachers named conditions that must change before they could make technology a priority in their classrooms (i.e., more computers, more training, more time, more support, addition of a computer lab).

Sandholtz, Ringstaff, and Dwyer (1997) referred to this stage of technology use by teachers as the *entry* stage. In this stage teachers struggle with management issues relating to the use of computers, including physical classroom arrangements, scheduling, and classroom organization of students into groups. Teachers in this stage continue to use traditional methods of instruction and see computers merely as “add-ons.” This stage also seems to describe many teachers in the current study as they expressed that they valued the use of technology in education, but then included technology in a token or a very peripheral manner (i.e, computer centers as rewards or electronic workbooks, student computer use estimated at less than one hour per week by many teachers, limited

examples of computer use tied to content learning through projects, investigations, etc.).

Sandholtz, Ringstaff, and Dwyer (1997) continued to suggest that a change in the dominant paradigm of traditional teaching methodology must give way to a constructivist approach to teaching and learning if true integration of technology into the curriculum can be expected. This shift in teaching philosophy requires a shift in teacher beliefs as described below.

What role do teacher beliefs regarding educational technology play in technology use at this school?

If we believe that most teachers genuinely want students to learn, genuinely want students to experience continuous success, genuinely hold students' best interests as central, then we must acknowledge that *teacher beliefs* guide classroom instruction, interactions, structure, materials, and the general learning climate of the classroom. What teachers would want to enter a classroom 180 days a year and teach, interact, instruct, and behave in a way *contrary* to what they believe is best for students? Because teacher belief systems regarding the best learning strategies for their students figure so strongly into the decision making powers that teachers possess and the psyche of each teacher, these beliefs lie at the very heart of what this study indicates about the role that technology plays at this school and in individual classrooms. A teacher's attitude regarding technology and change in instructional practices greatly influences his or her ability to effectively implement technology in the classroom (Knupfer, 1993).

The school principal, supervisor of instruction, and technology coordinator all referred to the "traditional" nature of instruction at this school (Appendix K.1, Appendix H,

Appendix D). Field notes from the pilot studies, observations, and surveys also provided insights into the general type of instruction provided at this school. These data reinforced Cuban's (2001) description of "traditional" forms of teaching, such as "reliance on textbooks, whole-class instruction, lecturing, and multiple-choice tests" (p. 14). These classrooms appeared teacher-centered, with segregated "subjects" taught by progressing sequentially through textbooks and workbooks. Teachers emerge as the "givers of knowledge and information," and students often play the role of passive receivers who prove proficiency and learning by providing exact answers on tests, thus precisely matching the information provided by the teacher and the textbooks. Students are not seen as active learners who bring experiences, insights, and information to the learning process, but instead as empty vessels that need filling. Teachers in this school felt the charge of teaching the "basics" and do so in very much the same way they themselves were taught in elementary school. Actually, the principal listed "student achievement" as one of the strengths she witnessed at the school. Traditional instruction does not mean that some students do not learn, but instead only limited amounts of innovations can be incorporated, only limited numbers of student learning styles are addressed, and higher-order thinking and problem solving skills – elements of instruction not always reflected in skills-based achievement tests – are not the main thrust of classroom interactions. The belief systems and educational philosophies that drive this pedagogy appeared in contrast to the *constructivist* learning model which emphasizes engaging students in active learning that is connected to real life (Jonassen, Peck & Wilson, 1999).

In their book, *Learning through Technology: A Constructivist Perspective* (1999), Jonassen, Peck and Wilson promoted using technology as a tool to empower learners as they construct knowledge through active learning. Based on all data collected in this research project, no evidence exists that teachers recognize a need for any shift in pedagogy that would allow for student-centered, active learning through the use of technology. No amount of direct training of teachers in the mechanics of how to use computers and related technology will magically transform these classrooms into learning communities where students have choice, learn through inquiry, and are actively involved in the learning process. The root of the problem exists not in which button to push, but rather in basic beliefs about how people learn.

Primary uses of technology reported by teachers included software applications (77.1%), Accelerated Reading exams (68.8%), word processing (42.9%), and Internet searches (37.1%). The software applications appeared as “electronic workbooks” with students playing learning games in math, language arts, science, and social studies. Most of the computers appeared as “centers” and not as requirements for content. Typically, students could “visit” the computer center when they needed extra help on a skill, or as a reward for good work/behavior. This use of technology fell completely in line with the traditional model of skills-based instruction. Students are not constructing knowledge and actively engaged in learning ... instead the computers are used as “exercise” tools that may or may not have any connection to other classroom learning, the students’ interests, or have any real world applications.

Accelerated Reading (AR) exams appeared again and again in survey responses from all stakeholders. The Accelerated Reading program at this school is not mandatory, nor are teachers allowed to include AR test results in students' grades. The computer is only the tool that presents the test questions as students use the mouse to indicate correct answers. Again this fits within the framework of the traditional model of instruction and does not alter classroom practices already in place.

Teachers provided few examples of word processing applications; however documentation of some Internet use appeared in the surveys. One teacher mentioned students searching for topics and then conducting class discussions including the new information. The most innovative project that another teacher mentioned explained plans to implement a pen-pal network on the Internet. While in a student-centered classroom this type activity would likely focus on the communication aspects of letter writing and encouraging students to learn to "tell their own story" to connect with others, this teacher sums up the experience by stating, "I will require that letters be sent alternately scanned, handwritten, and typed on the computer" (Appendix E.23.16). The end result of a potentially interactive activity presented as a very teacher directed, skills-based use of a computer as a typewriter.

Do the teachers at this school recognize that they need to integrate technology into the curriculum or that present instructional practices prohibit innovations of that nature? While that is not entirely clear from the data, it is clear that 88.9% of teachers self-reported that they do not blend the use of computer-based technologies into classroom learning activities, or they are still in the early learning stages of integration. So, what

does the future look like for these teachers as they plan for technology integration? One teacher's vision for the future includes her students who read at least on a second-grade level doing short-term research projects on the Internet – typed, double-spaced, with a cover sheet. “Second verse, same as the first”

Why do teachers stand so firmly on the barriers they have constructed regarding the integration of technology into the curriculum? Cuban (2001) suggested that true integration of technology would require changes in classroom organization and *control* over the learning would shift more from teacher to students: “Such changes would entail fundamental shifts in the teacher's and student's roles, the social organization of the classroom, and power relationships between teacher and students” (Cuban, 2001, p. 134). With teachers so deeply rooted in a traditional teacher-centered model of instruction, major changes in beliefs and behaviors must occur. Professional development for teachers needs to start at a fundamental level, detailing how people learn and how instruction should align with “best practice” and sound pedagogy. Until then, any increase in classroom use will serve only, as Cuban (2001) stated, “to sustain existing patterns of teaching, rather than to innovate” (p. 134).

If, as indicated, only 34.3% of these teachers ranked technology and computer literacy as “basic,” and their philosophies of instruction center around basic skills, little surprise surrounds the fact that 68.6% of teachers specified a *medium*, *low*, or *no* priority ranking for the degree of emphasis they place on computer and technology literacy in their classrooms. That would be an expected outcome of teacher beliefs that technology and computer literacy are not basic to their students' education ... even though a state-

mandated technology curriculum is in place, complete with standards and expected student achievement levels. In responses to the surveys, teachers didn't acknowledge the state-mandated technology curriculum, not mentioning it even once, either positively or negatively, throughout the surveys. In fact, during one of the teacher training sessions, (Pilot Study 2) all teachers who received a copy of the state technology curriculum for their grade level indicated that they had never seen it before. They certainly knew the language arts, math, social studies, and science curriculum for their grade levels, but were unaware of the technology standards. When questioned about this, the principal indicated that the same standards manual that includes the "core" curriculum for each grade level *also* includes the technology standards. All teachers in the school had a copy of this manual. The teachers possessed the technology standards all along but had never looked at that section of the manual; thus, when they received a copy of the technology curriculum as a handout, there was no recognition that these standards existed. Bottom line, these teachers' actions indicated that they felt little, if any, responsibility for the technology curriculum. Whether teachers justify this lack of responsibility by attributing it to lack of training, time, support, or computers, it is what the teachers *believe* and *value* that shapes many of the decisions they make in their classrooms (Cuban, 2001).

What technologies do parents expect their children to be provided at school?

Nearly all parent responses favored some "use" of technology in education. These findings replicated a recent Gallup poll by the International Technology Education Association (ITEA) which determined that 97% of those polled believed that the study of technology should be included in the school curriculum (Dugger & Rose, 2002). Of

those participants responding “yes” to the previous survey question, 63% indicated that the study of technology should happen within subject areas, such as math, science, and social studies. Many parents at the participating school also voiced strong opinions in favor of integration of computers and technology into the content areas, as opposed to students using computers for games and Accelerated Reading testing.

Cuban (2001) reported that parents strongly support computers in education as critical preparation for their children to secure jobs in the future. Several parents in this study indicated a belief that success in higher grades in school and in the job market required that elementary schools prepare students with the skills necessary to use computers for learning. Parents provided examples of even the lowest-paying jobs requiring the use of technology for employment. Nationwide, ITEA found that 61% of those polled believed that technological literacy should be included in high school graduation requirements (Dugger & Rose, 2002).

The consensus among parents was that even though there was some evidence of teachers using computers in the classroom, overall parents did not see an acceptable amount of hands-on time for students. Parents also wanted to see more computers in the school and requested that a computer lab be made available for students, with an “expert” computer teacher. Many of these comments seemed to arise out of frustration ... last resort pleas for some technology experiences for their children before they entered middle and high school. While parents consistently asked for changes in the way computers are used in the classroom, few gave concrete examples of exactly what types of uses they would like to see. Without information and understanding of the technology

content standards for each grade level, it would be very difficult for parents to make educated guesses as to what types of technology learning and use would be appropriate for their children. This brings us full circle to another major concern for parents – teacher training.

Parents trust schools and teachers to be as knowledgeable regarding the technology curriculum as they are in other curriculum areas. Parents expect teachers not only to receive the training they need, but also to incorporate the learned skills into classroom instruction. While a large percentage of the parent comments classified as “negative” regarding the level of attention the use of computers and technology receives at this school, no parents complained about the *quality* of teachers or the quality of instruction in general. Technology in particular appeared to be a “sore subject” with parents and one they were more than willing to vent about. Parents did complain about the lack of integration of technology into the curriculum, but not about the skills-driven instruction found in most classrooms. With the exception of parents’ pushing for integration, parents and teachers held many of the same realities and visions for the use of technology.

For most of the parents in this school, this is the only school their child or children have ever attended. They lack a basis for comparison for what occurs at other elementary schools (other than the ones they themselves attended). Much of what they know about the use of technology in education they hear or see in the media. These parents, like most parents in America, hold very favorable beliefs regarding the use of computers in teaching and learning. Parents know they want their children to have *it*, they just do not completely know what *it* is. Unlike many other areas of the curriculum where parents

can assist their children and help fill in the gaps in their child's education that the school does not or cannot fill, supplying home computers, learning and production software, and other peripherals was not an option for many of the parents at this school. Many of these parents simply could not afford the expenditures to supply the hardware and software at home. Other parents might have had the financial means, but not have the technology expertise to assist their children in using computers and other technologies. It is no wonder that parents found this topic to be particularly personal ... they were very much at the mercy of the school system to prepare their children in computer and technology literacy.

Do teachers, parents, administrators, supervisors of instruction, and technology coordinators share common goals for the role of technology in education at the participating school?

To ensure teacher success in integrating technology, all stakeholders - parents, teachers, administrators – must share a common vision (Melzer & Sherman, 1997; Sandholtz, Ringstaff, & Dwyer, 1997; Cooley, 2001). Means (1995) elaborated on this observation as she stated:

Sites most successful in infusing technology throughout their entire programs were schools and projects that also devoted a good deal of effort to creating a schoolwide instructional vision -- a consensus around instructional goals and a shared philosophy concerning the kinds of activities that would support those goals. What appears to be important is not the point at which technology becomes part of the vision but the coherence of the vision and the extent to which it is a unifying force among teachers. (p. 31)

The following table (Table 12) addresses stakeholder perceptions on key issues identified in this study and supported in the literature as being considerations for

Table 12: Stakeholder Perceptions on Key Issues

Reality	Teachers	Parents	Administrators
Amount of technology in school	- Not enough - Many teachers “waiting” until they receive “enough” computers - Repeated requests for computer lab	- Not enough - Repeated requests for computer lab	- “Availability” of technology a strength - Set “integration within the curriculum” as a target goal ... no mention of a computer lab - Requests from teachers for more technology without evidence that teachers use what they already have
Definition of technology “use”	- AR test - Software – game format	- Computers used for gaining knowledge - Too much AR testing - Too many games - Should not be used as a “reward”	- Integration into curriculum - Following state-mandated technology standards
View as major purpose of student technology use	- Learning - Only 34.3% ranked technology/computer literacy as “basic”	- Preparation for workplace - Preparation for middle/high school	- Computer/technology use is part of core state-mandated curriculum - Student achievement
Who is responsible for student use of technology?	- Parents and Schools (62.9%) - ½ of teachers do not know if parents are supportive or non-supportive of educational technology	- Teachers/Schools (90.5%) - Parents	- Teachers

Table 12: Stakeholder Perceptions on Key Issues Continued

Reality	Teachers	Parents	Administrators
Teacher skill level in the use of technology as a teaching/learning tool	- 40% somewhat comfortable - 31.4 % very comfortable - comfort vs. confident	- Teachers need to be trained	- Most teachers do not know how to use technology as a teaching and learning tool
Identified barriers for the use of technology	- Time - Technical problems/support - Lack of standard features on computers - Less focus on “basics” - Anxiety - Lack of computer lab	- Fear of less focus on “basics” if teachers include technology use in instruction - Can’t afford one at home - Don’t know how to purchase one	- Most teachers do not know how to use technology as a teaching and learning tool - Teachers not willing to devote time and effort necessary to learn to use technology
Teacher Training in Technology	- Stated they need more training - Rarely request technology PD - Rarely attend technology PD - Request different structure of PD in technology	- Teachers need to be trained	- Professional development sessions in technology not in great demand, nor are they well attended when offered - Lack of PD hampers use of existing technology - “Catch 22” cycle of training – purchase new equipment – training.

evaluating technology use in an educational setting (NCES 2000-102; Carter, 1998; U.S. Department of Education, 1998).

As Table 12 illustrates, not all stakeholders share common views of the emergent themes in this study. It is the dissonance and overlapping of these views that indicate areas of conflict and commonality. A major implication of the findings represented in this table is that stakeholder viewpoints on these key issues provide a starting point for the development of a school-wide technology action plan. Many of these key issues present as barriers to technology use in the classroom. A few of the barriers and key issues are discussed in the paragraphs to follow.

Barriers

There are plenty of obstacles to effective integration of technology in an elementary classroom. The literature carefully and consistently underscored what many of the teachers in this study named as barriers to the use of technology in an educational setting, namely:

- Time (NCES 2000-102; Siegel, 1995; Schrum, 1999; Strudler & Wetzel, 1999)
- Training in computer skills; training in pedagogical changes prompted by the use of technology in teaching and learning (Heaviside, Riggins, Farris, 1997; Burniske, 1998; NCES 2000-102; Poole & Moran, 1998)
- Technical support (NCES 2000-102; Siegel, 1995; Schrum, 1999; Strudler & Wetzel, 1999)
- Access to multiple computers, on-line computers, peripherals (NCES 2000-102; Siegel, 1995; Schrum, 1999; Strudler & Wetzel, 1999)
- Support from administration and parents (NCES 2000-102)

Computer Lab/More Computers

While administrators wanted technology integrated into the curriculum and not taught as a stand-alone “computer class,” teachers and parents continued to request a facility

where regularly scheduled computer times provided students with hands-on experiences and direct instruction. Teachers suggested that a computer lab be installed and an “expert” hired so that students received direct instruction in technology, and teachers would be relieved of that responsibility. No mention was made of adding a lab so that it would compliment or extend classroom instruction in technology. Perhaps a compromise lies somewhere in the middle. Many elementary schools do have computer labs where students learn keyboarding and basic computer functions. This might ensure that students receive more hands-on time, but still no connection would be made to classroom learning. This “solution” is more a way of getting around the problem than addressing it. Of course if a computer lab were added, another consideration would be that teachers will receive fewer, *not more* computers in their classrooms as funds would have to be diverted to establish and maintain a computer lab and instructor. In his studies of early childhood, high school, and university classrooms in Silicon Valley, Larry Cuban (2001) found that even in schools where computers were plentiful, and where teachers were trained and fully supported to ensure success in the integration of computers in teaching and learning, only a small percentage of the teachers used computers for instructional purposes. Merely adding more computers or putting them in a room with an “expert” will not change the status quo of technology integration at this school. Ultimately, teachers and parents need to sit down with administrators and discuss the pros and cons of this decision as all stakeholders are affected.

Use

Stakeholders need to discuss other issues related to technology use, such as what defines use, what barriers inhibit use, who is responsible for student use, and the major purposes of technology use. This will continue to be an area of contention until the stakeholders resolve their expectations and definitions associated with technology use. Exemplary models that focus on student learning and the integration of technology used at other schools could be examined and adopted to the satisfaction of all involved. These expectations and definitions should form a major part of a custom-designed technology plan for this school.

Training

“Training helps teachers transform lifeless equipment into useful tools. Creating high tech educational tools without training teachers to use them would be as useless as creating a new generation of planes, without training pilots to fly them” (Web-Based Education Commission, Section 2, p. 39). From all accounts that a review of the literature offers, teacher training in technology probably presents a greater challenge than any other aspect of educational technology (Poole & Moran, 1998; Hardy, 1998; Braun, 1993; Bailey, 1997). The Web-Based Education Commission (2000) stated, “The training teachers do receive is usually too little, too basic, and too generic to help them develop real facility in teaching with technology” (p. 39). While many schools, including the one in this study, still struggle with getting teachers up to a level of “basic” competency in technology use, Schwab & Foa (2001) presented the following notions:

... training teachers in the skills needed to do e-mail, search the Internet, do PowerPoint presentations, or even make home pages on the Web is not sufficient.

... it is clear that student learning will not improve unless teachers learn to develop curriculum that capitalizes on the power of telecommunications. (p. 624)

The main commonality that surfaced from the surveys of all stakeholders centered on teachers' receiving the necessary training. For teachers this was expressed in terms of computer training – which button to push. For administrators and most parents, this was expressed as training not only in how to *use* computers, but also in how to *teach* using computers and other technologies. Administrators used this term over and over again when discussing weaknesses and goals for improving the use of technology in teaching. Similarly, parents expressed wishes that their children use technology for research, for projects, and for more than Accelerated Reading tests and games, or as a reward for completing work quickly in class. While teachers failed to use the word “integration,” a few made reference to this concept as they discussed desires for using technology to teach “this” or “that” subject/content. Many times frustration rang out in the teachers' words as they struggled with the uphill battle of learning to manage the technology without really giving voice to the fact that even if they had spectacular computer skills, they would still not be assured of effective teaching through the use of technology (Schwab & Foa, 2001).

While all stakeholders agree that teachers need more training in the use of technology, the complicating factors surround the *types* of training and the *delivery* methods. The technology coordinator polls teachers to see what types of training they need and want, and the supervisor of instruction conducts the same type survey. Both the technology coordinator and the supervisor of instruction recognized the need for more teacher training, but indicated that past professional development sessions in technology were not

well attended by teachers. The lack of consensus regarding teacher training presents as the critical issue, in the opinion of this researcher. All groups of stakeholders made comments out of frustration, each blaming the other for the lack of training. Looking at this problem from the vantage point of each group of stakeholders, the following could be surmised:

- Teachers feel internal pressures from themselves because they do not feel as though they are prepared to effectively use technology in the classroom.
- Additionally, teachers feel pressure from administrators and parents who expect an accelerated use of technology in teaching and learning.
- Teachers feel frustrated because they do not know how to specify the type of training they really need to be successful.
- Administrators receive few requests for technology training from teachers, and when it the training is offered, it is not often well attended.
- Administrators want to see more teachers interested in technology as a teaching and learning tool.
- Administrators recognize that basic teacher beliefs and instructional practices need to shift from a traditional to a more holistic, constructivist model to allow for more student-centered learning and for more innovations in teaching and learning.
- Parents just want teachers trained in using technology for teaching and learning so that their children receive hands-on computer time and are prepared for the future.

So how can effective instruction through the use of technology ever become a reality in an elementary school? Schwab & Foa (2001) outlined a teacher technology training method used successfully in fourteen states, the Teacher Network Initiative. In providing a summary of the strategies used in this initiative, the authors suggested “training needs to be embedded within curriculum development” (p. 624). Professional development in technology provided for teachers in the county where this study occurred consisted of single-topic, single-session, “how to” technology sessions that lacked follow up or connection to curriculum areas. The Web-Based Education Commission (2000) reported that this type of training for teachers is not the exception, but more the rule. In reporting

the results of a national survey, the Web-Based Education Commission divulged that 96% of the technology training provided for teachers in 1998-1999 was for basic computer skills without training for integration into the curriculum.

Teachers expressed preferences regarding the structure of future professional development sessions in technology as one-on-one training (80%), short sessions limited to one topic (71.4%), and multiple sessions that require teachers to use the skills presented (57.1%). The Web-Based Education Commission underscored the need for more diversified approaches to teacher training as it stated, “Traditional one-size-fits-all professional development workshops are giving way to a new, more teacher-centered, self-directed model of teacher learning (p. 44). Black (2000) outlined critical elements in planning professional development for the integration of technology:

- The process must be focused on instructional improvement
- There must be intellectual stimulus for the teachers
- There must be a tie to the context of the workplace
- It must be tailored to teachers’ experience levels
- The instructor must be knowledgeable about the educational setting, and respected by peers as a leader
- The professional development must provide opportunities for teacher growth, reflection and long-term development
- Short-term “trainings” generally are not effective. More job-embedded, small-group and individualized approaches such as mentorship, action research, observation and feedback, and inquiry should be emphasized
- Planners should pay attention to the diffusion of innovation research which indicates when people adopt an innovation
- Technical and curricular support must be available for participants. Other supports such as curricular models, assessment instruments, administrative support are also necessary
- The program must be voluntary
- There must be good vision and leadership
- Teachers must be involved in the planning (pp. 11-14)

Time

Time is an issue for anyone trying to accomplish almost anything. Has there ever been a period when time was not an issue in the classroom? There is nothing about the introduction of technology into the classroom that suddenly causes “time” to be a factor. Any change in the status quo brings the issue of time into the forefront. Teachers make time to do what they *want* to do. In reality, the issue of time serves as an excuse for almost anything people really do not set as a priority. Almost certainly these same teachers who attribute not using technology in the classroom to a lack of time still find time to do special “pet” projects they have designed through the years (i.e., plays, performances, holiday crafts, seasonal activities, favorite read alouds, videos, etc.). The argument that teachers lack the time for technology use, computer training for students, and integration of technology into the curriculum again reflects teacher beliefs related to the priority of technology in education, their definitions of what is “basic” to elementary education, and their belief systems of how people learn. It is this researcher’s opinion that there is never *time* to do things you really do not value and you really do not want to do.

For those teachers genuinely attempting to integrate technology into the curriculum, justified issues related to time do exist. Teachers need unstructured planning time (Cuban, 2001), time to implement newly learned technology and pedagogical methods (Meltzer & Sherman, 1997; Hardy, 1998), time to visit other classrooms that provide good examples of technology integration, and time to brainstorm and share with colleagues. In his research involving teachers who were “serious” users of technology

and taught using computers daily, Cuban (2001) found that routinely these teachers prepared not only the technology-based lesson, but also backup lessons in case of technical difficulties (i.e., server going down or running too slowly; software problems with PowerPoint presentations). While all these issues related to time have to be taken into consideration and incorporated into a workable technology plan, it appears shortsighted to allow an age-old problem like *time* to become the barrier that prevents future innovations in technology.

Implications

Implications for Teachers

It is this researcher's belief that history will look back on this period of time and change in education and in society with a kind eye toward the teachers who were asked to function in a constant state of disequilibrium. Comfort zones in American classrooms are almost non-existent. Standardized testing, value-added assessments, newspaper publications of test scores, school report cards, over-crowded/under-funded schools, and pressures to teach more diverse students without proper materials or training keep teachers at a point that anything else is *too much*. Aside from all the barriers already discussed in this study, issues of unreliability, bandwidth, compatibility, and other technical issues make the effort to use technology seem overwhelming and complicated. So how do teachers make *peace* with technology? The truth may lie more in the hands of administrators, technology planning committees, school boards, and society than with teachers.

Teachers need to make their wishes known to administrators, and take an affirmative role in seeking out “best practice” and learning theory that will enhance their effectiveness in the classroom. Only deep changes in beliefs and practices will make technology integration meaningful and worth the effort. Teachers need to be open to change, form collaborative working relationships with administrators and other teachers, and energetically support the school’s technology plan once in place. While this is a challenging time for educators, it is also a time when history is made, molds are broken, and new courses charted.

The International Reading Association (2001) took a firm stand on the relationship between information and communications technology (ICT) and literacy: “To become fully literate in today’s world, students must become proficient in the new literacies of ICT. Therefore, literacy educators have a responsibility to effectively integrate these technologies into the literacy curriculum in order to prepare students for the literacy future they deserve” (p.2). Further, the International Reading Association in its Position Statement, “Integrating Literacy and Technology in the Curriculum” (December 2001) recommended the following for teachers:

- Take full advantage of professional development opportunities in technologies such as the Internet.
- Systematically integrate Internet and other ICT in thoughtful ways into the literacy curriculum, especially in developing the critical literacies essential to effective information use.
- Explore the instructional strategies and resources developed by other teachers on the Internet
- Provide equal access to technology to every student in your classroom.
- Ensure child safety in classroom Internet use.
- Regularly read professional publications such as books, print journals, and online journals to stay current on the research on and practical ideas for using technology to improve students’ literacy learning.

- Join professional electronic mailing lists to exchange insights about effective instructional strategies. (p. 3)

Implications for Parents

Parents have a vital stake, namely their children's future, in the successful implementation of technology at any school. Parents in this study appeared acutely aware of the future ramifications of computer and technology literacy for their children. As reflected in survey comments and from the pilot study, parents feel a sense of responsibility to share the charge of providing technology opportunities for their children. Many of the parents expressed disappointment and disillusionment over the lack and use of technology at the school. Standing back and looking at the dynamics of the situation as it exists at the school regarding the use of technology, it would be nothing less than a miracle if parents, teachers, and administrators *were not* disillusioned. No real plan exists that defines purposes, sets goals, outlines future plans, measures successes, or communicates among the stakeholders. For all stakeholder needs to be met with such a lack of structure would be highly unlikely.

If parents really want a "say" in the direction of technology implementation at the school, they must make their interests known to administrators and to teachers. Parents should volunteer to serve on technology planning committees, attend functions at the school to get a feel for needs and accomplishments, and support the innovative changes in classroom practice that would need to occur. Administrators and teachers should plan open events, like technology fairs, where all stakeholders could share learning, ask questions, and brainstorm future projects. School webpages, technology newsletters, on-line topical discussion boards should be implemented to keep open lines of

communication flowing among all stakeholders. Parent views and wishes should be sought and acknowledged as vision statements and technology action plans are established school-wide and in individual classrooms.

The International Reading Association (2001) made further recommendations for parents who are interested in effective technology integration:

- Inquire as to how your district and school integrates ICT [information and communication technology] into the reading and writing curriculum.
- Support district initiatives to provide up-to-date technology resources and staff development in the effective use of ICT.
- Supervise Internet use at home, especially by younger children.
- Become aware of age-appropriate Internet sites and software for use at home and in schools. (p. 3)

Implications for Administrators

Personnel who plan professional development opportunities for teachers may be overcome with what appears as the “futility” of providing technology training.

Considering that by some estimates (Meltzer & Sherman, 1997; Hardy, 1998) it takes teachers three to seven years to demonstrate competence and comfort in true technology integration -- compounded by the constant upgrades of hardware, software, and new products introduced upon the marketplace – successful integration of technology and learning seems likely to be overwhelmed by the inevitable and never-ending cycle of train/upgrade/train again. A lack of consensus concerning what teachers need and want also makes planning professional development in technology challenging ... especially when teachers admit that they do not know enough to make informed decisions or requests regarding training. The entire question of what teachers “want” versus what they “need” seems critical to any discussion of professional development planning.

Compound this with the fact that no staff development budget for technology training exists in this county, contrary to the U. S. Department of Education's (1996) recommendation that at least 30% of a school district's technology budget be dedicated for this type training, and it is easy to see why teachers in this school are not trained.

As in the case with this particular school, professional development in technology appears secondary to the more primary problem of the type of instruction present in most classrooms (Cuban, 2001). Professional development in computer and technology use that focuses on "button pushing" for the teachers in this study will not solve the problems outlined by the stakeholders. Teachers may know which buttons to push, although that type of direct, isolated training rarely results in long-term use (Schwab & Foa, 2001), but will still not be able to effectively integrate technology into teaching and learning. Administrators in this case need to focus on classroom instructional practices that support students' constructing knowledge, rely less on traditional methods and materials, align instruction and assessment, provide more opportunities for higher-level thinking and problem solving, and encourage innovations in teaching and learning – technology-based or otherwise.

Teacher attitudes must also be considered as their *needs* and *wants* are addressed by administrators. Cuban (2001) suggested that teachers be engaged "fully in the deliberations, design, deployment, and implementation of technology plans" (p. 183). Cuban continued as he noted that teachers need uninterrupted time for planning with others, exposure to different learning models, and a reorganization of present technical support and professional development infrastructures. The expertise that teachers bring

with them needs to be respected, and exemplary classroom and instructional implementations should be recognized. Cuban cited programs where these types of changes occurred and found that when teachers' needs and wants were considered and they were actively involved in technology plans and designs, classroom practices changed.

The teachers in this study expressed their needs and wants, namely more computers, more time, more support, more help, more training, and a computer lab to provide basic computer instruction for students. Many teachers also indicated that they are "waiting." Someone must make the first move to break the present stalemate. Principals, the supervisor of instruction, and the technology coordinator must:

- (1) recognize that a problem exists between present instructional practices and a constructive model of instruction more conducive to the integration of technology and other innovations in teaching and learning;
- (2) hear and respond to teachers' wants and needs;
- (3) investigate successful models of technology integration at other elementary schools;
- (4) work with other teachers and parents to develop a collaborative vision of the future of technology use at this school;
- (5) plan innovative and responsive professional development for teachers;
- (6) plan measures that promote open communication among and between all stakeholders;
- (7) model the use of technology by developing informative webpages, using email to communicate, taking and sharing digital photographs, etc.
- (8) devise incentive plans (i.e., mini-grants, release time) and strategies for recognizing and crediting exemplary uses of technology in the classroom;
- (9) structure future professional development that is responsive to teachers' requests of one-on-one training, short sessions limited to one topic, and multiple sessions that require teachers to use the skills presented; and
- (10) make concerted efforts to provide teachers and students with up-to-date technology that facilitates instructional practices, curricular needs, and student needs.

Byrom and Bingham (2001) outlined some key issues for administrators that lead to successful technology integration within a school. First, the authors suggested that “leadership is probably the single most important factor affecting successful integration of technology ...” (p. 4). Also mentioned as vital for administrators is a clear, shared vision that was attainable, and an ability to *focus* on a course of action once jointly decided upon by all stakeholders. Principals and other administrators are encouraged to share leadership roles, make overt efforts to highlight teacher successes in using technology, and be leaders who not only set high standards for technological literacy from faculty members, but also model technology use in everyday operations.

The International Reading Association (2001) recognized the vital role that administrators play and recommended the following actions by school administrators:

- Ensure that 30% of your district’s technology budget be devoted to staff development in effective instruction with technology.
- Provide sufficient time for teachers to develop proficiency in the new literacies of ICT [information and communication technology].
- Develop thoughtful acceptable-use policies to ensure easy access to the best information resources for both teachers and students.
- Support teachers who seek to develop classroom websites to organize resources and publish student work; encourage them to host these sites on the district’s server.
- Advocate for the inclusion of Internet and other technologies into state reading and writing assessments.
- Advocate for a school-based technology resource person who can help implement ICT in their classroom literacy instruction. (p. 3)

Implications for Teacher Educators

This research highlighted many of the challenges inservice teachers face when trying to integrate technology into the classroom. Understanding the types of challenges and the magnitude of these challenges provided teacher educators with opportunities to ensure

that preservice teachers participate in undergraduate and graduate level courses that provide them with the skills, knowledge base, and pedagogy to be successful in the field. This is a serious charge for teacher education programs and one that carries with it a great deal of responsibility. In a Report to the President (12-19-00), the Web-Based Commission emphasized the responsibility of post-secondary institutions to prepare future teachers to meet the challenges of using technology in teaching and learning; it noted that 42 states now require teachers to demonstrate proficiency in technology as one component for receiving certification, the National Council for Accreditation of Teacher Education (NCATE) now includes technology in accreditation considerations, and The Higher Education Act Amendments of 1998 hold higher education institutions responsible for training new teachers in effective uses of technology in the classroom (p. 45).

Carr-Chellman & Dyer (2000) recommended preservice programs of study that provide a balance of the powerful uses of technology and an understanding of the changing roles of teachers. The Web-Based Education Commission (2000) warned that all college technology courses aimed at teachers are not equally effective. The Commission suggested “providing a stand-alone course about technology is not the same as ensuring that courses in teaching methods integrate technology as a way of building understanding or assessing learning” (p. 45).

The Web-Based Education Commission (2000) also contended that the use of technology in college courses needed to be modeled not only within courses in the college of education, but also throughout all courses students take outside their teaching

major. The Commission maintained that for future teachers to fully understand how technology advances understanding in all content areas, they must see effective uses of technology for teaching and learning. Dockstader (1999) promoted this same type of technology integration as she outlined seven justifications for this model:

- (1) correctly designed, more depth into the content-area curriculum is possible,
- (2) in the information age, there is an intrinsic need to learn technology,
- (3) students are motivated by technology, thus increasing academic engagement time,
- (4) while working in more depth with the content, students are able to move beyond,
- (5) knowledge and comprehension to application and analysis of information,
- (6) computer skills should not be taught in isolation, and
- (7) students develop computer literacy by applying various computer skills as part of the learning process (p. 73)

The International Reading Association addressed the responsibility of teacher education programs to prepare teachers for integrated technology use in the classroom.

IRA suggested that teacher education programs:

- Integrate effective instructional models that use the Internet and other technologies into preparation programs in literacy education.
- Show preservice and inservice teachers ... how the new literacies of ICT are an essential component of the literacy curriculum.
- Provide opportunities for preservice teachers to practice using age-appropriate ICT in field experiences with K-12 children.
- Include online resources in our instructional program.
- Advocate that your higher education institution acquire and make available technology resources for use in your preservice education programs. (p. 3)

Drawing the Picture

Reality

The waiting game: Teachers say they will use technology when they get more computers and more training (undefined). The technology coordinator will support more funding for technology when s/he sees teachers using what they have. Principals view the situation as “have many, need more,” but not as “can’t use what we have.” No one is

providing a model for what teachers need – examples of how to use technology to *teach* ... this is different from just *how* to use technology. The supervisor of instruction says not many requests for technology professional development ... no focus of what is “most” needed ... not well attended when offered. Teachers say they don’t know what to ask for and are frustrated because someone doesn’t provide “it.” Strong negative comments from parents which seem to view this as a “school” problem ... when in reality principals are very supportive ... teachers don’t complain about non-support from principals, in fact compliment the support from all administrators. Why don’t parents see administrative support? What are parents looking for from administrators? Is it that they don’t see classroom use and integration and blame administration? How hard can principals push teachers without the training that teachers need? What do the supervisor of instruction and technology coordinator need to be able to move the process of technology integration along? Everyone is waiting ... including students.

Vision

The stakeholders in this study have all boarded the “train” for technology in education, but without an engineer to steer and a course charted directly to a destination, they will never leave the station. The answers needed to get the train on track are as elusive as the questions themselves. Sheingold (1990) recognized the multi-dimensional problems such as the ones outlined in this paper stating:

... the challenge of integrating technology into schools and classrooms is much more human than it is technological ... it is not fundamentally about helping people to operate machines. Rather it is about helping people, primarily teachers, integrate these technologies into their teaching as tools of a profession that is being redefined through the incorporation process. (p. 264)

Likewise, encouragement of technology use in the classroom is not about technology, it is about learning content and how our students should function as literate citizens in a technological society. An overwhelming number of stakeholders reported in this study gave voice to the glories of technology in education ... but the voices faded in the air and that is where it ended. Some of the voices were angry, some frustrated, some passionately optimistic, some realistic, and some confused by the question, but they all wanted and needed to be heard. Given the many barriers that exist to reaching the level of technology expertise that teachers need, the type of pedagogy that needs to be in place for effective technology integration into the curriculum, and the attitudes from all stakeholders that overshadow any changes to the status quo, the possibility of technology being accepted as a viable tool for teaching and learning seems unfeasible.

The vision of technology use at this school and at many other schools involves making some judgment calls. The arguments for and against the use of technology in education contain two primary dimensions, each with its own pitfalls and promises:

1. Is there enough *learning* value in the use of technology in education to justify the enormous efforts, monies, and educational reforms that it would take to make technology integration a reality in *all* U. S. classrooms?
2. Are schools responsible for preparing technologically literate students who can function successfully and competitively in an increasingly technology-based society?

This researcher contends that if the answer to either of these queries is “yes,” then the question of *if* we have to change the status quo is a moot point. Only those who really believe in the values of technology in education, and are willing to support those beliefs with *changes* in practices and attitudes, will effect success in this arena. Technology

does not represent the type of fleeting movement or pendulum swing that we are accustomed to in education. Technology is not waiting until schools are ready.

If this study had been built around a hypothesis, it might have been “Teachers are the stumbling blocks in integrating technology in education.” This study has soundly disproved that hypothesis ... the problems are much more comprehensive, more complicated, and more entrenched in societal and historical issues than can simply be accredited to teachers (Cuban, 2001).

Based on this research, valuing technology is not enough, assigning blame is not enough, and random attempts on the part of all stakeholders are not enough to reach the goal or “get the train on the track.” With a school full of computers, software, teachers who say they believe in the value of technology, administrators who say they value the use of technology, and parents who profess to want their children to receive the best in technology training, it is very much like sitting on that parked train ... all dressed up and no place to go.

Implications for Further Research

It appears clear from this study that further questions need to be asked. Future research should delve more deeply into the issues of what schools are trying to achieve with the use of technology in the classroom. Certainly as indicated in this research, piecemeal training and random attempts at integration hardly serve as a sound foundation or a substitute for a technology plan. More information is needed about what the entire learning community, teachers, administrators, parents, and students want to achieve with technology. Should technologies be used as “engagers and facilitators of thinking and

knowledge construction” (Jonassen, Peck, & Wilson, 1999, p. 13), as a constructivist model of instruction would dictate? Are most school communities satisfied with “token” use of technology without any change in pedagogy? While this study gave some insights into the attitudes of the stakeholders, many other avenues of thought have gone unexplored. How do caring teachers, informed administrators, concerned parents, and deserving students all make their beliefs and desires regarding technology known and work together to set a course that is achievable? The barriers are large ... they are real ... and they have the potential to shape both the future of public education and the futures of countless students. Will the advancement of technology itself be the barrier that permanently separates the “haves” from the “have nots?” When federal money to bridge the digital divide dries up, a trend that is underway as this paper is printed, will only the wealthy school districts be able to hire the technology-capable teachers and provide access for students? Further studies need to look at other elementary schools with greater student diversity, lower socio-economic status, and lower student achievement rates.

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APPENDICES

Appendix A

Research Project Information

The study attempts to determine factors and attitudes that effect teachers' success in using computers in the classroom.

Surveys of teachers, parents, and administrators provide data for this study. Information from the Supervisor of Instruction relating to previous and planned technology training for teachers will be requested. Information from the Technology Coordinator will be requested relating to the expenditures on technology for the participating school.

There are no foreseeable risks to any of the participants in the study due to the anonymity of the survey participants. You may refuse to participate or withdraw from participation at any time without penalty. This survey contains thirty-three questions and should take you approximately forty-five minute to complete. Return of completed survey constitutes your consent to participate.

Participants will have a chance to learn the results of the surveys used in this study. This information will be made available to teachers, administrators, and other interested school personnel who wish to use the data gathered to plan professional development for teachers, apply for grant monies, or other uses as they deem appropriate.

The surveys used in this study will be kept confidential. Data will be stored securely and will be made available only to the administration of the participating school and county school personnel with approval from the administration of the participating school. The dissertation that comes from this research may be submitted for publication in professional journals. No reference will be made in oral or written reports which could link the district, school, or participating individuals in this study.

The participation of the school in this study is completely voluntary: the school may decline to participate without penalty.

If you have questions about the study or the procedures, you may contact the researcher, Pamela W. Petty, at Western Kentucky University, TPH 120, Bowling Green, KY 42101, (270) 745-2922, or pam@pampetty.com. If you have questions about the rights of the participants, contact the Compliance Section of the Office of Research at (865) 974-3466.

Appendix B

Letter of Permission to Conduct Research

After having read the information sheet and discussing the proposed research project with the principal investigator, I hereby authorize her to utilize the facilities of this school district as set forth in the research proposal. I understand that the researcher will be working with teacher, parent, administrative, and community surveys conducted by the participating elementary school. These surveys were administered in the spring of 2000. I also grant permission for the researcher to contact school principal(s), teachers, parents, and community members as necessary to go forward with this study.

Name of School System _____

Name of Superintendent (please print) _____

Signature of Superintendent _____

Date _____

Appendix C

Letter of Permission to Conduct Research

After having read the information sheet and discussing the proposed research project with the principal investigator, I hereby authorize her to utilize the facilities of this school as set forth in the research proposal. I understand that the researcher will be working with teacher, parent, administrative, and community surveys conducted by the participating elementary school. These surveys were administered in the spring of 2000. I also grant permission for the researcher to contact school principal(s), teachers, parents, and community members as necessary to go forward with this study.

Name of School _____

Name of Principal (please print) _____

Signature of Principal _____

Date _____

Appendix D – Part 1

Request for Information from Technology Coordinator

(This form is adapted from <http://www.ed.gov/pubs/EdTechGuide/appc-1.html>)

To more clearly understand the status of educational computer technology in the participating school, please respond to the following request for information.

Thank you for your cooperation.

1. Including part-time staff, how many staff are employed by your district specifically to support instructional telecommunications and computing? _____

2. Does your district support a Wide Area Network?

_____ yes _____ no

3. How many Local Area Networks (LANs) are supported in your district? _____

4. Please check the type(s) of operating system(s) used with your LAN(s). Check all that apply.

<u>Operating System</u>	<u>Number in Use and Version</u>
-------------------------	----------------------------------

Novell	_____
--------	-------

LANtastic	_____
-----------	-------

Windows NT	_____
------------	-------

AppleShare/Macintosh	_____
----------------------	-------

Other	_____
-------	-------

5. Has your district adopted a district technology plan?

_____ yes _____ no

6. Has your district adopted a district Acceptable Use Policy?

_____ yes _____ no

7. Does your district have a Web page?

_____ yes

_____ no

8. What are the top three instructional technology support services that are **not** adequately provided in your district? Typical instructional technology support services might include maintaining a LAN, setting up a desktop computer, providing training on using the computer, installing software on a file server, or providing “help desk” question-answer services for teachers and students.

9. How would you rate the amount of teacher interest in using technology as a teaching and learning tool at the participating school?

1. _____ very interested

2. _____ somewhat interested

3. _____ I have no knowledge of interest or disinterest.

4. _____ somewhat disinterested

5. _____ very disinterested

10. What do you see as strengths in computer and technology use in the classrooms at the participating school? Please describe the basis for your response.

11. What do you see as weaknesses in computer and technology use in the classrooms at the participating school? Please describe the basis for your response.

12. Please state your vision for the use of computers and related technology in the classrooms at the participating school.

Appendix D – Part 2

Request for Technology Expenditures at Elementary School

Technology Coordinator:

Please list all computers and technology related equipment that has been placed at the participating elementary school. This information will be used to better understand the type of technology that is available to teachers and students at this school. The information will also give some idea as age of the equipment and the pupil-computer ratio in individual classrooms.

Date	Type of Equipment	Teacher/Classroom	Cost of Equipment
------	-------------------	-------------------	-------------------

Appendix E
Teacher Survey

1. Which of the following most closely describes your position?

1. _____ Classroom teacher (all subjects)
2. _____ Special Education
3. _____ Other

2. What grade do you teach? (Check all that apply.)

1. _____ Grades K-3
2. _____ Grades 4-6
3. _____ Other

3. How many total years of teaching experience do you have?

1. _____ < 1 year
2. _____ 1-2 years
3. _____ 3-5 years
4. _____ 6-10 years
5. _____ 11-20 years
6. _____ > 20 years

THE NEXT SECTION OF QUESTIONS REFERS TO GENERAL COMPUTER USE.

4. Including this year, how many years have you been using computer technology in your classroom lessons?

1. _____ Have not started yet.
2. _____ One year
3. _____ Two years
4. _____ Three – five years
5. _____ More than five years

5. How comfortable are you with computers in general?

1. _____ very comfortable
2. _____ somewhat comfortable
3. _____ neither comfortable or uncomfortable
4. _____ somewhat uncomfortable
5. _____ very uncomfortable

6. What elements/features of using computers do you find comfortable?

7. What elements/features of using computers make you feel uncomfortable?

8. How many hours per week do you use your computer for personal purposes (i.e., games, shopping, news, weather, current events, bookkeeping, learning, etc.)? Include time on your computer at home (elsewhere) and school.

1. _____ less than 1 hour per week
2. _____ 1 – 5 hours per week
3. _____ 10-20 hours per week
4. _____ 21 – 40 hours per week (and over)

9. How many hours per week do you use your computer for school purposes (this might include lesson planning, research, chatting with other teachers for educational purposes, word processing, etc.)? Include time on your computer at home (elsewhere) and school.

1. _____ less than 1 hour per week
2. _____ 1 – 5 hours per week
3. _____ 10-20 hours per week
4. _____ 21 – 40 hours per week (and over)

THE NEXT SECTION OF QUESTIONS REFERS TO INTERNET USE.

10. How long have you been using the Internet (including email)? Include personal and school use.

1. _____ less than 6 months
2. _____ 6 to 12 months
3. _____ 1 to 3 years
4. _____ 4 to 6 years (or more)

11. How satisfied are you with your current skills for using the Internet?

1. _____ very satisfied – I can do everything I want to do.
2. _____ somewhat satisfied – I can do most things I want to do.
3. _____ neither satisfied or unsatisfied

4. _____ somewhat dissatisfied – I can't do many things I would like to do.
5. _____ very dissatisfied – I can't do most things I would like to do.

12. How many personal computers are in your household?

1. _____ zero
2. _____ one
3. _____ two
4. _____ three
5. _____ four or more

13. I believe that this school has the adequate amount of computers/technology to produce students who are technologically literate?

1. _____ yes
2. _____ no
3. _____ I don't know.

14. Describe how you learned to use the Internet (email, searching, etc).

15. Indicate the statement below that most closely represents your views:

1. _____ I set computer and technology literacy as a VERY HIGH priority in my classroom.
2. _____ I set computer and technology literacy as a HIGH priority in my classroom.
3. _____ I set computer and technology literacy as a MEDIUM priority in my classroom.
4. _____ I set computer and technology literacy as a LOW priority in my classroom.
5. _____ Computer and technology literacy receives NO priority in my classroom.

Comments regarding Question 15:

16. Describe your primary purposes for using the Internet (include both personal use and classroom use).

17. How do students use computers in your classroom? (check all that apply)

1. ☐ Accelerated Reading
2. ☐ CD ROM or software learning programs
3. ☐ Internet for research
4. ☐ Email or other electronic communications
5. ☐ Power Point or other presentation software
6. ☐ Word Processing
7. ☐ Other (please specify) _____

18. I believe that the following people are PRIMARILY responsible for children learning about technology.

1. ☐ Parents
2. ☐ Teachers
3. ☐ Peers
4. ☐ Television/Media
5. ☐ Other: _____

19. How high a priority do you set on your students being competent in using technology.

1. ☐ very high
2. ☐ high
3. ☐ medium priority
4. ☐ low priority
5. ☐ Technology receives no priority in my classroom.

20. Describe the expectations you held for the use of technology in your classroom **when you received your first computer**. What most **excited** you about the possibilities of having technology in your classroom?

21. What **apprehensions** do you remember when first faced with using computers in your instruction?

22. Describe the expectations you **presently** hold for the use of technology in your classroom based on your experience with using computers in your classroom.

23. What features of technology **improve instruction** in your classroom and are most used by you and your students?

24. What do you presently see as **obstacles** to fully utilizing technology as a teaching and learning tool?

25. List all curricular areas you consider “basic” to a child’s elementary education.

26. Parents support my attempts to use technology as a teaching and learning tool in my classroom.

1. _____ Yes, definitely.
2. _____ Yes, I see some evidence of support.
3. _____ I am not sure if parents are supportive or non-supportive.
4. _____ No, I don’t see much evidence of support.
5. _____ No, definitely.
6. Describe the basis for your answer (i.e., specific situations, comments from parents, etc).

27. School administrators, Supervisors of Instruction, and Technology Coordinators for our school system place a strong emphasis on teachers using technology in instruction.

1. _____ Yes, definitely much emphasis on technology.
2. _____ Yes, I see some evidence of emphasis on technology.
3. _____ I am not sure if technology is supported by these people.
4. _____ No, I don't see much evidence of emphasis on technology.
5. _____ No, definitely no emphasis on technology.
6. Describe the basis for your answer:

28. About how many hours of basic technology skills training (e.g., word processing, using the Internet, electronic telecommunications, etc.) did you receive within the past 12 months?

1. _____ none
2. _____ 1-5 hours
3. _____ 6 – 10 hours
4. _____ 11-20 hours
5. _____ More than 20 hours

29. About how many hours of training did you receive on integrating technology into the curriculum within the past 12 months?

1. _____ none
2. _____ 1-5 hours
3. _____ 6 – 10 hours
4. _____ 11 – 20 hours
5. _____ More than 20 hours

30. Do you feel better prepared today to integrate technology into your classroom lessons than you did a year ago?

1. _____ Yes, much better prepared today.
2. _____ Somewhat better prepared today.
3. _____ No, I am no better prepared today.

31. On average, how many hours per week do your students spend using computers in your classroom?

1. _____ none
2. _____ one hour
3. _____ two hours

- 4. _____ three to five hours
- 5. _____ six to ten hours
- 6. _____ more than 10 hours

32. Describe the types of computer and technology skills training you have received.

33. Based on your experience, what methods of training best provide you with the skills you need? (check all that apply)

- 1. _____ short training sessions limited to one topic
- 2. _____ day-long sessions that cover a variety of skills
- 3. _____ multi-session training that require you to use the skills being presented
- 4. _____ college-based courses in technology
- 5. _____ on-line training
- 6. _____ video training
- 7. _____ manuals
- 8. _____ one-on-one training at a computer terminal
- 9. _____ other (please elaborate)

Appendix F

Staff Use of Technology

<http://www.bham.wednet.edu/tcomp.htm>

Please judge your level of achievement in each of the following competencies. Circle the number which best reflects your current level of skill attainment. (Be honest, but be kind.) This tool is designed to help understand your current level of skills with computer technologies and to plan for professional development.

1. Basic Computer Use

☐ Level 1 - I do not use a computer.

☐ Level 2 - I use the computer to run a few specific, pre-loaded programs.

☐ Level 3 - I run two programs simultaneously, and have several windows open at the same time.

☐ Level 4 - I trouble-shoot successfully when basic problems with my computer or printer occur. I learn new programs on my own. I teach basic operations to my students.

2. File Management

☐ Level 1 - I do not save any documents I create using the computer.

☐ Level 2 - I select, open and save documents on different drives.

☐ Level 3 - I create my own folders to keep files organized and understand the importance of a back-up system.

☐ Level 4 - I move files between folders and drives, and I maintain my network storage size within acceptable limits. I teach students how to save and organize their files.

3. Word Processing

☐ Level 1 - I do not use a word processing program.

☐ Level 2 - I occasionally use a word processing program for simple documents. I generally find it easier to hand write most written work I do.

☐ Level 3 - I use a word processing program for nearly all my written professional work: memos, tests, worksheets, and home communication. I edit, spell-check, and change the format of a document.

☐ Level 4 - I teach students to use word processing programs for their written communication.

4. Spreadsheet

☐ Level 1 - I do not use a spreadsheet.

☐ Level 2 - I understand the use of a spreadsheet and can navigate within one. I create simple spreadsheets and charts.

☐ Level 3 - I use spreadsheets for a variety of record-keeping tasks. I use labels, formulas, cell references and formatting tools in my spreadsheets. I choose charts which best represent my data.

☐ Level 4 - I teach students to use spreadsheets to improve their own data keeping and analysis skills.

5. Database

___ Level 1 - I do not use a database.

___ Level 2 - I understand the use of a database and locate information from a pre-made database such as Library Search.

___ Level 3 - I create my own databases. I define the fields and choose a layout to organize information I have gathered. I use my database to answer questions about my information.

___ Level 4 - I teach students to create and use databases to organize and analyze data.

6. Graphics

___ Level 1 - I do not use graphics with my word processing or presentations.

___ Level 2 - I open, create, and place simple pictures into documents using drawing programs or clipart.

___ Level 3 - I edit and create graphics, placing them in documents in order to help clarify or amplify my message.

___ Level 4 - I promote student interpretation and display of visual data using a variety of tools and programs.

7. E-mail

___ Level 1 - I have an e-mail account but rarely use it.

___ Level 2 - I send messages using e-mail – mostly to district colleagues, friends, and family. I check my e-mail account on a regular basis and maintain my mail folders in an organized manner.

___ Level 3 - I incorporate e-mail use into classroom activities. I use e-mail to access information from outside sources.

___ Level 4 - I use e-mail to request and send information for research.

8. Research/Information-Searching

___ Level 1 - I am unlikely to seek information when it is in electronic formats.

___ Level 2 - I conduct simple searches with the electronic encyclopedia and library software for major topics.

___ Level 3 - I have learned how to use a variety of search strategies on several information programs, including the use of Boolean (and, or, not) searches to help target the search.

___ Level 4 - I have incorporated logical search strategies into my work with students, showing them the power of such searches with various electronic sources to locate information which relates to their questions.

9. Desktop Publishing

___ Level 1 - I do not use a publishing program.

___ Level 2 - I use templates or wizards to create a published document.

___ Level 3 - I create original publications from a blank page combining design elements such as columns, clip art, tables, word art, and captions.

___ Level 4 - I design original publications that communicate to others what I've learned.

10. Video Production

___ Level 1 - I do not use a video camera.

___ Level 2 - I create original videos for home or school projects.

___ Level 3 - I create original videos using editing equipment.

___ Level 4 - I use computer programs to edit video presentations and I teach my students to create and edit videos.

11. Technology Presentation

___ Level 1 - I do not use computer presentation programs.

___ Level 2 - I present my information to classes or groups in a single application program such as a word processor, a spreadsheet, or a publishing program.

___ Level 3 - I present my information and teach my class using presentation programs such as Powerpoint or SuperLink, incorporating various multimedia elements such as sound, video clips, and graphics.

___ Level 4 - I teach my students how to use presentation software. I facilitate my students' use of a variety of applications to persuasively present their research concerning a problem or area of focus in their learning.

12. Internet

___ Level 1 - I do not use the Internet.

___ Level 2 - I access school and district websites to find information. I follow links from these sites to various Internet resources.

___ Level 3 - I use lists of Internet resources and make profitable use of Web search engines to explore educational resources.

___ Level 4 - I contribute to my school or district websites. I teach students how to effectively use the resources available on the Internet.

13. Responsible Use/Ethics

___ Level 1 - I am not aware of any ethical issues surrounding computer use.

___ Level 2 - I know that some copyright restrictions apply to computer software.

___ Level 3 - I understand district rules concerning student and adult use of e-mail and internet. I know the programs for which the district or my building holds a site license. I understand the school board policy on the use of copyrighted materials.

___ Level 4 - I model ethical use of all software and let my students know my personal stand on this issue.

14. Technology Integration

___ Level 1 - I do not blend the use of computer-based technologies into my classroom learning activities.

___ Level 2 - I understand the district technology plan supports integration of technology into classroom activities, but I am still learning about what strategies will work and how to do it. I accept student work produced electronically, but do not require it.

___ Level 3 - From time to time, I encourage my students to employ computer-based technologies to support the communicating, data analysis and problem solving outlined in the district technology plan.

___ Level 4 - I frequently model and teach my students to employ computer-based technologies for communication, data analysis, and problem-solving as outlined in the district technology plan.

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Revised 4/24/00

Appendix G

Teacher Survey – Technology Curriculum – K-2

DO NOT PUT YOUR NAME ON THIS MANDATORY SURVEY.

Computer Technology Literacy and Usage **Grades K-2** Grade Level: _____

Please put a check mark () beside each skill you have taught or that students are able to perform based on instruction **in your class this year.**

My students can:

- _____ 1. Identify the ways technologies are used in our lives at home, school, play and work.
- _____ 2. Discuss the privacy issues relating to technology in our society.
- _____ 3. Recognize and effectively apply menu vocabulary that is utilized with a specific software package.
- _____ 4. Identify and define the basic parts of a computer.
- _____ 5. Identify and effectively use input and output devices.
- _____ 6. Demonstrate the proper sequence of turning on/off computer equipment.
- _____ 7. Accurately use the keyboard and special keys on a microcomputer.
- _____ 8. List the rules for proper care of computer equipment: hardware, software, and technology systems.
- _____ 9. Demonstrate proper care of computer equipment.
- _____ 10. Choose the proper steps and order for the solution of a computer task.
- _____ 11. Follow the ordered steps and give the correct output for a simple computer task.
- _____ 12. Recognize that a computer requires instructions in order to operate.
- _____ 13. Interact with different computer software.
- _____ 14. Maneuver using the mouse and keyboard when working with applications.

- _____ 15. Follow the directions in a menu-driven program.
- _____ 16. Increase general knowledge in all subject areas through the use of software.
- _____ 17. Utilize the proper key strokes in using the keyboard to input information.
- _____ 18. Demonstrate how software is necessary in computer operation.
- _____ 19. Demonstrate supervised use of the Internet to access information.
- _____ 20. Use age appropriate technology to collaborate, publish and interact with peers, experts and other audiences.
- _____ 21. Demonstrate supervised use of the Internet to access information.
- _____ 22. Demonstrate a step-by-step process for solving a specific problem together with databases and spreadsheets for making interpretive graphs, charts, and tables.

.....
Please circle the appropriate number 5 – 1, with 5 meaning the most definite “yes,” and 1 meaning the most definite “no.”

	Yes.....	No
I feel that I am doing a good job teaching the technology curriculum.....	5 4 3 2 1	
I feel that the technology curriculum is as important as other areas of the curriculum.....	5 4 3 2 1	
I feel that I have the tools necessary for me to teach the technology curriculum.....	5 4 3 2 1	
I feel that most teachers I know are excited about using technology in the classroom.....	5 4 3 2 1	
I feel that most students are excited about using technology in the classroom.....	5 4 3 2 1	
I feel that parents are excited about our use of technology in the classroom.....	5 4 3 2 1	
I feel that technology in the curriculum is a major educational concern...	5 4 3 2 1	
I feel that our school should set technology as one of our priorities in our school improvement plan.....	5 4 3 2 1	

I would like to have more training provided for how teachers can use

Technology in the curriculum.....5 4 3 2 1

Please type any comments and attach to this survey. Do not identify yourself in any way
in your comments.

Teacher Survey – Technology Curriculum – Grades 3 - 5

DO NOT PUT YOUR NAME ON THIS MANDATORY SURVEY.

Computer Technology Literacy and Usage **Grades 3-5** Grade Level: _____

Please put a check mark () beside each skill you have taught or that students are able to perform based on instruction in your class this year.

My students can:

- _____ 1. Identify historical aspects of technology and modern technology.
- _____ 2. Forecast the future relating to computer development.
- _____ 3. Describe the ways technologies are used in our lives at home, school, play and work.
- _____ 4. Identify computer related jobs in the present and future.
- _____ 5. Identify positive and negative aspects of computer usage.
- _____ 6. Recognize that copyright laws exist and have penalties when violated.
- _____ 7. Exhibit ethical behavior in the use of computer technology.
- _____ 8. Review, learn and use the terms appropriate to the technology introduced.
- _____ 9. Identify and effectively use input and output devices.
- _____ 10. Demonstrate the proper sequence of turning on/off computer equipment.
- _____ 11. Follow the directions in a menu-driven program.
- _____ 12. Accurately use the keyboard and special keys on a microcomputer.
- _____ 13. List the rules for proper care of computer equipment: hardware, software, and technology systems.
- _____ 14. Demonstrate proper care of computer equipment.
- _____ 15. Choose the proper steps and order for the solution of a computer task.
- _____ 16. Follow the ordered steps and give the correct output for a simple computer

task.

- _____ 17. Recognize that a computer requires instructions in order to operate.
- _____ 18. Identify and effectively use input/output devices and peripherals.
- _____ 19. Develop proper keyboarding techniques for keying all letters.
- _____ 20. Recognize that computers use different computer languages to perform tasks.
- _____ 21. Access information storage retrieval capabilities of a computer.
- _____ 22. Develop a strategy for performing a given task on a computer.
- 23. Determine when a computer should be used and be able to identify certain models for specific applications such as:
 - _____ word processing
 - _____ database
 - _____ spreadsheet
 - _____ graphics
- _____ 24. Use multimedia and desktop publishing to develop and present computer-generated projects.
- _____ 25. Use a variety of computer technologies to access, analyze, interpret, synthesize, apply and communicate information.
- 26. Explain how the computer functions as an aid in the effective management of information such as:
 - _____ Internet and video conferencing
 - _____ E-mail
 - _____ Multimedia presentation
 - _____ Interactive software
- _____ 27. Develop a strategy for performing a given computer task.
- _____ 28. Organize the information to solve a given computer task.
- _____ 29. Analyze and identify the appropriate resources to accomplish a computer task.
- _____ 30. Recognize that a computer requires instructions in order to operate.

_____ 31. Recognize that computers may use several different codes (languages or formats) to perform the same tasks.

_____ 32. Use simulation software to build group interaction and problem solving skills.

.....

Please circle the appropriate number 5 – 1, with 5 meaning the most definite “yes,” and 1 meaning the most definite “no.”

	Yes.....	No
I feel that I am doing a good job teaching the technology curriculum.....	5 4 3 2 1	
I feel that the technology curriculum is as important as other areas of the curriculum.....	5 4 3 2 1	
I feel that I have the tools necessary for me to teach the technology curriculum.....	5 4 3 2 1	
I feel that most teachers I know are excited about using technology in the classroom.....	5 4 3 2 1	
I feel that most students are excited about using technology in the classroom.....	5 4 3 2 1	
I feel that parents are excited about our use of technology in the classroom.....	5 4 3 2 1	
I feel that technology in the curriculum is a major educational concern...	5 4 3 2 1	
I feel that our school should set technology as one of our priorities in our school improvement plan.....	5 4 3 2 1	
I would like to have more training provided for how teachers can use Technology in the curriculum.....	5 4 3 2 1	

Please type any comments and attach to this survey. Do not identify yourself in any way in your comments.

Appendix H

Request for Information from Supervisor of Instruction

1. Over the past five (5) years, how many requests for professional development training sessions in technology have you received from the participating school?

2. How many inservice presentations have you planned in the last 5 years that focus directly on developing technology skills that relate to classroom use of computers?

Please list:

3. How would you rate the amount of teacher interest in using technology as a teaching and learning tool at the participating school?

1. _____ very interested

2. _____ somewhat interested

3. _____ I have no knowledge of interest or disinterest.

4. _____ somewhat disinterested

5. _____ very disinterested

4. What do you see as strengths in computer and technology use in the classrooms in your school? Please describe the basis for your response.

5. What do you see as weaknesses in computer and technology use in the classrooms in your school? Please describe the basis for your response.

6. Please state your vision for the use of computers and related technology in the classrooms at the participating school.

Appendix I

Parent Survey

Dear Parents and Guardians,

Last spring you filled out a survey to help our school qualify for the Southern Association of Schools and Colleges and to prepare a School Improvement Plan. The survey asked some specific questions about the use of computers and technology at this school. As part of my research at the University of Tennessee in Knoxville, I am looking at the use of computers and technology in education and the beliefs of teachers, parents, and administrators regarding the importance of educational technology. It would greatly aid my research and provide some important information for this school if you could take a few minutes and respond to the following questions. **Please do not include your name or your child's name on this form.** All surveys are **completely anonymous**. **Neither this school, school system, nor the teachers, administrators, and parents associated with this school will be identified in this study.** The results of this study will be made available for any interested persons who would like to read them. Any questions regarding this study or this survey should be made directly to Pam Petty, Western Kentucky University, TPH 120, Bowling Green, KY 42101, (270) 745-2922, and my email address is pam@pampetty.com. Thank you for your time in responding to these questions and returning this form to school with your child. You may refuse to participate or withdraw from participation at any time without penalty.

Please fill out only one of these surveys even if you have more than one child at CES. Return of completed survey constitutes your consent to participate.

1. **Based on your child's educational experiences at this school, how much priority have you seen placed on using computers and technology for learning?** (List any instances you remember where your child (children) was involved in using computers for a class project. Recall any conversations you had with your child about new things they had learned to do on computers. Does one grade level stand out in your mind as a year when your child was most involved in technology?)

2. As a parent or guardian, describe the **amount and types of emphasis** you would like to see placed on learning with computers and technology at the elementary school level.

3. What do you see as the schools role in preparing your child to use computers and technology (either as learning tools or as preparation to function in society)?

4. What do you see as the parents role in preparing children to use computers and technology (either as learning tools or as preparation to function in our society)?

Appendix J

Parent/Guardian Survey

Parent and Guardian Technology Survey – May, 2000

Please fill out only one of these surveys even if you have more than one child at CES.

Thank you for taking the time to respond to a few questions about technology and computers. This information will make it easier for us to serve parents and students in the future. **YOUR RESPONSES CAN IN NO WAY BE LINKED TO YOU. DO NOT WRITE YOUR NAME OR YOUR CHILD'S NAME ON THIS FORM.** All responses are anonymous. Thank you.

1. How many computers do you have in your household?

_____ 0 (If zero, skip to question number 4.)

_____ 1 _____ 2 _____ 3 _____ 4 or more

2. Do you have Internet access at home?

_____ yes _____ no

3. Would you like to receive email from school that helps keep you informed regarding special events, PTO meetings, and other items of interest to you and your child (children)?

_____ yes (Please fill out attached email form and return to school. It will be collected separately from this survey to protect your identity.)

_____ no

4. How high a priority is it for your child (children) to be very competent in technology and computers?

_____ very high _____ high _____ medium priority _____ low priority

_____ I think technology and computer use has little or no value in my child's education.

5. I believe the following people are PRIMARILY responsible for children learning about technology. (Check all that apply.)

_____ parents _____ teachers _____ television and other media
_____ OTHER

6. I think this school has the adequate amount of computers/technology to properly train my child (children)?

_____ yes _____ no _____ I don't know about technology at this school

7. We don't have a computer because: (check all that apply)

_____ they are too expensive

_____ we don't know enough about them to make a smart purchase

_____ we don't put a high priority on our child learning to use computers

_____ we just haven't gotten around to it yet

_____ other

8. How comfortable do you feel using computers?

_____ very comfortable (daily use) _____ somewhat comfortable (occasional use)

_____ uncomfortable (only slight exposure to computer)

_____ very uncomfortable (never used computers)

9. Would you be interested in computer and technology (scanners, digital cameras, etc) training offered at the participating school?

_____ yes _____ maybe, tell me more _____ no

The following demographic information is optional and is used only to describe our school community and help us apply for grant money. This information is anonymous.

10. What is your marital status?

_____ married _____ divorced _____ separated _____ single
_____ widowed

11. How many children under the age of 18 years live in your household?

_____ 1 _____ 2 _____ 3 _____ 4 or more

12. Please indicate your current household income:

☐ rather not say ☐ under \$10,000 ☐ \$10, 000 - \$19,999
☐ \$20, 000 - \$29,999 ☐ \$30,000 - \$39,999 ☐ \$40,000 - \$49,999
☐ \$50,000 - \$74,999 ☐ \$75,000 - \$99,999 ☐ Over \$100,000

13. Please indicate the highest level of education of anyone in your household:

☐ elementary school ☐ high school or GED
☐ vocational or technical school
☐ some college ☐ college graduate (4 year) ☐ master's degree
☐ doctoral degree ☐ professional degrees (MD, etc).

14. What is your age?

☐ 21-35 ☐ 26-30 ☐ 31-35 ☐ 36-40
☐ 41-45 ☐ 46-60 ☐ over 60

Appendix K

Request for Information from School Administrators

(adapted from: <http://www.ed.gov/pubs/EdTechGuide/appc-4.html>)

Please provide the following information:

1. What level is your school? Please check one.

- ☐ Elementary (includes at least grades 1-4)
- ☐ Middle/Intermediate/Junior (includes no grade below 4 or above 10, but includes at least grade 7-8)
- ☐ High/includes at least grade 11 and 12)
- ☐ Combined (combination of one or more of the above categories)

2. What was the total enrollment in your school on May 25, 2000?

3. How many classroom teachers were employed full-time at your school on May 25, 2000? _____

4. How many classrooms/instructional rooms does your school have?

5. How many computers does your school own (include portable computers and laptops)?

a. For staff/administrative use only (no student access) _____

b. For student use (include any used by students, even if staff members also use them) _____

c. Other (please specify _____) _____

d. Total (should equal the sum of a, b, and c) _____

6. How many computers are located in each of the following areas?

a. Classrooms/Instructional rooms _____

- b. Libraries/Media Centers _____
 - c. Computer labs _____
 - d. Staff/administrative offices _____
 - e. Other (please specify _____) _____
 - f. Total (should equal the sum of a through e) _____
7. Does your school have a local area network? (please check one) Yes No
8. How many of your computers are connected to this network? _____
9. How many classrooms/instructional rooms have at least one computer permanently located in them? _____
10. How many classrooms/instructional rooms have at least one computer permanently located in them that is connected to the Internet?

11. Of those computers that are for student use, please indicate the number you have of each brand and capacity:
- a. IBM-compatible 286 _____
 - b. IBM-compatible 386 _____
 - c. IBM-compatible 486 _____
 - d. IBM-compatible Pentium _____
 - e. Other IBM-compatible _____
 - f. Apple II _____
 - g. Macintosh _____
 - h. Power Mac _____
 - i. LC 475/LC 580 _____
 - j. Other Apple or Macintosh clone _____
 - k. Total (should equal #5b above) _____

12. How many of these machines have each of the types of hardware specified available for student use?

- a. CD-ROM drive/DVD drive _____
- b. Microphone _____
- c. Speakers _____
- d. Interactive videodisc player _____
- e. Video camera _____
- f. Scanner _____
- g. Printer _____
- h. Other (please specify _____) _____
- Other (please specify _____) _____
- Other (please specify _____) _____

13. What types of software are available to students (please check those that are available)

- a. ___ Word processing
- b. ___ Spreadsheet
- c. ___ Database
- d. ___ Graphical
- e. ___ Desktop publishing
- f. ___ Presentations
- g. ___ On-line services (e.g., America Online, CompuServe, KidsNet, or Prodigy)
- h. ___ Hypermedia/Multimedia (e.g., Hypercard)
- i. ___ Integrated Learning Systems (e.g., Jostens, CCC)
- j. ___ Simulation Programs
- k. ___ Drill/Practice Programs/Tutorials
- l. ___ Other (please specify _____)

14. How many teachers received school or district-sponsored training in the use of computers during school year 1999-2000? _____
15. Does your school have a technical support person available on staff to provide assistance to teachers in using the computers? (please check one)
- ___ Yes, full-time
- ___ Yes, part-time
- ___ No
16. To how many professional journals on educational technology or that include articles on educational technology does your school subscribe? (please check one)
- ___ None
- ___ 1
- ___ 2-3
- ___ 4 or more
17. Is there any reading material available in your school for teachers regarding technology or the integration of technology into the classroom? (please check one)
- ___ Yes
- ___ No
18. Does your school follow a written curriculum? (please check one)
- ___ Yes
- ___ No (SKIP TO Q. 20)
19. If yes, is technology specifically mentioned in the curriculum, either as a tool for learning or as a separate subject? (please check one)
- ___ Yes, as a tool for learning
- ___ Yes, as a separate subject
- ___ Yes, both
- ___ No

20. Do you have minimum computer technology standards or requirements for teachers or students to meet?

___ Yes, for teachers only

___ Yes, for students only

___ Yes, for both teachers and students

___ No

21. What do you consider to be your school's strengths in using computers and technology as learning and teaching tools?

22. What do you consider to be your school's weaknesses in using computers and technology as learning and teaching tools?

23. What do you view as an elementary school's responsibilities regarding student competencies in using computers and technology as learning tools?

24. What are your personal goals for the use of computers and technology in this elementary school?

25. As an administrator, how much emphasis do you place on teachers using computers and technology in their classrooms? (This should include thoughts on teachers using computers as teaching and learning tools, to maintain classroom records, as a means of communicating with other professionals, as resources for lesson planning, and other related applications.)

Please use the attached blank sheet to complete your response.

Appendix L

Survey of Technology Training Attendees – Teachers/Parents Pilot Study

Thank you for taking the time to respond to a few questions. This information will make it easier to us to serve you in future sessions. **Your responses can in no way be linked to you. All responses are anonymous. Thank you.**

6. How comfortable are you with computers in general?

1. _____ very comfortable
2. _____ somewhat comfortable
3. _____ neither comfortable or uncomfortable
4. _____ somewhat uncomfortable
5. _____ very uncomfortable

7. How comfortable do you feel using the Internet?

1. _____ very comfortable
2. _____ somewhat comfortable
3. _____ neither comfortable or uncomfortable
4. _____ somewhat uncomfortable
5. _____ very uncomfortable

3. How satisfied are you with your current skills for using the Internet?

1. _____ very satisfied – I can do everything I want to do.
2. _____ somewhat satisfied – I can do most things I want to do.
3. _____ neither satisfied or unsatisfied
5. _____ somewhat satisfied – I can't do many things I would like to do.
5. _____ very satisfied – I can't do most things I would like to do.

4. How long have you been using the Internet (including email)? Include personal and school use.

1. _____ less than 6 months
2. _____ 6 to 12 months
3. _____ 1 to 3 years
4. _____ 4 to 6 years (or more)

5. In your opinion, what is the single most critical issue facing the Internet?

- _____ finding things – navigating around
- _____ speed/bandwidth
- _____ government regulation
- _____ equal access for all

- ☐ pornography
- ☐ Internet crime (e.g., hate crimes, stalking)
- ☐ censors
- ☐ accuracy of information

6. How often do you access the Internet from HOME?

- ☐ daily
- ☐ weekly
- ☐ monthly
- ☐ less than once a month
- ☐ never

7. How often do you access the Internet from WORK?

- ☐ daily
- ☐ weekly
- ☐ monthly
- ☐ less than once a month
- ☐ never

8. If you don't access the Internet from home or work, where do you use the Internet?

- ☐ relative's house
- ☐ friend's house
- ☐ from school
- ☐ from the Public Library
- ☐ other

9. What is your current marital status?

- ☐ married
- ☐ divorce
- ☐ separated
- ☐ single
- ☐ widowed

10. How many children under 18 years of age live in your household?

- ☐ none
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4 or more

11. Please indicate your current **household** income:

- ☐ rather not say
- ☐ under \$10,000
- ☐ \$10,000 - \$19,999
- ☐ \$20,000 - \$29,999
- ☐ \$30,000 - \$39,999
- ☐ \$40,000 - \$49,999
- ☐ \$50,000 - \$59,999

- _____ \$75,000 - \$99,999
_____ Over \$100,000
12. What is your primary language?
_____ English
_____ Spanish
_____ Other (Specify, if desired: _____)
13. Please indicate the highest level of education completed:
_____ grammar school
_____ high school or equivalent
_____ vocational or technical school (2 years)
_____ college graduate (4 years)
_____ masters degree
_____ doctoral degree
_____ professional degree (MD, etc.)
14. What is your age?
_____ 16 - 20
_____ 21 - 34
_____ 26 - 30
_____ 31 - 35
_____ 36 - 40
_____ 41 - 45
_____ 46 - 60
_____ over 60
15. To what extent would you say you use the Internet to search for specific information?
_____ most of the time
_____ sometimes
_____ seldom
_____ never
16. To what extent would you say you use the Internet to have "fun" and explore?
_____ most of the time
_____ sometimes
_____ seldom
_____ never
17. What is the number of items in your "Favorites" or "Bookmarks?"
_____ don't use
_____ don't know
_____ 1 - 10
_____ 11 - 50
_____ 51 - 100
_____ over 100
18. On average, how often do you make online purchases from Web-based vendors?
_____ daily
_____ weekly

- ☐ monthly
☐ less than once a month
☐ never
19. What do you primarily use the Web for? (check **all** that apply)
- ☐ education (learning)
☐ shopping / gathering product information
☐ entertainment
☐ work/business
☐ gathering information for personal needs
☐ other _____
20. How many hours per week do you use your computer for fun/play?
- ☐ less than 1 hour
☐ 1 – 5 hours
☐ 5 – 10 hours
☐ 10 – 20 hours
☐ 21 – 40 hours
☐ over 40 hours/week
22. In general, how concerned are you about security on the Internet? (privacy, confidentiality, etc.)
- ☐ not at all concerned
☐ a little concerned
☐ somewhat concerned
☐ very concerned
23. Which of the following email experiences have you had? (Check **all** that apply)
- ☐ sent email
☐ received email
☐ used a signature file
☐ sent an attachment
☐ received an attachment
☐ read an attachment
☐ archived old messages
☐ received SPAM
☐ used stationary
☐ made a mailing list
☐ kept an address book
24. Which email package(s) do you use? (Check **all** that apply)
- ☐ AOL mail
☐ Eudora
☐ Outlook Express
☐ Don't Know
☐ Messenger (Netscape)
☐ Other: _____
25. How many personal computers are in your household?
- ☐ 0

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4 or more

26. Which online services do you currently subscribe to:

- ☐ AOL
- ☐ AT&T WorldNet
- ☐ CompuServe
- ☐ Local Providers
- ☐ Other: _____

27. I believe the following people are PRIMARILY responsible for children learning about technology. (Select all that you think apply.)

- ☐ parents
- ☐ teachers
- ☐ friends (of children)
- ☐ television/media

28. I think this school has the adequate amount of computer/technology to properly train my child(ren)/students.

- ☐ yes
- ☐ no
- ☐ I don't know

29. How high a priority is it for your child(ren)/students to be very competent in technology/computers?

- ☐ very high
- ☐ high
- ☐ medium priority
- ☐ low priority
- ☐ I think technology has little or no value in my child's/students' education.

30. Future surveys may help us understand more about how we may serve you and your child(ren)/students better. Please include one of the following pieces of information so that you will be able to identify this as your questionnaire, but no one else (certainly not me) will be able to identify you.

My first grade teacher's name: _____

The model and year of my first car: _____

My grandmother's maiden name: _____

My favorite childhood pet's name: _____

My favorite food, plus my favorite sports team: _____ and _____

VITA

Pamela White Petty was born in Pulaski, Tennessee on 18 November 1955. After graduating from high school, she began her studies at Tennessee Technological University in Cookeville, Tennessee, completing three years of undergraduate work. After a twelve year absence from the university, during which time she performed the greatest and most rewarding work of her life – mothering her two children – she returned to TTU and graduated from there in 1989 with a B.S. in elementary education. She continued her college career as a graduate assistant at TTU and received her M.A. in Curriculum and Instruction with an emphasis in Reading in 1991. After teaching second grade for six years, Ms. Petty returned to Tennessee Tech as a full-time instructor, teaching reading methods courses, children’s literature, and foundations of education courses. It was during this time that she developed her love of teaching at the college level, and in 1997 she entered the University of Tennessee, Knoxville as a doctoral student in Holistic Teaching and Learning, presently the department of Theory and Practice in Teacher Education, under the guidance of Dr. Lester Knight.

Ms. Petty has been active in professional organizations and has held offices at the local, state, and national levels. She has also been a frequent presenter at local, state, and national levels and provided professional development for teachers in Tennessee and Kentucky. Her interest in technology has allowed her to develop her own domain on the Internet where she has published over 400 webpages, most of them focused on areas of literacy.

Ms. Petty lives with Sam, her husband of twenty-six years, and is still mothering her their two children, Matt (22) and Lindsey (20). Presently, she is a full-time faculty member in the College of Education and Behavioral Sciences at Western Kentucky University, in Bowling Green, Kentucky. At WKU she teaches reading methods courses, is the University Coordinator for a federal technology grant, and serves as the co-director of the Kentucky Adult Educators Literacy Institute (KAELI), an adult literacy grant from the Collaborative Center for Literacy Development in Kentucky.

Ms. Petty received her Doctor of Education degree from the University of Tennessee, Knoxville in May 2002 with a major in Education and collateral studies in Information Sciences and Child and Family Studies.

