PREPARING TEACHERS FOR TECHNOLOGY

by

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ABSTRACT

The purpose of this study was to gather information from teachers concerning their perceived proficiency in the use of computer software in preparing teachers to use technology in their classroom.

The development of technological age has overwhelmed many educators. More and more technology is available to teachers to assist them in their work. Teachers need to secure a role in this paradigm shift involving development of and instruction about the use of technology for teachers.

Review of the literature indicates various processes that are being used to train teachers in the workplace, from individual in-service programs to more extensive collaborates among several educational entities. Teams of teachers are working together to close the gap of understanding involved with incorporating the computer in the classroom.

This study used a descriptive survey to elicit perceptions from 60 teachers concerning technology programs available that might assist them in a more efficient use of the computer and computer software. The survey also identified teachers willing to assist other teachers in learning computer technology, and to identify other in-service priorities they would be interested in attending.

Findings were that current teachers (2000-2001) at Starlight Park School, Cartwright School District, are lacking in training to integrate technology into their

classrooms. Many teachers have little self-confidence in their skills to integrate. The teachers are afraid that they might break the computer. Because of this fear the teachers get frustrated easily. The teachers have problems trying to fit technology into their lesson plans. They received little or no technology training in pre-service. After the teachers have started teaching, they received little or no technology training during in-service, workshops, or staff development. There are a few teachers that can provide training for other teachers. Teachers need positive role models or mentors to show them how to integrate technology into their classroom.

Starlight Park School needs to have mentors that are savvy in technology. These mentors can be positive role models on integrating technology into the classroom. The mentors can provide technology training during in-service staff development days. The principal can allow teachers to observe the mentors in their classrooms as they integrate technology.

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I would like to thanks Elizabeth Meyers, Starlight Park School principal for allowing me to use her school so I could gather data. To my husband Ronald and my son Geoffrey, a big appreciation for understanding how important doing this project was for me. For my parents Nancy Baldwin and Marvin Nichols, for giving me the attitude that I can do anything that I set my heart to do.

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CHAPTER ONE

THE PROBLEM

Introduction

Technology in education used to be simple. It was more in the form of teaching aids for teachers (Poplin, 2000). As Poplin (2000) stated: "One of the earliest recorded 'traveling media centers' was The St. Louis Educational Museum, in 1905. It was literally a horse drawn wagon containing charts, colored photographs, stereoscopic pictures, lantern slides and maps which traveled from school to school" (p. 2). In 1907, Bell and Howell created the first 16mm projector and the radio was an important technology mainstay until the late 1930's (Poplin, 2000). World War II changed the use of technology in the classroom. Poplin (2000) recounts:

> From the military uses of instructional materials prepare, soldiers to go to battle, came a new era of audiovisual instruction. The research conducted by the military cast a new light on learning and created new forms of technology. Schools around the U. S. began to hire instructional technologists who modeled their practice after the military research findings. Thus, the field of educational technology began to evolve into what it is today. More and more individualized instruction for students began to shift. The major shift that occurred in education involved moving away from using technology as a teaching aid to using technology as a tool for student learning. (p. 2)

In his 1953 "Chance for Peace" speech before the American Society of Newspaper Editors, President Dwight D. Eisenhower made one of the most famous statements of his presidency concerning the cold war: "Every gun that is fired, every worship launched, every rocket fired signifies, in the final sense, a theft from those who

hunger and are not fed, those who are cold and are not clothed" (Moritz, 1999, p.1). A turning point of American attitudes about the cold war was the launching of Sputnik in 1957. This provoked national anxiety about a loss of U. S. technical superiority and led to immediate efforts to expand the U. S. Research and Design (R & D), science and engineering education and technology deployment (Allocating Federal Funds for Science and Technology, date unknown). As a result, massive federal support poured into the science effort, and spending on science education and research increased dramatically (Moritz, 1999).

Today, technology affects the way teachers teach, students learn, and administrators operate. Since most school systems in the United States are either getting wired or making plans to get wired for the Internet, it is important that teachers be prepared to educate the students of tomorrow by using technology today. Technology is changing at such a rapid rate that pre-service and in-service teacher preparation in technology can hardly keep up.

As with other changes, educators should be ready to change and to lead in the change. Teachers, administrators, and parents are discovering that technology requires more than just plugging in a computer. Teachers should be able to acquire up-to-date information, integrate curriculum and understand how to use content software. Additionally, educators should be trained to recognize the various learning styles of today's students, and how the learning may be enhanced with the use of technology.

Developmental of the Problem

Due to the advancement of technology, and because it has become such an integral part of societies' lives, the need to prepare our children to become successful adults has changed dramatically. In 1992, Cartwright School District had a number of elementary schools that operated Apple IIe labs that had low megahertz and memory capacity. On these computers, students could perform drill practice that required little problem solving. Today, there is still a vast number of these computers utilized at school sites even though there are G-3 Macintosh computers available. The G-3 Macintosh computer has a higher megahertz and more memory capacity which allows students to do more up to date problem solving techniques.

As of the year 2000, Starlight Park School, Cartwright School District, is making great strides to provide every classroom with one new and up-to-date computer for every eight students (Educational Technology Goals, 2001, p. 61). The district is providing classes/workshops for professional growth in the area of technology. Cartwright School District is going district-wide with technology, which will require teachers to know about programs involving computerized lesson plans, attendance, grade book inputs, and discipline. Meanwhile, professional development in the area of technology is not required. Cartwright School District has created technology standards that are aligned with national standards. However, there is no accountability on the efficient use of the technology.

Need for the Study

Teachers need to be ready to meet the needs of their students, their schools, and the district by integrating technology, in all its forms, into the curriculum. Students could be challenged and engaged in a student-centered classroom. Through the use of technology, these children would be asked to research, create, problem solve, and develop high level critical thinking skills, while cooperatively working with others. From these interactions, student achievement would naturally increase. Computers and technology integration can meet the needs of students with various learning strategies and different intelligence. Technology could often easily be incorporated within any of the content areas, thereby reducing teacher stress.

Utilizing computer based grading and lesson plan programs would increase teacher productivity, especially as it applies to computerized lesson plans, attendance, grade book input and discipline.

Purpose of the Study

The purpose of this study is to gather information from teachers concerning their perceived proficiency in the use of the computer software in preparing teachers to use technology in their classroom..

Research Question

How are institutions and school districts preparing teachers for technology?

Definition of Terms

Curriculum - the courses offered by an educational institution (Webster's Collegiate Dictionary, 2000, www.n-w.com/cgi-bin/dictionary, np).

Integration - the act or process or an instance of integrating: (a) incorporation as equals into society or an organization of individuals of different groups (as races) (b) coordination of mental processes into a normal effective personality or with the individual's environment (Webster's Collegiate Dictionary, 2000, www.n-w.com/cgi-bin/dictionary, np).

Internet - an electronic communications network that connects computer networks and organizational computer facilities around the world (Webster's Collegiate Dictionary, 2000, www.n-w.com/cgi-bin/dictionary, np).

Proficiency – advancement in knowledge or skill (Webster's Ninth New Collegiate Dictionary, 1983, p. 939).

Technology - a manner of accomplishing a task especially using technical processes, methods, or knowledge (new technologies for information storage), the specialized aspects of a particular field of endeavor (educational technology) (Webster's Collegiate Dictionary, 2000, www.n-w.com/cgi-bin/dictionary, np).

Wired - An aspect of an electronic circuit, which is determined by the wiring of the hardware, as opposed to being programmable in software or controlled by a switch (Webster's Collegiate Dictionary, 2000, www.n-w.com/cgi-bin/dictionary, np).

World-Wide Web - (WWW, W3, The Web) An Internet client-server hypertext distributed information retrieval system which originated from the CERN High-Energy

Physics laboratories in Geneva, Switzerland (Webster's Collegiate Dictionary, 2000, www.n-w.com/cgi-bin/dictionary, np).

CHAPTER TWO

THE LITERATURE REVIEW

Introduction

This chapter will present information concerning the preparation of teachers to use technology in classrooms. As one faces the future, it is clear to see that the technological age is engulfing education, and that educators need to secure a role in addressing this paradigm shift. As with other changes, teachers must be ready to address the changes, but also lead the way. America's schools have invested heavily in technology, with most of expenditure gone to purchasing computers (Fulton, 1997).

International Society for Technology in Education

According to a recent article in the Education Digest (1999), in the spring of 1998, an initiative of the Milken Family Foundation commissioned the International Society for Technology in Education (ISTE), the largest teacher base, nonprofit organization in the educational technology field, to survey United States schools, colleges, and departments of education to demonstrate how they prepared new teachers to use information technology in their work. According to Education Digest (1999), this initiative was timely for several reasons. The analysis of the survey data indicates:

(1) Most institutions report that their technology infrastructure is adequate or better in terms of carrying out their current programs.

(2) Faculty information-technology skills tend to be comparable to the information-technology skills of the students they teach; however, most faculties do not model use of those information-technology skills in teaching.

(3) Distance education and computer-assisted instruction currently affect only a small proportion of students in teacher training institutions.

(4) Most teacher-preparation programs do not have a written, funded, regularly updated technology plan.

(5) Most institutions report that information technology is available in the K-12 classrooms where student teachers get their field experience; however, most student teachers do not routinely use technology during field experience and do not work under master teachers and supervisors who can advise them on the use of information technology.

(6) The number of hours of information-technology instruction integrated into other courses has a moderate correlation with other scores on the survey, however, the number o hours of formal information-technology instruction does not.

(7) The integration factor, composed of items that addressed graduates' classroom skills and the actual use of information technology during college training, was the best predictor of other scores on the survey (p. 34).

The Education Digest (1999) had a statement: "Information technologies, computer hardware and software, networks, peripherals are increasingly available in schools; recent studies suggest that U.S. K-12 schools have about one microcomputer for every five students" (p. 33). But past studies document that teacher professional

development, preservice and inservice, have not kept pace with rapid changes in the quality and quantity of information technology. Additionally, the teacher workforce is expected to experience rapid turnover in the next decade (Education Digest, 1999).

ISTE developed a 32 item survey asking respondents to rate their teacher training institutions on coursework, faculty capacity and used of information technology, facilities, field experience opportunities, and the skills of graduates (Education Digest, 1999). About one-third of the 416 institutions responded representing about 90,000 graduates for the 1997-1998 school year (Education Digest, 1999).

According to Warner and Akins (1999), ISTE has adopted standards for technology preparation for all teachers. The ISTE addressed the student's ability to: (1) explore, evaluate and use computer technology-based materials; (2) use computers for problem solving data collection, information management, communications, presentations and decision making; (3) design and develop student learning activities that integrate computing and technology for a variety of student grouping strategies and for diverse student populations; and (4) demonstrate skill in using such productivity tools as word processor databases, spreadsheets and print/graphic utilities (p. 118).

"University-level teacher education programs have come under a great deal of fire lately for a variety of offenses, both of omission and commission" (Justice and Espinoza, 1996, p. 10). One of the areas of great criticism is that teacher education programs are not preparing teachers to operate effectively in a culturally diverse education environment. Many education majors have grown up in, attended school in, and plan to teach in rural America (Justice and Espinoza, 1996, p. 10). As Justice and Espinoza (1996) stated: "Many enter education programs believing that multiculturalism is of less

importance for them than for their peers who will teach in large urban and suburban districts" (p. 10). This is creating a unique challenge for higher institution. "A challenge that is being addressed in different institutions. Some are turning to technology in an attempt to bring the world to these pre-service teacher's desktops, believing that the computer is one of the most valuable teaching tools in the classroom" (Justice and Espinoza, 1996, p. 10).

An Evaluation of Technology Integration in Method Courses

The U. S. Office of Technological Assessment (OTA, 1995) was charged by Congress with answering questions as to whether prospective teachers are being prepared to use technology before entering the classroom (Wetzel and Chisholm, 1996). They found:

(1) Most teachers graduate from teacher preparation institutions with limited knowledge of the ways technology can be used in their professional practice.

(2) Most technology instruction in Colleges of Education involves teaching about technology as a separate subject, not teaching with technology by integrating it into other course work to provide a model for instructional use (p. 2).

A survey of recent graduates at Arizona State University West (ASUW) confirms the findings of the U.S. OTA (Wetzel and Chisholm, 1996), that graduates felt unprepared to integrate teaching technology into their lessons. Using the results of this survey led two teachers of education at ASUW to integrate technology in a Bilingual Education (BLE) and English as a Second Language (ESL) Language Arts course. The teachers on education ensure that education majors would visit K-6 sites where the

education majors could see and participate in appropriate models of technology integration in their practicum experiences (Wetzel and Chislom, 1996).

"The National Council for Accreditation of Teacher Education Unit Guidelines (NCATE, 1995) provide direction for the incorporation of technology in education programs"(Wetzel and Chislom, 1996, p. 2). The guidelines indicate that every teacher education candidate should be able to:

(1) Understand the uses of technology for the subjects they plan to teach.

(2) Acquire and learn to apply knowledge about the impact of technology and societal changes on schools.

(3) Understand and use computers and other technologies in instruction, assessment, and professional productivity (p. 3).

"Thirty-four BLE/ESL education majors in their junior year at ASUW simultaneously enrolled in two courses: Computers in Education and Language Arts Methods" (Wetzel and Chislom, 1996, p. 3). These students were sent to various K-6 sites to observe educators using technology. At the end of the semester "a common element in participant observation and the group debriefing was that participants came to realize that teachers' beliefs about teaching and learning, the writing process, the needs of ESL/BLE children are directly linked to the decisions teachers make about grouping of students for technology use and the purpose and outcomes of technology use" (p. 8).

Teacher Training for Technology

A recent survey by the Center for Technology Education from the Bank Street College of Education in New York City showed that it take at least five years of exposure

to computer technology before a teacher will consistently integrate technology into the classroom (Williams, 1992). This report stressed that if the teacher does use computers it is primarily for drill and writing assignments.

Lee (1996) posits: "What if the investment in teacher training for technology matched the investment in computer hardware in schools?" Then computer labs would be a buzz with students collaborating on multimedia projects and researching on-line. One might see students creating newspapers using desktop publishing program. Students might be using a spreadsheet to collect water pollution data of the local water supply and teachers could play a key role in mentoring students as they asked question, solved problems and transformed information into knowledge.

> This snapshot of a technology-rich learning environment illustrates the transformation from teacher-directed to student-centered learning. Technology is the catalyst, but the chemical starters for such fundamental changes are teachers highly skilled in technology, with a deep understanding of curriculum and knowledge of how children learn. The reality of teacher training in technology, however, does not support this vision, according to a national survey conducted by Electronic Learning magazine. 'Despite the lip survey about the importance of technology staff development, 28% of schools spend not one penny on it, on average, staff development makes up only 8% of technology budgets,' the magazine reports. (Lee, 1996, p. 12)

In Los Angles County, Technology for Learning is working to make its teachers the exception to that survey (Lee, 1996). "The primary goal of Technology for Learning is results-oriented computer training for 30,000 teachers, spread over five years in geographically and politically diverse districts throughout the county" (Lee, 1996, p. 12). The district's leaders have already taken the first steps. These steps are: (1) technology teacher leaders: trainers of trainers, (2) selecting teacher applicants, (3) how teacher training is conducted, (4) putting strands into action, and (5) asking questions and seeking answers.

Technology teacher leaders: Trainers of trainers, or teachers teaching teachers, is the central model for Technology for Learning's training plan. It is a model to educate teachers on how to teach computer literacy and is supported by Apple Classroom of Tomorrow research. Teachers are the primary trainer of teachers is one of eight key elements of exemplary technology staff development in a survey by Electronic Learning (Lee, 1996).

Selecting teacher applicants was done during the fall of 1995, wherein districts throughout Los Angles County were invited to participate in the first round of the Technology Teacher Leaders Program. Participants were selected using the district's self-assessment of technology readiness as measured by a countywide technology survey. Each district utilized the talents of technology teachers who submitted their applications. These applicants were also select bases on their curriculum expertise, leadership and integration. Two teachers were selected from each district. These teachers formed a team to assist each other in developing and implementing their plan for training. Each district was required to support its technology teacher leaders by providing nine days of release time, on-line access from school, and on gong assistance. The teacher leader was expected to provide a minimum of 10 hours of technology training within the school or district over the 1996-1997 school year.

How teacher training is conducted in the Technology Teacher Leaders program began with a group of 40 technology teachers in January 1996. A second group began two weeks later. Each teacher attended nine full days of training in teacher productivity tools telecommunications and multimedia. Much of the time is spent at the computer, however, the learning of software applicants was balanced with demonstrations of model

lessons and student products. This program also addresses strategies for increasing student access to computers. In addition, teachers were to develop educational strands designed to give teachers mutual support as they learned technology.

Putting strands into action was done when each teacher spent a portion of each day drawing on discussion, research and personal experience to design an effective training plan. At the end of each day, they wrote reflection on the day's activities and plan the next steps. On-going mentoring and coaching by a teacher-consultant provided support for the trainers after they finished the nine days of training. On-line communication was vital to technology teacher leaders training. Each trainer was required to have on-line access assured by the district, preferably from both home and school (Lee, 1996).

Asking questions and seeking answers began with Alan Key, a keynote speaker, at the Technology for Learning Summit, June1995, who reminded educators of the importance of technology-wise teachers. "Children, just like adults, learn best when they can ask their own questions, seek answers in many places, consider different perspectives, exchange views with others and add their own findings to existing understanding" (Lee, 1996, p. 13). If teachers were to act as guides, then they needed the time, skills and resources to ask questions and get answers.

There are eight key elements and benefits of exemplary technology staff development. They are:

(1) Even when outside consultants are used for workshops, local staff members are available for follow-up.

(2) Following workshops, teachers have easy access to the same technology they were trained on.

(3) Teachers are the primary trainers of teachers.

(4) Training is tied directly to classroom/curriculum school reform objectives.

(5) A minimum of 25% of the technology budget is set aside for staff development.

(6) Learning to use technology is required, not voluntary.

(7) Principals, superintendent and other administrators take technology staff development courses along with their teachers.

(8) Time for technology staff development is integrated into teachers' work schedules (Lee, 1996, p. 13).

District-Wide Technology Training based upon the Stages of Concern

A survey of teachers from the Forth Worth Independent School District indicated that there were two barriers to effective use of computers in the classroom. There were (a) a lack of staff development, which focuses on the use of technology to support instruction, and (b) adequate time outside of class for teachers to actually practice using the technology (Jones, Shelton, 1996).

In a medium sized school district in Northern Colorado a large-scale technology training project is currently underway (Persichitte, Bauer, Salazar, 1996). In the fall of 1994, the school district administration initiated this project. "Designers include two educational technology faculty members from a nearby university working collaboratively with the superintendent's office and the school district's Director of

Technology and Telecommunications to design and deliver training aimed at the integration of computer technologies in teaching and lifelong learning" (Persichitte, Bauer, Salazar, 1996, p. 60). A varied group of employees including pre-K through 12th grade teachers, classroom aides, school board members, school administrators, school library medial specialist, transportation, food service, and other classified employees. This group reflected the school district's strong desire to include all district employees in the development of computer-based technology.

"The development process involved conducting a through needs assessment, including focus group discussions and interviews with key district personnel" (Persichitte, Bauer, Salazar, 1996, p. 60). The designers decided to administrate Hall and Hord's Stages of Concern Questionnaire (SoCQ). The designers felt that this questionnaire will addressed the needs assessment phase. "According to Rossett (1987), a needs assessment should include data and opinions from many different sources in order to make effective training decisions. Consequently, the designers used multiple methods for gathering needs assessment data" (Persichitte, Bauer, Salazar, 1996, p. 61).

Initially, they held informal discussions with the superintendent's and the district's technology coordinator to determine the type of training needs and existing support structure. Focus group meetings that were held with a small group of district personnel interested in technology training followed these discussions. Then informal one-on-one key informal interviews were held on-site for their convenience (Persichitte, Bauer, Salazar, 1996).

This survey was a thirty-five item questionnaire which examines an individual's perception of an innovation and their personal feelings about the innovation. This

questionnaire allows for the identification of seven different Stages of Concern. "These seven stages range from early self type concerns, which address the logistics and scheduling arrangements with regard to the use of the innovation to impact kinds of concerns, which deal more with increasing the effectiveness of the innovation" (Persichitte, Bauer, Salazar, 1996, p. 62). Each of the seven Stages of Concern is briefly described below:

Stage 0	Awareness	Little concern about or involvement with the innovation.
Stage 1	Informational	General awareness of the innovation, concerned about general characteristics, effect, and requirements for use.
Stage 2	Personal	Uncertainty characterizes the individual, concerns about individual inadequacy, potential conflicts, and personal commitment.
Stage 3	Management	Concerns regarding issues of efficiency, organizing, managing, scheduling, time demands.
Stage 4	Consequence	Concerns regarding coordination and cooperation with others in the use of the innovation.
Stage 5	Collaboration	Concerns regarding coordination and cooperation with others in the use of the innovation.
Stage 6	Refocusing	Desire to explore universal benefits of the innovation; individual has definite ideas about alternatives to the proposed or existing form of the innovation (Persichitte, Bauer, Salazar, 1996, p. 62).

The following is a summary of the results:

(1) Highest level of concern (86th percentile) was Stage 0 Awareness.

(2) Lowest level of concern (28th percentile) was Stage 4 Consequence.

(3) Greatest variance in a level of concern was Stage 5 Collaboration. (p. 62).

This created a profile, which implies that the typical district employee tends to be a nonuser of computer-based technologies (Persischitte, Bauer, and Salazar, 1996).

Which means that they are nonuser for personal use as well as a nonuser for classroom instructions. The general profile also suggests that the typical district employee has individual ideas about redefining the use of this innovation. Lastly, the nonuser is likely to have a negative attitude toward the integration of computer-based technologies in their workplace. "It was with these defining characterizations in mind that the training format and materials were designed" (Persischitte, Bauer, and Salazar, 1996, p. 63).

Based upon the results, multiple training modules were selected as the primary format for delivery. Materials development and instructional design were directed at the beginning level for all the modules. Modules were developed and implemented for introduction to microcomputers, word processing, the Internet, desktop publishing, teaching thinking skills, and integrating technology into instruction with only one computer in the classroom (Jones, Shelton, 1996). Self-pace, detail instructional materials accompany each module. Materials for each module are customized for the particular software currently available in the district. To date, the accompanying materials have been only as a guideline in instructor-led workshop. "The workshops are carefully scheduled to meet the needs of the employees and are intentionally directed toward hands-on activities" (Persischitte, Bauer, and Salazar, 1996, p. 63).

All modules are offered on-site to raise the level of comfort of the members with computer-based technologies and to familiarize them with their access to these technologies. The modules, which have been conveyed to date, have been scheduled to work within limits set forth by the district administration as well as members. The modules were held in the district's lab, which contains rooms for both Macintosh and Window-based computers (Jones, Shelton, 1996). Arrangements have been made to offer

graduate level credit. Certified participants may also receive re-license credit at not cost. Upon completion of each module, members receive a certificate of completion, which was placed in their employee file (Persischitte, Bauer, and Salazar, 1996).

Over 100 employees in Northern Colorado have participated in the training workshops to date and the response has been overwhelmingly positive (Persischitte, Bauer, and Salazar, 1996). Almost 300 fort Worth Independent School District teachers have been trained (Jones, Shelton, 1996). Designers are continuing to modify and update training materials to reflect changes in the district hardware and software. Enrollments are strong, attitudes are changing to be positive regarding the integration of computer-based technologies in the participant workshop.

Howard County teachers, Florida Atlantic University and the Department of Educational Technology and Research in South Florida developed a collaborate. They have implemented an innovative program to encourage public school teachers to embrace new technology and utilize it in their daily curricula (Ariza, Knee, Ridge, 2000). Teachers have begun to take courses that will culminate in a master's degree in education with a specialization in technology. As the cohort works and studies together, teachers who would not ordinarily venture into such an unknown realm are bolstered by the knowledge that they are in the program as a team, and call on one another for help, guidance and support (Ariza, Knee, Ridge, 2000).

Results of a recent survey conducted by Education Week are included in a special report on education technology, Technology Counts '99: Building the Digital Curriculum (Reading Today, 2000). The Technology Counts '99: Building the Digital Curriculum project was unwritten by the Milken Exchange on Education Technology, an

independent, nonprofit initiative of the Milken Foundation. The survey itself was conducted by Education Week and Education Market Research (Reading Today, 2000). It stated: "Six in 10 teachers who search for educational software say it is "somewhat" or "very" difficult to find products to meet their classroom needs. Five in 10 teachers say the same thing about educational Web sites." "It's not enough to have computers in classroom. They need to be used in ways that help students learn. This survey shows that many teachers are having trouble finding the right software and Web sites to make that happen," said Virginia B. Edwards, the editor of Education Week. (Reading Today, 2000, p. 13).

The more recent push to wire schools for Internet access has greatly expanded our educational investments in "boxes and wires" (Fulton, 1997). Fulton (1997) stated; "The flurry of NetDays 96, occurring first in California in March and then replicated in almost every state this fall, have generated "electronic barn raisings" all across the nation in which million of miles of wires and hours of volunteer labor were donated by citizens and businesses" (p. 76). Many states are supporting special technology initiatives to complete wiring the schools. These are surely the greatest capital investment and donated resources ever made to education in this country (Fulton, 1997).

The Role of Technology in School Leadership

Technologies that enhance classroom instruction and school administration are widespread. The majority of schools, however, have yet to implement technology beyond a basic level. Reasons for this reluctance are five constraints for technology implementation. To help solve the problem of administrative support, Ritchie and

Rodriguez (1996) proposed the creation of university courses designed to nourish school technology leaders.

According Ritchie, and Rodriguez (1996), our society is witnessing exponential growth in the capabilities of educational technologies. This growth is the result of increased sophistication of software programs, speed advances of central processing units, storage space increase of hard discs, and reductions in overall cost and physical size of computer technologies. Yet schools are continually struggling with how to incorporate technology and how to encourage teachers to use technology effectively.

For technology integration to succeed on any scale, such as in the individual teachers' classroom, it must have strong support from the school board, district, and school site administrators (Hoffman, 1996). First, teachers begin using technology because they choose to and they perceive they are expected. Second, administrators can provide incentives for teachers to use, to get started, and continue to integrate. Third, administrators as school leaders can help motivate teachers to adopt technology by setting technology as a goal. Fourth, administrators and school board members have the responsibility to allocate resources for technology and staff development. "Finally, literature indicates that schools with greater district involvement in decision-making about computers have more computer-using teachers, because districts can provide more staff development than individual school sites" (Hoffman, 1996, p. 66).

Although the causes of this dilemma vary from place to place they often center around one or more of five constraints. They are: (a) a lack of funds, (b) teachers' beliefs on the value of technology, (c) inappropriate allocations of existing technologies,

(d) a lack of understanding in how technologies can accentuate education, and (e) a lack of support from school leaders (p. 73).

Lack of funds to procure current technologies is a common problem. Hardware, software, and network capabilities are constantly changing and improving (Ritchie and Rodriguez, 1996). Institutions that funded major technology purchases five years ago may today find their equipment out-of-date, today. Fortunately, the cost for computer power has decreased and schools are funding new methods for funding. Creative procedures to obtain technology include organizing parents and parent groups to donate used equipment, purchase groceries at participating stores that apply receipts toward the purchase of equipment, help schools apply for grant proposals, or use credit cards which allocate a percentage of the purchase towards computers.

Belief Systems of Teachers according to Ritchie and Rodriguez (1996) can undermine the use and impact of technology. They believe that some teachers hold the view that student access to technology causes discipline problems or diffuse emphasis on traditional "academic" content. Others may suffer from computer anxiety or be afraid of facing the learning challenges inherent in pursuing technology us (Ritchie and Rodriguez, 1996).

Helping educators to keep an open mind is the first step to proficiency with technology. Recognizing that technology comprehension occurs incrementally often on a "what do I need to know today" basis can help ease the pressure. Establishing informal support groups or mentoring relationships helps teachers to accept technology in the classroom. A teacher's positive modeling can sometimes do more to change other teacher's attitudes about technology than a year of in-service training.

Inappropriate Allocations of Technologies according to Ritchie and Rodriguez (1996): "A facility's physical limitations, as well as the usage restrictions may negatively impact the overall use of educational technologies. Facility designers in the past had little insight into the needs created by computer adoption. Simple items such as lack of electrical outlets for computers and data outlets for networks can make retrofitting a facility an expensive proposition" (p. 74).

Even when facilities are adequate, technology access among student can be a problem. "Andy Carvin summarizing a 1992 Computer in Education survey reports that though surveys suggest that most students have access to state –of—the-art hardware, their schools, their ability to utilize these tools can be quite limited" (Hoffman, 1996, p. 68). Especially, if specific users are more important than others. This could happen when computers are purchased for one department, a select group of students, and are restricted to other groups. By scheduling full use throughout the school day, and admittance access either before or after school for the student population, helps ensure that the technology is being use to their full potential

Understanding the Role of Technologies in Education according to Ritchie and Rodriguez (1996): "More problematic than previously mentioned constraints is when teachers lack specific knowledge and skills in how educational technologies can support learning through training and practice, even initially enthusiastic teachers may loose interest" (p. 74).

To help the transition teachers from novice to competent technology-using educators than various strategies are needed. They are: providing teachers with grade-appropriate software and curriculum plans that describe how technologies can be

integrated into the classroom, concrete examples of technology implementation in real-world context, and a support system to encourage that continual use and development of their skills (Ritchie and Rodriguez, 1996). Another way is to develop a technology plan. "A number of authors recommend development of a long range (three to five years) technology integration plan which includes commitment to staff development together with on going development of emerging technology and evaluation" (Hoffman, 1996, p. 69).

Support from School Leaders according to Ritchie and Rodriguez (1996): "The ability of school administrators to plan, inspire, and lead technology usage in a school strongly influences the success of any technology plan" (p. 74). School leaders can influence technology usage through a variety of methods. These methods are: providing and selling the vision to the community and facilities, and providing encouragement and recognition for teachers successfully making the transition.

To understand the role of the technology leader in a school, it is helpful to identify the attributes of this type of leader (Ritchie and Rodriguez, 1996). They are:

(1) First, this person must be able to deal with continual change.

(2) Second, technology leaders must be able to position them selves and their schools to take advantages of upcoming opportunities.

(3) Finally, school technology leaders must be able to empower teachers and share their leadership. (p. 75)

Structuring a Solution: Technologies for School Leadership, researchers have begun to examine methods to encourage administrators to become technology advocates (Ritchie and Rodriguez, 1996). Unfortunately, most training to date has focused on the

Missing

addressing this paradigm shift. As with other changes, teachers must be ready to address the changes, but also lead the way. The Milken Family Foundation commissioned the International Society for Technology in Education (ISTE) to conduct a survey of United States schools, colleges, and department of education on how they prepare new teachers to use information technology in their work. Their analysis concluded that technology infrastructure has increased more quickly than the incorporation of technology tools into teaching and learning. Respondents grated their technology facilities as adequate.

The ISTE has adopted standards for technology preparation for all educators. They addressed the students' ability to use computer-based materials, problem solve, develop student learning activities for diverse student populations, and use productivity tools. The OTA was charged with answering questions on whether prospective teachers being prepared to use technology in the classroom. This led to two teachers of education at ASUW to integrate technology into an ESL/BLE Language Arts course.

In Los Angles Country, California, Technology for Learning is supplementing the country's technology training program. This training project is allowing teachers to train teachers to integrate technology into their classroom. In Northern Colorado, a medium sized school district is undertaking a large-scale technology project. This project is including all district's employees and school board members. Forth Worth Independent School District have almost 300 teachers that have been trained.

Howard County teachers, Florida Atlantic University and the Department of Educational Technology and Research in South Florida developed a collaborate. These teachers began to take courses that will culminate in a master's degree in education with

a specialization in technology. As a team, they are calling on one another for help, guidance and support.

Results of a recent survey conducted by Education Week concluded that six in 10 teachers who search for education software said it is somewhat or difficult to find products to meet their classroom needs. Five in 10 teachers say the same thing about education Web sites. In 1996, California and almost every state have generated million of miles of wires and hours of volunteer labor were donated by citizens and businesses to wire schools.

The role of technology in school leaderships is changing. The causes for these changes vary from place to place, but often center around one of more constraints. They are (a) a lack of funds, (b) teachers' beliefs on the value of technology, (c) inappropriate allocations of existing technologies, (d) a lack of understanding in how technologies can accentuate education, and (e) a lack of support from school leaders.

CHAPTER THREE

METHODOLOGY

Introduction

The purpose of this study is to gather information from teachers concerning their perceived proficiency in the use of the computer software in preparing teachers to use technology in their classroom.

Research Design

The design for this study was be a descriptive research model. A descriptive research is a method used to describe systematically the facts and characteristics of a given population or area of interest (Merriam, Simpson, 1995). "Description may include (1) collection of facts that describe existing phenomena; (2) identification of problems or justification of current conditions and practice; (3) project or product evaluation; or (4) comparison of experience between groups with similar problems to assist in future planning and decision making" (Merriam, Simpson, 1995, p. 61). The technique was used to gather information was a survey. The survey was intended to gather baseline information on technology preparation from teachers, and to develop a means of rating programs and programs components as to information technology capacity.

Population

The population of this study was current 2000-2001 school year Starlight Park School's teachers who have completed training in pre-service or in-service technology workshops or technology coursework. Surveys were sent to 60 elementary educators (45 K-6 grade teachers, eight special area teachers, and seven resource teachers) at Starlight Park School in Cartwright School District, Phoenix, Arizona. Their range of experience was from one year of 37 years. There were seven male teachers and 53 female teachers.

Assumptions and Limitations

The assumptions for this study was that participants in the survey were current teachers at Starlight Park School and that responses were honest. Also, that teachers all knew the definition of the term "proficiency zone". The limitations are that the survey was conducted only at Starlight Park School, and as such may not be generalizable to other school districts.

Instrumentation

The instrument for this survey was a written questionnaire composed of three questions asking the degree of proficiency in the use of technology. Question one was a Likert-style question to gather teachers perceived expertise with identified computer software and hardware available in the district. Responses range from least (#1) to most (#5) proficient. The second question asked for teachers to identify software programs that they were willing and able to help teach other staff members. The third question was

a request for teachers to list any training workshop that they might be interested in teaching in the future. A copy of the questionnaire is found in appendix A.

The software packages that were critiqued were ClarisWorks (aka AppleWorks) and nine curricular enhancement programs. Additionally, there were four additional peripheral items that were examined. These additional peripheral items are One Computer/One Classroom, connect scanner/camera, use and download camera and installing programs.

ClarisWorks is an office program that consists of five sub-programs. They are word processing, drawing, spreadsheet, database, and a slideshow.

Hyperstudio is a media presentation program that teachers and students can use to create presentations. Scarpbook is a program to save graphics that can be insert into other presentations. Spelling Toolkit allows teacher to create spelling lists. The program has over 10,000 words. Teachers can use these words or add additional words. The program allows teachers to print spelling list with sentences and/or definitions, crossword puzzles, unscramble words, matching, and multiple choice tests. Easy Grade Pro is a computerize grade book program. It allows teacher to enter grades and automatically keep track of the average for each subject. The program allows teachers to print grades by subject, multiple subject, class roster, and progress reports. Storybook Weaver is an interact program that allows children to create their own stories. Bilingual Writing Center allows teachers and students to create presentations in Spanish and English. TimeLiner is a program that allows student to create time lines. The students insert the date and information and the program will print a poster size time line. Kid Pix is a media presentation program. It allows teachers and students to create multi media

presentations. Power Point is a slide show presentation program. The program allows teachers and student to create slide show for presentation.

One Computer/One Classroom is an attachment that allows the teacher to use one computer to interface with a large screen television monitor within the classroom. The teacher uses the computer and television monitor to present various computer programs or the Internet to a large group of students. Connecting the scanner and the camera to the computer allows the teacher and students to use and download pictures and various graphics. These graphics and pictures can be inserted in reports and projects.

The fourth item that was examined was installing programs. To determine if teachers knew how to install programs on to their computers.

Procedures

The surveys for this study were send to 60 educators (45 K-6 elementary teachers, eight special area teachers, seven resource teachers) who were currently employed at Starlight Park School in Cartwright School District, Phoenix, Arizona during the school year 2000-2001. The surveys were given to the staff members at a staff meeting with a return deadline of two weeks after the survey was given out. Staff members either hand delivered the survey to the researcher or placed them in the researcher's mailbox located in the teachers' lounge. The original intent of the survey/questionnaire was to use the responses as an assessment instrument.

Method of Analysis

Question one of the survey was rated according to proficiency of use of technical computer programs, which is the proficiency of use of the different software and other items. Likert-style response data was set up so that the number one was defined as the least proficient and five the most proficient. The programs that were rated were ClarisWorks (Word Processing, Drawing, Database, Spreadsheet, and Slide show), HyperStudio, Scrapbook, Spelling Toolkit, Easy Grade Pro, Storybook Weaver, Bilingual Writing Center, TimeLiner, Kid Pix, Point Power, One Computer/One Classroom, installing programs, connect scanner/camera, and use & download camera.

Question two was designed to gather information on how the teacher felt as to their proficiency in helping other staff members that are in need of assistance of the same computer programs. Question three of the survey asked what technology workshops would they, as teachers, attend, if offered by the school or district.

Table 1 and Table 2 record information gathered from the educators for the first question corresponding to the frequency of responses in each category on the continuum from least to most proficient. These results were used to determine the level of proficiency prior to any technology workshops on in-service. For question two, a list was prepared categorizing the number of teachers who would willing to instruct other teachers concerning various computer programs. These results were forwarded to the principal. The principal may use these results to identify any workshops or in-service that might be needed. Question three results were written statements from the educators suggesting computer workshops that instructor would attend if they were available. These results

were forwarded to the principal. The principal may use these results to identify any workshops or in-service that might be needed.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF THE DATA

Demographics

The population used for this study was the current school year 2000-2001, Starlight Park School's teachers who have completed training in pre-service or in-service workshops or coursework in computer technology. Surveys were sent to 60 elementary educators (45 K-6 grade teachers, eight special area teachers, and seven resource teachers) at Starlight Park School in Cartwright School District, Phoenix, Arizona. Teachers were asked to rate their proficiency levels on various hardware and software programs and to list workshops they would attend in the future, if they became available.

Findings and Results

The following are the results for educators who rated their proficient.

Table 1
ClarisWorks

Proficiency is measure from 1 (least proficient) to 5 (most proficient).

Program	Proficiency 1	Proficiency 2	Proficiency 3	Proficiency 4	Proficiency 5
Word Processing	3	4	12	11	17
Drawing	25	7	6	6	3
Database	27	12	3	5	0
Spreadsheet	18	17	5	4	3
Slide Show	37	8	7	4	1

Table 1 indicates that twenty-eight of 47 (rating 4 and 5) felt they were proficient in the use of the word processing program. Only nine of 47 felt proficient using the drawing program. Database proficiency was recorded at five of 47, spreadsheet - seven of 47, and slide show - five of 47.

Table 2
Miscellaneous Computer Programs

Miscellaneous computer programs used in education proficiency of use is measure from 1 (least proficient) to 5 (most proficient).

Program	**Proficiency 1**	**Proficiency 2**	**Proficiency 3**	**Proficiency 4**	**Proficiency 5**
Hyperstudio	34	9	4	0	0
Scrapbook	39	5	2	1	0
Spelling Toolkit	24	6	6	1	10
Easy Grade Pro	16	3	8	10	10
Storybook Weaver	24	8	5	5	5
Bilingual Writing Center	33	6	2	2	4
TimeLiner	43	2	0	2	0
Kid Pix	27	5	9	3	3
Power Point	32	8	1	5	1
Install Programs	21	7	5	6	8
One Computer/ One Classroom	30	6	3	5	3
Connect Scanner/ Camera	34	7	2	1	3
Use & Download Camera	36	5	3	1	2

Table 2 demonstrates the proficiency level for the teachers at Starlight Park for miscellaneous computer programs according to their perception. These teachers felt unprepared to use most programs. Spelling Toolkit and Easy Grade Pro had 10 teachers

who rated themselves at being proficient. TimeLiner had the largest number of teachers (45) who rated themselves at 1 or 2 (least level) proficiency.

Table 3
Resource List

Table 3 provides the results from the number of educators who would be able and willing to give other staff members training in various computer programs. Under ClarisWorks, 11 teachers felt that they were able to help other teachers. Under Other, five teachers felt that they were able to help other teachers in using Power Point, five could help using Spelling Toolkit, and six could help on using Easy Grade Pro.

Title	Results	Title	Results
ClarisWorks			
Word processing	11	Spreadsheet	5
Drawing	4	Slideshow	4
Database	2		
Other			
Hyperstudio	1	Kid Pix	2
Scrapbook	1	Power Point	5
Spelling Toolkit	5	Installing programs	3
Easy Grade Pro	6	One computer/one classroom	3
Storybook Weaver	4	Connect scanner/camera	0
Bilingual Writing Center	3	Use & down load camera	0

Table 4

Suggested Workshops to Increase Proficiency

Table 4 provides responses concerning training workshops that would help the educator to reach a comfort level to integrate technology into their classroom. Verbatim responses are:

How to trouble shoot problems that arise

Beginning computer classes

Learning all about the I-Mac. I've only worked with PC's.

Be willing to take any class

Computer programs

Any!

Basic keyboarding. I'm taking computer course and trying to "learn" myself on my home computer.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to gather information from teachers concerning their perceived proficiency in the use of computer software in preparing teachers to use technology in their classroom.

The development of technological age has overwhelmed many educators. More and more technology is available to teachers to assist them in their work. Teachers need to secure a role in this paradigm shift involving development of and instruction about the use of technology for teachers.

Review of the literature indicates various processes that are being used to train teachers in the workplace, from individual in-service programs to more extensive collaborates among several educational entities. Teams of teachers are working together to close the gap of understanding involved with incorporating the computer in the classroom.

This study used a descriptive survey to elicit perceptions from 60 teachers concerning technology programs available that might assist them in a more efficient use of the computer and computer software. The survey also identified teachers willing to assist other teachers in learning computer technology, and to identify other in-service priorities they would be interested in attending.

Conclusions

Current teachers (2000-2001) at Starlight Park School, Cartwright School District are lacking in training to integrate technology into classrooms. Many teachers have little self-confidence in their skills to integrate. The teachers are afraid that they might break the computer. Because of this fear the teachers get frustrated easily. The teachers have problems trying to fit technology into their lesson plans. They received little or no technology training in pre-service. After the teachers have started teaching, they received little or no technology training during in-service, workshops, or staff development. There are a few teachers that can provide training for other teachers. Teachers need positive role models or mentors to show them how to integrate technology into their classroom.

Recommendations

Teachers at Starlight Park Schools need to attend technology in-service, workshops, or staff development. There are some beginning workshops available from Cartwright School District that are being offered by collaborate peer teachers. These workshops were recently started during 2000-2001 school year. The workshops are called Computer Basis and Beyond Computer Basis. The Computer Basis class focuses on introduction to the computer from turning on the computer, to hooking up the mouse and printer, and introduction to ClarisWorks (a.k.a. AppleWorks). Beyond Computer Basics focuses on Hyperstudio, Power Point, and the Internet.

Starlight Park School needs to have mentors that are savvy in technology. These mentors can be positive role models on integrating technology into the classroom. The mentors can provide technology training during in-service staff development days. The

principal can allow teachers to observe the mentors in their classrooms as they integrate technology.

REFERENCES

Ariza, E. N., Knee, R. H., Ridge, M., (2000), Uniting Teachers to Embrace 21st Century Technology, THE Journal, May 2000, Volume 27, Issue 10, pages 22-27.

Author Unknown, (2000), Educational Technology Goals, www.ed.gov/pubs/AnnualPlan2001/Obj1-7.doc, pages 60-66.

Author Unknown, (2000), Teacher Training Key to Computer Use, Reading Today, December 1999/Januray 2000, Volume 17, Issue 3, pages 13-16.

Author Unknown, (1999), Will New Teachers be Prepared to Teach in a Digital Age? Education Digest, October 1999, Volume 65, Issue 2, pages 33-37.

Author Unknown, (date unknown), Supplement 1 The Evolution and Impact of Federal Government Support for R & D in Board Outline, Allocating Federal Funds for Science and Technology, www.nap.edu/readingroom/books/fedfunds/part2/suppl.html, no page given

Fulton, K., (1997), Moving from Boxes and Wires to 21st Century Teaching, THE Journal, November 1997, Volume 25, Issue 4, pages 76-79.

Hoffman, B., (1996), School technology Integration: An Automated Needs Assessment and Planning Tool, www.coe.uh.edu/insite/elec_pub/html1996/19techdi.htm, pages 65-73.

James, M., Shelton, M., (1996), Technology Bootcamp and Teacher Technologist Institute Staff Development That Works, www.coe.uh.edu/insite/elec_pub/html1996/19techdi.htm, pages 58-60.

Justice, M., Espinoza, S., (1996), Using Technology to Develop Culturally-Aware Pre-service Teacher, www.coe.uh.edu/insite/elec_pub/html1996/01divers.htm, pages 10-14.

Lee, C., (1996), Teacher Training for Technology, Thrust for Educational Leadership, April 1996, Volume 25, Issue 6, pages 12-13.

Merriam, S. B., Simpson, E. L., (1995) A Guide to Research from Educators and Trainers of Adults, Krieger Publishing Company, Malabar, FL, page 61.

Moritz, G., (1999), From Sputnik to NDEA: The Changing Role of Science During the Cold War, www.people.fas.harvard.edu/~gmoritz/papers/j3.html, no page given.

Persichitte, K., Bauer, J. W., Salazar, A., (1996), District-Wide Technology Training Based Upon the Stages of Concern, www. coe.uh.edu/insite/elec_pub/htm1996/19techdi.htm, pages 60-64.

Poplin, C., (2000), Lesson 1 Overview of Technology in Education, www.rio.maricopa.edu/classes/edu/edu260/011000/lessons/lesson01.html, pages 1- 6.

Ritchie, D., Rodriguez, S., (1996), The Role of Technology in School Leadership, www.coe.uh.edu/insite/elec_pub/html1996/19techdi.htm, pages 72-78

Warner, M., Akins, M., (1999), Training Today's Teachers for Tomorrow's Classrooms, THE Journal, October 1999, Volume 27, Issue 3, pages 118-121.

Webster's Collegiate Dictionary, (2000), www.n-w.com/cgi-bin/dictionary, no page given.

Webster's Ninth New Collegiate Dictionary, (1983), Merriam-Webster Inc., Publishers, Springfield, MA, page 939.

Wetzel, K., Chislom, I., (1996), An Evaluation of Technology Integration in Methods Courses, www.coe.uh.edu/insite/elec_pub/html1996/01divers.htm, pages 2-10.

Williams, D. H., (1992), Viewports to Technology and Teacher Training, Music Educators Journal, October 1992, Volume 79, Issue 2, pages 26-30.

APPENDIX A

TECHNOLOGY SURVEY

TECHNOLOGY SURVEY

Please rate each of the following areas as to your "proficient zone" (1-5). Number one is being not all proficient (no knowledge of) and five the very proficient (could instruct others).

1. Rate the following programs as to your proficiency in using the following.

ClarisWorks

Word Processing _____ Spreadsheet _____

Drawing _____ Slide show _____

Database _____

Other Programs

Hyperstudio _____ TimeLiner _____

Scrapbook _____ Kid Pix _____

Spelling Toolkit _____ Power Point _____

Easy Grade Pro _____ Install Programs _____

Storybook Weaver _____ Connect scanner/camera ____

Bilingual Writing Center ____ One Computer/One Classroom ____

Use & download camera _____

2. Check any of the following programs you would be able and willing to give other staff members training.

ClarisWorks

Word Processing _____ Spreadsheet _____

Drawing _____ Slide show _____

Database _____

Other Programs

Hyperstudio _____ TimeLiner _____

Scrapbook _____ Kid Pix _____

Spelling Toolkit _____ Power Point _____

Easy Grade Pro _____ Install Programs _____

Storybook Weaver _____ Connect scanner/camera ____

Bilingual Writing Center ____ One Computer/One Classroom ____

Use & download camera _____

3. Please list any training workshops that would help you reach a comfort level in using technology.