THE STUDY OF A STATE INITIATIVE FOR THE DISSEMINATION OF EDUCATIONAL TECHNOLOGY

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CHAPTER I

INTRODUCTION TO THE STUDY

Background of the Problem

At the present time we are experiencing more change of human affairs than in any previous era in history. It is a time for phenomenal importance that will fundamentally reshape almost every aspect of society the next couple of decades. Change is occurring in almost every segment of life, and the pace is increasing with each new year (Petersen, 1994). An important part of making sense of this period of rapid change is learning to think differently. Throughout modern history, people have been taught to use the scientific method to break big problems down into smaller segments and to study the parts independently. Specialization, particularly in this time of extraordinary complexity, interdependency and high rate of change, has serious deficiencies. For example, specialists tend to talk to each other, and when they do, they find difficulty in communication because they use different languages (Petersen, 1994).

The delivery of instruction via telecommunications is an exciting and growing phenomenon. The unique

characteristics of telecommunications and distance education necessitate careful planning in order for courses to be effective. One of the most important factors relates to adapting instruction not only to meet the needs of learners with different learning styles, but also to take advantage of the characteristics of the instructional content as well as the strengths and limitations of telecommunications. An effective way for instructors to achieve this is by varying the instructional methods they employ, such as using lecture, experiential, one-on-one, and group activities, incorporating telecommunications. The innovations in technology and attitudes within society in the 21st Century will demand that education professionals be committed to reaching out to students and to providing increased learning opportunities using technology in the classroom. Teachers who fail to do so will increasingly limit their ability to serve learners (Peters, 1997).

Educators in the State of Oklahoma need more training in how to use available technology to strengthen the mode of classroom learning (Peters, 1997). Understanding the use of the equipment and methods of delivering instruction are vital aspects of effective use of distance education. Teachers who do not have technology training are at a disadvantage and are not in a position to provide students

with the learning process for which they are responsible. It is vital that technology be integrated into the curriculum as a means of engaging the learner. Even in instances where technology is available for instruction, there is a concern that the faculty member is not adequately utilizing the equipment (Peters, 1997).

Oklahoma is embarking on a special effort to train teachers in a pressing area of social and economic concern. The outcomes of this training are important. To make it effective, we need to know what happens during the process and how faculty are managing the changes that are being brought about with the infusion of technology into the classroom environment both physically and intellectually. However, no formal evaluation from a learning perspective has been set up at this time. It would be advantageous to explore the practices of various educators as they incorporate this new concept of delivering instruction using technological advances.

The Problem

Understanding the use of technology in regards to the equipment and methods of delivering instruction are vital aspects of the effective use of distance education. The

state of Oklahoma embarked on training all educators to use technology, utilizing funds secured through state funded grants. Oklahoma House Bill 1815 provided funding to establish a consortium for training educators in the effective use of technology in the classroom. Teachers who do not have technology training could find themselves at a disadvantage because they may not be able to provide their students with some of the resources that promote the learning process. The HB 1815 state funded initiative provides funding for technology training for all teachers.

With regard to changes in the workplace, student demographics, and economic trends, educational institutions continue to realize the necessity of finding new ways of delivering education to adult learners. Insufficient research has been done to understand how educators have coped with the changes that have been brought about with the infusion of technology into the adult classroom environment. Specifically, are educators effectively trained and utilizing technologies where it is available?

Purpose of the Research

The purpose of this evaluative study was to describe the adoption of distance learning technology in the adult classroom by teachers who have been trained in state funded

programs. A main concern in the research was to explore how teachers were trained to use the technology through professional development opportunities and to investigate diffusion and adoption throughout the process. This study was prompted by the passing of Oklahoma House Bill 1815, which provided funding for a consortium to be established to train educators in the use of technology in the classroom. Interviews were conducted with six adult educators, each of whom is a Master Trainer (educators who successfully completed the technology training at the Master Trainer level). The overall goal of the plan to meet the intent of HB 1815 is to provide instructional development and support to higher education faculty, teachers in the comprehensive school districts, and career and technology educators to integrate technology into the curriculum, to engage learners, and to enhance overall learning experiences. The intent of this training is to increase institutional effectiveness and efficiency through the use of telecommunications and distance learning technology. The impact that technology education has had on career and technology education teachers after participation in the technology training will be assessed by the degree teachers are participating in the trainings,

and by the degree to which they use the new technology in the classroom.

Research Questions

Three major questions guided the focus of the study:

(1) How effective is the "train-the-trainer" (teachers training teachers) model for infusing technology into the classroom utilizing state mandated funds for training?

(2) How are relationships being built among the teachers and trainers through this professional development training series?

(3) What is the degree of acceptance/rejection of technology by the teachers according to the master trainers?

Assumptions

The following assumptions were made concerning this study:

1. The use of technology in the classroom is becoming standard practice in the United States.

2. Other states are going through similar changes in technology, and challenges to adopt technology effectively.
3. The adoption by the educators will be the key to successful diffusion of the use of technology in the teaching and learning practice.
4. All respondents have given true statements rather than socially acceptable ones.

Limitations

The following limitations were considered in this study:

1. Interviews and observations were limited to eight (six were interviewed and two were observed) career and technology educators located in the southeast quadrant of the state. The southeast quadrant was used due to accessibility for the researcher in regard to travel.
2. Only educators who had been selected to be Master Trainers in the initial training participated.

Definitions

The following definitions are given to assist the reader in understanding the terms and concepts used in the study:

1. Distance Education - the simultaneous telecommunicated delivery of instruction from a host site to distance sites, coupled with live audio and/or video interaction between teacher and student (Barker, 1989).
2. Technology - a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome. Technology usually has two components: (1) a hardware aspect, consisting of the tool that embodies the technology as a material or physical object, and (2) a software aspect, consisting of the information base for the tool (Rogers, 1995). The term technology includes telecommunications, such as the Internet (websites and e-mail), CD-ROMS, and computer-based instructional packages. Telecommunications and distance learning are components of the technology training used for this study.

3. Master Trainers/Lead Teachers - cadre of individuals trained to provide training in telecommunications and distance learning technology to work as teams to learn and develop content in the realm of multi-media and Internet-based curricula, and cascade the appropriate instructional development within the regions (Peters, 1997).
4. Mentoring - educators who serve as a role model to others. They tutor other educators by providing guidance and support, and encourage professional development (Odell, 1992).
5. Professional Development Trainings - a vehicle for the formulation and exchange of professional information, attitudes, and values. Professional development is fostered in many ways, such as publications, committee work, and participation in organized learning activities such as lectures, symposia, and workshops. Professional development can involve advocacy, such as public relations duties to aggressive political lobbying in the state legislatures and Congress; and coordination in which adult education councils often serve as informal mechanisms for communication and

coordination among agencies in a specific geographical area (Darkenwald, 1982).

6. HB 1815 - provided funding to establish a consortium to train educators, between 1998 and 2003 in the most effective use of telecommunications and distance learning technology for the purpose of improving education. It was referred to as the HB 1815 Telecommunications and Distance Learning Technology Training (Peters, 1995)
7. Adoption - a decision to make full use of an innovation as the best course of action available (Rogers, 1995).
8. Rejection - a decision not to adopt an innovation (Rogers, 1995).
9. Diffusion - the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995).

Significance of the Study

The significance of this study was to explore how teachers were trained to use the technology through

professional development opportunities and investigate diffusion and adoption throughout the process. Current data indicate that there are approximately 48,000 teachers in Oklahoma among comprehensive school districts, higher education, career and technology centers, and other agencies. It is a real concern that classroom instructors be provided training to achieve levels of competence in telecommunications. Also of significance in this research is how educators profited from professional development mandated and funded through state appropriations. Because it will assess the effectiveness of current initiatives and can serve as a means of helping legislators and curriculum developers plan for the future, this study can have a broad and far-reaching impact both statewide and nationally.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The review of literature will cover three relevant areas. First, a review of distance education literature is considered. The purpose of the distance education literature review will be to define and examine its role in adult education. Second, the adult learning literature is reviewed in regard to its relevance for distance education. The third area to be reviewed is the Oklahoma Legislation, HB 1815.

It is important for education that teachers be trained to infuse technology into their classroom teaching experience. A main concern is that teachers understand that technology is not going to replace them, but can be used to enrich learning. This review of literature has focused on reviewing distance education, adult learning, and Oklahoma Legislation HB 1815 in an attempt to lay the foundation for understanding the importance of diffusing and adopting technology in the educational process.

Educators need to look at expanding the curriculum to include distance learning efforts. With regard to changes in the workplace, student demographics, and economic

trends, educational institutions are realizing the necessity of finding new ways of delivering education to adult learners. This review of the literature will attempt to explore means for active adult learner involvement and interaction, in regard to the effectiveness of teaching strategies.

Distance Education

The past decade has witnessed much interest in alternative instructional delivery systems for education. Few educational practices have caught the attention of educators and policy makers as has the concept of distance learning. Distance learning is not necessarily a new area of study. It actually has its historical foundation in correspondence study (Barker & Dickson, 1994). The current introduction of telecommunications technology to distance education necessitates a restructuring of the definition. In most instances, distance education is intended to mean the simultaneous telecommunicated delivery of instruction from a host site to distant sites, coupled with live audio and/or video interaction between teacher and student. A broadening of the definition is needed to clarify the inherent strengths that new technologies continually bring to the field, to acquaint and recruit new audiences to the

benefits of distance learning, and to guide further study in this prospect of outreach education (Barker, 1989). The term technology includes such means of telecommunications as the Internet (websites and e-mail), CD-ROMS, and computer-based instructional packages.

Overcoming Barriers to Implementing Technology

A major negative factor in the implementation of technology instruction has been the cost, either because of the initial investment or due to the amount of time required to develop courseware (Titsworth & Baum, 1993). Resistance to change has always and continues to be the slow-down for use of technology in the field of education. Some educators feel that technology will even replace teachers altogether (Titsworth & Baum, 1993).

The collaborative effort among common education, career and technology education, and higher education will allow for broader economy and opportunities to improve learning in these educational settings. The advantages of the collaboration of the education entities according to the guidelines established for the technology training consortium effort in Oklahoma are (a) cost sharing on equipment and software, (b) better utilization of limited numbers of instructional designers and technical

specialists, and (c) joint curriculum development (Peters, 1997). The effectiveness of courses delivered over a distance, as with face-to-face instruction, depends on the planning of the course, class activities, and the instructional materials used. An understanding of the characteristics unique to the distance education environment will also aid the design and planning processes (Price, 1995).

Student Success in Distance Education

In the traditional mode of distance education, the main component of the instruction is a pre-prepared study package (correspondence course). Study support is normally provided either at a distance, through various channels, or at tutorial meetings. Increasingly, computer and telecommunication links are being used both in the instructional component and the tutorial assistance (Kember, 1994). Yet, some writers in the field continue to link distance learning to the traditional correspondence course study whereby the student is physically separated from the teacher and learns independently of direct contact with a teacher or other students (Barker & Dickson, 1994).

Principal stakeholders who embrace the key to the success of the program include: instructors who teach at a

distance, learners pursuing distance education courses and programs, site facilitators coordinating distance learning environments, and administrators responsible for managing distance learning courses, programs, staff and technologies (Wagner, 1995). In an attempt to better design outreach materials for adult learners, the academic counseling division of the Electronic University Network (EUN), a private online educational service, collected and reviewed the outreach material used by eighty-four undergraduate degree granting colleges. They then questioned fifty adult learners enrolled in the Electronic University's (EUN) distance learner's academic counseling service for their opinions on these outreach materials. These adults were all seeking distance degree programs in fields ranging from architecture to telecommunications. The average age was thirty-six (Phillips, 1995).

The EUN study led to the development of the following five rules for designing degree materials for the adult learner: (1) Adopt an Attitude - Most adult learners have been away from education for some time and feel out-of-step. When returning to college, these adults do so with some reservation. Distance learning materials must affirm that learning is not age bound in a society that conveys the contrary. (2) Assume that Money Matters - The

major complaint that adults expressed about outreach materials was that the price of college was often dismissed. Less than a third of the colleges provided direct information on the availability of financial aid. The attitude that money does not matter was evident in the promotional materials provided by the colleges and was in direct contradiction to the attitude of the majority of the adult learners. (3) Recognize Education as a Career Quest - Adults want more information on how academic majors and degrees translate into specific career goals. Half of all programs that provided degree majors tied to post-baccalaureate licensing or certification, such as engineering or accounting, failed to mention whether these degrees would qualify learners for post- graduation needs or if their approvals were state specific. (4) Provide Easy and Responsive Access - In this particular study sixteen letters were sent to various colleges asking for specific additional information not made clear in their additional materials. Four programs answered, four never replied, and the other eight resented receiving promotional materials and form letters. Adult learners were not satisfied with the responsiveness of distance learning programs. (5) Provide a Preparatory Academy - Over half of the adult learners questioned expressed fear about taking a course in

higher college math. These learners wanted a course in pre-college math first to build their skills and confidence. Finding a distance degree program that offered college preparatory work in math, English or some other subject was a problem for those who wanted this option (Phillips, 1995).

A clear indication from this study is that adults look at electronic distance education from a consumer and customer service perspective. They do care about the price, and they care about the responsiveness of educational institutions to their unique needs and questions. Many adult learners will complete distance education programs without ever having set foot on the campus; therefore, it is imperative that the programs continue to design courses with these five essential rules in consideration. Inadequate written materials or a lack of interpretative access clearly discourages, rather than invites, adults back into the learning process (Phillips, 1995).

Students' decisions about continuing or withdrawing from the program are based on a cost-benefit analysis of their participation which, essentially, is the analysis of the success of their integration process or of the congruence among their personal characteristics, their

social/work/family circumstances, and their academic circumstances. Further, the more successful the integration process, the more likely that students' initial goal commitments are to be maintained or even enhanced; thus, the more likely it is for students to persist. Accordingly, if persistence is to be enhanced, the institution should design the academic circumstances in such a way that students will find it easier to incorporate academic work with the larger framework of social life, work occupations, and family circumstances (Belawati, 1995).

Ball State University conducted a series of investigations aimed at exploring both determinants and consequences of student satisfaction with interactive higher education telecourses. They found that students who were more extroverted and relaxed tended to express more positive attitudes about their courses than individuals who were more introverted and anxious. The maintenance of positive student attitudes, in turn, would likely lead to several positive program-related consequences. By way of example, a highly satisfied student population would, in all probability, result in (1) lower student attrition rates, (2) higher levels of student commitment to a program's current and future success, and (3) a greater

number of course referrals from one student to another (Biner & Dean, 1995).

The success of any distance education system is primarily dependent on the correct mix of human factors that support faculty and learner needs. The most sophisticated technology system in the world will not guarantee success (Gibson & Gibson, 1995). The federal and state support given to distance learning is a clear indication this approach to educational delivery is not a passing fad. Distance learning is an accepted method for teaching and learning, and its practice is expected to grow significantly in coming years. Many higher education administrators are also showing interest in distance education as they face the challenges of declining enrollments, an aging student population, and reduced levels of state funding (Barker, 1994).

In regard to cost effectiveness of distance learning programs, growing interest in distance education has led educators to work together on efforts to offer more courses on television or even through computer networks. In many cases, existing consortia have focused new attention on distance learning issues. The benefits of cooperation far outweigh the riches that one institution could expect to

gain by forging into the distance-education market on its own (DeLoughry, 1995).

Education administrators say the primary motivation for building a consortium is economic. Producing a course for television broadcast or for transmission over the Internet is expensive and institutions are looking for ways to share the cost. A cost-effective approach that is already working involves institutions in the Western states region to combine their purchases of technology to assure compatibility, to win volume discounts from vendors, and to make it clear to the companies what educators want (DeLoughry, 1995).

Despite the economic concerns of distance education programs, their success is going to be derived from their creativity, resourcefulness, and a reluctance to give up. Resource areas to be tapped include: (1) grants, (2) awards, (3) business and industry, and (4) publicity. The stakeholders of distance education must realize that the resources are available if one is willing to do the research necessary to find them, that money is not the only resource needed to reach a goal, and that great power can be generated through partnerships (Schroth, 1995).

In the past decades educators have shown a keen interest in alternative instructional delivery systems for

American education. Interest has resulted in the establishment of distance learning projects utilizing telecommunications technologies at educational institutions across the country (Barker & Dickson, 1994). An understanding of the characteristics unique to the distance education environment will aid the design and planning processes for educators (Price & Repman, 1994).

Instructional Models of Distance Education

Instructional design models represent the framework that is used to guide the entire process of designing instructional systems. There are several adaptations of the Dick and Carey model for instructional design. Models of this type are very important in situations which do not have large support staffs and budgets. The Dick and Carey model includes nine stages: 1) identify instructional goals; 2) conduct an instructional analysis; 3) identify entry behaviors and learner characteristics; 4) write performance objectives; 5) develop criterion-referenced test items; 6) develop an instructional strategy; 7) develop and select instructional materials; 8) design and conduct a formative evaluation with possible need for revision; and 9) design and conduct a summative evaluation (Price & Repman, 1994).

Bialac and Morse (1995) found that effective interactive audio and video instruction required four components: (1) personalization, (2) interaction, (3) feedback, and (4) variety of presentation styles. To encourage student involvement it was suggested that students meet together early in the course. This would foster personalization and advocate interaction in the distance education courses. Having met initially with students gives the instructor an opportunity to get to know the students and opens the door for calling upon them to answer questions during class. This first meeting together allows the instructor to review distance learning etiquette. Since the equipment is voice activated, students have to learn not to talk until the speaker has finished and to allow for a slight pause before the audio is activated.

Bialac and Morse (1995) also noted some practical examples for interactive teaching techniques: (1) Be prompt in coming online. (2) Speak slowly, clearly and in a natural style (avoid reading). (3) Use effective visuals and employ a variety of approaches to change the pace. The long traditional lecture used by some instructors should be shortened into smaller segments, changing the activities and media (examples: short video, computer multi-media,

class discussion, question-and-answer session, student presentations, etc.) (4) Involve the participants in discussion and refer to individuals by name. The instructor must call upon the students (individual students or as a small group) at the remote sites. (5) Summarize the concepts that are presented in each class session (p. 3).

Special Methods Needed for Distance Education

Through a process of reflective analysis and formative evaluation (involving both teachers and students) it is possible to identify that combination of content and instructional methods that works for most learners. The importance of techniques that allow students to interact with students at other sites as well as with the instructor seems to be highly related to student satisfaction with interactive television (Price & Repman, 1994).

Distance learning requires changes in the way teachers' present instruction. Teaching styles and delivery methods are not the same as those used in the traditional classroom even though there are similarities. Usually, the distance learning teacher has had a number of years of experience in a traditional classroom and the

switch to a distance learning classroom may mean dramatic changes in teaching styles. Therefore, novice distance learning teachers need some training to maximize the interactive features of the use of technology (Bialac & Morse, 1995).

About 90 percent of the training provided faculty members was on how to use the equipment; approximately one-third taught how to use video including program design, selection and curriculum content. Interestingly enough, none of the institutions used distance learning media as a means of training these faculty members to prepare for distance education. A study by the Office of Technology Assessment (OTA) found that 64 percent of teleteachers had not received training before teaching via distance learning (Bialac & Morse, 1995). Training opportunities in distance education were desperately limited. Most in-service programs that deal with technology seem to focus on how to operate equipment. Little attention is given to key aspects of how to incorporate technology into instruction and virtually none into the concept and practice of distance education (such as different organization and techniques of instruction). The OTA concluded that the key to success in distance learning is the teacher. No technology can overcome poor teaching. When skilled teachers are

involved, enthusiasm, expertise and creative use of the media can enrich students beyond the four walls of their classroom (Moore, 1989).

Planning and preparation are required for distance learning classes; however, many of the suggestions for effective distance instruction would apply to traditional classes. Interaction, personalization and feedback are main instructional components of planning distance learning classes. Equipment and technology problems were fewer than anticipated (Bialac & Morse, 1995).

The concept of collaboration in distance education, particularly as implemented through networks of modern communications technology, brings with it many implications for change in institutions of higher education around the world. This need for collaboration has prompted some institutions to create special distance education divisions complete with their own support services. Probably one of the oldest and most noteworthy examples of this organizational structure is Britian's Open University; instructors and support staff are located at a central site, but it has no physical classrooms. The geographically dispersed Open University students have the freedom to determine when and where they want to learn. A more recent example of this model can be found in the

United States at the Pennsylvania State University (Thach & Murphy, 1994).

Delivery of courses for adults via Interactive Television (ITV) is an exciting and growing phenomenon. However, the unique characteristics of ITV and distance education necessitate careful planning in order for the courses to be effective. One of the most important factors appears to be adapting instruction to not only meet the needs of learners with different learning styles, but also to take advantage of the characteristics of the instructional content as well as the strengths and limitations of ITV. The most effective way for most instructors to achieve this is through the use of varied instructional methods.

A Summary of Distance Education Models

We have become a global village, and we have much to learn from the successes and failures of our colleagues around the world. We have learned the following through years of distance learning: 1) Traditional classroom models should not be emulated in distance learning. 2) Training is needed for faculty, administrators, and support staff. Successful distance learning requires a different way of doing business. 3) Distance learning students need to

"learn how to learn" from a distance learning system and their needs must be continually supported throughout the learning experience. 4) All of the instructional materials should be integrated. The whole should be greater than the sum of the parts. 5) The novelty effect is short lived. The novelty of compressed video or any other technology will soon dissipate and the learner will demand quality in the learning experience. Distance learning must provide both access and success in the teaching/learning transaction (Barker, 1994).

The increase of non-traditional students who work full-time, have family and social commitments, and find their course of study not available where they live, leads to greater emphasis being placed on distance education courses. The past decade has witnessed much interest in alternative instructional delivery systems for education, and few educational practices have caught the attention of educators and policy makers as has the concept of distance learning.

In the coming decade, innovations in technology and attitudes within society will demand education professionals be committed to reaching out to students and to providing increased learning opportunities through telecommunications. Educators who fail to do so will

increasingly limit their ability to serve learners. The hope is to prompt discussion among policy makers and educators, resulting in the optimal use of new technologies that will serve students and enable distance learning to assume its rightful and respected role in the educational process (Barker, 1994).

Adult Learning

Changing demographics is a social reality that shapes the provisions of learning in the American society. For the first time in the United States, adults outnumber youth. At the same time that there are more older adults, the population is better educated, and there is more cultural and ethnic diversity within society. Demographics, economics, and technology are three forces affecting all of society's endeavors, including adult learning (Merriam & Caffarella, 1991). The adult educator and adult learner are the key figures in regard to the development and delivery of successful distance education experiences. Anticipating and supporting the needs of the users of technologies, programs, and services are critical to the success of distance education enterprises (Wagner, 1995).

Distance education students are usually adults studying part-time while maintaining work, family, and social commitments. Some choose to study by distance education because no suitable courses are available where they live; others find distance education more suited to their lifestyle as it gives students freedom as to when and where they study. Students who enroll in distance education courses often never visit the main campus of their college; consequently, their contact with faculty can be limited to indirect contact via mail, telephone, or video link. Educators may need to change their teaching behaviors when introducing technology into the instructional environment. Learners should trust the process, be willing to take risks, and be open to new ideas and experiences. Instructors should be reflective, passionate, responsive, and be a model for the learner (MacKeracher, 1996).

Characteristics of the Adult Learner

As technology continues to become a fundamental part of the educational system it is important to understand the human aspect of the adult learner, and to assure that the design of technology systems work for learners, rather than require learners to adapt to the requirements of technology

(Gooler, 1987). In this study the learners are adult educators who received technology training to be disseminated in the educational process. The humanistic approach to adult education revolves around the learner being self-directed and the teacher fulfilling the role of a facilitator. The role of the educator is not to set the direction of change, but to provide a method by which the learner sets the direction (Rogers, 1969). Carl Rogers (1969) said, "A way must be found to develop a climate in the system in which the focus is not upon teaching, but on the facilitation of self-directed knowledge" (p.304).

As the use of technology has become more available within the educational process, new methods of facilitating information continue to surface. Malcolm Knowles's (1990) andragogical model of instruction is an acclaimed alternative conception of how learning for adults can be organized and facilitated. It is a process model in contrast to the content models used by most traditional educators. The cognitive changes related to life experiences have more to do with judgments, attitudes, and beliefs than with skills or information; for the most part, they are highly individualized. This does not mean that there may not be some experience-based adult changes that

are more universal in nature and thus some common pattern of cognitive change may exist (Merriam & Caffarella, 1991). Knowles (1990) model is learner-centered versus instructor-centered of which the learner is viewed as a mutual partner in each step of the model. His model for self-directed learning included the following elements (1) establishing a climate conducive to learning; (2) creating a mechanism for mutual planning; (3) diagnosing the needs for learning; (4) formulating program objectives that will satisfy these needs; (5) designing a pattern of learning experiences; (6) conducting these learning experiences with suitable techniques and materials; and (7) evaluating the learning outcomes and rediagnosing learning needs. Knowles stressed that self-directed learning is not an isolated process, but often calls for collaboration and support among learners, teachers, resource people, and peers. This process model is mainly concerned with providing procedures and resources for helping learners acquire information and skills (Knowles, 1990).

Three factors that affect the learning climate of an organization are people, structure, and culture. The people or humanistic factor includes all of those who are actively involved in the learning process or can influence it in some way (Brookfield, 1986). Many adult educators

believe these organizational factors can either facilitate or deter learning. The quality of learning that takes place in an organization is affected by the kind of organization it is. This is to say that an organization is not simply an instrumentality for providing organized learning activities to adults; it also provides an environment that either facilitates or inhibits learning (Merriam & Caffarella, 1991).

The aim of the education system in implementing change, such as the introduction of technology, to the adult learner should be to develop educators who are open to change and continued learning, with the goal of striving toward self actualization (Elias & Merriam, 1995). This approach to technology training would benefit education.

Motivational Orientations

There are several areas that relate to the method by which educators are motivated to understand the use of technology in the educational process and participate in technology trainings. Interest in categorizing the reasons for participating in adult learning has spurred several studies. Houle (1961) conducted a study that showed three separate learning orientations held by

adults: (1) goal oriented learners - those who use education as a means of achieving some other goal, (2) activity oriented learners - those who participate for the sake of the activity itself and the social interaction, and (3) learning-oriented learners - those who seek knowledge for its own sake (Merriam & Caffarella, 1991).

Morstain and Smart (1974) extended Houle's typology and found six reasons for learning in adulthood. These reasons cover the professional adult learner more specifically. They are:

1. Social Relationships - reflects participation in order to make new friends.
2. External Expectations - participants complying with the wishes or directives of someone else with authority.
3. Social Welfare - reflects an altruistic orientation - learners involved because they want to serve others or their community.
4. Professional Advancement - participation for job enhancement or professional advancement.
5. Escape/Stimulation - learners who are involved as a way of alleviating boredom or escaping home or work routine.

6. Cognitive Interest - participants engaged for the sake of learning itself (Merriam & Caffarella, 1991).

Barriers

A review of the characteristics of adult learners would not be complete without identifying barriers to participation. The technology education program that was studied was effective, yet not free of barriers. Two of the most frequently cited reasons for nonparticipation of adults are lack of time and lack of money. Researchers such as Johnstone and Rivera (1965) have clustered barriers into categories. These barrier categories are external/situational and internal/dispositional. The external barriers are influences that are more or less external to the individual or at least beyond the individual's control. This might include cost. Internal barriers can reflect personal attitudes, such as thinking that one is too old to learn (Merriam & Caffarella, 1999).

The barriers in regard to adult learning often connect to internal barriers or attitudinal problems of how people adopt change in their lives. These attitudes can be very influential on a human's behavior and learning because they tend to help the person make sense of their world and give

signs as to what behaviors will be most helpful in dealing with their world (Wlodkowski, 1993).

Diffusion and Adoption

Introducing technology into the teaching arena requires educators to learn a new skill and change their teaching style. It is important that one understand the diffusion and adoption of the innovation of distance education. This understanding would help predict the rate of adoption and lay the groundwork for developing effective strategies to manage successful professional development trainings.

It is important for teachers to learn how to use technologies efficiently in order to successfully integrate or diffuse distance education into the classroom. In order for faculty members to adopt an idea and be ready to diffuse it may require an attitude change as well as a change in ability. These changes occur over time and at different rates for every individual. The time element for this diffusion process is a vital element in the process and creates the opportunity to classify adopter groups (Rogers, 1995).

Five adopter categories were set forth by Everett Rogers (1995). Each of the adopter categories is described as an ideal type and is based on generalizations made from observations of actual cases. These categories are designed to facilitate comparisons among groups of similar types (Lamble & Seaman, 1994). The five adopter categories and a brief synopsis of the dominant characteristics of each follows:

1. Innovators: Venturesome - Innovators have almost an obsession with being venturesome. Their interest in new ideas leads them out of the local circle and into more "cosmos-type" relationships, which are a little more daring and risky.
2. Early Adopters: Respect - They are more localities, being more integrated into the local social system. The early adopter is respected by his/her peers and knows that to continue to earn esteem from colleagues, he or she must make cautious, innovative decisions. This early adopter decreases any uncertainty about the new idea by adopting it.
3. Early Majority: Deliberate - These people adopt new ideas just before the average member of the system. He or she may deliberate for some time before completely adopting the new idea.

4. Late Majority: Skeptical - The late majority adopt the idea just after the average member of the system and approach innovations being skeptical and cautious. It often takes peer pressure to convince him or her.
5. Laggards: Traditional - They are the last in a social system to adopt the new idea. Many laggards tend to isolate themselves from the rest of the system and tend to be suspicious of innovations and change agents (Rogers, 1995).

Effective learners need four kinds of abilities to aid in the adoption of a new method: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The learner will have to choose which to use in a particular situation (Kolb, 1977). This framework will be used to interpret the data since diffusion was the aim of Oklahoma HB 1815.

Oklahoma Legislation

Through House Bill 1815 of the Oklahoma legislature, seven million dollars were made available between 1998 and 2003 to train teachers in the most effective use of telecommunications and distance-learning technology for the purpose of improving education (Peters, 1997). Roy Peters

(1997), former director of the Oklahoma Department of Career and Technology Education, wrote a grant proposal based on the assumption that educators in the State of Oklahoma need more training in how to use available technology to strengthen the mode of learning. Understanding the use of the equipment and methods of delivering instruction are concerns related to the productive use of distance education. The learning process is obstructed when educators do not know how to make effective use of the technology that is available. Technology can be integrated into the curriculum as a means of engaging the learner.

The Oklahoma legislature passed HB 1815 to regulate the funding for Oklahoma's technology training during the 1997 session. This bill created within the Oklahoma Career and Technology Education System, the Oklahoma Telecommunications Technology Training Fund to develop training in technology for higher education faculty members, career and technology instructors and elementary, middle, and high school teachers (Peters, 1997).

The key features of this technology plan which included telecommunications and distance learning included:

1. Project advisory council - representatives of comprehensive schools, higher education institutions,

and area career technology centers were to be used for this project.

2. Kick-Off conferences - the visions of the value and use of technology and telecommunications to enhance student learning were to be presented in state and regional programs to the educators.
3. Six Sites - Comprehensive schools, area career technology centers, and institutions of higher education were to work in consortia arrangements to collaborate with the Oklahoma Department of Career and Technology Education to provide teacher training.
4. Competitive Grants - six regional sites, representing all areas of the state, received funding to be used to serve the needs of all teachers within their region.
5. Coordinator, fiscal agent, training facilities/connectivity - telecommunications sites were:
   a. Coordinated by a full-time site coordinator.
   b. To have a fiscal officer provided by and housed at a career and technology center.
   c. To have training facilities that meet the specified standards and criteria.
6. Lead Technology Teachers/Teams - selected from higher education institutions, comprehensive school

districts, and career and technology centers within each regional site were to be provided training in telecommunications and distance learning to work as teams to learn and develop content. The individuals trained were to disseminate the appropriate instructional development within the regions. This Master Trainer team approach was intended to ensure a consistency of effort and standards of quality.

7. Competency Levels - three competency levels and methods of delivery to meet the identified needs of the teachers, instructors, and faculty are provided.
8. Available training - Level 2 and Level 3 competency trainings were to be made available by the teams of master trainers for faculty, instructors, and teachers who were interested and prepared to use the technology upon completion of the training. Level 1 training is encouraged at the local level.
9. Local training efforts - educational efforts currently being provided by local institutions were strongly encouraged to continue.
10. Site administration plans - were developed by each regional site to administer and cascade the instructional development in telecommunications and

distance learning technology to additional trainers and teachers within the area they serve.

11. Web sites - available to provide opportunities for individualized, self-study in the basic computer skills to meet the Level 1 competency.
12. Repositories of resources - made accessible at the state and regional sites for software, CD-ROMS, etc. to use for self-study as well as to use in assembling discipline-specific courses.
13. Certificates - presented for completion of competencies in Levels 2 and 3 (See pages 73 and 74 for a full explanation of the levels).
14. Collaboration - a collaborative effort among comprehensive education, career and technology education, and higher education allows for greater economy and opportunities for use of available equipment, facilities, and expertise to enhance and improve learning in the educational settings.
15. Sources of Funds - sites are encouraged to maximize use of funds available from other local, state, federal, and private sources already available within the region (Peters, 1997).

Through professional development training, teachers learn to use technologies such as the Internet, computer

disks, and other high-tech tools that will help them learn to develop a learning packet that will suit each student's learning style. The Master Trainers helped to develop training manuals that the educators could use independently. This self-directed approach to learning allows the adult learner to make decisions regarding the educational process. This shift to a more learner-focused approach is in tune with both Mezirow's (1990) theory of transformative learning and Knowles' (1980) concept of andragogy (Merriam & Caffarella, 1991).

Summary

It is important for education that teachers be trained to infuse technology into their classroom teaching experience. A main concern is that teachers understand that technology is not going to replace them, but can be used to enrich learning. This review of literature has focused on reviewing distance education, adult learning, and Oklahoma Legislation HB 1815 in an attempt to lay the foundation for understanding the importance of diffusing and adopting technology in the educational curriculum.

The adult educator and adult learner are the key figures in regard to the development, delivery, and acceptance of successful adult distance education

experiences. Anticipating and supporting the needs of the users of technologies, programs, and services are critical to the success of the distance education enterprises. The theory behind the diffusion of innovation suggests that the presence or absence of certain characteristics can predict whether or not an innovative concept will be adopted and can also predict the rate of diffusion of an innovation which determines the success or failure of the effectiveness of the technology being introduced (Rogers, 1995). Many educational institutions are currently addressing the professional development needs of their educators in regard to the infusion of technology in the classroom.

CHAPTER III

RESEARCH METHODOLOGIES

Introduction

Case study is one research design that can be used to study a phenomenon systemically. The selection of a particular design is determined by how the problem is shaped, by the questions it raises, and by the type of end product desired. In most educational situations it is not possible to control all the variables, therefore, descriptive research may be undertaken. This is possible when description and explanation rather than prediction are sought (Merriam, 1988).

The purpose of this evaluative study was to describe the adoption of technology by classroom teachers who have been trained in state funded programs. The study explored how teachers were trained to use the technology through professional development opportunities and investigated diffusion and adoption throughout the process. Another purpose of this study was to determine whether teacher learning strategies were related to mentoring and interpersonal relationship building.

Rationale for a Qualitative Study

According to Creswell (1994), a qualitative study is designed to be consistent with the assumptions of the qualitative paradigm. It is an inquiry process, an understanding of a social or human problem based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting. Whereas, a quantitative study is an inquiry into a social or human problem based on the testing of a theory composed of variables, measured with numbers and analyzed with statistical procedures in order to determine whether the predicative generalizations of the theory hold true (p.11).

Qualitative research has its roots in cultural anthropology and American sociology, and has only recently been adopted by educational researchers. It is primarily an investigative process where the researcher gradually makes sense of a social phenomenon by contrasting, comparing, replicating, cataloguing, and classifying the object of study. The researcher enters the informant's domain and through ongoing interaction, seeks the informant's perspective of the situation (Creswell, 1994). The qualitative paradigm is termed the constructivist

approach or naturalistic approach, the interpretative approach, or the postpositivist or postmodern perspective (Creswell, 1994).

Lincoln's (1985) model of a qualitative (inductive) method of collecting data was used as the basis for gathering and analyzing the data.

Inductive Model - Qualitative

Step 1: Researcher gathers information.

Step 2: Researcher asks questions.

Step 3: Researcher forms categories.

Step 4: Researcher looks for patterns.

Step 5: Researcher develops a theory or compares a pattern with known theories.

An understanding of this method of inquiry and its approach allowed the researcher a means of clarifying the philosophical assumptions required for scholarly inquiry. In this particular study:

a. The researcher gathered information by reading HB 1815, by reviewing The Telecommunications and Distance Learning Technology Training Grant, and by interviewing the southeast district coordinator for the technology consortium.

b. The researcher developed a list of questions that was used to interview each of the six participants. These questions were tested in a pilot study that was conducted using 3 participants who had completed the technology training. They were all college professors who had participated in the second Master Training session.

c. The open coding method was used to interpret the data. The coding (1) leads to generative questions, (2) breaks down the data to free the researcher from description and forcing interpretation to higher levels of abstraction, (3) is the pivotal operation for moving toward the discovery of core categories, (4) moves toward ultimate integration of the entire analysis, and (5) yields the relationships among the codes and the development of each (Strauss, 2001).

d. The researcher looked for patterns to emerge from the coded data. Three outsiders were asked to read the data to identify potential themes. This step in the research process allowed for interpretation from persons who were not so close to the study.

e. The theory used in making sense of the data was compared to that of Everett Rogers' and the

Cooperative Extension Service's theory on diffusion and adoption of new ideas and practices. Rogers' diffusion research provided a new way of looking at change. His paradigm included a foundation in anthropology, sociology, medical sociology, communication, geography, marketing, and education. Rural sociology formed the intellectual paradigm for diffusion research and was mainly agriculture research (Rogers, 1995). The Cooperative Extension adopted his design for research in agriculture. The United States has gravitated from agricultural and more toward an information and service oriented nation, and so has diffusion research.

Rogers' (1995) six stages in the adoption process are:

1. Awareness of the problem
2. Interest in more information
3. Evaluation - how the technology can be applied to the producer's operation
4. Trial - testing the applicability at a specific site
5. Adoption - full use of the technology
6. Adaptation - customization of the practice or technique by the producer

7. Although the stages are outlined successively, the model is dynamic; an individual may return to any one of the stages at any time during the adoption process. Throughout the various stages information is vital. It provides knowledge used in deciding whether or not to adopt a particular practice or system (Brant, 1999).

Validity in Qualitative Research

Guba and Lincoln (1994) introduced and discussed four terms that parallel internal validity, external validity, reliability, and objectivity as they are used by qualitative researchers. Credibility (internal validity) asks, "Do the data stand for what we think they stand for? Or, are the data true?" Credibility was tested by having the director of the technology consortium identify the initial master trainers in the southeast quadrant of the state. All 10 of those identified were contacted; six were available to participate in the study by being interviewed and two others were observed in a training session. The other two chose not to participate. Transferability (external validity) can be achieved if enough thick description is available to permit some transferability of results to other like settings. The fact that more than one

person was interviewed gives rise to more data being collected and, therefore, provides for rich and thick description. In this particular study, the six master trainers were interviewed at their respective workplaces. Dependability (reliability), sometimes referred to as consistency, and answers the question, "Are the results stable? Are we fairly certain that the same general results would occur time and time again?" The same set of questions was posed to each of the six participants. Follow-up interviews were conducted as a member check to ensure clarity and allow the interviewee to expound on certain areas of concern. Finally, confirmability (objectivity) establishes certainty of findings and conclusions by establishing the trustworthiness of the analysis of data and of the entire study. An observation of a Level 2 training was conducted which allowed the researcher to see first hand what was being talked about in the interviews. Also, the researcher engaged outside experts to read the data and interpret it in terms of themes, objectivity was confirmed for this analysis.

The Population and Sample

The data collected for this study was obtained primarily through observation and interviews with eight

career and technology teachers who participated in the technology training at the Master Trainer level. The focus on these instructors was based on the fact that they attended the Master Trainer technology training being offered by the Technology Training Consortium.

Career and technology educators in the southeast quadrant of Oklahoma served as the target population. Criteria for selection included that the participants be career and technology educators who had attended the initial Master Training session. The eight participants were referred by the Southeast District Coordinator/Director of the Technology Training Consortium. The interviews were conducted in the fall of 2001, with follow-up interviews conducted in the fall of 2002 and the spring of 2003. The observation was conducted in the spring of 2003.

The Career and Technology centers of the southeast quadrant of Oklahoma are south of Interstate-40 and east of Interstate-35. There were four schools in this area that were used to conduct this qualitative research.

The method for selection was to ask the director of the technology training consortium for the southeast quadrant to provide the names of the 10 master trainers who fit the criteria (Only 10 teachers from each quadrant of

the state had been selected to participate in the initial training). These 10 educators were first contacted via e-mail and/or by telephone (Appendix A). Of the 10, two were no longer teaching and two chose not to participate. In every instance where a person was contacted by e-mail, a follow-up contact was made by telephone.

Interview times were arranged with each of the six participants. A private setting at the individual's workplace was secured for the interview. Since each individual was a career and technology educator, all interviews were conducted at career and technology education centers. A consent form was given to each of the participants (Appendix B). Both the participant and researcher signed and each participant was provided a copy. Face-to-face interviews were conducted and a tape recorder with a built-in microphone was used to record the interviews.

The tape recorder worked in all circumstances except one. It turned out to be a tape problem and the participant had a tape available that would work. A transcriber was hired to transcribe the data into typewritten form. This transcript was used as the basis for analysis. Three of the subjects participated in a follow-up interview as an opportunity for the researcher to probe

further into the teacher's perspective. The same transcription procedure was followed.

During the initial phase of the interview, the researcher asked questions to provide demographic or descriptive data and to get acquainted with the interviewee (Appendix C). The following is a list of the questions that were asked of each participant:

1. Name
2. Age
3. Gender M F
4. Technology Center
5. Area of Concentration
6. How long have you been teaching?
7. What educational/subject areas have you taught?
8. How would you describe yourself as a teacher?
9. Tell me about your background in distance education.
10. How did you utilize distance education techniques in your classroom prior to the Master Training Technology Program?
11. How were you selected to attend the technology training and become a Master Trainer?

12. What technology training did you receive in order to become a Master Trainer?

13. What does it mean to be a master Trainer and what is expected of you now that you are one?

14. Do you have the equipment available to implement the training that you received and how are you currently and/or do you plan to utilize the training in your classroom teaching?

15. Have you changed your instruction as a result of this technology training? How?

16. How do you think that other educators are going to receive and use this training in their classrooms?

17. Is there any additional information that you would like to tell me about the training you received or about the training that you will give to other teachers?

As stated earlier, these questions were structured and the same questions were asked of all participants. Unstructured probing questions were also asked throughout, and following the interview in an attempt to clarify and gain additional information. Linguists refer to this procedure as conversational repairs, which strive to make the interview as clear as possible (Rubin & Rubin, 1995).

A mutually convenient location was selected for each of the interviews. In all but one instance it was at the career and technology education center where the participant worked. The interviews were conducted in the classroom or office of the participant. No students were present at the time of the interviews. In one case, the participant came to the researcher's workplace. There were no other people present during the interview. The follow-up interviews were also conducted at the workplace of the participants, except for one; in that case the researcher conducted the interview at the participant's home. This was more convenient at the time than the workplace. All of the interviews were at least 45 minutes in length. One of the interviews was 1 hour and 15 minutes. The follow-up interviews were 30 to 45 minutes in length.

Data Collection

This project was conducted using the qualitative research paradigm. The most important task facing inquirers in this paradigm is problem solving; therefore, it is incumbent upon investigators to use whatever assumptions and methods will yield satisfactory answers to problems. Often, answers to research problems require background information that can be obtained only through documents.

Therefore, results of a state derived quantitative study were used to enrich the study and enforce rigor. Determining the accuracy of the account, discussing the generalizability of it, and advancing possibilities of replicating a study have long been considered the scientific evidence of a scholarly study (Creswell, 1994). The ethics of inquiry in both the qualitative (postpositivism) and quantitative (positivism) inquiry are considered to be very important and taken quite seriously by researchers (Lincoln & Guba, 1985). In this study, the researcher reviewed quantitative data previously collected from a study done by the University of Oklahoma and quantitative information gathered by the Oklahoma Department of Career and Technology Education. This information gave a broader understanding to the qualitative data and provided another examination point in the process of triangulation.

Creswell (1994) gives added meaning to the assumptions of the qualitative paradigm when he discusses it in relation to ontological, epistemological, axiological, rhetorical, and methodological assumptions. The ontological deals with the issue of "what is real." The qualitative researcher believes that the only reality is that constructed by the individuals involved in the

research situation. The qualitative researcher needs to rely on the voices and interpretations to report realities. The epistemological questions the relationship of the researcher to the researched. In qualitative studies, the researcher tries to minimize the distance between the researcher and the phenomenon being researched, by living with or observing the informants, or actual collaboration, such as interviews. The axiological issue is the role of values in a study. The qualitative researcher admits the value-laden nature of the study and reports his or her values and biases. Rhetorical assumptions deal with the language of the research. The language of the qualitative research may be first person and personal. Words such as "understanding", "discover", and "meaning" are part of the vocabulary of the qualitative researcher.

According to McMillan and Schumacher (1989), the purpose of most descriptive research is limited to characterizing something as it is; though some descriptive research suggests tentative causal relationships. "There is no manipulation regarding the subjects or treatments; the researcher simply takes things as they are" (p. 26). The ideal design for qualitative researchers is not as easily defined, as are the true experimental designs. Generally, qualitative researchers hope that their work

will have meaning and applicability beyond the specific setting for a given research project.

Actual studies are rarely completely pure and comprehensive, even though descriptions of the two paradigms seem to represent ideal-types. Just as few evaluations exemplify double-blind experiments, there are few that exemplify the anthropological ideal of long-term participant observation. Limited resources, limited time, practical considerations, and political limitations are all possible provisions imposed on the study. In utilization-focused evaluations, it is suggested that the two paradigms differ in their emphasis on detachment from versus familiarity to the data (Patton, 1982). The quantitative or experimental paradigm emphasizes distance in order to guarantee objectivity and neutrality. Scientific objectivity denotes cool, calm, and detached analysis without personal involvement. The qualitative or naturalistic inquiry paradigm questions the necessity of this distance and detachment. It assumes that with empathy and sympathetic introspection derived from personal encounters, the observer can gain insight into the varied meanings of human behavior. Understanding comes from trying to put oneself in the other person's shoes to see how that person thinks, acts, and feels. Being an

educator, the researcher has participated in professional development trainings, but has not been involved in any technology training of this nature. This allowed the researcher to look at this topic objectively yet with some understanding from an educator's perspective.

Issues of Rigor

Techniques such as triangulation help to confirm a study's findings and establish rigor. Triangulation is a strategy for increasing validity of evaluation and research findings in qualitative research. Typically, triangulating the use of a variety of data sources and methods leads to a single proposition about the particular phenomenon being studied (Mathison, 1988). Triangulation is the use of multiple measures and methods to overcome the inherent weaknesses of single measurement instruments. Using a variety of methods can also mean using both quantitative and qualitative means of data collection (Denzin, 1989).

Some qualitative studies rely exclusively on one type of data, such as interview transcripts, but most use a variety of data sources (Bogden & Biklen, 1998). The use of one or more data sources will ensure rigor and establish a strong sense of validity in the research project. This combination of methodologies in the study of the same

phenomenon is referred to in the literature as triangulation. Rigor is intended to describe the work of any and all sociologists, who employ multiple methods, seek out diverse empirical sources, and attempt to develop interactionally grounded interpretations (Denzin, 1989). The triangulated method is not without problems. Those problems include: (1) no two theories will ever yield completely compatible images of the phenomenon at hand, (2) every method reveals a different slice of the social world, (3) every researcher sees different qualities, (4) triangulation is expensive, and (5) weak designs may result from its implementation. However, its use, when coupled with sophisticated rigor, will broaden, thicken, and deepen the interpretive base of the study (Denzin, 1989).

This study explored technology training as a potential means for active learner involvement and interaction. The study investigated the effectiveness of teaching strategies that were used to train educators in the use of technology. This qualitative analysis using a descriptive case study focused on professional development training sessions conducted by career and technology educators. It analyzed teacher participation in the consortium effort developed to train them in the most effective use of distance learning technology for reinforcing learning.

To strengthen the study, establish validity, and ensure rigor in this study more than one data collection was used (1) interviews were conducted with six educators who participated in the master training, (2) follow-up interviews were conducted as a member check to ensure clarity and allow the interviewee to expound on certain areas, and (3) portions of a training conducted by two Master Trainers were observed to increase the understanding of the process. This is an assembly of ethnographic fieldwork techniques, which includes case study designs, unstructured interviewing, and observation procedures.

Analysis of Data

Interviews

The qualitative data gathered in the interviews were analyzed using several different methods. The researcher used a transcriber to transcribe the interviews from audio cassettes, used open-coding to interpret the transcribed data, and asked three outside readers to review the printed transcripts. The purpose of this stage of the analysis was to verify the researcher's analysis and add confirmability.

The transcriber used a transcribing machine to transcribe the interviews from the tapes. She listened to

the tapes and typed the conversation verbatim from the taped interview. Wide margins were left on both the right and left sides to provide space for making notes in the analysis stage. A line numbering function was used in the word processing software, so that the individual bits of information could easily be referenced. Several times, the researcher had to listen to portions of the taped interviews multiple times to clarify the meaning, as a word or group of words had been missed.

Coding involves the discovery and naming of categories. It also allows the discovery of subcategories which can be found in the same line or in other lines, as well (Strauss, 2001). The coding paradigm that was used functioned to code data for relevance for (1) conditions, (2) interaction among the actors, (3) strategies and tactics, and (4) consequences (Strauss, 2001). Two methods of open-coding were used to analyze the data. The first approach was to use coded data cards. The researcher dissected the data into units, which were single complete sentences, thoughts, comments, or descriptions from the text. Microsoft Word and Microsoft Publisher were used to cut and paste each of the units in the data and set them up as cards. Cardstock was used to print the information and it was cut into cards. The cards were previewed and sorted

into four categories. Other subordinate themes emerged with less saturation than the four principal themes. During the sorting stage when thoughts or units seemed to overlap they were forced into a category. The name of the category was written on each of the cards. This card sort method was used to set up the categories.

The second approach was the coded transcript method. This approach was less complex, relying on the coding developed in the card sort. The researcher read the transcript and wrote down words in the left margin that caught the researcher's eye. After reading the transcript, the researcher used the left margin to write additional thoughts or questions about the data. After analyzing all of the data, the researcher used the categories that emerged to create a table. Information from all of the transcripts was placed into these categories in the table.

Some of the trainers participated in a follow-up interview to allow the researcher to clarify the data and to allow them to expand on areas that were unclear. These follow-up interviews were also recorded, then transcribed by a third person. Transcribed interviews were then coded by writing directly on the transcript. The initial data was placed into a table organized by category.

The three outside readers, solicited to read the transcripts, coded them by writing directly on the transcript. They each identified themes and categories and raised questions as they saw fit.

These combined efforts of analysis gave a variety of interpretations and helped to identify consequential themes that emerged from the data. Seeing the recurrence of the specific categories allowed the researcher to narrow the data and identify a focus.

Observation

The researcher observed two portions of a training session. This allowed the researcher to see first hand the training described in the interviews. The researcher took detailed field notes and tape recorded the training, then used these to write a detailed description of the day. This information was used mainly to add meaning to the data and clarify areas that were more difficult to understand. The observation added depth to the study by allowing the researcher to see first hand what the trainers and trainees had actually experienced.

Summary

The purpose of this study was to describe the adoption of distance learning technology in the adult classroom by teachers who have been trained in state funded programs. Teacher trainers and professional development opportunities were studied to determine the effectiveness of this diffusion and adoption process.

According to Bogden and Biklen (1998), the qualitative approach requires researchers to develop empathy with people under study and to make concerted efforts to understand the various points of view. When practitioners employ the qualitative approach, they systematically try to understand the different people in their subject schools as they see themselves. This approach requires that educators be more rigorous and observant in collecting information in order to recognize their own points of view and to break through the stereotypical images that may govern their behavior toward others. When approached with an innovation to try in their classes, some educators say, "It won't work. It doesn't fit the real world." The theoretical perspective that underlies qualitative analysis takes the view that people construct reality as they go about living

their lives. People can be active in changing the real world. They can change, and they can affect others (p.233).

CHAPTER IV

PRESENTATION OF FINDINGS

This study explored the infusion of technology into the classroom as a means of enhancing the classroom experience. The purpose of this study was to explore how teachers are trained to use the technology that is available to them and how relationships are built as a result of the trainings. A theme that seemed to emerge from the interviews was that of building relationships. The researcher witnessed building of relationships through training and mentoring as a result of this technology training. Relationships were being built at the professional development training sessions with teachers training other teachers, mentoring took place both during and after the trainings, and teachers supported each other at their respective schools.

This study was prompted by Oklahoma HB 1815, which provided funding for a consortium to be established for training educators to use technology in the classroom. The overall goal of the plan to meet the intent of HB 1815 was to provide instructional development and support to higher education faculty, teachers in the comprehensive school districts, and area career and technology instructors to

integrate technology into the curriculum, to engage learners, and to enhance overall learning experiences. The intent of this training was to increase institutional effectiveness and efficiency through the use of telecommunications and distance learning technology. The purpose of this research project was to determine the degree to which teachers were trained to use the technology that was available to them and how, if at all, they were infusing technology into their day to day instruction.

The following research questions guided the study:

(1) How effective is state mandated training such as the "train-the-trainer" (teachers training teachers) model for infusing technology into the classroom?

(2) How are relationships being built among the teachers and trainers through this professional development training series?

(3) What is the degree of acceptance/rejection of technology by the teachers according to the master trainers?

Research questions were addressed using a qualitative descriptive case study approach. Interview transcripts were used to analyze the teacher participation and assess their use of technology instruction in this training consortium

effort. The focus was on professional development trainings.

Demographic Analysis of Sample

The Participants

The sample consisted of eight career and technology educators who were chosen to participate in the technology training at the Master Trainer level. These instructors had attended the master trainer technology training offered by the Oklahoma Department of Career and Technology Education technology consortium.

Six of the eight were interviewed and willing to participate. Each proved to be eager and enthusiastic to tell his/her account of the technology training sessions. The interviews seemed to offer opportunities for each participant to vocalize their support of the program. Each exhibited a passion for teaching and especially for technology.

The data collected for this study was obtained through observation and interviews, but primarily through interviews with six career and technology teachers who participated in the technology training at the Master

Trainer level. The six individuals were interviewed and the interviews were recorded and transcribed.

Career and Technology educators in the Southeast quadrant of Oklahoma served as the target population. Six participants were identified through the Southeast District Coordinator/Director of the technology training consortium. The interviews were conducted in the fall of 2001 and the follow-up interviews were conducted in the spring of 2003.

There were 2 males and 4 females interviewed and 1 male and 1 female observed (see Table 1). The ages of participants ranged from 38 years to 62 years of age with the mean age being 46.3 years. The number of years of teaching experience ranged from 10 years to 30 years with the mean years of teaching experience being 19.7 years. All of the teachers held teaching certificates and had attained at least a master's degree. Their instructional areas of concentration were varied. They included: Basic Computer Fundamentals, Marketing Education, Math and Science, Technology Education - Drafting and Woodworking, and Business Education.

The names of participants have been replaced with pseudonyms for reference in this chapter.

TABLE I. PARTICIPANT PROFILE

NAME	GENDER	AGE	YRS OF TEACHING EXPERIENCE	AREA OF CONCENTRATION
Linda Kamp	Female	46	14	Basic Computer Fundamentals
Oprah Sims	Female	43	10.5	Marketing Education
James Jones	Male	44	23	Math & Science
Randy Meed	Male	49	25	Drafting, Woodworking, Technology Education
Holly Johnson	Female	38	10	Basic Computer Fundamentals
Cynthia Parsons	Female	47	26	Business Education
*Gwen James	Female	62	30	English/Journalism
*Peter Stone	Male	41	19	Power Equipment Tech. Small Engine Repair

Note: Pseudonyms are used for names of participants.
Mean age - 46.3
Mean years teaching experience - 19.7

*Participants observed (others were interviewed)

Trainings

These trainings were set up according to levels of expertise regarding technology. Three levels of competencies were considered for instructional development in the use of telecommunications and distance learning

technology operations and concepts (Peters, 1997). The competencies for these levels are as follows:

1. Level 1 - the initial level for teachers to develop skills in basic computer usage.
    a. Perform basic operations on a computer.
    b. Understand the features and functions of operating systems.
    c. Use each component of office suites, including a working knowledge of features and capabilities of each.
    d. Establish an understanding of Internet connections and perform e-mail processing.
    e. Search for library resources on line.
2. Level 2 - designed to develop an understanding of the Internet. Prerequisites to receive Level 2 training are (1) evidence of competence in Level 1 skills and (2) availability of equipment and facilities for implementing and using skills developed in Level 2.
    a. Develop curriculum and instruction that can be used through the Internet.
    b. Develop a home page for instructional purposes for students to access.

c. Convert learning modules to multi-media format which may be used in classroom presentations, Internet, and other distance education media.

d. Teach search skills and evaluation skills to go along with it in identifying information to use in the classroom (Peters, 1997).

3. Level 3 - will culminate the training and bring together a full complement of instructional tools in the teaching practice; participants will demonstrate total competency for development and delivery of self-contained, media rich instruction (Peters, 1997).

The participants were each asked to describe the three levels of training. After the first interviews the researcher was confused about the Level 1 training and thought that it was the first training that the Master Trainers received, therefore the first training that they offered to fellow teachers. Linda, a 46 year old female trainer with 14 years of teaching experience, had said in her first interview that she helped to write the curriculum for the Level 1 training. Holly, a 38 year old female trainer with 10 years' teaching experience, said they trained the teachers from the beginning up to Level 3, while other participants never mentioned Level 1. In the

follow-up interviews the researcher discovered that the teachers were to be taught the Level 1 competencies at their respective schools prior to taking the Level 2 training.

The Master Trainers had all received the Level 2 training together at a common location. Cynthia, a 47 year old female trainer with 26 years of teaching experience, said, "It was very intensive, we were there for two separate weeks and we were taught the basic components that we've included in our Level 2 training." Others took pride in the fact that they had a hand in changing and developing the curriculum since, as one described, "We were the guinea pigs, the pioneers, or better yet the first to attempt the curriculum."

> Cynthia best depicted this phase of the training.
>
> In our Level 2 training we learned: effective use of graphics, using multimedia in the classroom, techniques for Internet search, basic PowerPoint, copyright law, story boarding, transmission modes for the different transmission for distance classes, understanding the distance of environment, virtual field trips, web page overview and design using FrontPage, and roles of the facilitator.

Training manuals were developed and issued to the participants to be used in their training of teachers. Each of the Master Trainers said that, after the training, they personalized the curriculum to meet the needs of their particular subject area.

The funding for the technology trainings expired in the summer of 2002. Since there were some grant funds remaining, the professional development training continued through the summer of 2003. Those interviewed regretted that the program would be discontinued, as they each believed that this program was excellent and by far the best means of disseminating technology information and trainings among fellow educators.

As one participant put it:

> I think that HB 1815 is one of the best bills that I have seen that really targets teachers. I think it is a great program. This is an exceptional way to get teachers together in a training setting. It is exciting to see the way they pool information and put their books together. I like the idea of 'teachers-teaching-teachers' and it is exciting to see these teachers respond. So, I mean, I think it is a fantastic program and I am so thrilled to be involved in it.

Although funding had ceased, according to information obtained in the follow-up interviews, there were still many teachers who had not yet received the training.

Three Emergent Themes

Establishing Relations

A theme that emerged from the interviews was that of building relationships. Relationships were being built at the professional development training sessions through teachers training teachers. The lead teachers served as mentors both during and after the trainings and teachers supported each other at their respective schools. Holly found the ideas and the camaraderie between the teachers to be absolutely uplifting. She said,

> I don't think I have ever taught one of these [training sessions] that I haven't learned something, and that is the most exciting thing. When I see light bulbs turn on and these other teachers say 'Hey I can do that!' it is so exciting.

At the training sessions the opportunity was there for relationships to form and be built upon. The idea of teachers as trainers started this process. The State proposed this type of training as a means of humanizing the

process (Peters, 1997). The researcher observed one of the HB 1815 Level 2 training sessions. This allowed her to see how the idea of teachers training teachers actually transpires. This particular training session was held in a computer lab at a county Work Force Development Building. As the researcher entered the lab where the training was held she found that several of the participants had already arrived. Gwen, a 62 year old Master Trainer with 30 years experience, greeted each new arrival. She smiled broadly and greeted those she knew by name, and she introduced herself to several of the participants. Before the training began Gwen and Peter, her co-trainer a 41 year old trainer with 19 years experience, asked the teachers to form a circle and they all participated in a warm-up activity. This was an opportunity for Gwen and Peter to lay the groundwork for being teachers themselves.

In the interviews the researcher talked with Oprah, a 43 year old trainer with over 10 years teaching experience, and Linda, who like Gwen and Peter, are master trainers, both currently teach in career and technology education, and have taught school for at least 10 years. Oprah mentioned that part of what this training means to her is that she prepares other teachers who will go back and train teachers at their particular sites. She says it is a fun

type of training that builds relationships. She says, "I have seen relationships develop, they talk to other teachers that teach the same thing they do." Linda finds that she can understand the connectivity that goes on among the teachers. She says, "Being a teacher I understand what these teachers have to do in order to fulfill those teachers that are out in the outlying areas in order to include them. I can see it from both sides." Therefore, her experience gives her a better understanding of those she is training, because she, too, shares that role as a teacher and a trainer. She can see both sides of the fence.

Linda especially liked being part of a training session designed for administrators.

She says,

> It was an awesome opportunity for me to be a part of this very unique experience. We concentrated on showing them the equipment that the teachers would be asking them to purchase. And we told them to equip their respective schools using as much money as the school can put into it, because having the equipment available is going to get the teacher and student excited about using technology.

The relationship created between the administrators and HB 1815 confirmed learning by doing as a means to change individual expectations.

Holly expresses,

> There is a waiting list for people from the area schools to get into our trainings. They come to us because we have the equipment and they know that they can ask our opinion when they are setting up a lab in their school. They can ask what type of equipment we think they should have in their schools. They will go back and tell their administrators what they learned in these classes and identify what they need to be able to give their students that same type of learning experience.

She added,

> My Superintendent is very supportive of this technology training program. He allowed me the time off to go through the training. In return I go back and share with him the things that I have learned, because he is very interested in PowerPoint and distance education. He has actually used some of the techniques that I showed him.

James, a 44-year-old male teacher/trainer with 23 years of experience, makes another point,

> Superintendents do not like for their teachers to see what other schools have - that is just not cool. Our job is to try to propagate the concepts, the ideas of what HB 1815 is about. That is the cascading effect that we use in teaching technology. We need to try to get schools to talk to each other to open the doors of negotiations so that we can promote this training concept.

House Bill 1815 training can be looked at as a way to "jump-start" professional development regarding technology. Holly thinks that being a Master Trainer put her and the others out there on the cutting edge of technology.

She said,

> There is so much available to us that we can teach other teachers about the new technology [what is learned in the Level II trainings]. We have the opportunity to go learn it and to share ideas with other trainers. When you are teaching you just have the time to get the latest technology information like you do by going through the Master Training program. If there is something new in technology out there usually we will know about it or at least someone in our program will be acquainted with it and share it with the others.

Mentoring

The model used in the training gives way to the continuation of relationship building following the trainings. The master trainers and the trained teachers serve as mentors when they return to their respective sites. Mentoring provides teachers with guidance and support, promotes the professional development of the teachers, and serves as a tool to retain teachers or in this instance to keep them using the technology after the training (Odell, 1992). The master trainer serves as a mentor to those he or she has trained and the trained teachers, in turn, serve as mentors to other teachers that have not had the training. Mentoring is being a role model to others or serving as a tutor (Odell, 1992).

Oprah implies that part of what the training does is prepare her to go back to her school and prepare other teachers for the technology changes that are emerging. She finds herself continually working with other teachers, updating them concerning the latest changes in technology. "This helps to keep them current," she says. This bit of contact will keep them using the technology. It also allows her to mentor to these teachers. Linda says, "It is mentoring, you know, because once you teach them you still

continue to mentor them and help them use technology." She serves as a role model during the professional development and continues to aid them in getting over any rough spots.

She says,

> At my school, all of the teachers that have taken the technology training still come and ask how to do something. Even though they have gone through the training, they all of a sudden get these ideas, but if they don't use it every day, they will need some help.

Holly affirmed this when she said, "The teachers that I have met through these trainings, we have formed a network that we know we can contact each other and ask questions and this has been very rewarding for me personally." The Master Trainers serve as mentors to the teachers they train and to other Master Trainers.

Randy believes that the Master Trainer is a resource for educating other teachers on this new concept of technology.

He said,

> People can actually call me if they have a problem and ask for help. As a Master Trainer I have been challenged to train as many other teachers as possible. House Bill 1815 challenges us to spread

technology into the schools, at least to have one lead teacher in each wing of each school.

Linda said, "I teach other teachers, who in turn will teach other teachers. It is a cascading of knowledge about computers. We all help each other."

In the training session that was observed, the researcher witnessed teachers exchanging phone numbers and e-mail addresses. This allowed for mentoring to take place following the session. On the first day, Gwen and Peter had even provided the participants with their e-mail addresses and phone numbers and told the teachers to call on them at any time. The tone was set for mentoring throughout the training session. The trainers provided examples of the activities that were being taught and they made themselves available at all times to offer assistance to individuals and to groups. This is an example of anticipating that a need will arise and showing a willingness to support that need.

One group arrived back from lunch early to get Peter's assistance. They got him to set up Image Maker and show two members of the group how to use it in the development of their video. The two who learned Image Maker proceeded to show the other members of their group how it worked. They were organizing a video presentation to be presented

at the end of the training. In an interview, Cynthia said, "We use a lot of hands-on in our training. We are actually in a distance lab and each person is required to work in a group and give a presentation. This allows them the opportunity to work with others as well as critique themselves as they watch the videotaped presentation."

Cynthia defines the Master Trainer as,

> The folks who have gone through the training and have excelled at the various skills that are taught. They are definitely "people persons", motivators, and all of that. The administrators in their school district have to agree to allow them to take time to go about and do this training. And they have to manage it in such a way that it won't interfere with their work. We work together, as master trainers, to make this happen.

Holly assists with the scheduling of the trainers. She makes an effort to work with each individual's schedule.

She adds,

> It is a privilege to teach other teachers and especially to teach them technology, because there are so many exciting things happening. Every day new things appear - new programs, new ideas - and when you

teach these classes the networking and the ideas and the camaraderie among other teachers is particularly inspiring.

The Supportive Power of Mentoring

In one of the interviews, Linda very enthusiastically said, "I like this implementation of teachers training teachers. The camaraderie is already there. It is so exciting to see these teachers respond. When teachers get together, it is unbelievable how much they network." These teachers, both trainers and trainees, use this bond that is formed to support each other. Linda said, "You are more understanding if you have been in the trenches, you just know what to do, you can understand, and this makes it exciting to see the teachers respond to this fantastic program."

At the training session, Gwen and Peter showed support to the attendees by working with each individually and by assisting the groups working on PowerPoint presentations. Gwen was seen working with one group, showing them how to incorporate sound into their presentation. She also encouraged them to support each other by advising them to each take a part of the presentation, work on it independently, and then return as a group to complete the

project. This shows support among all involved in the technology training. This would be especially helpful when one teacher had some expertise in one area and the others did not.

This idea of support has actually already been alluded to in the discussion of teachers as mentors. However, support can go a step further. It can serve to include those teachers who choose not to participate in the training. It can even go outside the circle and allow the teacher to utilize the technology they have acquired as a tool to reach out to the parents of their students. This can create unified support groups among teachers, between teachers and parents, and even between teachers and students.

Holly stated,

> The only way I have really learned to use technology and distance education was through our teacher technology program here at the school. I was introduced to it 3 or 4 years ago when we established our distance learning lab. Basically I learned to use technology from the regional coordinator of this program here at our school.

Oprah offers support to one of her colleagues who teaches geography. He chose not to participate in the

training, but through her help he burned a CD to go along with his geography curriculum. She said that, as a result of this, he has a great curriculum set up now that he doesn't have to revise every year. Randy finds the HB 1815 training to offer an excellent opportunity to the teachers and provide them a chance to apply the software they learn and build their own PowerPoint.

He says,

> When you participate in the HB 1815 training you leave with something that you can take back to your school, apply it to what you are teaching - you can actually use it. It is something useful. That is what we need more of, in getting teachers involved because they will have more ownership if they know they can use it when they get back.

Teachers are trained in the sessions to build a website for their particular curriculum that includes their program of study (syllabus). Oprah has seen teachers set these up as a link for communicating with parents. The parents can go to the website to reinforce their understanding of the homework or even to see how the students are doing. Linda has seen a coach use his website to keep in contact with former students. In either situation, there is an increase in communication that is

building relationships. Fostering relationships with other people is related to the welfare of others so that one caring for others in fact cares for her or himself. A caring relationship fosters a real commitment to another, which leads to mutual benefits for both (Merriam, 1999). James said, "Much of what I have to offer to the other teachers is to instill personal interaction and self-esteem in them." He sensed some anxiety among the teachers about learning something new, such as technology.

Oprah said,

> We've just completed the first group of teachers that have gone through that [Level 3 training]. We posted a course on blackboard.com, we've prepared a front page, web page to go along with that. Something that teachers can take back and not necessarily this time to use so much for the classroom but to use for themselves their Internet sites that have grade books available for the teachers as well so that the grades are available through password to parents or just other avenues for the parents to access the teacher or to find out what is going on in the school.

This ethic of care can be very time consuming, but can prove to empower the trainer, the teacher, the parent and

the student in this educational environment to be all that they can be.

Minor Theme

Barriers to the Infusion of Technology

In each of the interviews, there was some mention of barriers involved in the infusion of technology in the educational structure. In each instance, overcoming the apprehension and barriers opened comfort zones. The availability of equipment, lack of skills, and support from the principal stakeholders were areas of concern that the participants expressed.

The enthusiasm of each of the eight participants [the six interviewed and the two observed] was such a positive influence for the researcher, setting the stage to ease teachers and raise their level of comfort in these training sessions. Linda tells the teachers in her training sessions that they need to pick and choose what is going to best satisfy their needs in the classroom.

She said,

> They don't need to learn something new every single day, but just see the overview of great resources that are out there and choose what is going to best help

> their program and start implementing it. I tell them that they have so many resources available to them and it is so exciting.

She was bursting with enthusiasm when she made this statement.

Mike said,

> Using digital cameras and video cameras to put together a PowerPoint presentation makes teaching so much more fun. There is just so much more that teachers can do and they like seeing all of the possibilities. They especially like the hands-on trainings that we offer.

This shows how the technology is helping to bridge the digital divide. Holly said, "We need to have more training opportunities like this to get the teacher involved. They will take ownership if they know that they can use it when they get back to their schools." These attitudes are especially comforting when the equipment is available within the school.

During professional development training, the trainers discovered that many of the teachers already have the equipment available in their school, while other teachers were told they had to take the training to become more

literate even though they may not have the equipment to practice what they learn.

Oprah said, "I think that one of the big obstacles that I have seen is the lack of equipment and technology when they [teachers] get back to the classroom. That is one of the only obstacles I've seen, however."

Linda said,

> There are some teachers who attend the training because they have been told they have to do it. You can really pick those people out, as you know they do not want to be there. They just do not show much enthusiasm or excitement.

She added,

> It is probably the older teachers that are reluctant and even appear bitter that they are being forced to attend this training. In one school, the teachers were offered a stipend to attend the training. This was a way to encourage participation and not force it upon the teacher. I thought that was a real neat idea.

Cynthia stated,

> We have had some school districts that require teachers to go through the training and at first there is a little hesitation. They aren't sure that they

> will ever use this, but I find them to be won over on the first day because it is so hands-on and personalized, a very low trainer-to-trainee ratio. Some of the teachers are a bit insecure when they come to us thinking that they don't have the skills, but it is just not that way.

Randy added, "I actually saw teachers who were on the verge of retirement just blossom and I think it was because they already had some computer skills and they had the equipment available at their school." On the contrary, Cynthia is frustrated by the lack of technology skills that she has observed in the new teachers.

She said,

> We would like to think that the new teachers are coming out of the university with all of these technology skills, but we found that they are not. I had a student teacher who had never seen a distance lab until he was assigned to me and I took him in our lab.

She added, "We get a lot of teachers of various ages and years of experience that are very technical, but they are not software savvy and they are not lesson savvy." Mike stated, "I believe that in college, technology definitely needs to be taught to future teachers. They

need to be taught how to use PowerPoint and make it useful, not just learn the software."

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

In this society where technology advances are becoming important in education as a teaching tool, it becomes imperative to increase the awareness of the use of technology in the classroom and develop an understanding of how diffusing technology will impact teaching and learning. This study was prompted by the passing of Oklahoma House Bill 1815, which provided funding for a consortium to be established to train educators in the use of technology in the classroom. The purpose of this evaluative study was to describe the adoption of technology by classroom teachers who have been trained in state funded programs, to explore how teachers were trained to use the technology through the state mandated professional development workshops, and investigate the subsequent diffusion and adoption throughout the respective educational institutions. The study was guided by three major questions:

1. How effective is the "train-the-trainer" (teachers training teachers) model for infusing technology into the classroom utilizing state mandated funds for training?

2. How are relationships being built among the teachers and trainers through this professional development training series?
3. What is the degree of acceptance/rejection of technology by the teachers according to the master trainers?

Conclusions

The importance of this study was to determine the association the educational technology training in Oklahoma has in regard to building relationships. Through interviews and observations a recurring theme regarding relationships kept emerging.

The following conclusions were derived from the findings by the researcher:

1. Over 30 years ago Malcolm Knowles proposed that the climate for adult learning should create an environment for adults to feel accepted, respected, and supported, and there should exist a spirit of mutuality between the teachers and the students as joint inquirers (Knowles, 1980). This atmosphere aids in the adults' acceptance and participation regarding changes. HB 1815 mandated the infusion of technology, a possible unknown, into the current curriculum. The idea of teachers training teachers

by cascading (diffusing) the transfer of information in group settings was adopted by the state for professional development technology training. Learners engaged in the training with their peers in seeing, using, touching and experiencing first hand how to use and incorporate technology. This hands-on training and practice built confidence and kept teachers from being intimidated. The train-the-trainer model (designed by Oklahoma Career and Technology Education) used for this project draws on the design components of a humanistic and pragmatic philosophy, high participation by teachers, presentation by teacher trainers, feedback, and evaluation. These components are significant in distance education and key success tools for this face-to-face learning. The Master Trainers who conducted the trainings were connected to the teachers they trained because they were peers selected by the state to be Master Trainers. Master Trainers were equivalent to Rogers' innovators for the perspective of Oklahoma's initiative (See Figure 1). Teachers training other teachers to use technology in the classroom can actually benefit the educational institution by saving them time, money and resources. The consortium formed via the HB 1815 grant not only served to train the teachers, but the various educational institutions were able to pool their

resources and send information among the schools, as well as share some of the equipment.

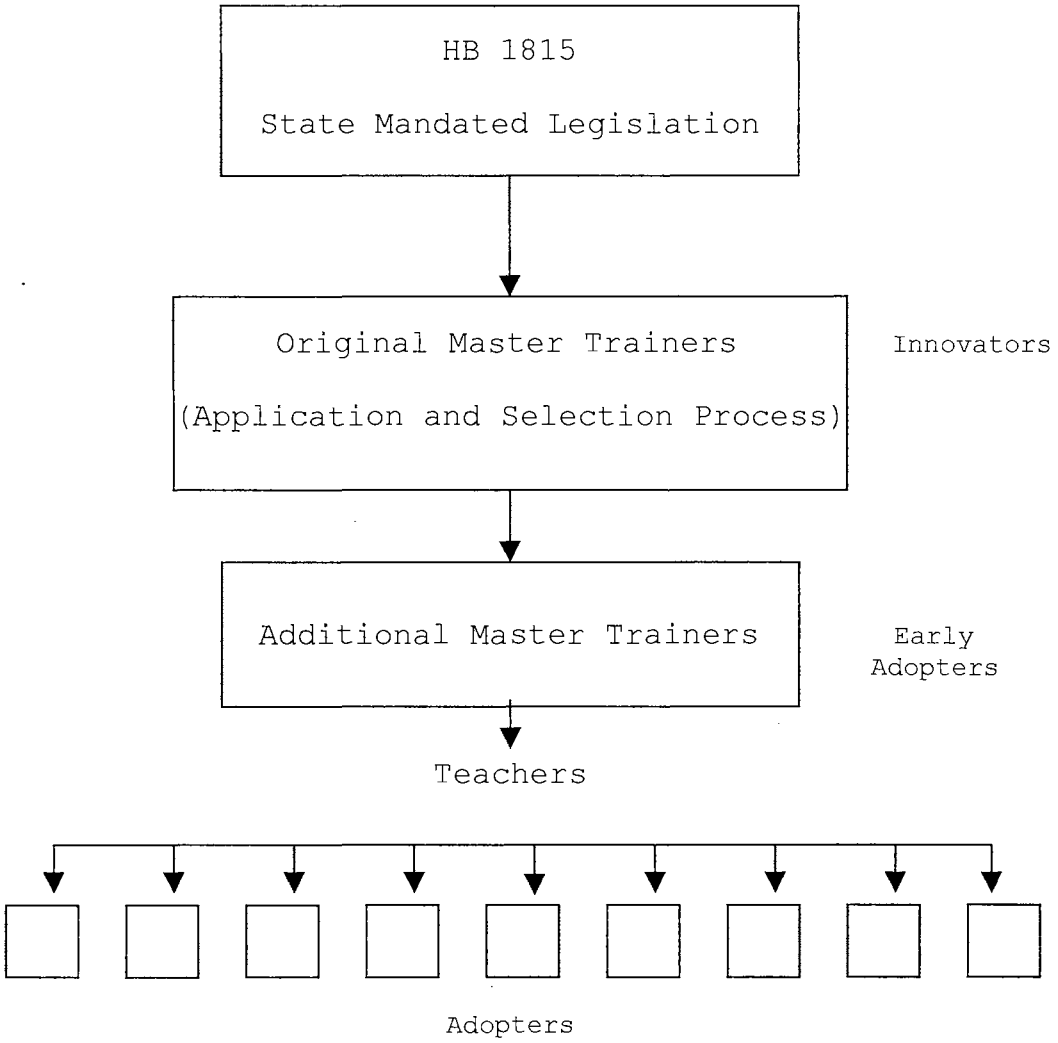

Figure 1. Diffusion Model Adopted by the State of Oklahoma (Teachers-Training-Teachers)

2. Effective learning strategies relate to mentoring and interpersonal relationships. The more effective and personal these relationships, the more effective and long

lasting the outcomes of the training will be. Teachers getting together to learn to use technology in professional development workshops promote the building of relationships, and educators who become mentors in the use of technology will in turn encourage other educators to use technology and interact. The use of technology is often regarded as impersonal and refers to lack of closeness among teachers and students. The state mandated technology training actually brought educators closer together. It gave them a reason to interact and more opportunities to interact. This interaction started at the training and continued in the schools. Educators can use technology to encourage and build relationships with parents by building a website accessible to both parents and students. It also allows for an opportunity to keep in touch with former students and network with other teachers. This can create support groups among teachers, between teachers and parents, and even between teachers and students.

3. Based on Rogers' (1995) adopter categories the Master Trainers are the Innovators and the Lead Teachers in each of the schools are Early Adopters (See Figure 1). The Master Trainers are venturesome, willing to accept risks and take on leadership roles. The Lead Teachers serve as mentors. Master Trainers as innovators, according to

Rogers' model, were successful in efforts to disseminate their skills and knowledge. Whether they were successful in passing on the knowledge can only be conjectured. They are respected and regarded by others in the school as role-models.

4. The adoption of technology by educators will actually give the teachers an additional tool to incorporate into their instructional environment. It is important for education that teachers be trained to infuse technology into their classroom teaching experience. A main concern is that teachers understand that technology is not going to replace them, but can be used to enrich learning. It can be used to enhance or enrich an already established curriculum.

The Limitations of HB 1815 Initiative

One of the limitations was the lack of or inoperable equipment. The lack of equipment is discouraging, especially after the teacher has been trained and is excited to begin using technology as a result of the training. Educational institutions must provide the equipment, resources and technical assistance needed to continue a technologically sound instructional environment

that encourages teachers to adopt technology as a teaching tool. The support of administrators is essential in the attainment of equipment. Training the administrators can help them to better understand the importance of buying and maintaining the equipment. It can also allow them to see the equipment first hand that is needed in their school.

Another limitation of statewide initiatives is that all educators have not been trained to use technology, some because they chose not to participate in the training and others due to the ending of the training because of the discontinuation of funding. Educational institutions need to be aware of the fact that just as in Rogers's theory of adoption of innovation there will be laggards. Not all teachers will adopt technology as a component in their teaching practice. Incentives should be offered to encourage professional development in the area of technology training to enrich and encourage this as a teaching method.

Implications for Practice

The information provided in this study constitutes a diffusion of training information using a cascading approach to assist in the adoption of the use of technology

by educators in the State. Additionally, the research findings from which these results were drawn are also designed to facilitate the conduct of further analysis into the diffusion and adoption of technology in education.

Educators across the United States need to be included in the effectiveness of this structure of technology training. It is recommended that other States use the teachers-training-teachers model to develop and implement professional development training in the use of technology in their educational institutions.

Secondly, business and industry could benefit from the results of the effectiveness of this model to diffuse information for training in the use of technology, as well as other professional changes that might develop. The implementation of this style of training can serve to break down barriers, such as negative attitudes and fear or discouragement, and can encourage the growth and development of interpersonal relations among peers.

Recommendations for Further Research

The diffusion of innovation in the use of technology in the educational environment necessitates an ongoing

program of assessment. Therefore, the following recommendations are made:

1. Further research should be done using teachers who did not receive training via HB 1815 as participants. It would be interesting to see if they are using the technology at comparable levels to those who had received the professional development training.
2. A study should be based on a longitudinal qualitative analysis with one Master Trainer - using ethnographic research methods that allow for the concentration of context as well as general categories or commonalities by interviewing the trainer, observing the trainer as a trainer and observing the trainer as a teacher.
3. A survey questionnaire should be designed based on the interview schedule of this study. It should be mailed out to a large sample and a quantitative analysis be done on the responses. This type of research would confirm the insights of this study.
4. A follow-up study could be to survey teachers who have received the training to see if they are continuing to use the skills they learned.

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APPENDIXES

APPENDIX A

Telephone Script

The first contact with the participant will be by phone and the script will be as follows:

Researcher: "Hello, my name is Susan Miller. I am a graduate student at Oklahoma State University. I am attempting to reach (name). Are you (name)?"

If the answer is yes - proceed with the script.

If the answer is no - thank them for their time and terminate the call.

"I am contacting you because I am conducting a research study of Career and Technology Educators in the Southeast Quadrant of the state who participated in the Master Training for Technology set up by HB 1815. The district coordinator for this program has given your name to me. I have spoken with your Superintendent and made him aware of my study and my contact with you. Do you, indeed, fit into this category?

(If yes), My purpose in contacting you is to find individuals such as yourself who would be willing to participate in my study. I am hopeful that you will be able to help me and would like to visit with you for a few minutes at your convenience to explain my study and if possible, obtain your commitment to participate.

The purpose of this evaluative study will be to describe the acceptance of the infusion of distance learning technology into the adult classroom. A main concern in this research will be how effective the training was to use the technology that is available to you. This study will be based on Oklahoma HB 1815, which provided funding for a consortium to be established to train educators such as yourself to use technology in the classroom.

I would like to conduct one interview face-to-face with you. The interview would be taped, I would transcribe the tape, and would then allow you to review it and make any necessary changes. All of your answers and your identity will be kept confidential.

In addition, I would like to spend some time observing in your classroom, and conduct a focus group interview with and the other participants in my study. I will come to your school for the interview and observation at a date and time that is convenient for you. The focus group will be conducted at a central location for all participants and at a date and time that we work out to be convenient for all.

I would ask questions such as:

-Tell me about your background in distance education.

-How did you use distance education techniques in your classroom prior to the Master Training Technology Program?

-How were you selected to attend the technology training and become a Master Trainer?

-How do you think other educators are receiving and learning to use this training?

Do you have any questions? Are you willing to participate in my study? If so, let us set a date and time for the interview. If not, thank them for their time and terminate the call."

Second Contact:

If the person has agreed to participate I will meet them at their school on the date we have set.

APPENDIX B

CONSENT FORM

As a follow up to our recent phone conversation, the following is a detailed description of my dissertation study and consent form for you to read and sign as your agreement to participate.

I, _____, hereby authorize or direct Susan Miller, doctoral candidate, Oklahoma State University, or associates or assistants of her choosing to perform the following treatment or procedure.

The study titled Teaching with Technology: A Learner-Focused Tool is a qualitative research analysis using a descriptive case study approach. The purpose of the evaluative study is to describe the acceptance of the infusion of distance learning technology into the adult classroom. A main concern in this research will be how well trained teachers are to use the technology that is available to them.

This study will be based on Oklahoma HB 1815, which provided the funding for the Master Training program that you have attended. The intent of this training was to increase institutional effectiveness and efficiency through the use of telecommunications and distance learning technology. This intervention will explore means for active learner involvement and interaction, in regard to the effectiveness of teaching strategies used. The study will involve interviews, observations, and your involvement in a focus group. The interviews and observations will be conducted at your place of employment and the focus group at a centrally located place for all participants. The interview should not take more than 45 minutes to one hour. The classroom observation may or may not occur on the same day as the interview, and both will be scheduled at your convenience. The focus group will be no longer than one hour in length.

Your participation will be strictly on a voluntary basis, knowing that neither your name nor the name of the school will be used in any of the report writing. A fictitious name will be used for both you and the school. You will not be penalized in any way if you choose not to participate

If you should have any questions or concerns you may secure further explanation by contacting the following people:

- Susan Miller, Project Director, 400 S. Highland, Ada,

OK 74820. Phone: 580-436-4382.

- Dr. Robert Nolan, School of Educational Studies, Willard Hall, Oklahoma State University, Stillwater, OK 74078. Phone: 405-744-9190.
- Sharon Bacher, IRB Executive Secretary, Oklahoma State University, 203 Whitehurst, Stillwater, OK 74078. Phone: 405-744-5700.

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

Date:_____

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

Signed:_____

_____

Signature of person authorized to sign for subject, if required

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

Signed:_____

Project director or authorized representative

APPENDIX C

INTERVIEW FORMAT

NAME_____

AGE_____ GENDER: M_____ F_____

TECHNOLOGY CENTER_____

AREA OF CONCENTRATION_____

1. How long have you been teaching?
2. What educational/subject areas did you teach?
3. How would you describe yourself as a teacher.
4. Tell me about your background in distance education.
5. How did you utilize distance education techniques in your classroom prior to the Master Training Technology Program.
6. How were you selected to attend the technology training and become a Master Trainer?
7. What technology training did you receive in order to become a Master Trainer?
8. What does it mean to be a Master Trainer and what is expected of you now that you are one?
9. Do you have the equipment available to implement the training that you received and how are you currently and/or do you plan to utilize the training in your classroom teaching?
10. Have you changed your instruction as a result of this technology training? How?
11. How do you think that other educators are going to receive and use this training in their classrooms?

12. Is there any additional information that you would like to tell me about the training you received or about the training that you will give to other teachers?

Oklahoma State University
Institutional Review Board

APPENDIX D

Protocol Expires: 1/26/2004

Date : Monday, January 27, 2003 IRB Application No ED0279

Proposal Title: TEACHING WITH TECHNOLOGY: A LEARNER FOCUSED TOOL

Principal Investigator(s) :

Susan V. Miller
400 S. Highland
Ada, OK 74820

Robert Nolan
210 Willard
Stillwater, OK 74078

Reviewed and Processed as: Exempt **Continuation**

Approval Status Recommended by Reviewer(s) : Approved

Signature

Carol Olson, Director of University Research Complian

Monday, January 27, 2003
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

Oklahoma State University
Institutional Review Board

Protocol Expires: 2/11/03

Date: Tuesday, February 12, 2002 IRB Application No ED0279

Proposal Title: TEACHING WITH TECHNOLOGY: A LEARNER FOCUSED TOOL

Principal Investigator(s):

Susan V. Miller
400 S. Highland
Ada, OK 74820

Robert Nolan
210 Willard
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

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

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

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

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

Sincerely,

Carol Olson, Chair
Institutional Review Board

Oklahoma State University
Institutional Review Board

Protocol Expires: 10/15/01

Date : Monday, October 16, 2000 IRB Application No ED0125

Proposal Title: TEACHING WITH TECHNOLOGY: A LEARNER FOCUSED TOOL

Principal Investigator(s) :

Susan V. Miller
400 S. Highland
Ada, OK 74820

Robert Nolan
210 Willard
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s) : Approved

Signature : Carol Olson

Carol Olson, Director of University Research Compliance

Monday, October 16, 2000
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

VITA

Susan V. Miller

Candidate for the Degree of

Doctor of Education

Thesis: THE STUDY OF A STATE INITIATIVE FOR THE DISSEMINATION OF EDUCATIONAL TECHNOLOGY

Major Field: Human Resources and Adult Education

Biographical:

Personal Data: Born in Durant, Oklahoma, on July 25, 1951, the daughter of Mary Lou and Gerald Vegher.

Education: Graduated from Antlers High School, Antlers, Oklahoma in May 1969; received Bachelor of Science Degree in Vocational Home Economics Education and Clothing, Textiles, and Merchandising from Oklahoma State University in December of 1974; received a Master of Science Degree in Family Relations and Child Development from Oklahoma State University in August of 1994. Completed the requirements for the Doctor of Education degree with a major in Human Resources and Adult Education in December of 2003.

Experience: Employed by the Texas Agricultural Extension Service as a County Home Economist and 4-H Agent in San Jacinto County, Texas; taught Family and Consumer Sciences at Ada Junior High in Ada, Oklahoma; currently am an Assistant Professor in Family and Consumer Sciences at East Central University in Ada, Oklahoma.

Professional Memberships: Oklahoma Association of Family and Consumer Sciences, American Association of Family and Consumer Sciences.