A STUDY OF INDUSTRIAL AND TECHNICAL TEACHER EDUCATION FACULTY ACCEPTANCE OF DISTANCE LEARNING TECHNOLOGY

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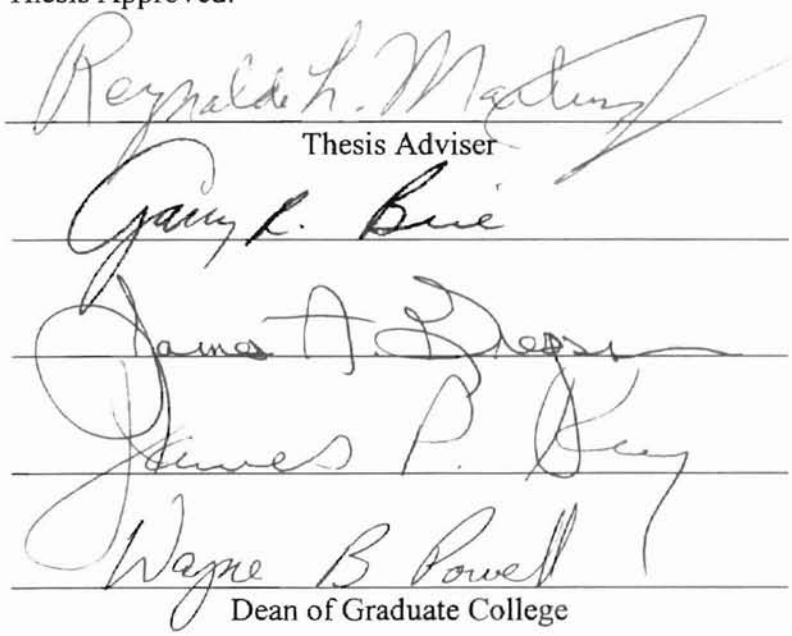

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CHAPTER I

INTRODUCTION

The influence of technology on teaching and learning is becoming more and more evident in educational institutions. "Though many technologies exist today, their impact in educational institutions has not been as extensive as was often predicted in the past" (Spotts & Bowman, 1995, p.57). The role of technology in education has not been totally defined nor has it been widely accepted by educators. Further, as with many innovations, accepting and understanding new methods usually takes more time than the actual acquisition of skills and knowledge (Bitter & Yohe, 1989).

Distance learning technologies are among the various technologies that are available to educational institutions. Therefore, institutions, faculty and students need to take advantage of the distance learning technologies available to them for teaching and learning. However, it is important to recognize that these technologies are not themselves solutions, but simply create a greater range of opportunities for teaching and learning (DiPaolo, 1996).

Distance learning refers to the teaching and learning situation in which the instructor and learner are engaging in interactive instructional settings when they are separated geographically by time and place (Mizell et al., 1995; Keegan, 1983; Sewart, 1982). Distance learning takes advantage of currently available technologies to

achieve two main objectives of teaching and learning: 1) providing equitable access to quality education, and 2) meeting the unique learning needs and styles of individuals (Barron, 1994). Both the instructor and student rely on electronic devices and print materials to deliver and or receive instruction. Although technological innovations and rapid growth in the telecommunications' industries have made distance learning no longer "distant" (Garg, 1996), it is important to explore the extent to which different distance learning technologies used for delivering instruction are accepted by their users, mainly instructors.

Early research in distance learning centered on media comparison, but other attributes that may contribute to enhancing learning are equally important (Solomon, Perkins, and Globerson, 1991). Researchers have also examined issues that have been of particular interest to administrators of distance education programs such as dropout rate, appropriateness of certain technologies used for delivery, student's performance, and cost effectiveness of the various technologies used (Jeffries, 1996). Distance learning relies heavily on technology for the delivery of instruction. This means that instructors should be willing to accept and use the technology effectively if their teaching is to be effective. However, this situation has not been clearly examined. As Beaudoin (1990) and Dillon and Walsh (1992) contend, faculties, the persons responsible for program design and delivery, have been largely neglected by distance education research. It is important to understand how faculty or instructors react to using distance education technologies because their attitudes toward these technologies have an impact on the effectiveness of their instruction.

Typical technologies used for distance learning include 1) satellite delivery,

television broadcast, compressed video, computer conferencing, multimedia, audio conferencing, radio, and videotapes. Among these technologies, video system technologies such as fiber- optic, satellite, and compressed video have proved to be effective distance learning delivery modes (Worley, 1991). These technologies enable live, one-way or two-way auditory and visual signals to be transmitted. The two-way interaction has improved the teacher-student interaction that was lacking in some distance teaching technologies, such as radio broadcast, print and the use of telephone. However, the effectiveness of live interactive distance learning technology was not a guarantee that faculty would embrace it nor use it successfully. Instructors have not adapted to distance technologies as needed largely due to instructor and institutional factors (Brock, 1987; Olcott, 1996).

According to Farr, et al. (1992), faculty members designated as distance education instructors typically lack the knowledge and expertise to adapt their courses successfully to distance delivery. This could be as a result of the lack of training to use the technology. Beaudoin, (1990) predicted that teachers accustomed to more conventional teaching modes would have to acquire new skills to assume expanded roles to teach not only distance learners but also to organize instructional resources suitable in content and format for individual study. Knupfer, (1992) contended that no matter the experience of faculty members at teaching traditional classes, they quickly found that there was a difference with a distance learning class.

A survey of nineteen vocational teacher education programs that used one and two-way audio/video, the internet and fax, indicated the need for enhancing personal relationships and for integrating a variety of technologies in distance learning (Martinez

& Sweger, 1996). Nevertheless, the growing interest and effectiveness of video system technologies for delivery of distance instruction presented a justified reason to investigate the level of faculty acceptance and challenges that could be associated with the use of the technology.

The Problem

Different types of distance learning technologies have been used to deliver instruction at remote sites, and studies have shown that students' achievements in a distance class were comparable to or better than students' achievements in a face-to-face class (Ritchie & Newby, 1989; Magiera, 1994; Weingand, 1984). However, acceptance of distance technology is not automatic; much skepticism still remains in spite of its effectiveness (Holt, 1992). One interesting question is how well these learning technologies are accepted by faculty.

A study of faculty attitude toward the implementation of interactive television and computer-mediated conferences as a distance education media concluded that there was faculty resistance to distance education technology (Larison, 1995). Several studies have concluded that the greatest challenges to implementing wide spread distance learning programs were those faculty members who were uncomfortable with distance education and reluctant to embrace it (Parrott, 1995; Swalec, 1993; Farr, Murphy & Flat, 1992; Dillon & Walsh, 1992).

The problem is, that evidence suggests that faculty resist the use of distance learning technology. We cannot develop strategies to overcome the resistance because the reasons for faculty willingness or unwillingness to use the technologies are not

clearly understood. The resistance to the use of distance learning technology is a problem that prohibits some faculty and institutions of the great opportunity distance learning technology can provide to their students, institution, and to the instructors themselves (Pelton 1990; Martin & Samels, 1995).

Considering the present innovations in the telecommunications industry, the role of technology will continue to expand, especially in the 21st century. Furthermore, changes in student demographics and a new emphasis on worker training and retraining, coupled with increasing public appreciation for lifelong learning have placed new curricular and organizational demands on colleges and universities to use technology for teaching and learning (Berge, 1996; Sayers, 1996). There is no doubt that the 21st century classroom will also change. Students will decide where and how they want to learn. Faculties will take much of the responsibility in providing instruction to students at different locations and with different needs and schedules.

Purpose of the Study

The primary purpose of the study is to identify the variables or factors that contributed to faculty willingness or unwillingness to use interactive distance learning technologies in industrial and technical teacher education programs. Secondly, the study will also investigate whether the characteristics of the theory of diffusion adoption of innovation (Rogers, 1995), and other factors that influenced faculty utilization or resistance to distance learning technologies were similar between users and non users of distance learning technology. Thirdly, the study will attempt to describe efforts made by

industrial and technical education institutions to encourage faculty to use distance learning technologies.

Finally, based on the findings, recommendations for professional and staff development activities in the area of distance learning technology acceptance and utilization will be made. Recommendations will also be made to institutions on ways that faculty can be encouraged to accept distance learning technology for delivery of instruction.

Research Questions

The following research questions will be answered in this study:

1. To what extent is distance learning technology utilized by industrial and technical teacher education faculty?

2. What are the problems encountered by industrial and technical teacher education faculty in using distance learning technology for delivery of instruction?

3. What are the reasons for the willingness of some faculty to use or embrace distance learning technology for delivery of distance instruction?

4. What are the reasons for the unwillingness of some faculty to use distance learning technology for the delivery of instruction?

5. To what extend are variables similar between users and non-users of distance learning technologies?

6. What have institutions that offer industrial and technical teacher education programs done to encourage faculty to use distance learning technology and to overcome resistance?

Definition of Terms

Compressed Video: a digital technology compression system that move compressed video signals through standard telephone lines. Compression also increases the number of programs that can be carried without increasing the capacity of transmission system (USDLA, 1996).

Compression: a process for reducing the amount of visual information sent in a signal by only transmitting changes in action (Touchstone, 1996).

Codec (Coder/Decoder): a device used to convert analog signals to digital signals for transmission and reconvert signals upon reception at the remote site allowing for the signal to be compressed for less expensive transmission (Touchstone, 1996).

Digital: an electrical signal that varies in discrete steps in voltage, frequency, location, et cetera. Digital signals can be transmitted faster and more accurately than analog signals (Touchstone, 1996).

Distance Learning: an educational system that involves students and faculty engaged in interactive instructional settings when they are at different locations (Mizell, et al. 1995).

Fiber Optic: a technology that use light waves sent through thin glass of strands, fiber optic technology can move voice, video and data information digitally using a fraction of space and energy required by conventional copper cable (USDLA, 1996). It also permits the instructors to send different kinds of materials--including multimedia presentations—to receiving sites (Portway & Lane, 1994).

Satellite: the most commonly used distance learning technology, satellite transmission is primarily "one-way" but a variety of telephone and similar technologies can make satellite programming interactive by adding two-way audio to a one way video signal (USDLA, 1998).

UCVE: University Council for Vocational Education, is a non profit organization representing the nation's leading universities in vocational education. The council provides leadership for teaching, research, and service initiatives in vocational and technical education (UCVE, 1997).

ADEC: a national consortium of state universities and land grant institutions that provides high quality and economical distance education programs and services via the latest, most appropriate information technologies (ADEC, 1998).

NAITTE and CTTE DIRECTORY: is the National Association of Industrial and Technical Teacher Educators and The Council on Technology Education (NAITTE Handbook, 1997/98).

Telecommunication: a type of information transport that uses wire, radio, optical, or electromagnetic channels to transmit signals for voice or data communication using electrical means.

Assumptions

The study was undertaking with the following assumptions:

1. All faculties that participated in the study had a vocational and industrial technical background.

2. The institutions selected for the study used one or more of the distance learning technologies.

3. Distance learning technologies will become increasingly more important in the future.

Scope of the Study

The study was targeted to twenty universities that offered distance learning in industrial technical teacher education programs and used one or more of the distance learning technologies available in their institution for the delivery of instruction. The Universities were as follows: California State University at Long Beach, The University of Georgia, Valdosa State University, University of Wisconsin-Stout Campus at Menomine, The University of Tennessee, Northern Arizona University, Virginia Polytechnic Institute and State University, The Ohio State University, Kent State University, Idaho State University, Oklahoma State University, University of Missouri at Columbia, Louisiana State University, The Pennsylvania State University, University of Central Florida, University of Illinois- Champaign, Colorado State University, Texas A&M University, University of Arkansas, and University of Nebraska at Lincoln (Martinez, & Sweger, 1996; UCVE, 1996; NAITTE & CTTE, 1997/98; ADEC, 1998).

Significance of the Study

The significance of the study cannot be over emphasized at a time when the population of non-traditional students is increasing on virtually all campuses. Higher education is experiencing a dramatic shift, notably a move toward lifelong learning, as a

result of the need to retrain individuals whose skills are no longer marketable (Portray & Lane, 1994). Additionally, Berryman and Bailey (1992) noted that the changing workplace diminishes the effectiveness of traditionally delivered education. More students can be easily reached through distance learning.

In the area of reforming education, leaders of business and industries have called for a more intelligent work force, a work force that is better able to adapt to different work situation, work in teams and solve complex problem (SCANS, 1991). Distance learning is uniquely able to achieve some aspects of improved learning by connecting school learning and application in the work place (Council of Chief State School Officer, 1995).

Because the subjects for this study are in industrial technical teacher education programs, it will shed more light on the level of acceptance and utilization of distance learning technologies. The use of technology for teaching and learning is needed not only in teacher education reform but also in preparation. It is evident in our schools today that some vocational teachers received no formal preparation as teachers before beginning their careers but were employed because of their extensive occupational experience (Lynch, 1996). Prospective, practicing, and uncertified teachers need more accessible training programs especially in rural areas (Ludlow, 1994). Distance learning programs can provide the necessary teaching skills and knowledge these teachers need to be effective.

The integration of vocational and academic education, currently being undertaken as part of a reform program for vocational education, requires all teachers to have sound knowledge of the process of integration. This knowledge will require

practicing teachers who have little or no knowledge of integration to take a full college course on integration of academic and vocational courses. However, in-service training that has been used very often to train teachers has been criticized as being largely ineffective, lacking in substance, and often not providing the theoretical applications that are necessary to initiate and sustain changes (Lynch, 1996). Distance learning can provide instruction to these classes of teachers without their having to leave their jobs and be on campus.

In response to the wave of calls for reforming teacher preparation (Lynch, 1996), faculty acceptance of distance learning technology will go a long way to providing, not only vocational teachers but also practicing teachers with the knowledge base they need to carry out their teaching responsibilities successfully while on the job. This means that practicing teachers do not have to be physically on campus to receive the instruction in courses they will need.

Enrollments in recent times have been on the decline in vocational teacher education. The use of distance technology may be one way to ease access to vocational teacher education, boost declining enrollment and expand opportunities for teachers (Martinez & Sweger, 1996). "It is increasingly likely that college professors will be responsible for teaching in a distance education program" (Wolcott, 1995, p. 39). This is especially necessary for professors of vocational technical teacher education programs that are needed to provide the knowledge base that practicing and prospective teachers would require to carry out the educational reform, such as the integration of academic and vocational education in the current school-to-work initiative.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Distance learning, as it is often called these days, is not a new concept. In the late 1800s at the University of Chicago, the first major correspondence program in the United States was established in which the student or learner and the teacher were at different locations. However the most effective form of education in those days was to bring students together in one place to learn. This form of traditional education remains the dominant method of learning today (McIsaac & Gunwardena, 1996). The development of new technologies had promoted a rapid growth in distance learning, both in the number of students enrolling and in the number of institutions offering programs (Garison, 1990). While the application of modern technology may glamorize distance education, literature surrounding this field reveals a conceptually fragmented framework lacking in both theoretical foundation and programmatic research. Without a strong base in theory and research, this field has struggled for recognition by the traditional academic community (McIsaac & Gunawardena, 1996).

Technology-based distance learning is an expanding new trend in the delivery of instruction in higher education and business. Additionally, corporations, colleges and universities found that technology enabled dissemination of knowledge and information

to students regardless of age, interest, and culture (Miller, 1992). Thus colleges need to examine internal institutional policies and procedures to make them more flexible and responsive to the needs of their students. Furthermore, institutions that place high value on services designed to enhance students' success and to meet community and lifestyle needs will become models for other institutions of higher education (Burnett, 1996).

This study investigates faculty resistance to the use of distance learning technology for the delivery of instruction. Although much of the literature on distance learning discusses the importance of faculty, this group has been largely ignored by the research (Beaudoin, 1990). This is not to say that problems do not exist, but rather that research has focused more on learner outcomes, learner characteristics, and learner attitudes (Dillon & Walsh, 1992). If meaningful improvements in learning and teaching are to be achieved, it is important to conduct research on faculty as well as research conducted on the learner. This is necessary because the view of the learner has a strong implication for the role of the faculty as instructor (Miller, 1996). The instructor should be effective in using whatever medium of instruction to impact student learning.

A portion of this study reviews literature related to distance learning and barriers to the use of the technology. This includes: the theory of diffusion adoption of innovation, characteristics of innovation, the importance of distance learning for the delivery of instruction, students' performance and quality of distance learning, distance learning technologies used for delivery of instruction, faculty attitudes and skills needed to utilize distance learning technologies for delivery of instruction, and the barriers to the use of distance learning technology for delivery of instruction.

Theoretical Background

Diffusion Adoption Theory: The Characteristics of Innovation

The use of distance learning technology is new to many institutions, faculty and students. Innovation perceived as new creates uncertainty and resistance by those affected by the innovation (Rogers, 1995). An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 1995) Furthermore, newness in an innovation does not just involve new knowledge; someone may have known about an innovation for some time but not yet developed a favorable or unfavorable attitude toward it, nor have adopted or rejected it. Distance learning and other technology have been around for some time, but some faculty have yet to develop a favorable attitude towards using the technology or entirely to reject it. People do not adopt an innovation at the same time (Rogers, 1995). The theory of diffusion adoption of innovation suggests that the characteristics of an innovation affect the subsequent degree and rate of adoption. These characteristics are the following.

Relative Advantage of Innovation

This is the degree to which an innovation is perceived as better than the idea it superseded or replaced. The degree of relative advantage might be measured in economic terms, and might be expressed as increased productivity, yielding high economic profitability, or the gain of social status. Also, convenience and satisfaction are important factors. It does not matter so much if an innovation has a great deal of

objective advantage, but rather what did matters is whether the individual perceives the innovation as advantageous. It is true that faculty have different perceptions about distance learning and technology (Reilly & Gullier, 1992).

Compatibility

Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of the potential adopter. Innovation must be compatible with deeply embedded cultural values and with previously adopted ideas; innovation that is incompatible with norms and values of a particular group will not be adopted. Therefore the adoption of innovation requires the prior adoption of a new value system. The question could then be asked if faculty are ready to change their value system.

Complexity

Complexity is the degree to which an innovation is perceived as difficult to understand and use. While some innovations are readily understood, others are more complicated and would be adopted more slowly. New ideas that are simpler to understand are adopted more rapidly than innovations that require the adopter to develop new skills and understandings. Triability reduces the risk and allows reversion to occur such as returning to the status quo if innovation does not prove satisfactory.

Triability of Innovations

Triability of innovation is the degree to which an innovation might be experimented with, on a limited basis. New ideas that can be tried will generally be adopted more quickly than innovations that can not. This is so, because an innovation that is triable, represents less uncertainty to the individual who is considering it for adoption.

Observability

Observability occurs when the result of the innovation are visible The easier it is for individuals to see the result of an innovation, the more likely they are to adopt it. Such visibility stimulates discussion of new ideas and subsequent adoption.

Innovations that are perceived by individuals as having greater relative advantage, as consistent with existing values and past experiences, and are less complex to adopt, can be tested on a pilot basis, and results that are clearly visible would be adopted. Roger's diffusion theory indicates that these qualities were important characteristics for adoption of innovation.

The Importance of Distance Learning

It has often been assumed that all distance learning programs are geared toward students. However, in the past few years, several distance learning programs have emerged for all types of educators, including teachers and administrators (Schiller, 1993). The use of technology-based delivery systems, for delivery of instruction has many potential benefits to both institutions and students. In today's society, attending

college is difficult for some adults because of geographic location, work schedules and personal responsibilities (Newman, 1997). To make these situations of more concern to adults, employers are demanding workers with more education (Lynch, 1996). This means that adults must continue to seek more education in order to keep up with employers' demands. Similarly, higher education is experiencing a dramatic shift toward life-long learning as a result of the need to improve their workers skills that are no longer marketable (Portway & Lane, 1994). The evidence of this is seen in the changing demographics of students in higher education. The National Center for Education Statistics reported that, between 1980 and 1990 the enrollment of students under the age of twenty-five, increased by twenty percent while enrollment for older adults during the same period climbed thirty-two percent in 1992. In addition, part-time students accounted for over forty percent of total enrollments (Sayers, 1996). The primary factors calling for change in the structure of higher education that could lead to emphasis on distance learning were the shifting trends in the student population (Sayers, 1996), and the increasing demands for continuing adult education and training (Bruce & Shade, 1995). These issues are not peculiar to developed countries, but parallel some of the reasons for distance education in developing countries. Developing countries are faced with shortages of trained teachers and equipment, raising cost of education, restricted educational opportunities, especially in remote and rural areas, concentration of facilities in cities, and the constraints of job and family life (Bobb-Semple, 1997). Globally, the quest for additional tools to support the traditional method of delivering instruction will continue. In the United States a "Virtual University" set to begin operation in the early part of 1998, was organized by fifteen western states and Guam

and is called the Western Governors University (WGU). The University will offer competency-based degrees and certificates via the internet, electronic mail, computer software, video or satellite. The idea is to make degrees and certificate courses available to more students regardless of their location. It will also serve educators in different states, ranging from universities to corporations that offer skill training (Hettinger, 1997)

A UCLA study cited by Pelton (1990), concluded that by the year 2010, fifty percent of the instruction in the United States will be mediated education. A justifiable question can then be asked whether higher education is ready to move into the future by joining the expanding capabilities and services of the telecommunication industry with the demands of a growing number of nontraditional students. Distance learning has given the opportunity for non-traditional learners to make a choice where learning will take place, at what time, and what they will study (Perrin, 1996). That is to say, students can design their schedule to fit their personal needs and choose a course from numerous available options. Distance learning also serves as a bridge to accessing education and that makes equity of educational opportunities one of its most obvious advantages (Wood, 1995).

Increased enrollment has always been a source of funds for institutions. Educators has argued that colleges and universities that overlook the potential of new technology for development of distance learning programs might find themselves losing money and students to other institutions and corporate competitors (Martin & Samels, 1995). Institutions that offer distance learning provide more course offerings by delivering instruction to remote sites or places where teachers in a particular subject

matter are not available. Similarly, the use of distance learning technology permitted the delivery of courses that might not have been offered due to limited or fluctuating enrollment on campus and decreasing budgets (Glaser, 1993).

Distance learning technology could be used for the purpose of education reform. The report "A Nation at Risk" (1983) among its findings found out that textbooks remained the basic unit of instruction. Teachers used "chalk and talk" to convey information, and only a few teachers had access to interactive technology because schools adopted and practiced new technology slowly in spite of the numerous advantages associated with it. What did matter was whether faculty perceived the use of distance technology as advantageous, or "relative advantage" (Rogers, 1995). The tools of telecommunication and distance learning, including broadcast, cable, satellite, computers and telephone networks, have a vital role to play in education reform and in meeting the needs of all learners. New digital interactive systems have significantly influenced teaching and learning and these technologies serve all learners regardless of age, disability, or language (Council of Chief State School Officer, 1995).

For meaningful education reform to take place, educators stress the need for all teachers to be certified. In Industrial and Technical education for example the alternative certification process allow uncertified teachers with satisfactory occupational experience to teach (Lynch, 1996). The use of distance learning would eliminate this problem. Teachers could enroll in college courses to be certified without having to leave their job. Distance learning is able to uniquely achieve some aspect of improved learning including opportunities to connect school learning to application in the workplace by electronically linking the school and workplace (Council of Chief State

School Officer, 1995). This is important in the present school-to-work movement. Students and teachers do not have to be at a workplace physically, but may remain in their schools and receive up-to-date information and demonstrations.

In-service and professional development activities are important parts of teacher retraining. Prospective and practicing teachers needed more accessible training especially those in remote rural locations (Ludlow, 1994). This is crucial in upgrading the knowledge-base of teachers if they are to be effective in their jobs. Distance learning technology has provided in-service to teachers at their schools (Baker & Dickson, 1993; Jefferies, 1989). This training upgrades the knowledge base of teachers, especially those enrolled in college courses. The current School-to-Work initiative demands industrial and technical education teachers be able to integrate academic and vocational education courses. Distance learning can be an effective medium to teach the concept of integration to practicing teachers while still at their place of work. Teachers need to work together to achieve success in integration. Distance learning technologies can increase collegial discussion among teachers at distant or remote sites. They can discuss how they plan their lessons, share ideas and strategies, and participate in cooperative research (Glaser, 1993). The technology can allow for specialized programs to be designed to meet the needs of diverse students including gifted and talented, hospitalized, homebound, special education students, and older learners, thus expanding education within the reach of special groups (Glaser, 1993). Furthermore, the use of distance learning technology permit students to encounter people from all parts of the world, to share ideas, to learned from each other and develop appreciation for cultural diversity.

Students' Performance and Quality of Distance Learning

Users of interactive media are faced with challenges such as the inability to stimulate human interaction as in a face-to-face classroom setting and to adapt to undefined needs and characteristics of students (Schwier, 1994; Martinez & Sweger, 1996). Several studies have compared students' performance in a face-to-face classroom and in a distance classroom to see if significant differences occurred in terms of performance and quality of distance learning. Quality is traditionally defined by customer expectation and needs. (Hrydziuszko, 1996). Quality is not measured by the number recruited, the dropout rate, or the number graduating. These are performance indicators but do not necessarily measure quality. Quality in distance learning comes from the commitment of all involved, students, academics, and administrative staff (Black, 1995). Taking a cue from business, Black asserts that the way to achieve quality is to listen to the customers and give them what they want to a certain extent. Therefore the student experience with the learning process is the key to quality in distance learning and is the product of the commitment of all involved.

A study of student perception in a two-way interactive video class indicated that an overwhelming majority of the students gave a favorable response to the type of medium used. The students also adjusted to the setting with little or no effect on their academic performance, attendance, motivation, or answering and asking questions. The students were also satisfied with the distance teaching (Bozik, 1996; Applin et al., 1996).

Similarly, a study of graduate students' perception of the effectiveness and comfort level of a two-way audio-video distance learning, found out that there were relationships between graduate students level of comfort with the delivery system. However, there was no significant difference in the students' rating of the effectiveness of the delivery system before and after the learning session (Bangpipob, 1995).

Comparing the achievement of face-to-face classroom students and students taught at a distance as measured by test scores, grades, and retention, has been a line research going back more than fifty years. The usual findings in these studies have been that, there was no significant difference between learning in the two different classrooms, regardless of the nature of the content, medium or educational level of the learners (Russell, 1998).

A study compared the performance of students in a remote site with that of students in a face-to-face classroom using compressed video to deliver instruction over a period of one semester. Results indicated that students' performance at the remote site was comparable to that of the face-to-face classroom students (Magiera, 1994). Also compressed video was used to teach a personal investment course to students at different locations. The students at the sending site were linked to students at two other remote sites. A pre-test, post-test analysis indicated that students at the remote sites experienced learning comparable to that of students at the sending site (Magiera, 1995).

In an effort to compare students' achievement in an interactive television classroom, a study sought to determine if there were differences in math achievement of students taught in an ITV class setting with the instructor present, students receiving instruction via television at a remote site, and students who were taught in a traditional

classroom setting. Results of the study showed no significant difference in achievement among the three groups. There was also no difference in students' attitudes towards enrolling in future ITV courses. The study concluded that interactive television should be considered as an adequate method of providing instruction beyond the campus (Hodge, 1995).

A study sought to determine the effectiveness of interactive televised teaching by examining the performance of students on campus and at two other remote locations. Two groups had access to two-way audio and video while the third group had access to one-way video and two-way audio. Results based on course grades, showed no significant difference among the three groups (Nixon, 1990).

A study was conducted in a teacher training program where computer-based distance learning was used to deliver instruction to on- campus students and to off-campus students. The results indicated that in overall performance, no significant difference was revealed on total scores for the entire course between the groups (Cheng, 1990). In a video-based distance learning graduate program that used one-way audio and video broadcast via satellite, Obermire (1991) compared the performance of students on campus and students at a remote location. The study concluded no significant difference in performance between the two groups.

The effectiveness of traditional versus satellite delivery in three management technology master's degree programs was determined by comparing students' performance. Fifty-seven master's degree students participated in three separate degree programs taught by the same instructor. Achievement was measured by exams, term papers and assignments. The findings showed that students taking the course by

satellite performed as well as or better than traditional face-to-face classroom learners. Thus, the study also added to the evidence that distance learners should not be viewed as disadvantaged (Souder, 1993). It was clear that using distance technology to teach a class could be as effective as traditional teaching. Instructors should see the effectiveness of the technology and students' performance as an encouragement to adopt the technology.

Distance Learning Technology Used for Delivery of Instruction

Among the most discussed, the least understood and fastest growing area of technological change in higher education is distance learning (Samels & Martin, 1995). Telecommunication technology help universities overcome the constraints that time, geographic location, and costs used to placed on acquiring and disseminating knowledge of different kinds to a wider variety of users. Further, the digitization of all forms of telecommunication, and the lowering of costs means these constraints will become even less important (Commission on Information Technology, 1996). New types of technology are involved in distance delivery. However, two primary forms of communication are used to deliver instruction: synchronous and asynchronous. The main distinction between the two forms is whether teachers and learners are participating at the same time or not (Parrott, 1995). Asynchronous or on-demand education was of critical interest due to the convergence of three trends in education. First, higher and continuing education has become and will continue to become increasingly important for occupational and personal success. Secondly, increasing

demographic and occupational diversity is rendering many long-held assumptions about the education process obsolete and is in turn, creating increasing pressure for alternative means of education. Thirdly, education has become increasingly expensive, which makes institutions look for alternative and cost-effective means of delivering instruction (DiPaolo, 1996). As the scope of distance learning expands, institutions are using a variety of live interactive distance learning technologies, some of which are: Compressed Video, Fiber Optic and Satellite delivery.

Satellite Delivery

This delivery system is the most commonly used distance learning technology and the technology through which the greatest volume of educational programming is available. Satellite transmission is primarily a "one-way audio and video" technology; however, a variety of telephone and similar technology can make satellite programming interactive by adding two-way audio to the one-way video signal. Satellite serves as a relay system to broadcast video, audio, and data signals over an extremely large area. These signals can not be directly received using a television, radio, computer or other user interface device; their reception requires a downlink antenna dish aimed at the satellite. The signal is received by the dish and transmitted by wire or broadcast to the user (USDLA, 1996; Jones & Simonson, 1996). Satellite deliveries are currently being used in education at all levels to deliver voice, video, and data signals. For video-based interactive, distance learning services, satellite delivery is often used because it can be received at any geographic location. Satellite distribution of distance learning services allows for programs to be received live directly from the provider. This capability has

expanded the potential economy of producing and delivering the programming (Council of Chief State School Officer, 1995).

Compressed Video

A compressed video system transmits live video and audio simultaneously over special telephone lines called an integrated services digital network (ISDN). Video compression technology provided for two-way, live audio and video interaction between the instructor and students at remote sites. An encoder/decoder (Codec) and a camera must be present at each location. Existing digital telephone lines are used as the medium of transmission. The technology reduces the amount of information in a video signal so that it can be transmitted over standard digital telephone circuits (Kolomeychuk & Peltz, 1992). The use of compressed video has overcome geographic barriers, and effective partnerships among educators, government, and communities has been formed by linking remote locations (Bruce & Shade, 1995). Compressed video has been deemed a satisfactory transmission method. Overall it is the least expensive to install and was a viable solution no matter the distance (Jones & Simonson, 1996).

Fiber-Optic

The fiber-optic is one of the newest two-way, interactive technologies. It can move voice and data information digitally using a fraction of the space and energy required by conventional copper cable. The major components of the fiber optic systems are 1) the multiplexor, which converts the signal to an electrical signal, 2) the Codec, which changes the signal to a digital signal and 3) the optical transmitter,

converts the signal to an optical signal, 4) the receiver, reconverted the optical signal. and 5) the repeater, amplified the signal to extend transmission distances (Jones & Simonson, 1996). A The fiber optic system has the advantages of allowing audio, video and data to be combined on one line, resulting in a lower cost per channel. It also permits full motion video transmissions. However a major disadvantage of the system is, high start-up costs.

The benefits of distance learning look very attractive if the cost of using technology to deliver instruction is compared to the cost of an in-service training in terms of paying for items such as the training location, the tutors, fees, travel and cost for teachers (Gardner & McNally, 1995). Educational applications of interactive satellite delivery have been found to be cost-effective for the delivery of distance instruction to in-service teachers (Barker & Dickson, 1993). On a general basis, distance learning has proved to be a cost-effective and timely approach to staff development (Schiller, 1993). It affords a viable, profitable, and cost effective means of providing higher education to those in need by bringing the classroom within the reach of the students (Newman, 1997).

Faculty Attitude, Knowledge and Skills Needed to Utilize Distance Learning Technology for the Delivery of Instruction

Distance teaching is similar in many respects to conventional face-to-face teaching but one thing is obvious, faculty need to take on new challenges. These challenges might be perceived as non-existent for those who have not taught a distance

class. Those who use technologically-mediated types instruction find using distance technology to have unique challenges. Although teachers who function and teach well in technologically mediated courses use some of the same skills, techniques, and materials appropriate for traditional instruction, the physical and psychological differences require teachers to modify their teaching techniques (Moore & Thompson, 1996). Knupfer (1992) agreed that faculty who teach traditionally, found that there was a difference in teaching a distance class. Nevertheless, some faculty members seemed to prepare lessons for a distance class in the same way they did for on-campus instruction. Although they realized that the students were not all in the same room, they did not realize that the lessons needed to be restructured. Faculty members also faced a difficult transition, having for the most part, been used to developing and delivering courses by themselves; often they had to work as a member of a team. Additionally their teaching was more open to inspection (Berge, 1996). This situation may certainly make some faculty uncomfortable with the entire process of development and delivery of instruction.

The acceptance of distance learning is seldom automatic (Willis, 1994). This resistance was largely due to lack of knowledge and the skills needed to use distance technology and teach a distance class. However most college professors will likely be participating in teaching a distance education program (Wolcott, 1995). To be able to teach a distance class, faculty need to have good communication skills, choose a delivery mode based on the students needs, develop a plan for instructional strategy, spend more time organizing and planning, and work with instructional designers and technical experts (Knupfer, 1992). Additionally faculty need the ability to coordinate

group activities, and a willingness and ability to work as a team member in planning and using technology (Chute, Balthazar, & Poston, 1988).

Training is an important factor in technology utilization. Teaching a class on "TV" for example, the instructor must adapt to being on camera and dealing with the necessary equipment. He or she must be well prepared and organized and might have to learn new teaching strategies (Magiera, 1994). Teachers using distance learning have had to find new ways to structure student-teacher interaction because old styles of teaching are not appropriate nor effective. In distance teaching, it is not safe to assume that a teacher who is good at teaching in a face-to-face setting, is equally good at teaching in a distance setting, nor is it safe to automatically apply preferred face-to-face techniques (Baker, 1996).

> Distance learning means change in the way teaching styles and delivery systems are utilized. Usually, the distance learning teacher has had a number of years of teaching in the traditional classroom and to switch to a distance learning classroom means dramatic changes in teaching styles (Bialac & Morse, 1996).

Distance teachers must adapt to an instructional environment for which customary instructional practice might be inadequate (Wolcott, 1995). Training can improve faculty skills on using distance technology and teaching a distance class. If professors are trained in the effective use of the interactive technology and delivery of instruction, they might not be so resistant to using the technology (Garland and Loranger, 1996).

A study of the impact of an interactive distance learning network on classroom communication, revealed that instructors who used a sense of humor in dealing with technical nuances, and used a relaxed interpersonal style focusing on the interaction that

involved students directly in the course content, were perceived as more successful on the network (Comeaux, 1995). These skills are not easily achieved without training.

A major problem of adaptation involves the lack of visual cues one is accustomed to receiving through subtle body language and facial expression. In compressed video, for example, images might lack clarity, and be jerky in their movement, and many student messages sent by body language may be difficult to understand. Thus, the instructor might lecture on and on, not observing the expression of existential despair and perplexity on the faces of learners who have become confused or sidetracked. This problem can be easily solved by having the technician in the remote classroom zoom in on individual student's faces to provide better feedback to the instructor (West, 1994).

A study that used the Delphi technique to gather experts' opinions concerning the most important knowledge and skills in the distance learning setting, reported the following knowledge as being highly rated: subject matter knowledge, strategies for fostering student interaction, and strategies for using technology. The most highly rated skills were communication, listening, and questioning skills (Furiga, 1996). Also Houdek (1990) suggested that the instructor's qualifications should include good writing skills, content knowledge, flexibility, enthusiasm for teaching, the ability to anticipate problems and to provide solutions at distance, and be a commitment to distance program policies and procedures.

Barriers to the Use of Distance Learning

Different types of distance learning technologies are used to deliver instruction at remote sites. How these technologies are accepted by faculty needs to be understood. Despite the growing popularity of distance learning, it is still a relatively untapped resource with enormous potential to improve learning opportunities across the education spectrum (Council of Chief State School Officer, 1995). Studies have shown that faculty who are uncomfortable with distance learning were often reluctant to teach a distance class (Parrot 1995; Farr et al. 1992). A similar study that investigated the attitudes, beliefs, and intentions of college faculty regarding use of interactive television for distance teaching concluded that the level of comfort with technology in general is an important factor in the use of distance learning technology (Freberg, et al. 1995).

Some faculty regard distance teaching as a threat to traditional faculty roles and classroom enrollment, while others doubt the comparable quality of distance teaching to the more familiar classroom teaching (Reilly & Gullier, 1992). Optimizing the use of information technology requires faculty to change what they clearly prefer to leave untouched. It clearly challenges a faculty member's definition of autonomy, which dictates that a professor can individually decide what, when, and where he or she will teach (Massy & Zemsky, 1996). Rogers (1995) asserted that compatibility was an important characteristic of adoption of innovation because a new idea that was incompatible with existing values and norms was bound to be rejected. Lack of change in attitude could often result in resistance to new idea. Faculty resistance to distance learning has often been cited as a major barrier to the implementation of distance education programs (Dillon & Walsh, 1992). Brock (1987) concluded that negative

faculty attitude, ranging from apathy to open antagonism, remains the major barrier to implementation of distance learning. Overall, faculty resistance to instructional technology is the primary barrier to the continued growth of distance learning programs (McNeil, 1990; Swalec, 1993; Gunawardena, 1990). Other factors include resistance to change, selecting and training quality teachers, "technophobia," and the negative attitude of faculty (Swan & Brehmer, 1992).

A study that sought to identify barriers to the use of distance learning and individual learner technology, found that seventy-five percent of respondents were not familiar or only somewhat familiar with the distance learning technologies. It was also found that eighty-one percent of the respondents were not familiar or only somewhat familiar with individual learner technologies. Thus the majority of the respondents were at the first stage of the innovation process which Rogers (1995) described as the knowledge stage. Consequently, the lack of knowledge was a significant barrier to the adoption of technology (Derr, 1991). Additionally, lack of competence in the use of electronic technology, appropriate teaching methodologies, and the competence in producing instructional materials, resulted in negative attitude toward distance teaching (Murphy & Terry, 1996).

Dealing with technology is not free of technical problems. The technology itself is a source of frustration for some faculty because it has the tendency to break down. Moreover since more than one person might be involved in one class production, break down in communication and technical assistance were also possible (Barron, 1987). It was also obvious that faculty who experienced technology break down in their class might think that it happens all the time. Poor teaching skills could be a barrier to the

use of distance learning technology for delivery of instruction. The key to success in distance learning was the teacher.

> If the teacher on the system is good, the technology can become almost transparent. Conversely, no technology can overcome poor teaching. Poor teaching is actually exacerbated in distance education applications. But when skilled teachers are involved, enthusiasm, expertise, and creative use of the media can enrich students beyond the four walls of their home classroom. Outstanding teachers can also serve as electronic mentors to teachers (Baker, 1996, p. 7).

Faculty who simply have poor teaching skills might be able to teach on campus with less serious programmatic consequences than at a distance because students will sometimes tolerate poor teaching if there is the compensation of friendly interaction between them and the instructor or among themselves (Farr, et al. 1992). This means that poor teaching skills and the challenges in using technology could make the situation more complicated for the distance instructor.

Adequate information about the particular technology that is to be used is important for the adoption of innovation (Rogers, 1995). A study of the usefulness of fiber-optic telecommunication technology for the delivery of agricultural education found that teachers were indecisive about using the interactive network because they lacked adequate information about the technology that would increase their awareness and stimulate interest. Studies in technology have shown that teacher attitudes became more positive as a result of experience with technology "triability" (Na & Lee, 1993; Rollins, 1993; Rogers, 1995).

The absence of clear institutional policies as to what the institution wants to achieve with information technology, and how it should be achieved also affects how instructors accept the technology (Easdown, 1996). Institutions embarking on the

introduction of educational technology with the purpose of bringing about institutional transformation need to be clear about why it is being attempted (Kershaw, 1996). A clear policy will it guide teachers toward the use of the technology and aid in achieving the mission of the institution.

Institutional support and recognition are important factors affecting faculty attitudes toward distance teaching. Although, some faculty members believed in the effectiveness of distance teaching, they also felt it was neither rewarded by the institution nor recognized as a scholarly activity (Dillon & Walsh, 1992).

Wolcott and Harderlie (1997, p.14) observed that

> lately, there has been a growing interest in reforming institutional reward structures in higher education. Observers of the academic scene describe the current system of incentives and rewards for faculty performance as inequities in recognition for faculty work, and have been particularly apparent with respect to continuing education and the adoption of technological innovations. Faculty efforts in these areas have gone largely under-rewarded because of the emphasis accorded to traditional academic values, namely research. Faculty engaged in distance education, a discipline which shares the dual heritage of continuing education and technological education, would appear to be destined to suffer the same inequitable treatment marked by inadequate compensation.

Faculty members were, therefore, reluctant to participate because of fear that such participation was not recognized as a valuable educational activity or educational contribution at the department or institutional level (Moore & Thompon, 1996). Similarly a study that examined the relationship between distance teaching and the faculty reward system, whether or not distance teaching was valued, rewarded and accommodated within the institutional reward, structure concluded that distance teaching was neither highly valued nor well-rewarded as a scholarly activity and was not highly related to promotion and tenure decisions, and that the rewards for distance

teaching depend on the academic unit's commitment to distance learning (Wolcott, 1997). Instructors should be encouraged to be involved in using distance learning technology and not merely assigned to teach a class. According to Swalec (1993), faculty members were reluctant to embrace new technology, and the manner in which they were approached to participate in distance learning environment could have had an impact on the success of the network. Instructors should be encouraged to look at the utilization of distance learning technology as a way to provide courses to a wider audience. Therefore, participation should be on a voluntary basis.

Institutions should involve faculty in the initial stage of the planning process. A faculty feeling of ownership in the entire project was vital to its success and their participation, because they were the primary users of the network. However, attention to faculty involvement and training is often overlooked until the system is operational (Swalec, 1993). Institutions should therefore create an environment where academic norms and new learning systems are compatible (Olcott, 1994).

Summary

The literature reviewed issues that affect the use of distance learning technology in higher education. Several findings suggested that technology is making a substantial contribution to improved teaching and learning. Students learning at a distance had performed equally well as their counterparts receiving face-to-face classroom instruction. However, faculty in universities continue to rely on traditional methods of delivery of instructions. This resistance to distance teaching technology can not continue on the eve of the 21st century, when the population of non-traditional students is growing fast and people whose skills are no longer marketable are seeking access to

new knowledge. These groups of prospective students can not all be on campus due to other responsibilities. If the universities are there to disseminate information and knowledge, they have the responsibility to reach students wherever they are, and at a convenient time.

The technological innovations in the telecommunications industry have reduced the problem of teacher-student interaction. Distance learning technology can provide one- way audio and two-way video or simultaneously two-way audio and video. This has increased the interaction between instructor and students. In spite of these technological improvements, faculty are still resistant to distance learning and the technology, because of personal, technical, pedagogical and institutional factors. Rogers (1995) asserted that for new ideas to be adopted, certain characteristics have to be in place. Some of these characteristics can be achieved through training, changes in the value system, information and knowledge.

Research indicates that institutions and faculty need to work together from the planning process to the implementation of the technology. Often instructors are neglected in the planning stage; however, they are brought in at the implementation stage. Institutions should also make clear what they want to achieve with the implementation of technology for the delivery of instruction. Lack of clear policies has affected faculty and students' participation.

The review of literature has explained clearly the importance of distance learning, and the capability of the technologies. What is not clear though, is the reasons why faculty show resistance to the use of distance learning technology. This study

investigated the factors that cause resistance to the use of distance learning technologies among industrial and technical teacher education faculty.

CHAPTER III

METHODOLOGY

The primary purpose of the study was to identify the variables or factors that contributed to faculty willingness or unwillingness to use interactive distance learning technologies in Industrial and Technical Teacher Education programs. The literature reviewed indicated significant findings on faculty resistance to distance learning but not enough information on the factors that led to the resistance. This chapter presents the methodology used in conducting the study. It includes the type of research and design, data collection, instrumentation and procedure used for data analysis.

Type of Research and Design

A descriptive research method was used for this study because it describes and interprets a given state of affairs as fully and carefully as possible. It is concerned with condition or relationships that exist opinions that are held, processes that are going on, effects that are evident or trends that are developing (Best & Kahn, 1986). Based on the data gathered and analyzed, the researcher was able to describe the current situation, as it corresponds to faculty levels of utilization, acceptance of and resistance to distance learning technologies. Also the researcher was able to determine whether the characteristics of diffusion adoption of innovation, and personal and professional variables were similar between users and non-users of distance learning technologies.

Design of the Study

The design for the study was The Static Group Comparison (Campbell & Stanley, 1996).

$$\begin{array}{cc} X^1 & O \\ \text{----------} & \\ X^2 & O \end{array}$$

The Static Group Comparison

This is a design in which a group that experienced a variable X^1 (distance learning technology) was compared with a group that had not experienced the variable X^2, (non use of distance learning technology) (Campbell & Stanley, 1963). It was used to determine the influence of a variable on one group and not the other (Wallen & Fraenkel, 1990). Similarly, variables such as, age, years of teaching experience, qualification, tenure, and rank were also matched between the two groups (Specter, 1981). A single group, in this case industrial and technical teacher education faculty, were exposed to a single survey and based on their responses, one group of users and group of non users of distance learning technology were formed.

Instrumentation

It was clear from the literature reviewed that the use of distance learning was not a replacement for face-to-face or on-campus teaching but a complement or additional tool for faculty to reach all students in spite of distance and location. However, what was not clear, was the level of acceptance and use of distance learning technologies, mainly due to the resistance shown by faculty. Therefore the instrument used for the study was designed using methods recommended by Dillman (1978). This method

involved questions that determine the beliefs, attitude, behaviors and attributes of the respondents. Also statements of innovativeness by Rogers (1995) were used to determine reasons for utilization and resistance to distance learning technology. The questions elicited answers to these research questions :

1) To what extent is distance learning technology accepted by Industrial and Technical teacher education faculty?

2) What are the problems encountered by industrial and technical teacher education faculty in using distance learning technology for delivery of instruction?;

3) What are the reasons for some faculty willingness to use or embrace distance learning technology for delivery of instruction?

4) What are the reasons for some faculty unwillingness to use distance learning technology for the delivery of instruction?

5) To what extent are acceptance and resistance variables similar between faculty who use distance learning technologies and those who do not use the technology?

6) What have institutions that offer industrial and technical teacher education programs done to encourage faculty, utilize distance learning technology and to overcome resistance?

Instrument of the Study

The instrument used to gather data for the study was a three part questionnaire modeled from a study of faculty attitudes and beliefs about the implementation of interactive television and computer-mediated conferencing as distance education media (Larison, 1995). Questions were also taken from studies that were similar (Cohenour,

1994; Hobb, 1990; Mafeild, 1994; Miller & Deorfert, 1995; Murphy & Terry, 1996; Rollins, 1993; Spotts & Bowman, 1995; Swan & Brehmer, 1992). Modifications were made to the design and questions to suit the current study. The first page of the questionnaire is a letter to faculty explaining the purpose of the study and assuring confidentiality of all respondents. The contact address of the Oklahoma State University Institutional Review Board, an e-mail address, and the telephone number of the researcher and his dissertation advisor were provided for the respondents in case they had any questions about the study.

Part one of the survey consisted of statements that positively correlated with characteristics of innovations (Rogers, 1995) and statements of other factors that may contribute to faculty willingness and unwillingness to utilize distance learning technology. Responses to these statement were made on a four point Likert-type response scale involving the following choices: 1 = "Strongly Agree," 2 = "Agree," 3 = "Disagree" 4 = "Strongly Disagree." The four points' Likert-type scale was chosen in order to accurately obtain faculty opinion as to whether they use distance learning technology or do not use the technology. A total of twenty-nine statement soliciting faculty opinions were formed in this section.

Part two of the questionnaire was designed to gather qualitative data. Open-ended questions were asked to provide an opportunity for the respondents to add their comments concerning their willingness or unwillingness to use distance learning technologies. Questions were also asked on how their institutions encouraged them to participate in the use of distance learning technology. A total of eight questions were

formed and adequate space was provided at the end of each question for faculty to respond in their own words.

Part three of the survey consisted of demographic information designed to identify selected personal and professional characteristics of faculty that may have influenced the use of distance learning technology. The demographic variables were age, years of teaching experience, faculty rank, and qualification. This section had a total of nine questions with range of choices between two and five. Faculty were instructed to circle only the number that corresponded to their choice.

Validity of the Instrument

The instrument was reviewed by a panel of five experts to determine content and face validity. The panel was made up of the director of independent and correspondence study, two members of the faculty advisory committee of the Institute for Telecommunications, and four faculty members, all from Oklahoma State University. Selection of the panel members was based on their many years of experience in research and the use of different types of distance learning technology. Additionally, the instruments were pilot-tested by administering the survey to thirteen faculty of the department of technical education at Pittsburgh State University in Kansas. The faculty members were contacted through the head of department after a short telephone conversation. Thirteen surveys were mailed and seven were returned representing 53.8 percent response rate. Six faculty answered all questions, and one of the questionnaires was partially answered. Based on the panel evaluation for face and content validity, three questions were slightly modified. Overall, both the qualitative

and quantitative data obtained provided information on the questions the investigator intended to study.

Data Collection

Sample

The population for the study was industrial and technical teacher education faculty. The sample for the study was drawn from twenty universities that have industrial and technical teacher education programs and the use distance learning technology for delivery of instruction. The following represents a list of universities and the number of faculty included in the sample: California State University at Long Beach = 8, The University of Georgia = 5, Valdosa State University = 16, University of Wisconsin-Stout Campus at Menomine = 20, The University of Tennessee = 9, Northern Arizona University = 2, Virginia Polytechnic Institute and State University = 5, The Ohio State University = 3, Kent State University = 7, Idaho State University = 4, Oklahoma State University = 4, University of Missouri at Columbia = 5, Louisiana State University = 8, The Pennsylvania State University = 14, University of Central Florida = 2, University of Illinois-Champaign = 10, Colorado State University = 30, Texas A&M University =11, University of Arkansas = 11, and University of Nebraska-Lincoln = 5 (ADEC, 1998; Martinez & Sweger, 1996; NAITTE & CTTE, 1997/1998; UCVE, 1998).

All industrial and technical education faculty in the respective departments of universities selected for the study were sampled. A purposive sampling was used to select the number of universities and faculty. This was based on knowledge of the

population and purpose of the research, and the investigator used personal judgment to select the sample (Wallen & Fraenkel, 1990). The universities selected were among the few that used distance learning technologies for delivery of instruction in Industrial and Technical teacher education programs. The researchers personal judgment in selecting the universities and faculty was based on the information needed, and that could be obtained from the sampled population

Procedure: Heads of departments of institutions included in the sample, were contacted through telephone calls. Their interest and willingness to participate in the study were sought. Questionnaires, along with cover letters explaining the purposes of the study, and assuring anonymity and confidentiality of responses were mailed to faculty members through their heads of department with a return envelop and stamp for their reply. Two faculty from the University of Central Florida were contacted individually by e-mail. They all replied and expressed their willingness to participate. Participants were also given an opportunity to indicate whether they would like to make further contact with the researcher concerning results of the study. Few faculty mailed their survey with a request to obtain the final results of the study. A total of fifty-five questionnaires, representing 30.7 percent, were received within the first three weeks. Two follow-up telephone calls were made to heads of departments to remind non-respondents to mail their completed questionnaires. The calls were made in the third and fourth week after the initial mail-out. It was possible to identify non respondents because the questionnaires were coded before being mailed. The follow up telephone calls yielded some results that increased the response rate. Babbie (1986) pointed out that a telephone reminder should be employed when the total return rate is low. Overall,

eighty-four questionnaires were received representing 47.0 percent. Ray and Ravizza (1988) indicated that while the acceptable response rate depends on the type of survey, a typical mail survey would have a return rate of less than 50 percent. However for generalizability, Babbie (1973) asserts that a response rate of 50 percent is adequate for analysis and reporting. The purposive sampling procedure used in this study does not allow for generalization.

One study that used purposive sampling and examined how a selected group of journalism teachers faced the challenge of applying professional standards in the quest for students' press freedom, received a response rate of 46.5 percent (Eveslage, 1995).

Data Analysis

The study used a descriptive statistics and the SAS (Statistical Analysis System) program was used to analyze the data. "The goal of descriptive statistics is to provide a representation of the data which describes, in tabular, graphical, or numerical form, the results of the research" (Shavelson, 1988, p. 9). In this study appropriate statistics, for example frequencies, percentages, and chi-square test with alpha set at 0.05, were used.

In order to investigate whether characteristics of diffusion adoption of innovation, and selected personal and professional variables were similar between faculty who adopted distance learning technology and those who were resistant to the technology, a chi-square test was used to measure if there is significant relationship between use or non use of distance learning technology and variables, age, teaching experience, tenure, and qualification and similarly the relationship between use or non use of the technology and the characteristics of innovation of new ideas (Roggers,

1995). A Chi-square test enables us to answer question about the observed frequencies in relation to what frequencies will be expected (Shavelson, 1988).

Frequencies and percentages were used to summarize agreement or disagreement with the statements of resistance and utilization. Those respondents who were neither in agreement nor disagreement were considered as non respondents. The qualitative data collected using open-ended questions were analyzed by organizing the data into categories relevant to the study and were coded based on the pattern of responses given by the respondents. Organizational arrangements of data are generally focused around categories relevant to an investigation. The data was coded and assigned to the categories with comments regarding the categorical assignment being made (Stainback & Stainback, 1988). A narrative summary with direct quotes was made to explain some of the categories.

The procedure followed in this study was not intended to prove or disapprove existing situation but rather answer to questions that might lead to understanding the problem studied, with the view to making recommendations and building on reference points for further research.

CHAPTER IV

ANALYSIS OF DATA AND PRESENTATION

Introduction

The data for the study were collected and analyzed to achieve the purpose of the study, which was to identify the variables or factors that contribute to faculty willingness or unwillingness to accept the utilization of interactive distance learning technologies in industrial technical teacher education programs. Additionally, the study investigated whether the characteristics of the theory of diffusion adoption of innovation of new ideas (Rogers, 1995), and other factors that influence faculty utilization or resistance to distance learning technologies, were similar among users and non users of the technology.

Research Questions

The following research questions were answered to achieve the purpose of the study.

1. To what extent is distance learning technology utilized by Industrial and Technical Teacher education faculty?

2. What are the problems encountered by industrial and technical teacher education faculty in using distance learning technology for the delivery of instruction?

3. What are the reasons for the willingness of some faculty members to use distance learning technology for delivery of instruction?

4. What are the reasons for the unwillingness of some faculty members to use distance learning technology for the delivery of instruction?

5. To what extend are variables similar between users and non-users of distance learning technology?

6. What have institutions that offer industrial and technical teacher education programs done to encourage faculty to use distance learning technology and to overcome resistance?

A questionnaire was developed to gather information that answered the research questions. Quantitative and qualitative data were gathered using a four point Likert-scale type questionnaire and structured, open-ended questions respectively. Faculty were instructed to respond to all statements and questions in the survey.

The data were analyzed using the SAS program. Appropriate statistics were used for the description of data, including frequencies, percentages and chi-square test. All responses to the open-ended questions were coded and categorized. A narrative statement explains the categories.

Population and Response Rate

The sample for the study was drawn from twenty universities across the United States. A total of 179 faculty members were mailed surveys. Eighty-four of the surveys were returned, representing 47.0 percent. Five of the surveys were returned uncompleted and considered unusable while 79 of the surveys were used for analysis.

The break down of the population and surveys returned is shown in Table I. The table also shows all institutions sampled, the number of surveys mailed to each institution and the surveys returned with the percentages of the total number returned.

TABLE I

INSTITUTION RESPONSE RATE AND PERCENTAGE OF SURVEYS RETURNED

Institution	Survey Mailed	Returned	Percent of the Total Returned
California St. U. at Long Beach	8	4	2.23
Colorado St. University	30	9	5.02
Penn State University	4	3	1.67
Texas A&M University	7	4	2.23
University of Central Florida	8	4	2.23
University of Arkansas	2	2	1.11
University of Illinois-Champaign	4	3	1.67
University of Nebraska-Lincoln	3	3	1.67
University of Tennessee	14	7	3.91
Idaho State University	1	4	2.23
Kent State University	2	2	1.11
Louisiana St. University	1	5	2.58
Northern Arizona University	10	2	1.11
Oklahoma State University	5	2	1.11
Ohio State University	9	2	1.11
University of Georgia-Anthens	5	4	2.23
University of Wisconsin-Stout	20	6	3.35
University of Missouri-Columbia	5	5	2.79
Valdosa State University	16	10	5.58
Virginia Poly. Institute & St.U.	5	3	1.67
Total	179	84	47.00

Research Question I

1. To what extent is distance learning technology utilized by industrial and technical teacher education faculty?

Research question one investigated the level of utilization of distance learning technology by faculty. To answer this question, it was important to understand how many faculty used the technology to deliver instruction, how many courses they taught, how often they taught, and what technology they used for the delivery of instruction. Faculty responded to these issues in questions 30, 43, 44, 45 and 46.

Table II shows the number of faculty that used distance learning technology for delivery of instruction. Fifty faculty, 63.1 percent, more than half the respondents said they used distance learning technology to teach a class, and twenty-eight faculty, 35.4 percent, said they have not taught a distance class using a distance learning technology, while one respondent 1.3 percent, did not respond to the question.

In response to the open-ended question number 30, Table III shows five categories mainly faculty that use the technology once a year, once every two years, every semester, seldom use the technology, and do not use it at all. A breakdown of these responses, showed twenty-four faculty, 30.3 percent, used the technology once a year and three faculty, 4.0 percent, used it once every two years. Sixteen faculty, 20.2 percent, used it every semester to teach a course, while eight faculty, 10.1 percent, seldom use the technology. Twenty-eight faculty, 35.4 percent, or about one third, did not use distance learning technology.

TABLE II

RESPONSES OF FACULTY USING DISTANCE LEARNING TECHNOLOGY FOR DELIVERY OF INSTRUCTION BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Yes	50	63.1	50	63.1
No	28	35.4	78	98.5
No Response	1	1.3	79	100.0

TABLE III

RESPONSES TO OPEN-ENDED QUESTION NUMBER 30 BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Once a Year	24	30.3	24	30.3
Once Every Two Years	3	4.0	27	34.3
Every Semester	16	20.2	43	54.5
Seldom	8	10.1	51	64.6
No Use	28	35.4	79	100.0

In response to the question about the number of courses taught using distance learning technology, Table IV shows fifteen faculty, 19.0 percent, taught one course and eleven faculty, 13.9 percent, taught at least two courses. Five faculty, 6.3 percent, taught three courses, while eighteen faculty, 22.8 percent taught more than three courses. Thirty faculty, 38.0 percent, did not teach any courses.

In response to Question 45, that sought to determine whether or not faculty plan to use or will continue to use distance learning technology for delivery of instruction, table V shows sixty faculty, 75.9 percent, or three quarters of the respondents, said they planned to and will continue to use distance learning technology, while nineteen faculty were not sure and do not plan to use the technology in the future.

TABLE IV

FACULTY RESPONSES TO NUMBER OF COURSES TAUGHT USING DISTANCE LEARNING TECHNOLOGY BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No Course	24	30.4	24	34.0
One Course	15	19.0	39	49.4
Two Courses	11	13.9	50	63.3
Three Courses	5	6.3	55	69.6
More than Three courses	18	22.8	73	92.4
No Response	6	7.6	79	100.0

TABLE V

FACULTY RESPONSES TO QUESTION NUMBER 45 IN REGARD TO USE OR CONTINUED USE OF DISTANCE LEARNING TECHNOLOGY FOR DELIVERY OF INSTRUCTION BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Yes	60	75.9	60	75.9
No	11	13.9	71	89.8
No Response	8	10.1	79	100.0

Question 46 sought to identify the type of distance learning technology used by faculty to deliver instruction at remote sites. Table VI shows twenty-four faculty, 30.4 percent, or about one third of respondents, used compressed video to teach a distance learning class and eighteen faculty, 22.8 percent, used fiber-optic and satellite delivery. Fourteen faculty used other technology such as video tape, microwave, and computer - based technology (Internet and web), while twenty-three faculty, 29.1 percent, did not respond to the question.

TABLE VI

FACULTY RESPONSES TO QUESTION NUMBER 46 REGARDING USE OF DISTANCE LEARNING TECHNOLOGY AT REMOTE SITES BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Compressed Video	24	30.4	24	30.4
Fiber-Optic	9	11.4	33	41.8
Satellite	9	11.4	42	53.2
Other	14	17.7	56	70.9
No Response	23	29.1	79	100.0

Summary

The data showed that more than half the respondents used distance learning technology to deliver instruction at a remote site, while slightly more than a third did not use the technology. One third of the faculty that used the technology used it once a year, and about a third used it every semester. The technology most widely used was compressed video, by about one third of the faculty. Other technologies used were fiber-optic, satellite, microwave, video tape, and computer-based technology.

Research Question II

2. What are the problems encountered by industrial and technical teacher education faculty in using distance learning technology for the delivery of instruction?

To determine what problem faculty encountered when using video system technology or any type of technology for delivery of instruction, they were asked to respond to four statements by indicating their level of agreement on a four-point Likert scale. Tables VII to X report the results.

Table VII shows that sixty-seven faculty, 84.8 percent, more than three quarters, strongly agreed/agreed that problems with equipment were a major concern to them in using distance learning technology for delivery of instruction and twelve faculty, 15.2 percent, disagreed /strongly disagreed with the statement.

In Table VIII, fifty-five faculty, 69.6 percent, more than half the respondents agreed/strongly agreed that problems may arise in the delivery of instruction because more than one person is involved in the planning, production, and delivery of a course. Conversely, twenty-four faculty, 30.4 percent disagreed / strongly disagreed with the statement.

Faculty responded to the statement that they lacked the technical knowledge to handle some of the distance learning technology and equipment with overwhelming agreement. Table IX, shows that sixty-four faculty, 81.0 percent, more than three quarters, agreed/strongly agreed with the statement, while fifteen faculty, 19.0 percent, disagreed/strongly disagreed that they lacked the technical knowledge to handle the equipment.

TABLE VII

FACULTY RESPONSES AS TO WHETHER EQUIPMENT PROBLEMS WERE OF A MAJOR CONCERN BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	37	46.8	37	46.8
Agree	30	38.0	67	84.8
Disagree	9	11.4	76	96.2
Strongly Disagree	3	3.8	79	100.0

TABLE VIII

FACULTY RESPONSES ON POSSIBLE PROBLEMS IN DELIVERY OF INSTRUCTION DUE TO MORE THAN ONE PERSON INVOLVED IN PLANNING AND DELIVERY OF A COURSE BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	13	16.5	13	16.5
Agree	42	53.2	55	69.6
Disagree	19	24.1	74	93.7
Strongly Disagree	5	6.3	79	100.0

TABLE IX

FACULTY RESPONSES ON LACK OF TECHNICAL KNOWLEDGE NEEDED TO HANDLE SOME OF THE DISTANCE LEARNING TECHNOLOGY EQUIPMENT BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	26	32.9	26	32.9
Agree	38	48.1	64	81.0
Disagree	12	15.2	76	96.2
Strongly Disagree	3	3.8	79	100.0

The response to the issue of student-teacher interaction is shown in Table X. Fifty-six faculty, 70.8 percent, or almost three quarters, agreed/strongly agreed that it was difficult to interact with students when using distance learning technology to deliver instruction, while twenty-three faculty, 39.2 percent, disagreed/strongly disagreed that teacher-student interaction was difficult when using these technologies to deliver instruction.

TABLE X

FACULTY RESPONSES ON DIFFICULTY OF TEACHER STUDENT INTERACTION WHEN DISTANCE LEARNING TECHNOLOGY IS USED TO DELIVER INSTRUCTION BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	25	31.6	25	31.6
Agree	31	39.2	56	70.9
Disagree	13	16.5	69	87.3
Strongly Disagree	10	12.7	79	100.0

The open-ended question number 31 added more information on the problem encountered by faculty in using distance learning technology. Five categories of responses to the question were determined: equipment, interaction, faculty, planning, and coordination.

Equipment

Faculty were concerned with the equipment they used. They stressed issues such as equipment failure, delay in transmission time, system malfunction, and poor audio among other things. In the words of one faculty member, "the hardware (equipment) was not always reliable and caused interruption of signal." Another faculty

person said that equipment problems wasted class time, completely eliminated whole lesson or slow down communication between sites.

Interaction

Teacher-student interaction was also one of the problems faculty had to deal with in using distance learning technology. In any classroom situation, teachers consider their interaction with students, and students-to-students' interaction as very important to the learning process. One faculty member was concerned with the in-attentiveness of students at a distance site, and the lack of face-to-face discussion, while some faculty stated there was poor student and faculty interaction.

Faculty

Responses to this question indicated that some of the problems were directly related to faculty. Some faculty members disliked the idea that they had to serve as a teacher and camera operator in a distance learning class. In the words of one respondents, "the teacher should not have to be a teacher and a camera operator (technician)." One faculty person who did not elaborate further, explained that his problem was "other faculty." There were also faculty who stressed the fact that, learning a new tool was the problem they encountered in using distance learning technology for delivery of instruction.

Planning

The issue of planning was raised by some faculty, as the main problem they encountered with distance learning technology. Some felt that too much was involved in preparation, compared to the traditional face-to-face classroom teaching and therefore, they felt they lacked the time to prepare due to work overload.

Coordination

Faculty who are teaching a distance class expressed a need to coordinate activities at all receiving sites. Instructors were concerned with the difficulty they had encountered in coordinating activities at distant sites. Some instructors stated they could not get their students involved and others said it was difficult to mail out handouts, test students and get them to return assignments.

Summary

It was clear from the data that a majority of faculty, about three quarters, agreed that they had encountered problems with the equipment they used. They also agreed that they lacked the knowledge to handle some of the equipment. The fact that more than one person was sometimes involved in the production and delivery of courses created problems for most of the faculty that used distance learning technology. They were, however, in favor of technicians' operating the cameras and not instructors. Other problems faced by faculty were lack of time to plan, difficulty interacting with students at remote sites, and coordination of activities at both on campus and remote sites.

Research Question III

3. What are the reasons for some faculty willingness to use distance learning technology for delivery of instruction?

Instructors that participate in the use of distance learning technology have their reasons for doing so, just as do those who choose not to participate. Research question III investigated reasons for faculty willingness to use the technology. Tables XI to XIV reported responses to items 5, 6, 7, 8, 32, and 33 on the survey. Table XI shows that faculty were split over the issue of status on campus. Slightly more than half of respondents, forty-seven, 59.5 percent, agreed/strongly agreed that teaching a distance class does not affect their status on campus, while twenty-seven faculty, 34.2 percent, disagreed/strongly disagreed with the statement. Five instructors, 6.3 percent, did not respond to the statement.

Table XII shows the faculty responses to the statement that their teaching skills could be improved by using distance learning technology to deliver instruction. Forty-nine faculty, 62.0 percent, about two thirds, agreed/strongly agreed with the statement, while twenty-seven, faculty 34.2 percent disagreed/strongly disagreed with the statement. Six instructors did not respond to the statement.

In Table XIII, faculty overwhelmingly showed dissatisfaction with the effort made by their institutions with respect to monetary reward. Sixty-three faculty, 89.7 percent, or more than three quarters, disagreed/strongly disagreed with the statement that their institutions have done much in terms of monetary rewards to those teaching a

TABLE XI

FACULTY RESPONSES ON THE ISSUE THAT TEACHING A DISTANCE CLASS DOES NOT AFFECT FACULTY MEMBER STATUS ON CAMPUS BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	13	16.5	13	16.5
Agree	34	43.0	47	59.5
Disagree	24	30.4	71	89.9
Strongly Disagree	3	3.8	74	93.7
No Response	5	6.3	79	100.0

TABLE XII

FACULTY RESPONSES ON USING DISTANCE LEARNING TECHNOLOGY TO DELIVER INSTRUCTION TO IMPROVE FACULTY TEACHING SKILLS BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	20	25.3	20	25.3
Agree	29	36.7	49	62.0
Disagree	21	26.6	70	88.6
Strongly Disagree	6	7.6	76	93.7
No Response	5	6.3	79	100.0

TABLE XIII

FACULTY RESPONSES ON ISSUE OF WHETHER INSTITUTIONS HAVE DONE MUCH IN TERMS OF MONETARY REWARDS FOR TEACHING A DISTANCE CLASS BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	2	2.5	2	2.5
Agree	8	10.1	10	12.6
Disagree	26	32.9	36	45.5
Strongly Disagree	37	46.8	73	92.3
No Response	6	7.6	79	100.0

distance class. Ten instructors, 12.6 percent, agreed/strongly agreed with the statement. Six faculty members, 7.6 percent, did not respond to the statement.

Table XIV, shows that fifty-five faculty, 69.0 percent, disagreed/strongly disagreed with the statement that teaching a distance class is a valuable educational contribution considered during promotion, tenure, and salary increases, while seventeen faculty members, 21.5 percent, agreed/strongly agreed with the statement. Seven faculty members, 8.9 percent, did not respond to the statement.

TABLE XIV

FACULTY RESPONSES ON ISSUE OF WHETHER TEACHING A DISTANCE CLASS IS A VALUABLE EDUCATIONAL CONTRIBUTION TO BE CONSIDERED DURING PROMOTION, TENURE AND SALARY INCREASE BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	2	2.5	2	11.4
Agree	15	19.0	17	30.4
Disagree	38	48.1	55	78.5
Strongly Disagree	17	21.5	72	100.0
No Response	7	8.9	79	

The open-ended question number 32 gave more insight as to why some faculty were using distance learning technology for delivery of instruction. Faculty reasons for using the technology were grouped under four categories: accessibility. administrative, economic, and enrollment.

Accessibility

One of the major reasons for distance learning was equity of educational opportunities. Most faculty mentioned that their main reason for using distance learning technology was to provide access to students at remote locations. Some faculty said that they wanted to expand their program to remote areas and reach out to new

populations. In the words of one instructor, "the primary reason was to reach learners in other parts of our state, and provide access to students." Another faculty member's main reason was to provide access to education for vocational teachers throughout the state.

Administrative

The administration played an important part in faculty decisions to participate in the use of distance learning technology for delivery of instruction. Respondents stressed several ways in which their administrations were involved in their decision. Some said they were mandated to teach a distance class and others said it was required by their administration, while some said they were asked to participate. In the words of one faculty member, "I was forced to do it" and one said, "I was asked to participate in a new program." while some faculty members said they were assigned to teach a class. However some instructors said their department encouraged them to try the technology.

Economic

It is not uncommon for faculty to travel to other campuses to teach classes. This had some cost bearing for both the institution and instructors. Some faculty made it clear that the economic benefit was the main reason for their participation. They mentioned that their participation had saved them the travel time and saved money for the university. Some instructors felt that their participation would reduce travel time and costs for students that lived several miles from campus and had to commute every week.

Enrollment

Industrial and Technical teacher education programs have in recent times faced declining enrollments and steps had been taken by some institutions to increase the population of students in their programs. Some faculty said their reason for using distance learning technology was to get students for their programs and to increase enrollment. Other responses given were to offer teacher education certification to teachers throughout the state, while some said they wanted to try something new.

The open-ended question number 33 added more information about the level of training that faculty received before using distance learning technology to deliver instruction. It was clear from the responses that some faculty received no training at all, while some of them had as little as half an hour to as much as one hundred hours of training. The breakdown showed thirty-nine faculty members, 49.0 percent, or almost half, received no training and thirty-three, 42.0 percent, received between 1/2 hour and 10 hours of training. Three instructors 4.0 percent, received between 11 hours and 25 hours of training while another three, 4.0 percent, received between 40 hours and 48 hours of training. Only one faculty member, 1.0 percent received up to 100 hours of training.

Summary

It was evident from the data, that there were problems associated with using distance learning technology. More than three-quarters of faculty were not satisfied with their institutional reward system and also the lack of consideration of distance teaching

as a valuable educational activity. However, more than half the respondents were willing to use the technology to improve their teaching skills. Some faculty that used the technology said they wanted to provide access to educational opportunities to prospective and remote students and also increase their program enrollment. Some said they were willing to use the technology for economic reasons.

Research Question IV

4. What are the reasons for the unwillingness of some faculty to use distance learning technology for the delivery of instruction?

Making a demonstration was an issue of concern to some faculty when using distance learning technology to deliver instruction. Table XV shows that fifty faculty members, 63.3 percent, or about two thirds, agreed/strongly agreed that demonstration is difficult, and twenty-eight instructors, 35.4 percent, or slightly more than one third, disagreed/strongly disagreed that it is difficult. One faculty member, 1.3 percent, did not respond to the statement. Table XVI shows that forty-nine respondents, 62.0 percent, or about two thirds, disagreed/strongly disagreed that teaching using distance learning technology does not use class time as effectively as does teaching in a traditional classroom. Twenty-seven faculty members, 34.2 percent, agreed/strongly agreed with the statement, while three instructors, 3.8 percents, did not respond to the statement.

TABLE XV

FACULTY RESPONSES ON ISSUE OF WHETHER IT IS MORE DIFFICULT TO MAKE DEMONSTRATIONS TO STUDENTS USING DISTANCE LEARNING TECHNOLOGY BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	10	12.7	10	12.7
Agree	40	50.6	50	63.3
Disagree	22	27.8	72	91.1
Strongly Disagree	6	7.6	78	98.7
No Response	1	1.3	79	100.00

TABLE XVI

FACULTY RESPONSES ON ISSUE OF WHETHER THE USE OF DISTANCE LEARNING TECHNOLOGY USES CLASS TIME AS EFFECTIVELY AS A TRADITIONAL CLASSROOM COURSE BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	12	15.2	12	15.2
Agree	15	19.0	27	34.2
Disagree	37	46.8	64	81.0
Strongly Disagree	12	15.2	76	96.2
No Response	3	3.8	79	100.0

Table XVII shows that the majority of sixty faculty 75.9 percent, or exactly three quarters disagreed/strongly disagreed that the authority of a faculty member is disrupted by using a distance learning technology to teach a class. Seventeen respondents, 21.6 percent agreed/strongly agreed with the statement. Two faculty members, 2.5 percent, did not respond to the statement. On the issue of faculty involvement in planning and implementation of technology for teaching, Table XVIII shows that thirty-five faculty members, 44.3 percent, agreed /strongly agreed that faculty were not involved in the initial planning process to implement distance learning technology. Thirty-seven respondents, 46.8 percent, or about one-half, however disagreed/strongly disagreed with the statement, while seven, 8.9 percent, did not respond to the statement.

TABLE XVII

RESPONSES ON AUTHORITY OF FACULTY MEMBER DISRUPTION BY USING DISTANCE LEARNING TECHNOLOGY TO TEACH CLASS BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	4	5.1	4	5.1
Agree	13	16.5	17	21.6
Disagree	40	50.6	57	72.2
Strongly Disagree	20	25.3	77	97.5
No Response	2	2.5	79	100.0

TABLE XVIII

RESPONSES ON ISSUE OF FACULTY NOT INVOLVED IN THE INITIAL PLANNING PROCESS IN IMPLEMENTING DISTANCE LEARNING TECHNOLOGY BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	10	12.7	10	21.7
Agree	25	31.6	35	44.3
Disagree	29	36.7	64	81.0
Strongly Disagree	8	10.1	72	91.1
No Response	7	8.9	79	100.0

Table XIX shows that sixty-eight respondents, 86.1 percents, or more than three quarters, agreed/strongly agreed that faculty should be encouraged to use distance learning technology for delivery of instruction and not merely assigned to teach a distance class. Ten faculty members, 12.7 percents, however, disagreed/strongly disagreed with the statement. One instructor did not respond to the statement. The responses to the issue of adequate information about the use of a particular technology are shown in Table XX. Seventy instructors, 88.6 percent, or more than three quarters, of the respondents agreed/strongly agreed that faculty lack adequate information about the use of distance learning technology which affects its utilization for delivery of instruction, while nine, 1.4 percents, disagreed with the statement.

TABLE XIX

FACULTY RESPONSES ON THE ISSUE OF ENCOURAGEMENT TO USE DISTANCE LEARNING TECHNOLOGY FOR DELIVERY OF INSTRUCTION AND NOT MERELY ASSIGNED TO TEACH A CLASS BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	32	40.5	32	40.5
Agree	36	45.6	68	86.1
Disagree	6	7.6	74	93.7
Strongly Disagree	4	5.1	78	98.8
No Response	1	1.3	79	100.0

TABLE XX

FACULTY RESPONSES TO LACK OF ADEQUATE INFORMATION ABOUT DISTANCE LEARNING TECHNOLOGY AFFECTING ITS UTILIZATION FOR DELIVERY OF INSTRUCTION BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	25	31.6	25	31.6
Agree	45	57.0	70	88.6
Disagree	9	11.4	79	100.0

The responses to the issue of training faculty to use distance learning technology for delivery of instruction is shown in Table XXI. Seventy-five respondents, 94.9 percent, or almost all of them agreed/strongly agreed that faculty must be trained if they are to use the technology effectively, while only four instructors, 5.1 percent, disagreed/ strongly disagreed with the statement. Table XXII shows that sixty faculty, 86.0 percent, more than three quarters agreed/strongly agreed that lack of incentive to faculty is an obstacle to the use of distance learning technology for delivery of instruction while sixteen instructors, 20.2 percent, disagreed/strongly disagreed with the statement. Three faculty members, 3.8 percent, did not respond to the statement.

TABLE XXI

FACULTY RESPONSES ON ISSUE THAT MOST MUST BE TRAINED IF THEY ARE TO USE DISTANCE LEARNING TECHNOLOGY EFFECTIVELY BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	49	62.2	49	62.2
Agree	26	32.9	75	94.9
Disagree	3	3.8	78	98.7
Strongly Disagree	1	1.3	79	100.0

TABLE XXII

FACULTY RESPONSES TO ISSUE OF LACK OF INCENTIVES FOR TEACHING A DISTANCE CLASS AS AN OBSTACLE TO FACULTY USE OF DISTANCE LEARNING TECHNOLOGY FOR DELIVERY OF INSTRUCTION BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	27	34.2	27	34.2
Agree	33	41.8	60	76.0
Disagree	14	17.7	74	93.7
Strongly Disagree	2	2.5	76	96.2
No Response	3	3.8	79	100.0

Institution policies with respect to the use of distance learning technology have been an issue of concerned to some faculty members. Table XXIII shows that fifty-nine respondents, 74.7 percent, or almost three quarters, agreed/strongly agreed that lack of clear institutional policies on the use of distance learning technology affect its adoption. Eighteen faculty members, 22.8 percent, disagreed/strongly disagreed, while two, 2.5 percent, did not respond to the statement. In Table XXIV, forty-eight respondents, 60.7 percent, or more than half, disagreed/strongly disagreed that using distance learning technology in teaching requires too much planning on the part of the instructor. On the other hand, twenty-nine faculty members, 36.7 percent, agreed/strongly agreed with the

TABLE XXIII

RESPONSES TO ISSUE OF LACK OF CLEAR INSTITUTIONAL POLICIES ON THE USE OF DISTANCE LEARNING TECHNOLOGY AFFECTS ON ITS ADOPTION BY FACULTY BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	23	29.1	23	29.1
Agree	36	45.6	59	74.7
Disagree	15	19.0	74	93.7
Strongly Disagree	3	3.8	77	97.5
No Response	2	2.5	79	100.0

TABLE XXIV

FACULTY RESPONSES TO ISSUE OF TEACHING THAT USING DISTANCE LEARNING TECHNOLOGY REQUIRES TOO MUCH PLANNING ON THE PART OF THE INSTRUCTOR BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	11	13.9	11	13.9
Agree	18	22.8	29	36.7
Disagree	37	46.8	66	83.5
Strongly Disagree	11	13.9	77	97.4
No Response	2	2.5	79	100.0

statement while two, 2.5 percent, did not respond to the statement.

The respondents felt that poor teaching skills hindered the use of distance learning technology for the delivery of instruction as shown on Table XXV. Seventy-six instructors, 96.2 percent, or almost all respondents agreed/strongly agreed with the statement, while three, 3.8 percent, disagreed. Table XXVI shows that sixty-one faculty members, 77.3 percent, or more than three quarters, agreed/strongly agreed that faculty who do not have a strong sense of ownership in the planning and implementation of a technology will not choose to use it if given the choice. Conversely, fourteen faculty members, 17.7 percent, disagreed, while four, 5.1 percent, did not respond to the statement.

TABLE XXV

FACULTY RESPONSES ON THE ISSUE THAT POOR TEACHING SKILLS COULD HINDER THE USE OF DISTANCE LEARNING TECHNOLOGY FOR THE DELIVERY OF INSTRUCTION BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	42	53.2	42	53.2
Agree	34	43.0	76	96.2
Disagree	3	3.8	79	100.0

TABLE XXVI

FACULTY RESPONSES ON ISSUE OF THOSE WHO DO NOT HAVE A STRONG SENSE OF OWNERSHIP IN THE PLANNING AND IMPLEMENTATION, WOULD NOT CHOOSE TO USE DISTANCE LEARNING TECHNOLOGY IF GIVEN THE CHOICE BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	16	20.3	16	20.3
Agree	45	57.0	61	77.3
Disagree	14	17.7	75	95.0
No Response	4	5.1	79	100.0

The use of distance learning technology, like other technologies, was not without its problems. It was obvious that some faculty were unwilling to use the technology due to problems associated with it. The open-ended question number thirty-four, provided more information on this issue. Faculty responses were grouped under six categories that included: Institution, equipment, planning, faculty, training and incentives.

Institution

Some faculty believed that their institution was the main obstacle for their unwillingness to implement the use of distance learning technology. One of the issues

raised by faculty, was the manner in which they were asked to be involved. Some faculty said it was mandatory to use the technology. Others said their institution had no clear policy on what it wanted to achieve with distance learning technology. One faculty member felt that his/her institution had shown reluctance in the implementation. In the words of one instructor "It was not the faculty as much as it was the institution." Another faculty member said that, his/her institution had no consideration for quality issues. Some respondents felt that people at the top of the administration were their main problem.

Equipment

Faculty indicated that problems with distance learning technology equipment contributed to their unwillingness to use the technology for delivery of instruction. Some faculty said the technology was not suitable for demonstration and students' participation was difficult. Others were concerned with the unreliability of some of the equipment and the lack of technical assistance at remote sites. In the words of one instructor, "my problem was logistics and equipment." while another member's problem was keeping the equipment operational. There were also faculty who were concerned with the equipment's limitation. One person said it was difficult to motivate students; therefore the technology should be used for selective courses.

Planning

Planning was important in every teaching situation, but in teaching a distance class, more planning was involved. Some faculty considered the time spent planning

their courses to be the reason for their unwillingness to use distance learning technology for delivery of instruction. Respondents said time was inadequate due to work overload. A typical response was "lack of planning time, and poor past experience with the technology."

Faculty

Personal faculty reasons contributed to their unwillingness to use distance learning technology for delivery of instruction. They raised issues such as, fear of change and replacement, instructor knowledge and changes in technology. Some faculty blamed their unwillingness to use the technology on their colleagues. One faculty said the obstacle to his/her implementation was the "lacked of buy in on the part of some faculty" while others said they did not buy in to the technology.

Training

While faculty agreed that personal factors had hindered their use of distance learning technology for teaching, they were concerned with the lack of adequate training and staff development activities in that area. One faculty member said he/she needed not only reliable equipment but training in the use of the technology and improvement in teaching skills.

Incentives

Some instructors believed that much was needed in preparation time, to successfully use distance learning technology. Therefore, they equally believed that

more should be done in the area of incentives to faculty. Their unwillingness to implement the use of distance learning technology was simply due to the lack of reward or incentive to engage in such extra work. Other reasons given by faculty were "no feedback from students, "scheduling problem", "no psychomotor learning" and "student past experience with the technology."

Summary

Several factors may account for faculty unwillingness to use distance learning technology for delivery of instruction. The data clearly showed that more than half the respondents agreed that it was difficult to make demonstration while teaching, and another three quarters said they would like to be encouraged rather than just assigned to distance class. More than half the respondents also agreed that they lacked adequate information on the use of the technology and almost all faculty agreed that training was very vital if they were to use the technology effectively. They also agreed that poor teaching skills was an obstacle to using distance learning technology. About three quarters of the respondents would like their institution to provide more incentives for teaching a distance class and also have a clear policy on the use of distance learning technology. Other issues of concern were unreliable equipment, faculty fear of change and lack of initial involvement during planning.

Research Question V

5. To what extend are variables similar between users and no-users of distance learning technologies?

Faculty were asked some demographic questions that included age, years of teaching, academic rank, qualification and tenure. Additionally they were asked to indicate their level of agreement or disagreement to statements related to characteristics of diffusion adoption of innovation of new ideas (Rogers, 1995). These were relative advantage, compatibility, complexity, triability, and observability. A chi-square test was used to determine the relationship between these variables and use or non-use of distance learning technology for teaching.

In Table XXVII, fifty faculty members, 63.3 percent, or about two thirds agreed/strongly agreed that the quality of instruction delivered using distance learning technology is not comparable to face-to-face teaching, while twenty-seven, 33.2 percent, disagreed/strongly disagreed with the statement. Two instructors, 2.5 percent, did not respond to the statement. Table XXVIII shows that fifty-one respondents, 64.5 percent, or more than half, disagreed/strongly disagreed that using distance learning technology to deliver instruction increased faculty productivity, and twenty-three, 29.2 percent, agreed /strongly agreed with the statement. Five faculty members, 6.3 percent, did not respond to the statement.

TABLE XXVII

RESPONSES TO THE QUALITY OF INSTRUCTION DELIVERED USING DISTANCE LEARNING TECHNOLOGY IS NOT COMPARABLE TO A FACE-TO-FACE TEACHING BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	19	24.1	19	24.1
Agree	31	39.2	50	63.3
Disagree	17	21.5	67	84.8
Strongly Disagree	10	12.7	77	97.5
No Response	2	2.5	79	100.0

TABLE XXVIII

RESPONSES TO ISSUE THAT USING DISTANCE LEARNING TECHNOLOGY TO DELIVER INSTRUCTION INCREASES FACULTY PRODUCTIVITY BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	4	5.1	4	5.1
Agree	19	24.1	23	29.2
Disagree	37	46.8	60	76.0
Strongly Disagree	14	17.7	74	93.7
No Response	5	6.3	79	100.0

The issue of faculty intellectual property was not of great concern to faculty. Table XXIX shows that thirty-eight respondents, 57.1 percent, about half, disagreed/strongly disagreed that a faculty member did not have complete control of his/her intellectual property using distance learning technology, while thirty five faculty, 44.3 percent agreed/strongly agreed with the statement. Five faculty members, 6.3 percent, did not respond to the statement. Table XXX shows that seventy respondents, 88.6 percent, or more than three quarters, agreed/strongly agreed that prior knowledge and use of educational technology encourage faculty to use distance learning technology for delivery of instruction and seven faculty members, 8.9 percent, disagreed/strongly disagreed. Two instructors, 2.5 percent, did not respond to the statement.

TABLE XXIX

RESPONSES TO THE ISSUE THAT A FACULTY MEMBER DOES NOT HAVE COMPLETE CONTROL OF HIS/HER INTELLECTUAL PROPERTY USING DISTANCE LEARNING TECHNOLOGY BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	5	6.3	5	6.3
Agree	30	38.0	35	44.3
Disagree	33	41.8	68	86.1
Strongly Disagree	5	6.3	73	92.4
No Response	6	7.6	79	100.0

TABLE XXX

RESPONSES TO THE ISSUE THAT PRIOR KNOWLEDGE AND USE OF EDUCATIONAL TECHNOLOGY ENCOURAGES FACULTY TO USE DISTANCE LEARNING TECHNOLOGY TO DELIVER INSTRUCTION BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	25	31.6	25	31.6
Agree	45	57.0	70	88.6
Disagree	6	7.6	76	96.2
Strongly Disagree	1	1.3	77	97.5
No Response	2	2.5	79	100.0

Table XXXI shows that seventy-one faculty members, 89.9 percent, or more than three quarters, agreed/strongly agreed that distance learning technology is difficult to use without proper training and eight, 10.1 percent, disagreed with the statement. In Table XXXII, fifty-one faculty members, 64.6 percent, or more than half the respondents disagreed/ strongly disagreed that faculty should not be required to deal with technology if it was outside their area of academic expertise, and twenty-six faculty members, 32.9 percent, agreed/ strongly agreed with the statement. Only two instructors, 2.5 percent, did not respond to the statement.

TABLE XXXI

RESPONSES TO THE ISSUE OF DISTANCE LEARNING TECHNOLOGY IS DIFFICULT TO USE WITHOUT PROPER TRAINING BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	36	45.6	36	45.6
Agree	35	44.3	71	89.9
Disagree	8	10.1	79	100.0

TABLE XXXII

RESPONSES TO THE ISSUE THAT FACULTY SHOULD NOT BE REQUIRED TO DEAL WITH TECHNOLOGY, IF IT IS OUTSIDE THEIR AREA OF ACADEMIC EXPERTISE BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	11	13.9	11	13.9
Agree	15	19.0	26	32.9
Disagree	38	48.1	64	81.9
Strongly Disagree	13	16.5	77	97.5
No Response	2	2.5	79	100.0

The statement on trying a technology before using it was agreed with by an overwhelming majority of respondents. Table XXXIII shows that seventy-five instructors, 94.9 percent, or almost all of them agreed/strongly agreed that faculty should have the opportunity to pilot test distance learning technology before being fully engaged in using it. Three faculty members, 3.8 percent, disagreed with the statement, while one, 1.3 percent did not respond to the statement.

TABLE XXXIII

RESPONSES TO THE ISSUE THAT FACULTY SHOULD HAVE THE OPPORTUNITY TO PILOT TEST DISTANCE LEARNING TECHNOLOGY BEFORE BEING FULLY ENGAGED IN USING IT BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	32	40.5	32	40.5
Agree	43	54.4	75	94.9
Disagree	3	3.8	78	98.7
No Response	1	1.3	79	100.0

Table XXXIV, shows that forty-nine respondents, 62.0 percent, or more than half, disagreed/strongly disagreed that the use of distance learning technology for delivery of instruction is as effective as face-to-face teaching and twenty-nine, 36.8 percent agreed / strongly agreed with the statement. Only one faculty, 1.3 percent, did not respond to the statement. Respondents were split on the issue of students' performance. Table XXXV shows that thirty-nine instructors, 59.3 percent, or slightly more than half, agreed/strongly agreed that students taught using distance learning technology perform as well as students taught face-to-face, while thirty-four, 43.1 percent, disagreed/ strongly disagreed with the statement. Six instructors, 7.6 percent, did not respond to the statement.

TABLE XXXIV

RESPONSES TO THE ISSUE OF THE USE OF DISTANCE LEARNING TECHNOLOGY FOR DELIVERY OF INSTRUCTION IS AS EFFECTIVE AS FACE-TO-FACE TEACHING BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Agree	10	12.7	11	12.7
Agree	19	24.1	30	36.8
Disagree	26	32.9	56	69.7
Strongly Disagree	23	29.1	78	98.8
No Response	1	1.3	79	100.0

TABLE XXXV

RESPONSES ON THE ISSUE THAT STUDENTS TAUGHT USING DISTANCE LEARNING TECHNOLOGY PERFORM EQUALLY AS WELL AS TRADITIONAL FACE-TO-FACE CLASSROOM STUDENTS BY CUMULATIVE FREQUENCY AND PERCENT

Responses	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No Response	6	7.6	6	7.6
Strongly Agree	11	13.9	11	13.9
Agree	28	35.4	39	49.3
Disagree	24	30.4	63	79.7
Strongly Disagree	10	12.7	73	92.4
No Response	6	7.6	79	100.0

A chi-square test was conducted to determine the relationship between use or non use of distance learning technology, (Q43), and the following variables: age (Q28), years of teaching(Q39), rank (Q40), qualification (Q41), tenure (Q42) and the characteristics of diffusion adoption of innovation, which are, relative advantage (Q21), compatibility (Q24), complexity (Q25), triability (Q27) and observability (Q28).

The analysis showed that age, teaching experience, qualification, and tenure are significantly related to the use of distance learning technology, while rank is not significantly related. Table XXXVI shows that faculty who use distance learning technology to deliver instruction were more likely ($p=0.159$) to be between the ages of

45-59 years, and faculty members having 7- 16 years of teaching experience were more likely (p=0.388) to use distance learning technology to deliver instruction. Faculty members with a doctoral degree were also more likely (p=0.106) to participate in the use of distance learning technology for the delivery of instruction, and faculty members that were tenured were more likely (p=0.075) to use distance learning technology to deliver instruction. The variable rank had no significant relationship to the use of distance learning technology.

Table XXXVII showed faculty members that use distance learning technology were more likely (p=0.204) to believe that the use of the technology was better than the idea it superseded (relative advantage), and also were more likely (p=.430) to perceive the use of distance learning technology as consistent with their existing values, past experiences and needs (compatibility). Faculty members that used distance learning technology were more likely (p=0.993) to find the technology less complicated and simpler to use (complexity). Faculty members that use distance learning technology were more likely (p=0.687) to pilot test the technology before engaging in using it (triability) and were also more likely (p=.359) to see the results of using the technology as positive (observability).

TABLE XXXVI

CHI-SQUARE DETERMINATION INDICATING RELATIONSHIP BETWEEN USE OR NON USE OF DISTANCE LEARNING TECHNOLOGY AND VARIABLE AGE, TEACHING EXPERIENCE, RANK, QUALIFICATION AND TENURE

Variables	DF	X^2	P
Age	3	5.179	0.159
Teaching Experience	4	4.137	0.388
Rank	3	10.099	0.018
Qualification	2	4.496	0.106
Tenure	1	3.180	0.075

$\alpha = 0.05$

TABLE XXXVII

CHI-SQUARE DETERMINATION INDICATING RELATIONSHIP BETWEEN CHARACTERISTICS OF INNOVATION AND USE OR NON USE OF DISTANCE LEARNING TECHNOLOGY

Char.Inn	DF	X^2	P
Relative Advantage	3	4.599	0.204
Compatibilty	3	2.762	0.430
Complexity	2	0.15	0.993
Triability	2	0.750	0.687
Observability	3	3.220	0.359

$\alpha = 0.50$

Summary

It is clear from the data that the variables age, teaching experience, qualification, tenure, and characteristics of adoption of new ideas, mainly, relative advantage, compatibility, complexity, triability, and observability that may influence faculty utilization of distance learning technology were no different between users and non users of the technology. However, faculty members who use distance learning technology were more likely to be influence by these variables and characteristics diffusion adoption of innovation.

Research Question VI

6. What have institutions that offer Industrial and Technical Teacher education programs done to encourage faculty to use distance learning technology and to overcome resistance?

It was obvious that some institutions that use distance learning technology for teaching encourage their faculty while other institutions do not. The open-ended questions numbers 35, 36, and 37 asked faculty to give their opinion on how they were encouraged by their institutions. In response to question 35, three categories were determined: training, incentives, and administration.

Training

Some faculty agreed that their institutions encouraged them to use distance learning technology by providing training and professional development activities in the form of workshops and seminars. One faculty person said that only workshops and training were organized. There were also faculty who said their institutions provided all forms of support and resources they needed for successful implementation.

Incentives

While some faculty members said there was no encouragement from their institutions or departments, some said they received encouragement for their participation. Incentives such as monetary rewards and recognition were used to encourage faculty. In the words of one respondents "I am paid $3,000 for a three credit course" and another faculty member said he/she received an extra $2,000 to $3,000 per

course. Some faculty said they were paid a minor stipend for taking the extra workload, while others said they were recognized for their participation.

Administration

The administration was a key factor in faculty use of distance learning technology. While some faculty blamed their administration for their unwillingness to use the technology, others commended their administration for encouraging them to participate. In the words of one respondent, "my institution strongly encourages faculty." Some faculty members said they were recognized for participating in the implementation, and another faculty member said his / her institution provided released time and general recognition. Others said they were encouraged to use the technology because it was part of the institution's master plan.

The open-ended question 36, added more information relate to the research question. Respondents suggested ways to improve the use of distance learning technology. Their suggestions were similar to what some institutions are presently doing, which included providing incentives such as extra payment, lighter teaching loads, training, proper coordination, facilities, and equipment. Additionally they suggested two areas that needed attention by institutions that used distance learning technology. Some faculty felt that the issue of the quality of distance learning needs to be looked into further as well as the level of learning it was used for. Some faculty said the technology should only be used for cognition based learning and not psychomotor type skills learning

Question 37 added more information as to steps that should be taken to increase technical and industrial teacher education faculty's use of distance learning technologies. Respondents gave opinions similar to what some institutions have done to increase the participation of instructors. These included voluntary participation, and providing incentives and training. However they stressed another important area: the benefits of the technology. Faculty wanted their institution to show them the effectiveness of the technology, how it could improve students' learning and show them a model and provide evidence of success. In the words of one respondent, "I want the opportunity to see it in action to become more comfortable."

Summary

Some of the institutions that use distance learning for delivery of instruction have done much to encourage faculty to participate in teaching a distance class. Efforts made by these institutions include providing training and staff development activities. They have also provided incentives in the form of recognition and stipends up $3,000 to faculty teaching a course. Administrations have also allowed voluntary participation by faculty and have provided all necessary support and resources.

Summary

The data analyzed in this study form the bases for all findings, recommendations and further research suggestions. On the question of level of utilization, the data show that there is a low level of utilization and that faculty taught between one and three

courses per semester. All the distance learning technologies under study were used, including other technologies, such as computer, video tape and microwave.

Faculty that used distance learning technology encountered problems such as equipment failure, unadjusted work load, lack of student-teacher interaction, and difficulty in operating equipment while teaching.

In spite of all the problems involved with the use of distance learning technology, some faculty were willing use the technology. They gave reasons such as the desire to improve their teaching skills, provide current and prospective students with access to education, increase program enrollments and save money and travel time for their institutions.

The problems that faculty perceived or faced when using distance learning technology for the delivery of instruction have led some to resist participation. Reasons given by faculty were limited teaching skills; lack of adequate information, training, institutional encouragement, and incentives; vague policy, and the lack of adequate time for planning.

Respondents that used or resisted the use of distance learning technology for delivery of instruction did not show any difference in factors that contributed to use of distance learning. However, personal variables, such as age, teaching experience, tenure, qualification and the characteristics of diffusion adoption of innovation, significantly contributed to faculty use of distance learning technology. Some of the institutions that used distance learning technology to deliver instruction, encouraged faculty to use the technology to deliver instruction. These institutions provided

training, resources, and incentives in the form of monetary rewards, and recognized faculty who engaged in distance teaching.

The data indicated some problems with institutions as well as faculty. However, efforts were also made by both faculty and their institutions.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The use of technology by faculty to deliver instruction has not been an easy innovation, especially in this time of fast-changing technology. This study examined industrial and technical teacher education faculty's acceptance of distance learning technology. The purpose of this study was to identify factors that contributed to faculty willingness or unwillingness to accept or participate in the innovation of distance learning technology for the delivery of instruction. The study also investigated whether the characteristics of diffusion adoption of innovation of new ideas (Rogers, 1995), and other variables of resistance are similar between users and non users of the technology.

A review of literature provided information about studies in the following areas: The characteristics of diffusion adoption of innovation, the importance of distance learning, student performance and quality of distance learning, distance learning technology used for delivery of instruction, faculty knowledge, and skills needed to utilized distance learning technology and barriers to the use of distance learning technology, for delivery of instruction.

Data for the study was collected from industrial and technical teacher education faculty in twenty universities across the United States. The universities were selected

based on the investigator's knowledge of the information needed, universities that used distance learning, and the departments in these universities that were willing to participate in the study. A total of one hundred and seventy-nine (179) surveys were mailed and eighty-four (84) were returned representing a 47.0% response rate. Appropriate statistical techniques were used to analyze the data. These included frequencies, percentages and chi-square test with alpha set at 0.05.

Summary of Findings and Conclusions

The findings and conclusions of this study were based on the data analyzed and the issues reflected in the research questions.

1. Level of Utilization of Distance Learning Technology.

More than half the population studied used one or more distance learning technologies to deliver instruction, one third used compressed video. Other technologies that were used included satellite, fiber-optic, video tape, microwave, and computer-based technology (internet and web). Most faculty taught between one and three courses per semester. Three quarters, 75.9 percent, of the faculty surveyed were willing to continue or have plans to use the technology in the future, and about one quarter, 24.1 percent, were still resisting the use of the technology.

The results led to the following conclusions:

The level of utilization among industrial and technical teachers was low, and more than one third of the faculty member are still resistant to the use of the technology. Industrial and Technical teachers are beginning to realized the importance and advantages of using distance learning technology for delivery of instruction. This has

resulted in a positive change in attitude about future use of distance learning technology by faculty to deliver instruction to remote locations. If a distance learning technology is simpler and less complicated to use, its adoption will be encouraged by faculty. That was why compressed video was widely used.

2. Problems Encountered in Using Distance Learning Technology.

Faculty that used distance learning technology for the delivery of instruction indicated that the most common problems they encountered were I) equipment failure during delivery of instruction, II) work load not being adjusted to allow adequate time for planning and coordinating activities at remote sites, III) the lack of student-teacher, and student-to-student, interaction, IV) their role as technicians, and problems with operating some of the equipment due to their lack of technical knowledge.

These results led to the following conclusions:

I. Distance learning equipment that does not function properly, can cause frustration and subsequent dislike for the use of the technology.

II. Faculty jobs are made difficult when work load adjustments have not been made to allow instructors to coordinate activities at various sites and have sufficient time for planning and preparation.

III. The improper selection of distance learning technology by the administration or faculty, limited teaching skills and interaction techniques, and the lack of technical knowledge by faculty to effectively use the distance learning the technologies were major reasons for the inability to interact with students.

The preference by faculty, that technicians operate all their equipment, relates to the lack of technical training in the effective use of the distance learning technology.

3. Reasons for Using Distance Learning Technology.

Interestingly, most faculty believed that their institutions have not done much in terms of monetary reward or consider distance teaching a as valuable educational contribution. Nevertheless, the majority participated in teaching a distance class for the following reasons. They wanted to I) improve their teaching skills, II) provide current and prospective students with access to education, III) increase the enrollment in their programs, IV) save travel time to distant locations and reduce costs to their institutions.

These results led to the following conclusions.

Most of the respondents have realized that the key to effective use of distance learning technology is improved teaching skills and techniques. Thus, when faculty are involved in effective delivery of instruction, the result is improved teaching skills. Therefore, on a personal level, there was a desire on the part of faculty to improve their teaching skills.

Faculty interest in providing access to education means that they are aware of the declining enrollment in some of their programs, students constraints, and the demand of today's workforce for training and retraining.

Faculty who used distance learning technologies were aware of the shrinking budgets in their institutions and the need to spend more time in planning and preparation.

4. Reasons For Not Using Distance Learning Technology.

Faculty gave several reasons for their unwillingness to use distance learning technology for delivery of instruction: I) Limited teaching skills on the part of faculty which was complicated further by having to make demonstrations while teaching,

II) lack of adequate information and training in the use of technology, III) lack of institutional encouragement, support, and incentives, IV) vague institutional policies on the use of distance learning technology, and V) lack of adequate time for planning.

The results led to the following conclusions:

If faculty teaching skills and techniques are not improved before faculty are engaged in teaching a distance class, it was clear that their challenges will be greater and their lack of skills made more transparent when teaching. This situation had kept some faculty from participating.

There was a fear of change and uncertainty on the part of faculty member as a result of inadequate information. Additionally, there was limited or poor use of distance learning technology caused by lack of training. These circumstances have strengthened faculty resistance to the use of distance learning technology.

Some institutions or departments do not consider teaching a distance class a valuable educational contribution for promotion, salary increases, and tenure. They also make it mandatory for instructors to teach a distance class, and do not provide the necessary support and resources they need. This lack of encouragement made faculty question the incentives to become involved and therefore choose not to participate.

Faculty were confused about their institutions' policy on the use of distance learning technology because it was not made clear. They did not understand what their institution wanted to achieve with the technology and how it wanted to achieve that. Some faculty would not participate if they did not clearly understand the policy.

Faculty work is made more difficult because departments have not adjusted their work load to give them sufficient time for preparation and planning. When departments fail to take this into account, some faculty will not participate if given the choice.

5. Acceptance or Resistance Variables and the Characteristics of Diffusion of Innovation.

The data indicated that variables age, teaching experience, degree, tenure, and the characteristics of diffusion adoption of innovation of new ideas (Rogers, 1995) have significant relationship to the use of distance learning technology. There was no significant relationship between rank and the use or non use of distance learning technology.

These results led to the following conclusions:

In determining which faculty are likely to use distance learning technologies for the delivery of instruction, age, teaching experience, terminal degree, and tenure are key variables to be considered. Therefore, institutions should target their professional development effort toward younger faculty, those with limited teaching experience, and those who do not hold a terminal degree. Also when the characteristics of the diffusion adoption of innovation are given consideration by the administration and faculty, there is higher chance of participation in the use of distance learning technology by faculty.

6. Institution Effort to Encourage Faculty to Use Distance Learning Technology.

Some of the institutions that offer industrial and technical teacher education programs have encouraged faculty to use distance learning technology by 1) providing substantial hours of training and professional development activities, 2) providing

administrative support, equipment, and resources (Toll-free telephone, e-mail, fax, technical support staff), 3) providing incentives such as recognition and monetary rewards ranging from $2,000 and $3,000 4) allowing faculty to participate voluntarily and 5) providing adequate time for instructor preparation and planning. These results led to the following conclusions:

When faculty received adequate training on the technology they were expected to use, it boosted their confidence and reduced the chances of resistance to participation.

Faculty will engage in trying new technology if there is full support and encouragement from their institution and administrators.

Voluntary participation, monetary rewards, recognition, and reduced work loads, were all incentives that would allow faculty to participate in the use of distance learning technology for the delivery of instruction.

Recommendations

The study focused on faculty level of utilization and resistance of distance learning technology for delivery of instruction at remote sites. Distance learning is not a replacement for the traditional face-to-face classroom teaching but an additional tool for instructors to reach students in distant places. Like all technology, distance learning technology has its own disadvantages. However the success of its implementation rests on the willingness of faculty to use the technology and the institutional support rendered to faculty. Therefore the findings and conclusion have led to the following recommendations. Institutions and faculty that use distance learning technology for delivery of instruction should consider the following:

Characteristics of Diffusion Adoption of Innovation: Institutions and faculty willing to use distance learning technologies need to give more consideration to characteristics of diffusion adoption of innovation of new idea (Rogers, 1995).

(I) Institutions should allow faculty to understand the advantage of using distance learning technology by providing and sharing necessary information, before faculty are asked to participate (Relative advantage).

(II) Institutional culture and values should be consistent with its policy on the use of distance learning technology, and should meet the needs of faculty expected to use the technology (Compatibility).

(III) Adequate training should be provided to faculty on how to use, plan, and coordinate activities, in order to make the entire process understood and the use of distance learning technology simpler (Complexity).

(IV) Faculty should pilot test whatever technology they are expected to use in order to reduce some of the difficulty they may encounter in the process of using it (Triability).

(V) Institutions should pilot test the technology so that faculty can visibly see the possibilities and relative advantages of the use of the technology (Observability).

Quality: Institutions that use distance learning technology should evaluate the issue of quality, that is, the process involved, students' satisfaction, achievement, personnel needed, and the development and delivery of distance learning courses, before engaging in the use of the technology. Courses to be taught using distance learning technology should be selected on the basis of the need to deliver such courses through distance learning and the availability of appropriate technology.

Workload: Institutions or departments that use distance learning technology should consider adjusting the workload for faculty engaged in teaching a distance class, so that they can devote more time to planning and preparation. This is necessary if their productivity is to be increased. Minimum workload has been associated with high productivity and effectiveness in teaching; however increasing faculty workloads will lead to reduction and omissions of important curriculum components.

Rewards: Reward has long been ignored by some institutions that use distance learning technology to deliver instruction. It is important that teaching a distance class be considered a valuable educational contribution, for promotion, tenure, and salary increases. Additionally faculty can be paid extra stipends when they take the extra load of teaching a distance class.

Training: Faculty should be exposed to adequate training that includes the use of distance learning equipment and how to incorporate the technology into instruction. Training should also involve interaction strategies and appropriate teaching techniques. This can be achieve by long or short term training and periodic professional development activities. Training will improve faculty members' self-concept and confidence in the use of distance learning technology. It will also provide them with intellectual stimulation and opportunities to develop new knowledge and skills.

Support: Administrative support is vital to the success of distance teaching. The administration should give its full backing to the innovation, by encouraging voluntary participation and providing all necessary support and resources it can afford. Without the support of the administration, it will be difficult for the institution and faculty to achieve the desired success.

Policy: The policy that is developed to guide the use of distance teaching should be made clear by the institution. The policy should clarify areas related to academic issues, service areas, staffing, structures, technology, workload, incentives, training, legal issues, and student support services. The policy should be made available to all faculty.

Further Research

The sampling procedure used in this study does not allow for generalization of the results.

1. The researcher would recommend further study involving a much broader population and the use of random sampling method to select the sample. Emphasis should also given to quality of distance learning in the study.

2. Further research should also focus on the role of administrators of distance learning programs.

3. Study should be conducted on how to best train faculty to use distance learning technology and also to determine the kind of teaching techniques that are most effective.

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APPENDIXES

APPENDIX A

LETTER TO HEADS OF DEPARTMENT/PROGRAM

OKLAHOMA STATE UNIVERSITY

OSU

College of Education
School of Curriculum and Educational Leadership
245 Willard Hall
Stillwater, Oklahoma 74078-4042
405-744-7125, 405-744-8893
Fax 405-744-6290

October, 4th 1997

Dear Head of Department / Coordinator,

I hope all is going well for you today. Based on our recent telephone conversation in which you accepted the participation of your department in my research on **Faculty Acceptance of Distance Learning Technology for the Delivery of Instruction**.

I have enclosed the instruments and return envelopes for the faculty in your department. As per our agreement, please distribute the research instruments to the faculty, and ask them to return to me in the prescribed manner. If you have any questions, do not hesitate to contact us at Oklahoma State University by e-mail at hpt@okstate.edu or RLM6604@okway.okstate.edu or telephone, (405)743 -1463 and (405) 744 - 7741

I greatly appreciate your willingness to participate in my study. Thanks for facilitating the distribution of my survey

Sincerely,

Hassan B. Ndahi
Graduate Research Associate

Curriculum Studies/ Supervision
Educational Leadership
Elementary, Secondary and K-12 Education
Occupational Education Studies
Reading Education
Special Education

APPENDIX B

LETTER TO INDUSTRIAL AND TECHNICAL EDUCATION FACULTY

Oklahoma State University

Occupational Education Studies
College of Education
Stillwater, OK 74078

Dear Faculty,

Our educational institutions will always operate in a changing environment. Similarly, the changing student demographics, educational reform movement, continuing adult education, and the changing knowledge base required, demand that more tools need to be used to deliver instruction other than the traditional means of delivery by industrial and technical teacher educators.

Distance learning technologies are among the tools that can be used to deliver instruction reaching different geographic locations, to students with individual needs, personal responsibilities, and for training and retraining purposes. These technologies are not the replacement of the traditional method of delivery of instruction, but rather additional means for faculty to reach all students.

This national study seeks to describe variables related to the **Level of acceptance of live interactive distance learning technology** by industrial and technical teacher education faculty for the purpose of making recommendations to faculty and institutions regarding the utilization of distance learning technology. Your response to all questions in the survey is highly appreciated. This survey will take approximately fifteen minutes to complete.

You are assured complete confidentiality and the findings of the study will be used for the purpose stated only. If you have any questions, comments, or are interested in the results of the study, do not hesitate to contact us at Oklahoma State University. E-mail hpt@okstate.edu or RLM6604@okway.okstate.edu and telephone, (405) 743-1463 and (405) 744-7741. You may also contact Gay C. Clarkson, the executive secretary Institutional Review Board, 305 Whitehurst, Oklahoma State University. E-mail gay@okway.okstate.edu or (405) 744-5700.

Thank you for your assistance in making this study a success.

Sincerely,

Hassan B. Ndahi
Graduate Research Associate,
Independent and Correspondence Study,
Oklahoma State University.

Reynaldo, L. Martinez, Jr. Ph.D
Associate Professor,
Occupational Education Studies,
Oklahoma State University.

APPENDIX C

INDUSTRIAL AND TECHNICAL EDUCATION

FACULTY QUESTIONNAIRE

Part 1: This section should be completed by all faculty. Circle the number that reflects your level of agreement with the statements.

Key For Items: 1 = Strongly Agree, 2 = Agree, 3 = Disagree and 4 = Strongly Disagree.

		SA	A	D	SD
1.	Problems with equipment are a major concern to faculty in using distance learning technology for delivery of instruction.	1	2	3	4
2.	Problems may arise in the delivery of instruction because more than one person is involved in the planning, production and delivery of a course.	1	2	3	4
3.	Faculty lack the technical knowledge to handle some of the distance learning technology and equipment.	1	2	3	4
4.	Teacher- student interaction is difficult when using distance technology to deliver instruction.	1	2	3	4
5.	Teaching a distance class does not affect faculty member status on campus.	1	2	3	4
6.	Using distance learning technology to deliver instruction improves faculty teaching skills.	1	2	3	4
7.	Institutions have done much in terms of monetary rewards to faculty who teach a distance class.	1	2	3	4
8.	Teaching a distance class is a valuable educational contribution considered during promotion, tenure and salary increase.	1	2	3	4
9.	It is more difficult to make demonstrations to students, using video systems technology.	1	2	3	4
10.	A course taught using distance learning technology does not use class time as effectively as a traditional classroom course.	1	2	3	4
11.	The authority of a faculty member is disrupted by using distance technology to teach a class.	1	2	3	4
12.	Faculty were not involved in the initial planning process to implement distance learning technology.	1	2	3	4

1= Strongly Agree, 2 = Agree, 3 = Disagree and 4 = Strongly Disagree

		SA	A	D	SD
13.	Faculty should be encouraged to use distance learning technology for delivery of instruction and not merely assigned to teach a distance class.	1	2	3	4
14.	Lack of adequate information about distance learning technology affects its utilization for delivery of instruction.	1	2	3	4
15.	Most faculty must be trained if they are to use distance learning technology effectively.	1	2	3	4
16.	Lack of incentives for teaching a distance class is an obstacle to faculty use of distance technology for delivery of instruction.	1	2	3	4
17.	Lack of clear institutional policies on the use of distance learning technology affects its adoption by faculty.	1	2	3	4
18.	Teaching using distance technology requires too much planning on the part of the instructor.	1	2	3	4
19.	Poor teaching skills could hinder the use of distance learning technology for the delivery of instruction.	1	2	3	4
20.	Faculty who does not have a strong sense of ownership in the planning and implementation, would not choose to use distance learning technology if given the choice.	1	2	3	4
21.	The quality of instruction delivered using distance learning technology is not comparable to face-to-face teaching.	1	2	3	4
22.	Using distance learning technology to deliver instruction increases faculty productivity.	1	2	3	4
23.	A faculty member does not have complete control of his/her intellectual property using distance learning technology.	1	2	3	4
24.	Prior knowledge and use of educational technology encourages faculty to use distance learning technology for delivery of instruction.	1	2	3	4

1 = Strongly Agree, 2 = Agree, 3 = Disagree and 4 Strongly Disagree.

		SA	A	D	SD
25.	Distance learning technology is difficult to use without the proper training.	1	2	3	4
26.	Faculty should not be required to deal with technology if it is outside their area of academic expertise.	1	2	3	4
27.	Faculty should have the opportunity to pilot test distance learning technology before being fully engaged in using it.	1	2	3	4
28.	The use of distance learning technology for delivery of instruction is as effective as face-to-face teaching.	1	2	3	4
29.	Students taught using distance technology perform equally well as traditional face-to-face taught students.	1	2	3	4

1 = Strongly Agree, 2 = Agree, 3 = Disagree and 4 Strongly Disagree.

Part 2: This section is to be answered by all faculty. The section asks your opinion on issues about the use of distance learning technology for delivery of instruction.

30. How often do you use distance technology to deliver instruction to a distance class?

31. What were the problems you encountered in using distance learning technology for delivery of instruction?

32. Briefly describe your primary reason for using distance learning technology for delivery of instruction.

33. How many hours of formal instruction or training have you received in using distance distance learning?

34. In your opinion, what are the obstacles hindering the successful implementation of the use of distance learning technology for delivery of instruction?

35. In your opinion, how does your institution encourage faculty to use distance learning technology for delivery of instruction?

36. Based on your experience with distance learning technology, what improvement would you suggest?_____

_____

_____

37. In your opinion, what steps should be taken to increase technical and industrial teacher education faculty acceptance and utilization of distance technologies for delivery of instruction? _____

_____

_____

Part 3: This section contains demographic questions to be answered by all faculty. Please circle the number that corresponds to your choice.

38. What is your age group?

(1) 18-29 years (2) 30-34 years (3) 35-44 years (4) 45-59 years (5) 60+ years

39. How many years have you taught in higher education?

(1) 1 - 3 years (2) 4 - 6 years (3) 7-10 years (4) 11 - 15 years (5) 16 + years

40. What is your academic rank?

(1) Professor (2) Associate Professor (3) Assistant Professor (4) Instructor

41. What is your highest academic degree?

(1) Doctoral degree (2) Masters Degree (3) Bachelor degree (4) Associate degree

42. Do you have tenure?

(1) Yes (2) No

43. Have you taught a distance class using distance learning technology?

(1) Yes (2) No

44. How many courses have you taught using distance learning technology?

(1) NO course (2) One course (3) Two courses (4) Three courses
(5) More than three courses.

45. Do you plan to use or will continue to use distance learning technology for the delivery of instruction in the future?

(1) Yes (2) No

46. Which of these distance technologies have you used?

(1) Compressed video (2) Fiber-Optic/Full motion Video (3) Satellite delivery
(4) Other (Specify) _____

_____

APPENDIX D

INSTUTIONAL REVIEW BOARD (IRB)

APPROVAL FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 08-21-97 **IRB#:** ED-98-007

Proposal Title: A STUDY OF INDUSTRIAL AND TECHNICAL TEACHER EDUCATION FACULTY ACCEPTANCE OF LIVE INTERACTIVE DISTANCE LEARNING TECHNOLOGY

Principal Investigator(s): R. Martinez, Jr., Hassan B. Ndahi

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:

Signature: John H. Wyckoff Date: August 25, 1997

Chair of Institutional Review Board

cc: Hassan B. Ndahi

VITA

Hassan Bata Ndahi

Candidate for the Degree of

Doctor of Education

Thesis: A STUDY OF INDUSTRIAL AND TECHNICAL TEACHER EDUCATION FACULTY ACCEPTANCE OF DISTANCE LEARNING TECHNOLOGY

Major Field: Occupational and Education

Biographical:

Personal Data: Born in Jos Plateau State, Nigeria, May 9, 1959, the son of Bata Ndahi and Akliwa.

Education: Attended E.C.W.A. Primary School, Jos, Nigeria, 1968-1973; attended Yelwa Practising School Bauchi, Nigeria, 1973-74, received Primary School Certificate; attended Government Secondary School. Bauchi, Nigeria, 1974-79, received the West African School Certificate; Attended Ramat Polytechnic Maiduguri, Nigeria 1979-82, received the Nigerian Certificate in Education; Attended Kaduna Polytechnic (A.B.U) Zaria, Nigeria 1985-87, received the Bachelor Degree in Technical Education; received the Master of Science degree in Trade and Industrial Education, Oklahoma State University, Stillwater, Oklahoma; completed the requirements for the Doctor of Education Degree at Oklahoma State University in May, 1998.

Professional Experience: Industry Practical Training, Graham Furniture Company, June-September,1980; Industry Practical Training, Borno Engineering Works, June-September, 1981; Technical Teacher, Government Technical College Mashi. Kaduna State, 1982-83; Technical Teacher, Government Science Secondary School Yerwa, Marduguri 1983-1988; Industry Practical Experience, State Mechanical Workshop Maiduguri, September 1986-January, 1987; Instructor/Supervisor, Sam Bass Nigeria Limited, Nigeria, 1985-1992; Senior Technical Teacher,

Government Technical College, Bama, 1989-1992. Graduate Reseach Associate, Independent and Correspondence Study, Oklahoma State University 1994-1998.

Honors: Recipient of Borno State Academic Achievement Award, 1988.