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Faculty Adoption and Integration of Technology at East Tennessee State University.

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ABSTRACT

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The purpose of this study was to identify and describe the demographic characteristics of faculty related to (1) faculty integration of technology, (2) the use of technological tools, (3) and the knowledge of computers and information technology of full-time faculty members at East Tennessee State University.

Four hundred forty-three full-time faculty members from East Tennessee State University were surveyed. The mailed and e-mailed returned responses for this study were 205. Eighteen hypotheses generated from 3 research questions were tested using Pearson Product-Moment Correlation, Analysis of Variance, Two-Way Analysis of Variance, and Multiple Regression Analysis.

This study showed that full-time faculty at East Tennessee State University possessed a positive attitude about the integration of technology and use of technological tools. The full-time faculty members also possessed a positive attitude towards the knowledge of computer and information technology.

Age did not have an impact on the integration of technology but was related to the use of technological tools and faculty knowledge of computers and information technology. No differences were found in the integration of technology, use of

technological tools, and knowledge of computers and information technology in gender and ethnicity. The percentage of computer usage in the classroom was related to the integration of technology, use of technological tools, and knowledge of computers and information technology while no relationship was found with tenure status. Differences were found between academic units and faculty integration of technology however, no differences were found in academic units and the use of technological tools and knowledge of computers and information technology. No relationship was found between faculty integration of technology and the number of years teaching whereas a relationship was found with the use of technological tools and knowledge of computers and information technology.

DEDICATION

This dissertation is dedicated to my parents, Albert and Wanda Lyons, and my husband, James Barnes, who have encouraged and supported me with love throughout my educational process.

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I would like to express my heartfelt appreciation for all who have spent countless hours to help me make my life-long dream a reality.

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CHAPTER 1

INTRODUCTION

Higher education has always sought out new and innovative technological ideas. These innovations produce and drive the global marketplace. This quest for advancement has allowed higher education institutions to be at the forefront of technological advances. However, the birth of a new century and the development of new technological tools have created an increased pressure on college and university faculty members to integrate new technologies into the classroom and to produce students prepared for the technology-based environment they will be entering.

The word "technology" was once defined as a basic calculation performed on a simple slide rule (Green & Gilbert, 1995). Today the word "technology" refers to technological tools that are used by many anyplace and anytime. These innovations have allowed faculty members to extend their instruction far beyond the traditional classroom. Instruction can be a learning experience encompassing the world.

Programmed instruction, computer-assisted instruction (CAI), and instructional systems were the some of the first types of technology used in the classroom. Computers were first placed in college classrooms in the 1970s, and the personal computer became a reality (Sharp, 2002). The 1990s were the beginning of the information age, which brought about the onset of the microcomputer. Colleges and universities were then faced

with an information-rich environment that supported educational activity, collaboration, and student/teacher interactivity (Trentin, 1999). Today, distance education has opened the door for teaching and learning anywhere, anytime, and anyplace in the world (Dubois, 1996).

College and university administrators are now confronting one of the most challenging issues in higher education: how to assist and support faculty with the integration of technology into the curriculum. Teachers are thought of as "Dispensers of knowledge," "information giver," "facilitators of learning …" (Leh, 2002, p. 44), in the education system of today. Today the classroom teacher must have a new attitude toward technology, a new understanding of the tools, and new approaches in teaching to adapt to the advantage of technology for instruction.

Throughout history, the teacher has been the person who provided information and knowledge to the students. However, with the onset of technology entering the educational arena, the role of instructor, teacher, facilitator, or faculty member has drastically changed. This paradigm shift has placed enormous pressures on teachers from administrators, students, and society to integrate new technologies into the curriculum.

Changing familiar teaching practices and strategies are daunting tasks for many educators. Inadequate training, students with an array of technological skills, privacy and personal safety issues, and standards and autonomy are just a few complexities that faculty now endure (DeVoss & Selfe, 2002). While many educators are reluctant to accept innovations in

teaching at the post-secondary level, others have valid concerns regarding technological advances in the classroom.

Institutions must constantly undergo change in order to remain on the cutting edge. Part of this process includes the way administration allocates resources, the instructional role of the faculty, the use of time, and the mission statements of colleges and universities. These constant comparisons aid universities in identifying areas for continuous improvement (Van Dusen, 1998).

Purchasing and placing computers in a classroom is not true technology integration (Dockstader, 1999). True integration happens when technology is effectively applied to a curriculum and to the students' learning. Educational researchers have designed many models of integration. These models describe steps or stages in incorporating technology into the curriculum and into student learning. Furthermore, Dockstader wrote that the teacher is an integral part of the integration.

College and university administrators, faculty, and staff have come to the realization that technology integration is inevitable. Technological skills are needed to succeed in the marketplace. Schools and teachers are called upon to educate a new technical workforce (Nisan-Nelson, 2001). However, the economic woes that besiege institutions of higher learning place them at a disadvantage. According to Pratt (2003), the institutions that rely heavily on state sales and federal income tax revenues are those that are feeling the greatest impact.

Some of the wealthiest private universities have already announced budget cuts, with others likely to follow.

Funding for higher education is on the decrease, while student enrollments are on the increase. One projected enrollment for postsecondary institutions by the year 2010 is 17.5 million (Office of Higher Education, 2000). The financial difficulties of colleges and universities have affected both the faculty and the students at most higher education institutions. The reality encountered by faculty members includes larger teaching loads, larger class sizes, and less research support, because of an economic crisis. According to Pratt (2003), students may be confronted with program elimination, higher tuition, and increased competition for courses and programs. Furthermore, post-secondary institutions must continue to operate during difficult financial times; and many have been striving towards new and innovative ideas to help alleviate the budget crunch. Kezar (2000) suggested several examples of how institutions were adjusting in these tough financial times. Profit-sharing, outsourcing, marketing, grant writing, and new revenue generations were the positive financial strategies that institutions were using to continue higher education operations. These strategies allow colleges and universities to continue their quest for offering quality education, which in turn means implementing new technologies and true integration.

No discussion of technology integration is complete without considering future technological innovations. Many institutions have developed five-year technology plans that include distance

education. Many educators support distance education as a mode for teaching and learning. Colleges and universities are just beginning to understand that distance education has the potential to increase productivity, enhance the curriculum, and prepare students for the marketplace (Green & Gilbert, 1995). Institutions have begun to explore these new and exciting global technology tools. However, some are hesitant and are cautiously waiting to ensure that these new technologies offer high-quality teaching and learning on college and university campuses.

Significance of the Study

Colleges and universities are undergoing a major transformation. New technologies function as indicators for this change with these technological advances. These changes in familiar teaching practices may be initiated by demographic concerns such as age, gender, ethnicity, tenure status, academic units, number of years teaching, and percentage of computer usage in the classroom. The success of the new methods of instruction with these technological advances will also be impacted by faculty integration of technology, use of technological tools, and the knowledge of computers and information technologies. In response to these changes, faculty members are confronted with the need to adopt new teaching and learning techniques for instruction.

Purpose of the Study

The purpose of this study was to identify and describe the demographic characteristics of faculty related to (1) faculty integration of technology, (2) the use of technological tools, (3) and the knowledge of computers and information technology of full-time faculty members at East Tennessee State University. The results of this study identified the characteristics that affect the adoption and integration of technology in the classroom at East Tennessee State University. The study also investigated faculty knowledge of computers and the technology tools used in instruction and learning.

Research Questions

1. To what extent are demographic characteristics related to faculty integration of technology at East Tennessee State University?

2. To what extent are demographic characteristics related to the faculty use of technological tools at East Tennessee State University?

3. To what extent are demographic characteristics related to faculty knowledge of computers and information technology at East Tennessee State University?

Limitations

The following limitations are applicable to this study:

1. The study was limited to the full-time faculty to determine the faculty adoption and integration of technology at East Tennessee State University.

2. This study was limited in scope by considering those variables included in the 65 items on the Faculty Adoption and Integration of Technology instrument.

3. My professional interest and background is both strength and a limitation with regard to this study. I am a faculty member in the College of Education at East Tennessee State University. I have over 10 years of professional work experience in education and a master's degree in education with a major in Instructional Technology. Study findings represent the interpretation of data that is of significance and importance to the researcher.

4. This study was limited to full-time faculty members of fall semester 2003.

Definition of Terms

Within the scope of this study, unless otherwise clarified in reference to a specific work, the following definitions are used:

Demographic Characteristics - include the following variables related to this study: age, ethnicity, gender, academic unit, number of years teaching, and academic rank.

Diffusion – members of a social system communicating about an innovation through certain channels and over time (Rogers, 1995).

Innovation – an individual perception of a practice, idea, or object that is perceived as new (Rogers, 1995).

Integration – enhancing student learning by incorporating technology into a curriculum area (Dockstader, 1999).

Use of Technological Tools - the operation of specific technological products.

Technological Tools

Computer - assisted instruction – courseware/software that teaches skills and/or information related to a specific topic (Roblyer, 2003).

Distance learning - electronically connecting students with instructors and/or resources that can help them attain knowledge and skills.

Filtering technologies - a software program that will filter inappropriate material or web pages from loading in on a computer.

Groupware and collaboration tools - software program(s) and/or imported data used for training purposes on the computer.

Instructional learning systems - a set of networked computers using software programs to assist the instructor with data management and student instruction.

Knowledge-management systems – a system (computerized) developed to support learning and skills through the presentation of information.

Microcomputer - a small, stand-alone computer designed for use by one person.

Multimedia presentation technologies - a computer system or computer software product that incorporates text, sound,

pictures, graphics, and/or video and is displayed in slide presentation format.

Networked Technologies – a file server that connects series of computers through wireless or cabling system.

Overview of the Study

Chapter 1 contains an introduction to the study, statement of the problem, research questions, limitations, definition of terms, and the organization of the study.

Chapter 2 provides a review of related literature.

Chapter 3 includes information regarding the methodology of the study, introduction, research design, population, instrumentation, hypotheses, data collection, and data analysis.

Chapter 4 provides a presentation and analysis of the data.

Chapter 5 contains a summary of the findings, conclusions, and recommendations resulting from the study.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

This study is concerned with the faculty adoption and integration of technology at East Tennessee State University. Chapter 2 is divided into five major sections that address these components and issues. The sections are based on the book *Information Technology: A Road to the Future* (Gilbert & Green, 1995).

In the first section, the historical aspect of technology in education is introduced. The second section includes a discussion of the campus environment of higher education institutions, including faculty and students, faculty adoption of technology, and the institution and technology. In the third section, an overview of the models of technology integration and the technological tools used by college and university campuses' faculty are presented. The fourth section includes the motivating behaviors of the institution that influence effective technology integration on college and university campuses. The fifth section addresses the aspects of change and future expectations that are facing students, faculty, and institutions in the 21st century.

Evolution of Technology in Education

Technology has made the transition from the simple slide rule to a networked computer system that allows its users to

communicate instantly worldwide. The slide rule is a tool used by one person to perform mathematical calculations (Green & Gilbert, 1995). Today technology encompasses a network of tools that are used by millions worldwide. In this transition of today's high-tech tools, our understanding and definition of technology have changed, especially in the field of education. According to Rosow (2001), "Technology has achieved almost cult status among educational designers…" (p. 31). The interaction of technological innovations opened the door for teaching and learning, especially on college and university campuses. Campuses once spoke of informational technology, but today they speak about the integration of technology. Overall, technological innovations have changed the roles of the traditional teacher and have extended learning outside the classroom walls.

Prior to the Microcomputer

One of the first documented sources of technological instruction in education was programmed instruction. Programmed instruction is the accumulation of information broken into small easy-to-read segments. B. F. Skinner, a Harvard psychologist in the early 1950s, introduced this type of instruction. Skinner gave his students small sections of information to learn and master on a new machine that was known as the teaching machine. The teaching machine made it possible for a student to learn at his or her own rate. After the completion of each assignment, the teaching machine administered a test to each student to

ensure accuracy and mastery of the skill. The teaching machines would evaluate their progress and give immediate feedback (Sharp, 2002).

In the late 1950s and the early 1960s, there was an increased interest in computer-assisted instruction (CAI). Computer-assisted instruction encompassed students' involvement in instructional activities on the computer. Sharp (2002) determined that the first instructional use of computers was in 1959 in a federally funded project for students in New York City. This project supported research and instruction of binary arithmetic to school-aged children.

Other movements that shaped technology integration in education included the use of instructional systems. Instructional systems were first introduced by the military but emerged later in university research. This approach helped change the attitudes of teachers, administrators, and society, demonstrating how the teacher and a media could work together to address instructional needs (Roblyer, 2003).

The Microcomputer

In the late 1970s, computers were first placed in classrooms, and the focus moved from instructional systems to the microprocessor chip and the microcomputer. The Apple II and the IBM Personal Computer entered the marketplace, and the desktop computer became a reality (Sharp, 2002). Industrial and vocational educators first introduced technology education. Education reflected the need for technology and training

students for the job market. These early adopters opened the door for higher education and its understanding of the need for technology by all students in all curriculum areas (Roblyer, 2003).

Future Expectations

Education has always been attracted to the potential and the promise of new technologies. In the 1950s, there was the birth of the television. In the 1970s, educators saw the arrival of the personal computer. The 1990s brought about the information age and the great expectations of technology and its role in teaching and learning. While the microcomputer was evolving, students, faculty, and higher education institutions were engaged in the onset of the revolution of the microcomputer. Truckloads of desktop computers were purchased and brought to thousands of educators who had never thought of themselves as computer users (Gilbert & Green, 1995).

The 1ate 1990s brought the second major phase of the computer revolution. Colleges and universities shifted their emphasis to communications and technology connectivity. Network services played a crucial role in keeping students, faculty, and administrators in touch. These network systems described an information-rich environment that supported educational activity, institutional collaboration, and student/teacher interactivity (Trentin, 1999).

The promise of technology yielded institutional productivity and extended instruction and learning to any

person, anywhere in the world, and at any time of the day or evening (Gilbert, 1996). The expectations of technology integration should have been accomplished by indicating an increase in student learning and an increase in faculty productivity. However, colleges and universities continually faced marketplace demands and the need for current technologies. According to Dubois (1996), most higher education institutions were faced with new initiatives and launched distance education technologies as a way for students to learn and to earn a degree. The author also reported that distance education technologies emerged to help eliminate barriers and to create a tool for learning for individuals all over the world, at many educational levels, and at any time.

Institutional Environment

Over the past 20 years, technological advances have dramatically changed the institutional environment and the lifestyles of most colleges and universities. According to Gilbert and Green (1995), "This transformation is inevitable, irreversible, and unpredictable…" (p. 5). Van Dusen (1998) revealed that over one-third of all American universities increased technology use in the classroom and offered an increased number of distance education courses to students. Bertelmann Foundation – AOL Time Warner Foundation (2002) noted, information and technologies are raising the limits on the standards needed to be successful in this century.

Faculty and Students

Many experienced faculty members have reported that the traditional classroom had changed. Technology has changed so rapidly that not only has the technology made teaching more productive; it has also made it more complex (Nisan-Nelson, 2001). Gilbert and Green (1995) reported that a small minority of faculty members found improvements by using information technology in their teaching. Leh (2002) agreed that education had been faced with new technological innovations; however, it has changed the traditional classroom and its instruction dramatically. Resources are essential for the classroom, and the learning process has become dynamic and multifaceted. Traditionally, faculty members have been the primary foundation for information and knowledge presented to students. Murray (2003) contended that teachers were individuals who assisted students in developing the needed skills to succeed in the future. Gilbert and Green (1995) wrote that faculty were knowledge workers who strove to adapt their work lives to provide knowledge as they met the demands of the new economy. Clearly, the faculty members of higher education institutions are vital components in this evolving society.

Leh (2002) wrote that students are wonderful new resources, not the traditional learner. She noted that learning no longer comes strictly from the teacher but from other students and from experts in the field of study. Leh also commented that a student may obtain information from various sources and in turn share with others. Bruner (1971) commented that students should have

interaction with other students and interaction with the teacher. The teacher should instruct through showing, giving the student the opportunity to make sense of the content in which they are learning.

Faculty Adoption of Technology

There are many factors that have an effect on faculty understanding and use of new technologies in higher education. According to Compeau and Higgins (1995), these factors have been an issue since the early 1970s. The operation of new hardware and software, professional development, and administrative pressures has been some of the demands facing the adoption and use of technology by college and university faculty. As the availability of equipment and technological publicity increased, the demand for adoption increased. Gilbert and Green (1995) noted, "A faculty member cannot adopt a combination of new teaching approaches, application of technology, and instructional materials as easily as he/she might pick a new textbook for a course" (p. 6). The authors stated that many faculty members have rarely had any formal training in the use of instructional technology. They supported that it was still rare for a faculty member to have had a class or have been a student where information technology was used in the classroom.

Rogers (1995) confirmed, "Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). He shared that there are four elements in the process of diffusion. The

elements included innovation, communication channels, time, and the social system. An innovation is a practice or idea that is new to an individual. The "newness" of technology is gaining knowledge about the innovation, persuasion to use the innovation, or making a decision to adopt the new innovation. Rogers also suggested five characteristics that explain the differences in rates for faculty adoption of a new technology. The five characteristics included relative advantages, compatibility, complexity, trialability, and observability. According to Pullman and Parsegian (1990), faculty members needed to become interested in technology, and then they would become confident and move on to other strategies of growth and development. Through training and practical exercise, the authors contended that these approaches could be obtained.

The ability to pass a message from one person to another is known as a communication. Rogers (1995) suggested that the most efficient means to inform a group about a new idea or new innovation was to pass information through communication channels. Mass media channels such as newspapers, Internet, telephone, radio, and television are means for transmitting new information or messages throughout a social system. Rogers (1995) confirmed, "…diffusion is a very social process" (p. 18).

The third factor in the diffusion process is time. Bates (2000) commented that timing is a critical component. It takes time to put technology systems into place and to develop effective curriculum that supports technology. Rogers (1995) addressed that there are five different measures (rates of

adoption) of individuals who adopt technology. The five different rates of adoptions included (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. Jacobsen (1998) stated that teachers who have adopted technology early are those who have much to contribute. She also wrote that early adopters' efforts should be widespread and that training, rewards/incentives, and support should be considered to build a strong structure for teaching and learning.

Mitra, Steffensmeier, Lenzmeier, and Massoni (1999) wrote that increasing the use of technology, supplying an efficient campus infrastructure, faculty training, capable technical support, and altering faculty attitudes would increase the adoption of technology and help eliminate barriers that hinder faculty adoption. Jacobsen (1998) stated that there are large numbers of faculty who are enthusiastic about teaching with technology. However, there are still many who are hesitant.

Jacobsen (2000) stated that there were five barriers that hindered faculty adoption of technology. The five items included (1) lack of time to develop instruction that incorporates technology, (2) problems scheduling computer time and resources for staff development classes, (3) limited financial support from administration for technology integration, (4) inadequate amount of computers for students, and (5) limited financial support for the development of instructional uses of technology. According to Jefferies (2000), a holistic approach to faculty training would help to break down the barriers that inhibit faculty adoption of technology. He reported those formal

training sessions, peer workshops, and mentoring approaches conducted by university faculty would assist with many barriers.

Solomon (1994) stated that a well trained faculty member can transform basic technology skills into successful multimedia products. Faculty members need basic instruction on tools, experience using the tools, and examples of how to integrate technology using those tools into the curriculum (Pullman & Paresgian, 1990). Educators need to have an appreciation for a full range of technological options and understand the workings of computers in order to become informed users of technology. Prior to presenting information in the classroom, faculty members need to add hardware basics, multimedia formats, networks, and basic trouble-shooting techniques to their pedagogical knowledge (Goodwin-Jones, 2002).

Arnold (1999) revealed that only the enthusiasts engaged in changed teaching practices and that engagement had to expand to all teachers. The enthusiasts are change agents who need to provide impressive examples and compelling evidence that technology enhances teaching and learning. However, most educators are still unprepared to use technology for instruction. "Teachers must not only 'know how' to operate technology, they must know 'how to use' technology to enhance learning" (Krueger, Hansen, & Smaldino, 2000, p. 47).

The National Center for Education Statistics (2000) reported that 23% of classroom teachers believed they were prepared to use technology in the classroom and were able to integrate these tools effectively into their instructional

practices. Ninety-three percent of these teachers attributed independent learning for their feelings of preparedness. A number of faculty members use technology for teaching, to communicate with students and colleagues, and for research. Sixty-seven percent of the faculty reported that the most stressful aspect of their daily workload was keeping up with new technologies. Seventy percent of the faculty members stated that they had a home computer and used this tool to communicate with their students (National Education Association of Higher Education, 1999). Further complicating issues were the demands and pressures placed on faculty by administration and by society. Critics of higher education constantly point their fingers at administration to provide students and faculty members with the proper training and opportunity to be successful in the marketplace.

Institutions and Technology

Gilbert and Green (1995) wrote that many institutions were trailing in the academic use of technology. The authors suggested that many higher education administrators were approving large amounts of money for technological tools based on the assumption that these tools would improve instruction and later bring rewards to the institution. Adams (2002) said that educational institutions were struggling with the societal demands of leadership and the role of incorporating technology. She stated that pressures had mounted to producing tech-savvy individuals with high-tech skills to meet the demand of society.

Green and Gilbert (1995) determined that time and monies that are invested today still lag behind in the areas informational technology and education. They also stated that higher education institutions and university faculty members are experimenting with using technologies in new ways with students.

Finally, Green and Gilbert (1995) determined that colleges and universities were falling behind in their development of a technological infrastructure. This lack of development is noticeable, especially in the area of curricular and instructional benefits. Overall, institutions must determine what they currently provide and measure where they would like to go. Gilbert (1996) discussed the developments of institutional productivity and information technology. His perspectives included the following:

> 1. Reach a wider, more diverse audience of students more efficiently (ultimately support learning for "anyone, anywhere, anytime"); for example increase student access to specialized topics for which many colleges and universities cannot afford to maintain through specialized faculty.
>
> 2. Decrease the time it takes students to complete courses and degrees without sacrificing content.
>
> 3. Encourage uniformity of (remedial and introductory) courses across institutions in order to increase economies of scale associated with developing course--related materials--or full courses--that can be offered by many institutions with little faculty intervention.
>
> 4. Increase students' responsibility for their own learning.
>
> 5. Increase interactive educational responses to individual differences in learning style, preferences, and capabilities among students.

6. Make substantial capital investments quickly, which (it is hoped) will lead to reductions in operating costs for students and institutions--a reduced incremental cost for additional educational applications of information technology.

7. Modify the reward structure to encourage most faculty to adopt new technology-based teaching approaches rapidly.

8. Compete effectively for additional students while maintaining the same faculty.

9. Increase the effectiveness and efficiency of educational transactions between students and the faculty, staff, and administration.

10. Increase the student/faculty ratio--as a means to or by-product of achieving some of the above objectives. (pp. 9-10).

Gilbert and Green (1995) concluded, "Clearly technology has brought both enhanced institutional productivity and reduced costs to some parts of higher education" (p. 9).

Technology Integration and Productivity

The planning and integration of technology in the college and university classroom has required institutions to think about the cost, complexity, and the duration of the process. With an understanding of these components, institutions can attain the full benefit for students, faculty, and the curriculum. Shapiro, Roskos, and Cartwight (1995) proposed, "Technology-enhanced learning environments use computers to simulate activities and promote student-faculty interaction" (p. 67). The author also reported,

> Over the recent years, computers and networks have become more widespread and accepted in faculty and staff offices

> and in collegiate laboratories. Now colleges and universities are stepping up to the next challenge: putting instructional technology to work in the classroom (p. 67).

Arnold (1999) explained that not many institutions have the proper strategic plan or the ample supply of money needed to produce such innovative effects. West (1999) reported

> The U.S. Department of Education is addressing the funding need by providing $75 million with its new program, "Preparing Tomorrow's Teachers to Use Technology." This new technology program provides grants to consortia by helping future teachers become proficient in the use of modern learning technologies (pp. 17-18).

West (1999) also noted "Higher education is beginning to change in response to these challenges" (p. 18). Daniel (1996) introduced the idea of the "mega-university." The mega-university was defined as an online university that has over 100,000 students enrolled. The mega-university has helped administrators focus on the issues of access, quality, cost, and the potential of technology. Daniel wrote that an example of a "mega-university" was the Open University in the United Kingdom. The Open University led in the pioneer work of distance education in post-secondary institutions. Overall, quality and technology are two major issues facing higher education and the mega-university.

Models of Technology Integration

According to Dockstader (1999), "True integration avoids merely substituting computers for traditional teaching methods and uses technology as part of an integrated set of educational tools. It involves efficiently and effectively using computers

so many students can apply learned computer skills in a meaningful way with a general curriculum" (p. 73). Computer skills should not be the focus of the curriculum but designed to take advantage of the technology and to enhance the learning. Dockstader provided steps needed for effective technology integration. Those steps included: (1) select the topic or curriculum area, (2) determine the technology, (3) choose a lesson to be used with the technology, (4) develop the lesson incorporating the technology, (5) teach the lesson, (6) evaluate the lesson and its effectiveness and, (7) adapt the lesson for future use.

In the past, the teacher's ability or inability to adapt to new technologies has been the cause for the success or failure of new technologies in education. According to Tobin and Dawson (1992), teachers have had the tendency to stay with familiar and comfortable instructional strategies. They are often thought of as the status quo by their school systems. Technology should be viewed as an important component of the school and the school curriculum. Rieber and Welliver (1989) provided a hierarchical or evolutionary process through which teachers adopted technology and integrated it into their instructional process. This process consisted of five steps: (a) familiarization (b) utilization (c) integration, (d) reorientation, and (e) evolution.

In the first stage, familiarization, teachers were introduced to various types of software. The teacher had little background and could easily be impressed with most activities.

One example of the activities included creating a handout or test in a word processing software. In the second stage, utilization, the teacher incorporated technology into their instruction. The teacher was limited to enrichment activities and drill and practice software. While the teacher may have been comfortable using this technology, when a problem occurred the teacher was quick to return to traditional methods. Integration was the stage that was thought to be an integral part of technology integration. It was also the final stage of integration for the majority of teachers. The fourth stage included the reorientation stage, which began to redefine the teacher's role as a professional educator. In this stage, the teacher took on new responsibilities and became more of a facilitator. The student took on more responsibilities in the learning process as well as took more initiative in how they learned. In the fifth stage, evolution, the teacher began his or her ongoing quest for integration. This process allowed the teacher to work with administrators in identifying educational solutions to various educational problems. This process was on-going process. The teacher developed and evaluated skills needed by other educators.

As education has changed to reflect the needs of society, teaching strategies have also changed. However, not all educators agree about appropriate strategies that will best achieve educational goals. Roblyer (2003) noted two views that have served as methods for teaching and learning and the technological applications associated with them. The first view

was known as direct instruction, which was derived mainly from cognitive learning theories (the information-processing branch) and behavior learning theories. Drill and practice and computer tutorials were examples of directed instruction. The second view was referred to as constructivist, which was derived from the cognitive learning theories. Web-based learning and multimedia production could be considered as examples of both directed and constructivist learning. Roblyer contended, "Proficient technology-oriented teachers must learn to combine directed instruction and constructivist approaches. To implement each of these strategies, teachers must select technology resources and integration methods that are best suited to their specific needs" (p. 56).

Gilbert and Green (1995) reviewed the "Implementation Cycle" that occurs during integration of technology in educational institutions. The cycle included four stages that were very slow moving as compared to industrial organizations of the same size. The stages included the following:

1. In this stage, planning, experimentation, and investigation are present recognition is seen and individuals are more productive with certain tasks produced on a computer (desktop). Small groups are encouraged to experiment with the technology.

2. An increase in funding is made available for professionals, and the institution is starting to see gains and accomplishments not seen before.

3. Readjustments are made in the costs and annual investments in technology. Growth continues and implementations of new functions are put into play.

4. Finally, new levels of effectiveness have arrived and efficiency has occurred. At this point the organization realizes that is not doing the same business as before. They are no longer pursuing the same objectives and goals. Due to the many advances made because of technology, no one now could conceivably abandon the use of it.

Gilbert and Green (1995) noted, "…most colleges and universities are somewhere in Phase 1 or 2 - spending money" (p. 11). However, these institutions must play an active role in moving on to Stages 3 and 4. Overall, "Institutions must not continue to underestimate the real cost, complexity, and duration of successful implementation process" (p. 12).

Integration Tools

Education has tested and tried new technologies as they have been introduced to society. These technological tools have been examined over a time spanning 50 years. Each new tool has had its failures and successes. According to Rosow (2001), power can be obtained through technology. It is up to the society to determine what it wants to do with such power. Senge (1990) reported that there was a variety of tools that supported institutions of learning. These tools expand the capacity to create results and nurture thinking. Examples of these learning tools include computers and peripheral devices, learning

software, and network systems, which connected knowledge and learning to application (Wilson, 1999).

According to Goodwin-Jones (2002), most colleges and universities in the United States have already adopted computer literacy requirements. These requirements vary according to the institution and are limited to basic computing skills. Goodwin-Jones (2002) reported that Florida Gulf Coast University had developed its own training program for its students using Microsoft Office tutorials. He found that Florida Gulf University faculty also used other learning software for developing training materials. They used programs from TechSmith and Ambrosia that included sounds and movies from the screen (in AVI or QuickTime formats). According to Lewis (1999), multimedia involved the use of many senses (stimulation) and was thought to increase information retention of students. In addition, Lewis added, "Interactivity adds yet another dimension. By interactive, we mean that the user can manipulate objects on the computer screen and receive visual or auditory feedback" (p. 23). According to Sharp (2002), educators can use various learning conditions to determine what courseware (software) will best fit the instructional process. She summarized five common types of courseware that help to accomplish these instructional tasks. The five were drill and practice, tutorials, simulations, instructional games, and problem-solving programs.

Wilson (1999) found that many educators stopped at this phase of technology integration: basic usage of computers and software programs in the classroom. He addressed a new array of

learning technologies that were available to the traditional classroom instructor. Network systems, as defined by Wilson, included a variety of tools, such as

1. Network technologies – A group of computers that share a single server and are connected through a series of cables or wireless access.

2. Web browsers – A technological tool that allows access to information resources available on the World Wide Web.

3. Filtering technologies – Software programs that assist users in gathering information and help filter unwanted materials.

4. Knowledge management systems – Systems (computerized) developed to support learning and skills through the presentation of information.

5. E-mail – An electronic communication tool for computer users.

6. Threaded discussion and conferencing tools – Online tools that enable a group of users to communicate online through the use of text and live presentation.

7. Groupware and collaboration tools – Computer software that allows the sharing of ideas and creation of products.

8. Multimedia presentation technologies – Tools that allow the computer user to incorporate graphics, video, and sound into presentations.

Wilson (1999) reported that it was hard for theorists to maintain the development of skills for the technology of the generation. Trentin (1999) confirmed that if we focused on

technology tools in education, then we clearly must consider the network system and its role in individual study and engaging collaboration. Shapiro, Roskos, and Cartwright (1995) introduced their ideas about technology integration and an example of a learning environment that is technology enhanced. The description included as follows: (a) electronic classroom that included a smart lectern teaching station, electronic presentation system, student response system, and a unobstructed view seating system, (b) teaching laboratory with a smart lectern teaching station, multiple networked computers, and a master computer control system, and (c) open laboratories with a set of networked computers, working space, and a direct connection to the academic institution.

According to Shapiro et al. (1995), learning environments were enhanced by the use of technology software and other technological tools. The authors also stated that the aim should not be to just add a piece of new technology to the classroom but to reconceptualize the traditional classroom. This required the educator to think of a learning environment enhanced with technology.

Motivational Behaviors of the Institution

Van Dusen (1998) contended that institutions of higher education had already begun to change. "From 1970 to 1995, higher education enrollment increased from approximately 8 million to 14 million, in large part due to adult enrollees 25 years of age and older" (p. 60). He noted that 750,000 students

were enrolled in distance education courses at colleges and universities in this country and that half of those universities used telecourses or two-way video.

Gilbert and Green (1995) revealed that growing numbers of college students were coming to college campuses with high technological expectations, many with proficient computer technology skills. The authors also suggested that colleges and universities must invest in technology to ensure that students were as competitive as students from other institutions. Overall, traditional colleges and universities had begun to realize that there are several competitive reference points that need to be considered for continued existence. These reference points include faculty teaching and learning, curriculum enhancement, and preparation for the job market.

Teaching, Learning, and Curriculum Enhancement

There are many ways that information technology can enhance courses, curriculum, and student learning. According to Gilbert and Green (1995), the major issue "…is the effective use of information technology resources as tools to support instruction and learning outcomes" (p. 17).

Even though we have adopted technology in the curriculum, the teacher is still the facilitator of instruction. The degree of integration depends upon the teacher and the technological tool that is used in the classroom. The teaching method should produce active learning and be appropriate according the grade level and subject area (Leh, 2002).

Kozma and Johnston (1991) examined the evolving uses of technology and identified seven ways that information technology could be transformed into teaching, learning, and the curriculum:

1. From reception to engagement - student passively absorbs knowledge dissemination to active engagement.

2. From the classroom to the real world - applies new knowledge to situations of the real world.

3. From text to multiple representations - the expansion of our abilities to understand, use symbol systems, and express one's self through the use of technology.

4. From converge to mastery - computers will drill and teach students essential concepts in a particular curriculum area.

5. From isolation to interconnection - technology has helped us move to collaborative activity rather than individualized acts.

6. From products to processes - technology is helping us move from the product to the process of creating knowledge.

7. From mechanics to the laboratory - technology can unleash possibilities of understanding in the area of science and the uses in the science laboratory.

Because teachers are the designers of the courses, they are considered the integral part of integration. The most critical component, in order for students to attain the true benefits of technology, lies in the implementation by the teacher.

Integration comes when technological tools assist students in the process of learning.

College and university faculty members understand and use computers in the classroom. However, teachers must be familiar with basic network services and be able to communicate effectively through the network. The vital component in the proper use of a computer network consists of being able to structure and manage the exchange of information of the parties involved. Trentin (1999) stated that this did not mean that every faculty member had to be a network expert just a regular user. He gave a list of the basic skills needed to manage and maintain information on a network. This information included (1) access to information, (2) knowledge sharing, (3) cooperation, and (4) professional development training on the network.

Challenges and Issues of Technology Integration

Technology is an essential part of the educational process. Information technology has become a needed component in all fields of study and in most aspects of the workplace. Higher education would do a disservice to its students if technology were not a part of the educational curricula. However, this issue is one that faculty members are unsure of how to address it and that universities cannot ignore (Gilbert & Green, 1995). They also found that the essential product of the workforce was technology. This workforce involves a different kind of worker. Nisan-Nelson (2001) suggested that society had placed a growing need for highly skilled workers upon educational institutions.

Plowman (2000) contended that the students' informational technology skills were the indicators of future success for the workplace. This thrust affected higher education and its traditional issues of academic integrity. West (1999) stated, "Technology is being used more and more by companies to facilitate the instructional needs of their employees…" (p. 16). He also noted that some companies had started their own private universities to offer skills needed for their employees. For colleges and universities to continue to grow and compete in the educational arena, they must address the issue of technological preparation for students preparing for the workplace.

According to Bates (2000), it is very important to get a general understanding of the benefits and the funding strategies for educational technologies in higher education. Colleges and universities are required to spend large sums of money for technology. Students require continuous upgrades of technological equipment to meet the growing needs of the workplace. Institutions are then forced pay these extending costs.

Colleges and universities are faced with a huge economic disadvantage. State sales taxes and federal income tax revenues are two areas that have greatly affected higher education institutions. This economic crunch has not only affected public institutions but has affected private institutions as well.

Student enrollment included another area of concern for post-secondary institutions. The projected enrollments given for colleges and universities by the year 2010 are 17.5 million

(Office of Higher Education, 2000). This increase in enrollment and the decrease in availability of money will greatly affect the educational campus. According to Pratt (2003), this reduction in the budget will bring about changes and significant harm to our campuses. This fiscal uncertainty creates a future for many on campus as unclear and discouraging.

In response to difficult financial times, institutions are developing new and creative ideas to help the budget situation. Kezar (2000) shared several promising alternatives that institutions could use to assist in these tough financial times. Profit- sharing, outsourcing, marketing, grant writing, and new revenue generations are financial strategies that institutions are using to continue progressive higher education operations. These strategies allow colleges and universities ways to implement new technologies and the integration of technology into the curriculum.

Changes and Expectations

With the continuous onslaught of new technology, traditional higher education institutions must realistically consider the changes they must face. The strategies of academic administrators, financial managers, and educators should reflect the focus of all institutional changes. Over the past decade, educational institutions have replaced typewriters with computers, telephones with cell phones, and the one classroom for a worldwide classroom. Over the next 10 years, institutions have the potential for many new advances. Gilbert and Green

(1995) stated that faculty had obtained these four instructional benefits: (1) increased personal and institutional administrative productivity, (2) enhanced traditional teaching, (3) changing pedagogy, and (4) changing content. Hopey and Ginsberg (1997) noted that many educational institutions are rushing to be a part of the new technological world hoping to stay competitive and not get left behind.

The Morrisville State University of New York (SUNY) campus realized the importance of technology for the future. The university equipped each building on campus with connectivity to the wireless local area network (LAN). Another part of its overall technology goal was to incorporate into its curricula the use of notebook computers. This goal allowed its students no confinement to classroom computer labs but provided university connectivity throughout the entire campus. The administration stated that this was a win-win situation (DeCerce, 2001). The Rose-Hulman Institute of Technology also introduced the use of student laptop computers into its engineering, science, and mathematics curricula. Each entering student purchased a laptop computer and a software suite that included a word processing, spreadsheet, and algebra calculating system. Overall, the faculty saw a paradigm shift in the work of the students. Students were no longer just performing mere calculations; instead, the students were found solving problems as they performed algebraic calculations (Kiaer, Mutchler, & Froyd, 1998). According to Pascopella (2002), students of the future will no longer have to carry backpacks filled with 1,000-page

textbooks. Online textbooks are becoming more and more common in educational institutions. An overall, online textbook encourages student interaction, provides the teacher with a management system, and meets the teacher's needs for integrating technology to the classroom. However, administrators must be wary in choosing online texts over traditional texts until they can ensure access for all students. According to Schifter (2000), "Distance education is the hot topic in higher education these days…" (p. 43). Plowman (2000) stated, "Educators now have an information tool that is in a position to revolutionize the way humankind learns" (p. 26). Schifter (2000) reported that distance education was an interactive computer-mediated communication system. These communication systems cannot operate without the participation of the faculty member. However, faculty participation in distance education programs requires a basic interest in technology. Early distance education programs required that faculty members know hypertext markup language (HTML). Today current management systems are reducing that need. Rankin (2000) described two other online tools that faculty and students used for distance education courses. Course web sites and online syllabi publicize course information from the instructor to the students very easily. These tools provide various university policies, class procedures, and make available needed hyperlinks to various resources in order for students to participate in the courses on campus.

Summary

This chapter reviewed literature related to faculty adoption and integration of technology in higher education institutions. It summarized historical issues of technology in education. The role of faculty members and the post-secondary student was examined. Several different models of technology integration were defined. A comprehensive discussion of technological tools was conducted. Finally, the chapter revealed motivating behaviors for integrating technology into faculty teaching and student learning. Present challenges and future expectations made up the conclusion of this chapter.

CHAPTER 3

METHODS AND PROCEDURES

Introduction

This chapter describes the research design that has been used in this study. This includes the population and sample, research instrument, research hypotheses, data collection procedures, and the methods used for analyzing the data.

Research Design

The objective of this study was to measure faculty adoption and integration of technology at East Tennessee State University (ETSU). ETSU opened in 1911 to prepare teachers for instruction in the public school system. Today ETSU serves more than 11,500 students primarily from Tennessee and Virginia. The university offers baccalaureate degree, master's degree, educational specialist degree, and doctorate degree programs. ETSU degree programs are available through schools and colleges related to four areas that include arts and sciences, business and technology, education, and health sciences and services. ETSU constantly expands and identifies programs to serve the local region, the state, the nation, and the world. The university supports higher education values and places emphasis on student learning and innovative teaching practices (ETSU Graduate Catalog, 2002-2003).

The ETSU Office of Information Technology provides faculty with the opportunity to participate in technology training and

to develop a personalized Faculty Technology Professional Development Plan. This plan can chart a course to improve faculty technology skills. Overall, the faculty technology professional development plans help to build and integrate a strong technological community campus-wide.

It also provides five technology tracks for faculty. The tracks include the following: (1) Core Technology Competencies-37 hours of coursework, (2) Professional Productivity-21 hours of coursework, (3) Instructional Technology Enhancements-34 hours of coursework, (4) Multimedia Classroom-16 hours of coursework, and (5) Online Course Development-20 hours of coursework. These technology professional development courses offer both core and advanced level technology-training tracks. All tracks support and enhance technology integration and lifelong learning (ETSU Office of Information Technology, 2003).

ETSU and the Office of Information Technology provide a wide array of technological training opportunities for faculty throughout the academic school year. These offerings are made available via the university web site, e-mail transmissions, and monthly technology training schedules. Classes and workshops are located in multimedia classrooms, scheduled at a variety of times throughout the month, and taught by highly skilled professionals in the field of technology and education.

East Tennessee State University also operates a wide-area network (WAN) that interconnects all academics classrooms and offices, laboratories, dormitories, and the administration offices across campus. The university maintains connectivity to

the World Wide Web, the Internet, and other educational networks. The entire community of ETSU has the opportunity to use this system (ETSU Graduate Catalog, 2002-2003).

The Faculty Adoption and Integration of Technology study investigated the relationship among predictor variables such as age, gender, ethnicity, tenure status, academic units, number of years teaching, and percentage of computer usage in the classroom using the following response variables: (1) faculty integration of technology, (2) faculty use of technological tools, and (3) faculty knowledge of computers and information technology. In this study, data were organized, collected, tested, and analyzed through quantitative research methods. To achieve the research objectives, 3 research questions and 24 hypotheses were generated and stated as the null hypotheses. The hypotheses were tested at the .05 level of significance.

Population and Sample

The target population of this study consisted of the full-time faculty employed at ETSU, excluding the College of Medicine and the Sherrod Library. A complete listing of full-time faculty was obtained from the ETSU Human Resources Office. As a result, 443 full-time faculty members were generated for the study.

Due to the technological nature of the study, a complete faculty e-mail listing was generated from the *ETSU 2002-2003 Telephone Directory and Student Handbook*. After the list was compiled, e-mail distribution lists were established for each college and/or school. The survey method was then adapted for

e-mail purposes. A letter was sent to each college dean at ETSU requesting support and permission to survey the faculty for data collection purposes. Five of the seven deans gave permission to survey the faculty of their college. A copy of this letter is included in Appendix C.

Instrumentation

The survey instrument was developed to gather data, test hypotheses, and answer questions posed in Chapter 1 of the study. The 65-item survey instrument consisted of five major sections. The first section was designed to include questions on demographic information (Questions 1-10). Short-answer responses were used for each of the demographic questions. In section two, questions 11 through 22 were used to measure faculty knowledge and information technology. Responses were coded on a four-point scale with the numerical one representing no experience and a code of four representing a great deal of experience. The response category of no access was coded nine and defined as missing.

Based on the analysis of the scale's internal reliability, discussed in Chapter 4, questions 19 and 21a were excluded from the scale. The faculty knowledge score was then created by summing the remaining 11 items in the scale and dividing by the number of items included. In section three, questions 29, 30, 31, 32, 33, 34, 35, and 36 covered the concept of faculty use of technological tools. The responses were given a score ranging from a four, which represented daily use of technological tools

to a score of one, which represented no experience. The response category for no access (NA) was coded nine and defined as missing. After the analysis of the internal reliability of the scale, presented in Chapter 4, questions 30 through 36 were summed and divided by the number of items to create the faculty use score.

The information in sections four and five included questions 43, 52, 54, 55, 56, 58, 60, 63, and 64 which were used to measure faculty characteristics that support integration of technology. A Likert-type format was established for these questions. The responses were given a score of Strongly Disagree (SD) coded as one to Strongly Agree (SA) coded as five. For this scale, questions 54 and 56 were reverse coded so that all integration items were measured with one representing the lowest degree of integration and five representing the highest degree of integration. After the analysis of the scale's internal reliability, presented in Chapter 4, the integration score was then created by summing the numeric responses to the items in the scale and dividing by the number of items.

Questions 37, 38, 39, 40, 44, 45, and 46, from sections four and five, were used to measure general attitudes about the adoption of technology. The responses were given a score of Strongly Disagree (SD) coded as one to Strongly Agree (SA) coded as five Questions 38, 39, and 45 were then recoded so that all items in the general attitude scale were coded with one representing the least favorable attitude and five representing the most favorable. The score was then created by summing the

numeric responses and dividing by the number of items in the scale.

Questions 42, 48, and 61, also from sections four and five, were used to measure faculty perceptions about the benefits of technology for students. The responses were given a score of Strongly Disagree (SD) coded as one to Strongly Agree (SA) coded as five. Each item was coded one through five with five representing the most favorable attitude regarding the benefits of technology for students. The scale score was created by summing the numeric responses to the items and dividing by the number of items.

Several of the questions selected for use in this survey were derived from two instruments that measure faculty attitudes and the integration of technology in the classroom. The instruments include the Technology Survey for Faculty and Staff Survey designed by the Southeast and Islands Regional Technology in Education Consortium (SEIR*TEC) and the Survey of Faculty Attitudes Toward Information Technology (FAIT) designed by Rhonda Christensen and Gerald Knezek of the University of North Texas, Denton, Texas. Letters of permission to use survey instruments are included in Appendix D.

A selected team of experts in the area of technology validated the instrument. Each person was contacted and sent a copy of the instrument. Dr. Harold L. Daniels, Program Coordinator of Educational Technology in the College of Education at East Tennessee State University, was requested to

review, evaluate, and critique the survey instrument (H.L. Daniels, personal communications, July 2003). Several other experts were asked to evaluate the instrument and to make suggestions and comments. Modifications were made according to the recommendations and comments.

The reliability of the instrument was tested through a pilot test that I conducted at ETSU. A sample of 10 faculty members from the user group was selected to complete the survey in order to test the reliability and clarity of the instrument. After the pilot test, interpretations and changes were made accordingly to complete the instrument. The individuals who participated in the pilot study were excluded from the later stages of the study. A copy of the instrument is included in Appendix B.

Following approval from the ETSU Institutional Review Board, I scheduled dates to mail and e-mail the survey to each of the full-time faculty of the university. I enclosed a cover letter with each survey explaining the purpose of the study. I also assured them that all information would be kept confidential.

Hypotheses

The following research questions were tested because of the questions generated in Chapter 1. The null hypotheses included Ho1A. There is no relationship between faculty age and faculty integration of technology.

Ho1B. There is no relationship between age and faculty use of technological tools.

Ho1C. There is no relationship between age and faculty knowledge of computers and information technology.

$Ho2A_1$. There is no difference in the integration of technology between males and females and ethnicity among full-time faculty of East Tennessee State University.

$Ho2A_2$. There is no difference in the integration of technology between males and females among full-time faculty of East Tennessee State University.

$Ho2A_3$. There is no difference in the integration of technology and ethnicity among full-time faculty of East Tennessee State University.

$Ho2B_1$. There is no difference in the use of technological tools between males and females and ethnicity among full-time faculty of East Tennessee State University.

$Ho2B_2$. There is no difference in the use of technological tools between males and females among full-time faculty of East Tennessee State University.

$Ho2B_3$. There is no difference in the use of technological tools and ethnicity among full-time faculty of East Tennessee State University.

$Ho2C_1$. There is no difference in the knowledge of computers and information technology between males and females and ethnicity among full-time faculty of East Tennessee State University.

$Ho2C_2$. There is no difference in the knowledge of computers and information technology between males and females among full-time faculty of East Tennessee State University.

$Ho2C_3$. There is no difference in the knowledge of computers and information technology and ethnicity among full-time faculty of East Tennessee State University.

Ho3A. There is no difference between academic units integrating and faculty integration of technology.

Ho3B. There is no difference between academic units integrating and faculty use of technological tools.

Ho3C. There is no difference between academic units integrating and faculty knowledge of computers and information technology.

Ho4A. There is no relationship between the integration of technology and the percentage of time that computers are used in the classroom.

Ho4B. There is no relationship between the use of technological tools and the percentage of time that computers are used in the classroom.

Ho4C. There is no relationship between faculty knowledge of computers and information technology and the percentage of time that computers are used in the classroom.

Ho5A. There is no relationship between the number of years of teaching and faculty integration of technology.

Ho5B. There is no relationship between the number of years of teaching and faculty use of technological tools.

Ho5C. There is no relationship between the number of years of teaching and faculty knowledge of computers and information technology.

Ho6A. There is no relationship between faculty tenure status and percentage of computer usage in the classroom and the faculty integration of technology.

Ho6B. There is no relationship between faculty tenure status and percentage of computer usage in the classroom and the faculty use of technological tools.

Ho6C. There is no relationship between faculty tenure status and percentage of computer usage in the classroom and the faculty knowledge of computers and information technology.

Data Collection

A listing of faculty campus addresses was obtained from the ETSU Office of Human Resources and a complete faculty e-mail listing was generated from the *ETSU 2002-2003 Telephone Directory and Student Handbook*. A cover letter and the 65-item Faculty Adoption and Integration of Technology Survey were mailed and e-mailed to the full-time faculty members at ETSU except, those in the College of Medicine, the Sherrod Library, and those who participated in the pilot study. The mailings took place in the fourth week of September 2003. During the first week of October 2003, a second survey was sent to faculty members who had not yet responded. All surveys were collected by the second week of October 2003. Data were collected and organized for statistical analysis.

Data Analysis

Items from the Faculty Adoption and Integration of Technology Survey were used in data analysis for this study. The independent variables in this study were age, gender, ethnicity, tenure status, academic units, number of years teaching, and percentage of computer usage in the classroom. The dependent variables were the integration of technology, use of technological tools, and knowledge of computers and information technology of full-time faculty of ETSU. Descriptive and inferential statistics were used to determine significance between dependent and independent variables. Univariate descriptive statistics were used to evaluate the faculty's general attitude and student benefits of information technology.

The computerized process for data analysis was conducted by using the Statistical Package for Research Software Program (SPSS). The data were organized and entered into the software program as required by the research design. Pearson Product-Moment Correlation Coefficient, Analysis of Variance, Two-Way Analysis of Variance, and Multiple Regression tests were used to determine differences and relationships of the data. Tables were used to present data that were collected.

The first step in data analysis was to address Research Question One: To what extent are demographic characteristics related to faculty integration of technology at East Tennessee State University? An Analysis of Variance, Two-Way Analysis of Variance, and a multiple regression test were used to determine the level of technology integration of null hypotheses $Ho2A_1$,

$Ho2A_2$, $Ho2A_3$, Ho3A, and Ho6A. The tests examined the level of technology integration of full-time faculty members at ETSU.

Null hypothesis Ho1A, Ho4A, and Ho5A were used to analyze the relationship between the faculty integration of technology and demographic characteristics. A Pearson Product-Moment Correlation Coefficient test was used to indicate direction and significance of the hypotheses.

The second step in the data analysis process was to address Research Question Two: To what extent are demographic characteristics related to faculty use of technological tools at East Tennessee State University? An Analysis of Variance, Two-Way Analysis of Variance, and a Multivariate Regression test were used to test null hypotheses $Ho2B_1$, $Ho2B_2$, $Ho2B_3$, Ho3B, and Ho6B.

Null hypothesis Ho1B, Ho4B, and Ho5B were analyzed to determine whether if there was a relationship between demographic characteristics and the use of technological tools. A Pearson Product-Moment Correlation Coefficient was used to predict and evaluate relationships between the characteristics and the utilization of technological tools.

The third step in the analysis process was to focus on Research Question Three: To what extent are demographic characteristics related to faculty knowledge of computers and information technology at East Tennessee State University? An Analysis of Variance, Two-Way Analysis of Variance, and a Multivariate Regression test were conducted null hypotheses $Ho2C_1$, $Ho2C_2$, $Ho2C_3$, Ho3C, and Ho6C. A Pearson Product-Moment

Correlation test was used to test for relationships of null hypotheses Ho1C, Ho4C, and Ho5C. The results of this analysis can be found in Chapter 4.

CHAPTER 4

ANALYSIS OF DATA

Introduction

Chapter 4 presents an analysis of the data collected from ETSU full-time faculty members relative to the adoption, integration, and faculty knowledge of technology. To obtain this data, Faculty Adoption and Integration of Technology surveys were mailed and e-mailed to 443 full-time faculty members at East Tennessee State University. The mailing included a cover letter introducing the study and a copy of the survey instrument. Two hundred five surveys were returned. This represents a return rate of 46% of the (137) mailed and (68) e-mailed surveys. The Cronbach's reliability coefficient was run to determine the reliability of each of the scales in this study. The alpha level for faculty integration of technology was 9.130.The alpha for faculty knowledge of computers and information technology was .8270, when Questions 19 and 21a were excluded. These two questions had 18% and 14.1% missing data, respectively, and contributed to the high percentage of missing data, (35%) for the scale. The alpha for the use of technological tools was .5438. In light of the fact that 100% of the sample responded "daily" to the question, "How often do you use a computer," the statistical program removed this question. The decision was made to leave the items for use of technological tools based on the study of Thorndike and Hagen (1969). Those authors stated that the reliability of any new

instrument must be made in terms of other measurement instruments that were competitive in nature. Therefore, the reliability coefficient for use of technological tools was considered adequate.

Demographic information was defined by independent variables such as gender, ethnicity, tenure status, academic unit, computer use at home, access to the ETSU network, access to the World Wide Web, age, percentage of time spent using a computer in the classroom, and the number of years teaching (See Tables 1-3).

Table 1

Characteristics of Age, Percentage of Time that Computer are used in the Classroom, and the Number of Years Teaching

Characteristics	*n*	*M*	*SD*
Age	193	48.91	9.22
Percentage of Time that Computers are Used in the Classroom	195	32.71	35.03
Number of Years Teaching	198	15.47	10.99

Table 2

Demographic Definition of Gender, Ethnicity, Tenure Status, and Academic Units

Characteristic	*n*	%
Gender		
Male	109	53.4
Female	95	46.6
Total	204	100.0
Ethnicity		
White	181	91.0
Other Ethnicity	18	9.0
Total	199	100.0
Tenure Status		
Tenured	116	56.9
Non-Tenured	88	43.1
Total	204	100.0
Academic Unit		
Education	31	15.3
Arts & Sciences	75	37.1
Nursing	28	13.9
Public & Allied Health	28	13.9
Business & Technology	40	19.8
Total	202	100.0

Table 3

Faculty use of Computers at Home, University Network Service, and Home Access to the World Wide Web

Characteristic	*n*	%
Computer at Home		
Yes	199	97.1
No	6	2.9
Total	205	100.0
ETSU Network Service		
Yes	142	69.3
No	63	30.7
Total	205	100.0
Home Access to WWW		
Yes	185	90.2
No	20	9.8
Total	205	100.0

Other information regarding the general attitude about adoption of technology and the student benefits of technology was found in this study. Both scales had a potential range of one to five with five representing the most favorable attitude. The mean for the general attitude was 4.0044 with a standard deviation of .5906. Overall, the results indicated that the faculty had a positive attitude about the adoption of

technology. The mean for the student benefit variable was 3.797 with a standard deviation of .8083. The finding indicated that ETSU faculty had a positive attitude towards the student benefits of technology in the classroom.

The results of the data analysis also revealed various types of computer training in which faculty had participated. Faculty perceptions toward technology as a consideration for tenure and promotion were also found to be an important factor in this study. The results of these findings are seen in Tables 4 and 5 on the following pages.

Table 4

Sources of Faculty Training

Faculty Training	*n*	%
Self Taught		
Yes	154	75.9
No	49	24.1
Total	203	100.0
College & School		
Yes	130	64.0
No	73	36.0
Total	203	100.0
Professional Development		
Yes	115	56.7
No	88	43.3
Total	203	100.0

Table 5

Faculty Perceptions Toward Tenure and Promotion

Faculty Perception	*n*	%
Technology as Consideration for Tenure and Promotion		
Agreed	81	40.7
Undecided	50	25.1
Disagreed	68	34.2
Total	199	100.0
External Reward as Incentive to Integrate Technology		
Agreed	108	53.2
Undecided	31	15.3
Disagreed	64	31.5
Total	203	100.0
Technology in Instruction is Valued in my College for Tenure and Promotion		
Agreed	78	39.6
Undecided	77	39.1
Disagreed	42	21.3
Total	197	100.0

Analysis of Research Questions

Data for this study were compiled from the results of the survey and various statistical methods were used to analyze the data. The organization of this chapter follows the order of the research questions posed in Chapter 1.

Research Question One

To what extent are demographic characteristics related to faculty integration of technology at East Tennessee State University?

$Ho2A_1$. There is no difference in the integration of technology between males and females and ethnicity among full-time faculty of East Tennessee State University.

$Ho2A_2$. There is no difference in the integration of technology between males and females among full-time faculty of East Tennessee State University.

$Ho2A_3$. There is no difference in the integration of technology and ethnicity among full-time faculty of East Tennessee State University.

A Two-Way Analysis of Variance was conducted to evaluate gender and ethnicity on the Integration of Technology Scores for the faculty at East Tennessee State University. The Two-Way ANOVA indicated no significant interaction between gender and ethnicity, $F = .191$ and $p = .662$. For the main effect of gender, $F = .379$, $p = .539$, partial $\eta^2 = .002$. For the main effect of ethnicity, $F = .023$, $p = .880$, partial $\eta^2 = .000$ for ethnicity.

The null hypotheses were retained, and the results of these tests were reported in Table 6.

Table 6

Difference in the Integration of Technology Between Males and Females and Ethnicity Among Full-Time Faculty

Source	*df*	*SS*	*MS*	*F*	*p*
Corrected	3	.319	.106	.204	.894
Gender	1	.198	.198	.379	.539
Ethnicity	1	1.184E-02	1.184E-02	.023	.880
AGE*Ethnicity	1	9.981E-02	9.981E-02	.191	.662
Error	173	90.237	.522		

*p < .05.

Ho3A. There is no difference between academic units and faculty integration of technology.

An Analysis of Variance (ANOVA) was conducted to evaluate the differences between academic units and the integration of technology scores. The ANOVA was significant, F = 4.129, p = .003. The strength of the differences between the academic units and integration of technology scores, were as assessed by η^2 = .087, with academic units accounting for 8.7% of the variance of the dependent variable. According to the results of these tests

for the academic unit variable, the null hypothesis was rejected as reported in Table 7.

Table 7

Difference Between Academic Units and Faculty Integration of Technology

Category	*n*	*M*	*SD*
Education	27	4.0617	.6996
Arts & Sciences	67	3.5871	.7710
Nursing	27	4.0000	.5064
Public & Allied Health	22	3.9848	.6946
Business & Technology	35	4.0222	.6370

Academic Units	*MS* = 7.881	*F* = 4.129*
Error	*MS* = 82.549	*P* = .003

*p < .05.

Ho6A. There is no relationship between faculty tenure status and percentage of computer usage in the classroom and the faculty integration of technology.

A multiple regression analysis was conducted to evaluate how well faculty tenure status scores and percentage of computer usage in the classroom scores predicted integration of technology scores of the faculty at East Tennessee State

University. The linear combination of the two independent variables was significantly related to integration of technology scores of ETSU faculty, F = 15.771, p = .000. The sample multiple correlation coefficient was .394 with r^2 = .155 indicating that 15.5% of the variance of the scores on faculty integration of technology can be accounted for by the linear combination of tenure status and percentage of computer usage in the classroom. The standard regression coefficient for tenure status was -.022, t = -.315, and p = .753. Therefore, after controlling for the percentage of time computers were used in the classroom, tenure status was not statistically significant. The standardized regression coefficient for percentage of time used in the classroom was .389, t = 5.45, and p = .000. Therefore, after controlling for tenure status the percentage of time computers were used in the classroom was statistically significant. The results of the tests were reported in Table 8.

Table 8

Relationship Between Faculty Tenure Status and Percentage of Computer Usage in the Classroom and the Faculty Integration of Technology

Variable	B	*SE B*	β	*t*	*p*
Tenure Status	-3.258E-02	.103	-.022	-.315	.753
Percentage of Computer Usage	8.039E-03	.001	.389	5.455	.000

Ho1A. There is no relationship between age and faculty integration of technology.

Using a Pearson Product-Moment Correlation Coefficient in which r was the correlation and the p was the probability, the correlation between age and integration is r = .017 with p = .828. The correlation showed a very weak positive relationship but not significant between age and integration.

Because p = .828 is greater than the preset alpha of .05 the null hypothesis was retained. There was no statistically significant relationship found between age and integration.

Ho4A. There is no relationship between the integration of technology and the percentage of time that computers are used in the classroom.

The correlation between percentage of time computers are used in the classroom and the integration of technology was .391 with p = .000. The correlation showed a moderate positive relationship between the percentage of time computers are used in the classroom and the integration of technology. Given that p = .000 was less than the preset alpha of .05 the null hypothesis was rejected. There was a statistically significant relationship found between percentages of time computers are used in the classroom and the integration of technology.

Ho5A. There is no relationship between the number of years of teaching and faculty integration of technology.

The correlation between the number of years of teaching and integration of technology was -.029 with p = .702. The relationship between number of years of teaching and the

integration of technology showed a very weak negative relationship. Because p = .702 was greater than the preset alpha of .05 then the null hypothesis was retained. There was no statistically significant relationship between number of years of teaching and the integration of technology.

Research Question Two

To what extent are demographic characteristics related to faculty use of technological tools at East Tennessee State University?

$Ho2B_1$. There is no difference in the use of technological tools between males and females and ethnicity among full-time faculty of East Tennessee State University.

$Ho2B_2$. There is no difference in the use of technological tools between males and females among full-time faculty of East Tennessee State University.

$Ho2B_3$. There is no difference in the use of technological tools and ethnicity among full-time faculty of East Tennessee State University.

A Two-Way Analysis of Variance was conducted to evaluate gender and ethnicity on the use of technological tools scores for the faculty members of East Tennessee State University. The Two-Way ANOVA indicated no significant interaction between gender and ethnicity, F = .048 and p = .000. For gender the main effects were F = .162, p = .688, partial η^2 = .001, and for ethnicity the main effects were F = .085, p = .772, partial

η^2 = .001 for ethnicity. The null hypothesis was retained, and the results of these tests were reported in Table 9.

Table 9

Difference in the Use of Technological Tools Between Males and Females and Ethnicity Among Full-Time Faculty

Source	*df*	*SS*	*MS*	*F*	*p*
Corrected Model	3	5.421E-02	1.807E-02	.084	.969
Gender	1	3.477E-02	3.477E-02	.162	.688
Ethnicity	1	1.820E-02	1.820E-02	.085	.772
Gender*Ethnicity	1	1.026E-02	1.026E-02	.048	.827
Error	1596	33.576	.215		

*p < .05

Ho3B. There is no difference between academic units and faculty use of technological tools.

An Analysis of Variance (ANOVA) was conducted to evaluate the differences between the use of technological tools scores and academic units of ETSU faculty. The dependent variable was the use of technological tools scores. The ANOVA revealed no statistical significance difference (F = 1.033, p = .392). The strength of the differences between academic units and use of technological tools scores, as assessed by η^2 = .026, with academic units accounting for 2.6% of the variance of the dependent variable. There was no significant difference in the

means found between the academic units; therefore, the null hypothesis was retained. The results for the academic unit variable were reported in Table 10.

Table 10

Difference Between Academic Units and Use of Technological Tools

Category	*n*	*M*	*SD*
Education	27	3.1058	.4910
Arts & Sciences	56	3.0510	.4831
Nursing	25	3.2000	.3998
Public & Allied Health	23	3.2422	.4919
Business & Technology	31	3.1889	.4114
Academic Units	*MS* = .219	*F* =1.033	*p* = .392
Error	*MS* = .212		

*p < .05

Ho6B. There is no relationship between faculty tenure status and percentage of computer usage in the classroom and the faculty use of technological tools.

A multiple regression analysis was conducted to evaluate how well faculty tenure status scores and percentage of computer usage in the classroom scores predict the use of technological tools scores of faculty at ETSU. The linear combination of

strength measures was significantly related to use of technological tools scores of ETSU faculty (F = 37,157, p = .000). The sample multiple correlation coefficient was .566 with r^2 = .320 indicating that 32% of the variance of the scores on the use of technological tools accounted for by the linear combination of faculty tenure and status scores.

The standardized regression coefficient for tenure status was -.098 with p = .144. Therefore, after controlling for the effect of percentage of time the computer was used in the classroom, tenure status was not statically significant. The standardized beta coefficient for the percentage of time the computer was used in the classroom was .537 with p = .000. Therefore, after controlling for tenure status, the relationship between percentages of time the computer was used in the classroom and the use of technological tools was statistically significant. The results of the tests were reported in Table 11.

Table 11

Relationship Between Faculty Tenure Status and Percentage of Computer Usage in the Classroom and the Use of Technological Tools

Variable	B	*SE B*	β	*t*	*p*
Tenure Status	-9.043E-02	.062	-.098	-1.468	.144
Percentage of Computer Usage	6.930E-03	.001	.537	8.003	.000

Ho1B. There is no relationship between age and faculty use of technological tools.

Using a Pearson Product-Moment Correlation Coefficient in which r was the correlation and the p was the probability, the correlation between age and the use of technological tools was r = -.227 with p = .004. The number of cases upon which this correlation was based was n = 157.

The relationship between age and the use of technological tools showed a weak and negative relationship. Because p = .004 was less than the preset alpha of .05, then the null hypothesis was rejected. According to the findings those who were older used fewer technological tools. There was a statistically significant relationship between age and the use of technological tools.

Ho4B. There is no relationship between the use of technological tools and the percentage of time that computers are used in the classroom.

Using a Pearson Product-Moment Correlation Coefficient in which r was the correlation and p was the probability, the correlation between percentages of time computers are used in the classroom and the use of technological tools was r = .557 with p = .000. The number of cases upon which this correlation was based was n = 161.

The correlation showed a moderate positive relationship between the percentage of time computers were used in the classroom and the use of technological tools.

Because p = .000 was less than the preset alpha of .05, the null hypothesis was rejected. There was a statistically significant relationship between percentage of time computers were used in the classroom and the use of technological tools.

Ho5B. There is no relationship between the number of years of teaching and faculty use of technological tools.

Using a Pearson Product-Moment Correlation Coefficient in which r was the correlation and p was the probability, the correlation between the number of years of teaching and use of technological tools was r = -.199 with p = .012. The number of cases upon which this correlation was based was n = 160.

The correlation coefficient showed a weak negative relationship between numbers of years teaching and the use of technological tools.

Because p = .012 was less than the preset alpha of .05, the null hypothesis was rejected. The findings show that those with more experience used fewer technological tools; therefore, there was a statistically significant relationship between number of years teaching and the use of technological tools.

Research Question Three

To what extent are demographic characteristics related to faculty knowledge of computers and information technology at East Tennessee State University?

$Ho2C_1$. There is no difference in knowledge of computers and information technology between males and females and ethnicity among full-time faculty of East Tennessee State University.

$Ho2C_2$. There is no difference in knowledge of computers and information technology between males and females among full-time faculty of East Tennessee State University.

$Ho2C_3$. There is no difference in knowledge of computers and information technology and ethnicity among full-time faculty of East Tennessee State University.

A Two-Way Analysis of Variance was conducted to evaluate gender and ethnicity on the use of technological tools scores for the faculty of East Tennessee State University. The Two-Way ANOVA indicated there was no significant interaction between gender and ethnicity with F = 1.756, p = .187, partial η^2 = .011. The main effect of gender had an F =. 424, p = .516, partial η^2 = .003. The main effect of ethnicity had an F = 1.181, p = .279, partial η^2 = .007. The null hypothesis was retained. The results of these tests were reported in Table 12 on the following page.

Table 12

Difference in the Knowledge of Computers and Information Technology Between Males and Females and Ethnicity Among Full-time Faculty

Source	*df*	*SS*	*MS*	*F*	*p*
Corrected Model	3	.927	.309	1.096	.353
Gender	1	.120	.120	.424	.516
Ethnicity	1	.333	.333	1.181	.279
Gender*Ethnicity	1	.495	.495	1.756	.187
Error	157	44.262	.282		

*p < .05

Ho3C. There is no difference between academic units and faculty knowledge of computers and information technology.

An Analysis of Variance (ANOVA) was conducted to evaluate the differences between the knowledge of computer and information technology scores and academic units of ETSU faculty. The ANOVA revealed no statistical significant difference between the academic units and knowledge of computers and information technology (F = .831, p = .508). The differences between academic units and knowledge of computers and information technology scores were assessed by η^2 = .021 with academic units accounting for 2.1% of the variance of the dependent variable. The null hypothesis was retained, and the results for the academic unit variable were reported in Table 13 on the following page.

Table 13

Difference Between Academic Units and Faculty Knowledge of Computers and Information Technology

Category	*n*	*M*	*SD*
Education	25	3.0473	.5243
Arts & Sciences	58	3.1034	.5746
Nursing	27	3.0067	.5407
Public & Allied Health	22	3.2603	.5137
Business & Technology	30	3.1636	.5044
Academic Units	*MS* = .243	*F* =831	*p* = .508
Error	*MS* = .293		

*p < .05

Ho6C. There is no relationship between faculty tenure status and percentage of computer usage in the classroom and the faculty knowledge of computers and information technology.

A multiple regression analysis was conducted to evaluate how well faculty tenure status scores and percentage of computer usage in the classroom scores predicted knowledge of computers and information technology scores of faculty at East Tennessee State University. The linear combination of strength measures was statistically significantly related to knowledge of computers and information technology scores of ETSU faculty

(F = 35.168, p = .000). The multiple correlation coefficient was .567 with r^2 = .311 indicating that 31% of the variance of the scores in knowledge of computers and information technology would be accounted for by the linear combination of computer knowledge and information technology scores. The standardized beta coefficient for tenure status of faculty members was -.059 with p = .384. Therefore, after controlling for the percentage of time computers are used in the classroom, tenure status was not statistically significant. The standardized beta coefficient for percentage of time computers were used in the classroom was .542 with p = .000. Therefore, after controlling for tenure status, there was a statistically significant relationship found between the percentage of time computers were used in the classroom and the faculty knowledge of computers and information technology. The null hypothesis was rejected and the results of these tests were reported in Table 14.

Table 14

Relationship Between Faculty Tenure Status and Percentage of Computer Usage in the Classroom and the Faculty Knowledge of Computers and Information Technology

Variable	B	*SE B*	β	*t*	*p*
Tenure Status	-6.485E-02	.074	-.059	-.874	.384
Percentage of Computer Usage	8.476E-03	.001	.542	7.953	.000

Ho1C. There is no relationship between age and faculty knowledge of computers and information technology.

The correlation between age and faculty knowledge of computers and information technology was -.280 with p = .000. The number of cases upon which this correlation was based was n = 158. Since p = .000 was less than the preset alpha of .05 then the null hypothesis was rejected. According to the findings, older faculty members had lower levels knowledge about computers and information technology. There was a statistically significant relationship between age and the knowledge of computers and information technology.

Ho4C. There is no relationship between faculty knowledge of computers and information technology and the percentage of time that computers were used in the classroom.

The correlation between percentage of time computers are used in the classroom and the knowledge of computers and information technology was .554 with p = .000. The number of cases upon which this correlation was based was n = 159.

This correlation showed a moderate, positive relationship between the percentage of time computers were used in the classroom and the knowledge of computers and information technology.

Because p = .000 was less than the preset alpha of .05, then the null hypothesis was rejected. There was a statistically significant relationship found between percentage of time computers used in the classroom and the knowledge of computers

and information technology; in classrooms where computers were used a great deal, the level of knowledge was higher.

Ho5C. There is no relationship between the number of years of teaching and faculty knowledge of computers and information technology.

The correlation between number of years teaching and knowledge of computers and information technology was -.210 with $p = .008$. The number of cases upon which this correlation was based was $n = 161$.

The correlation showed a weak negative relationship between number of years teaching and the knowledge of computers and information technology.

Because $p = .008$ was less than the preset alpha of .05, then the null hypothesis was rejected. The findings show that those with more experience had less knowledge of computers and information technology; therefore there was a statistically significant relationship between numbers of years teaching and the knowledge of computers and faculty knowledge of computers and information technology.

Summary

Chapter 4 has displayed and described the data collected and analyzed in this study. Data were presented in many different configurations on the faculty adoption and integration of technology at East Tennessee State University. A summary of the findings of this study, conclusions, and recommendations for further study are included in Chapter 5.

CHAPTER 5

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This study was concerned with the faculty adoption and integration of technology at East Tennessee State University. The survey was mailed and e-mailed to full-time faculty members at East Tennessee State University. Of the 443 surveys mailed and e-mailed to the faculty, 205 (46%) were returned. The data were collected through the combination of e-mail and hard copy surveys. Descriptive statistics and statistical testing for relationships and differences were used to analyze the data.

The purpose of this study was to identify and describe the demographic characteristics of faculty related to (1) faculty integration of technology, (2) the use of technological tools, (3) and the knowledge of computers and information technology of full-time faculty members at East Tennessee State University. The results of this study identified the characteristics that affect the adoption and integration of technology in the classroom at East Tennessee State University. The study also investigated faculty knowledge of computers and the technology tools used in instruction and learning.

Three research questions were addressed from which 24 hypotheses were generated. Each research question addressed eight hypotheses investigating the differences and relationships of the variables. The following section addresses the findings obtained from the data analysis that is related to research questions.

Summary of Findings

The demographic findings of this study show that 53.4% of the respondents were male and 46.6% were female. Ninety-one percent reported their ethnicity as white, while 9% reported other ethnicities. Seventy-four percent of the full-time faculty members reported that their age was between 40 and 60 years of age. Fifteen percent of the respondents reported that they were 25 to 39 years of age and 11.4% were 60 and above. Approximately 56.9% of the faculty members indicated that they had acquired faculty tenure status, and 43.1% reported they were non-tenured faculty. The breakdown of the colleges represented in this study was as follows: 15.3% teach in the College of Education, 37.1% teach in the College of Arts and Sciences, 13.9% teach in the College of Nursing, 13.9% teach in the College of Public and Allied Health, and 19.8% teach in the College of Business and Technology. Forty-five percent of the full-time faculty members reported that they have taught 1 to 10 years, 28.6% have taught for 11 to 20 years, and 30% have taught for 21 years or more.

The demographic section of the survey also reflected concerns about faculty access to three different technologies. The three technologies included access to a home computer, the World Wide Web, and the ETSU network service. Ninety-seven percent of the faculty reported that they had access to a home computer, 90.2% indicated having access to the World Wide Web, and 69.3% provided that they accessed the ETSU network services. Part of the survey instrument in section two addressed questions about faculty training on the use of computers and the types of

training in which they had participated. Seventy-six percent reported that they had learned informally or were self-taught. Sixty-four percent of the faculty indicated that they received training in college and 56.7% reported that they had received training through in-service or professional development workshops. Several respondents indicated that various family members taught them, and some indicated that they had received training through the military.

Item 41 on the survey asked for faculty perception regarding whether faculty training should include instructional applications that apply to individual curriculum areas. The responses on the five-point Likert type scale were Strongly Disagree (SD) to Strongly Agree (SA), with a score of SD being the least desired response and a score of SA being the most desired response. Seventy-five percent of the faculty indicated a positive attitude. Item 65 on the survey read, "I would like to know more about instructional methods that utilize technology in the classroom." One hundred fifty-one respondents (75.5 %) indicated that they positively agreed that instructional methods should include the use of technology.

ETSU faculty members were also asked three questions on the instrument that was concerned with the uses of technology by fellow colleagues. Item 47 stated, "I am aware of the successful uses of technology by my colleagues." Ninety-one percent of the faculty indicated that they were aware of successful uses of technology by colleagues. Forty-four percent stated that they would like to help other faculty members in their use of

technology, and 68.6% reported that the integration of technology into the curriculum was very important.

Other information regarding the general attitude about the adoption of technology was found in this study. Items 37, 38, 39, 40, 44, 45, and 46 addressed positive and negative responses regarding the faculty's general attitude about the adoption of technology. The mean score for the general attitude variable was 4.0044, which indicated a positive attitude about the adoption of technology. Items 42, 48, and 61 addressed the concept of student benefits in the classroom. The mean for the student benefit variable was 3.7976, which indicated a positive attitude towards the student benefits of technology in the classroom.

In addition to the above data, information concerning the respondent's perception towards promotion and tenure was elicited in Section four of the survey. The educators were asked for their reactions regarding the following statement: "I believe the use of technology in instruction should be a consideration in decisions regarding tenure and promotion." The responses were Strongly Disagree (SD) to Strongly Agree (SA), with a score of SD being the least desired response and a score of SA being the most desired response. Forty-one percent of the respondents positively agreed that technology in instruction should be a consideration in decisions regarding tenure and promotion. Faculty members were also asked whether external rewards (merit pay, tenure, promotion, and performance appraisals) would be an incentive to integrate more technology into their teaching. Fifty-three percent indicated that external

rewards would be an incentive to integrate more technology in their teaching. Forty percent reported their college for consideration of promotion and tenure values the use of technology in instruction.

Findings Related to Research Questions

Research Question One: To what extent are demographic characteristics related to faculty integration of technology at East Tennessee State University?

The finding for this research question included the results from eight hypotheses addressing demographic characteristics and the integration of technology. The dependent variable that was tested for research question one was faculty integration of technology. Several statistical tests were used to explore this research question. Differences between gender and ethnicity and the integration of technology were tested using a Two-Way ANOVA. No interaction was found between gender and ethnicity and integration of technology. The main effects of gender and ethnicity were not statistically significant. In a second test of the dependent variable, differences were tested between academic units and the integration of technology. An Analysis of Variance was used for this test. A difference was found between academic units and faculty integration of technology. The results indicated that there was a significant difference between the academic units. In the third test of the research question, a multiple regression analysis was used to test for relationships between faculty tenure status and the percentage

of computer usage in the classroom and integration of technology. No statistically significant relationship was found between tenure status and the integration of technology. However, while controlling for tenure status, a statistically significant relationship was found between the percentage of computer usage in the classroom and the integration of technology.

A Pearson Product-Moment Correlation Coefficient was used in the fourth test to determine whether if there was a relationship between age and faculty integration of technology. As the absolute value was very close to zero, it showed a very weak relationship between age and integration of technology. The result indicated that no significant relationship was found for age and faculty integration of technology. In the fifth test, a Pearson Product-Moment Correlation Coefficient was used to test the relationship between the integration of technology and the percentage of time that computers were used in the classroom. According to the results, a significant relationship was found. The last statistical test run for this research question indicated that there was no relationship between the number of years teaching and the faculty integration of technology. The results indicated a very weak negative relationship. Therefore, the evidence showed that the number of years teaching had no significant relationship with integration of technology.

Research Question Two: To what extent are demographic characteristics related to faculty use of technological tools at East Tennessee State University?

This research question included the findings for eight hypotheses addressing faculty use of technological tools and demographic characteristics. The dependent variable that was tested for this research question was faculty use of technological tools. Several statistical tests were used to explore this research question. A Two-Way ANOVA was used to test the differences between gender and ethnicity and the faculty use on of technological tools. No interaction was found between gender and ethnicity and the faculty use of technological tools. In the second test, an Analysis of Variance was used to test for differences between academic units and the faculty use of technological tools. The results indicated that there were no significant differences between academic units and the faculty use of technological tools. In the third test, a multiple regression analysis was used to test for a relationship between faculty tenure status and percentage of computer usage in the classroom and the faculty use of technological tools. The multiple correlation coefficients indicated that there was no statistical significance for tenure and the use of technological tools. However, after controlling for tenure, the results concluded that a relationship was found for the percentage of computer usage in the classroom and the use of technological tools. The fourth test used in this analysis was a Pearson Product-Moment Correlation Coefficient. This test was used to

determine a relationship between age and the use of technological tools. A statistically significant relationship was found between age and the use of technological tools. However, the relationship was weak and negative. In the fifth analysis, a Pearson Product-Moment Correlation Coefficient was used to test the relationship between the use of technological tools and the percentage of time that computers are used in the classroom. The correlation showed a moderate positive relationship between the use of technological tools and the percentage of time that computers are used in the classroom. The last statistical test used for analysis of the dependent variable was a Pearson Product-Moment Correlation Coefficient. This test was used to determine whether a relationship was found between the number of years teaching and faculty use of technological tools. A weak negative relationship was found between the number of years teaching and faculty use of technological tools. Therefore, it must be concluded that there was a statistically significant relationship between the number of years teaching and faculty use of technological tools.

Research Question Three: To what extent are demographic characteristics related to faculty knowledge of computers and information technology.

The findings for this research question included the results of eight hypotheses addressing demographic characteristics and faculty knowledge of computers and information technology. The dependent variable being tested for

this research question was faculty knowledge of computers and information technology. In the first analysis, using a Two-Way Analysis of Variance (ANOVA) differences were tested between gender and ethnicity and faculty knowledge of computers and information technology. The results indicated no significant interaction was found between gender and ethnicity and faculty knowledge of computers and information technology. In the second test, an Analysis of Variance was used to test for difference between academic units and faculty knowledge of computers and information technology. Academic units accounted for only 2.1% of the variance of the dependent variable. Therefore, the results indicated no significant differences in means between academic units. In the third test, a multiple regression analysis was used to test for a relationship between faculty tenure status and percentage of computer usage in the classroom and the faculty knowledge of computers and information technology. The results indicated that no significant relationship was found for faculty tenure status. A significant was found for the percentage of computer usage in the classroom and the faculty knowledge of computers and information technology. Therefore, after controlling for tenure status, significance was found for percentage of computer usage in the classroom and the faculty knowledge of computers and information technology. A Pearson Product-Moment Correlation Coefficient was used in the fourth test to determine whether there was a relationship between age and faculty knowledge of computers and information technology. A weak negative relationship was found

between age and faculty knowledge of computers and information technology. Therefore, a statistically significant relationship was found. In the fifth analysis, faculty knowledge of computers and information technology and the percentage of time that computers were used in the classroom were tested. A moderate positive relationship was found between faculty knowledge of computers and information technology and the percentage of time that computers are used in the classroom. The last statistical test analyzed for this research question was a Pearson Product-Moment Correlation Coefficient. A significant relationship was found between the number of years teaching and faculty knowledge of computers and information technology. The correlation test showed a weak negative relationship. Therefore, a statistically significant relationship was found between number of years teaching and faculty knowledge of computers and information technology.

Conclusions

Based on the major findings that are related to the three research questions raised in this study, the conclusions are as follows:

1. This study provided evidence that a relationship was found between percentage of computer usage in the classroom and the integration of technology. The results of the study also showed that tenure status was not related to the integration of technology.

2. The research results indicated that there were differences found in East Tennessee State University academic

units and the integration of technology. No differences were found between academic units and the use of technological tools and faculty knowledge of computers and information technology.

3. No differences were found in males and females and ethnicity and the integration of technology.

4. It should also be pointed out that no relationship was found between the number of years teaching and faculty integration of technology.

5. The study concluded that age was not related to faculty integration of technology at East Tennessee State University.

6. The results of the study showed that the percentage of computer usage was related to the faculty use of technological tools. The correlation showed a moderate positive relationship between percentage of computer usage and the use of technological tools. The results also indicated that tenure status was not related to faculty use of technological tools. Therefore, a correlation was indicated between percentage of computer usage in the classroom and the full-time faculty use of technological tools.

7. Evidence was found that the age of full-time faculty members was related to the use of technological tools.

8. The results of the study indicated that the number of years teaching was related to the faculty use of technological tools. The relationship was weak and negative; however, the statistical test indicated a relationship did exist.

9. No evidence was found that the factors for gender and ethnicity related to the use of technological tools.

10. The results of this study showed that academic units were not related to the faculty use of technological tools.

11. There was evidence to show that the percentage of computer usage in the classroom was positively related to the faculty member's knowledge of computers and information of technology. However, the results showed no evidence that faculty tenure status related to the knowledge of computers and information technology.

12. Evidence was found that age of full-time faculty members was related to the knowledge of computers and information technology. Although the relationship was weak, the results showed a relationship between age and the faculty knowledge of computers and information technology.

13. The evidence showed that the number of years teaching was related to faculty knowledge of computers and information technology. The results indicated that the relationship was weak; however, a relationship was determined.

14. No evidence was found that the factors for gender and ethnicity related to the knowledge of computers and information technology.

15. The results of this study showed that academic units were not related to the faculty knowledge of computers and information technology.

Recommendations

In this chapter, the following recommendations are made based on the findings, summary of research questions, and

conclusions that were presented in Chapter 4. The recommendations are made for further research on the faculty adoption and integration of technology. The recommendations are as follows:

1. Technology is rapidly changing in today's society. Because of change in technology, a study should be replicated in two to three years on the East Tennessee State University faculty population.

2. A study should be conducted in other states and geographic regions with universities of similar size to compare differences and similarities between the results.

3. Technology integration and faculty adoption of technology is an important issue and concern in higher education today. I recommend that faculty training should emphasize the principles of technology integration and adapting those principles to specific curriculum areas.

4. Because faculty adoption and technology integration issues are becoming more important in higher education, very few survey instruments have been developed. Many of the instruments that are available are not valid or reliable instruments and do not address faculty adoption and the integration of technology. Further studies should be conducted to develop valid survey instruments that can be used to measure faculty adoption and the integration of technology.

5. Faculty members indicated a strong positive attitude towards technology. However, the research did not indicate a strong positive or negative response on whether or not

technology should be a consideration in tenure or promotion status. The researcher believed that further research is needed to identify whether technology in instruction should be a consideration for promotion and tenure.

6. Further research is needed to determine the reason why faculty members possess a strong positive attitude and knowledge about technology and the use of computers but do not integrate technology into the curriculum.

7. Longitudinal research is recommended to identify technological tools and practices that will provide full-time faculty with the skills needed to prepare students for the workforce.

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APPENDICIES

APPENDIX A

COVER LETTERS

September 2003

Dear ETSU Faculty Member:

My name is Tammy L. Barnes and I am a faculty member of the College of Education at East Tennessee State University. In addition to my role as faculty, I am currently completing my doctoral dissertation at East Tennessee State University. More specifically, the purpose of my study is to research faculty adoption and integration of technology.

As we are all aware, there are increasing demands for knowledge and use of technology in education, the workplace, and in society. The adoption and use of technology has become an important issue in higher education. This dissertation will provide valuable information regarding technology integration at East Tennessee State University.

The proposed title of my dissertation is "Faculty Adoption and Integration of Technology at East Tennessee State University". Included is a printed copy of the Faculty Adoption and Integration of Technology Questionnaire. It is the instrument being used to collect data for the doctoral dissertation. You have also been sent an e-mail copy of this same questionnaire. Please complete and return the questionnaire that is most convenient for you. You may return the completed questionnaire by mail to Tammy L. Barnes, P.O. Box 70684, College of Education or by e-mail at barnestl@mail.etsu.edu.

Your cooperation is very important to this research. Every survey instrument will be guaranteed complete anonymity and confidentiality. You may also note a coding system on the return envelop for this survey. I assure you this is for purposes of determining those that have completed the survey in efforts not annoy you with a second mailing of the survey. Likewise on the e-mail response, the name will be eradicated and deleted from to

the investigator's computer. I will appreciate your support in the completion and participation in this study.

Sincerely yours,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University
423/439-4155
barnestl@mail.etsu.edu

October 2003

Dear ETSU Faculty Member:

My name is Tammy L. Barnes and I am a faculty member of the College of Education at East Tennessee State University. In addition to my role as faculty, I am currently completing my doctoral dissertation at East Tennessee State University. More specifically, the purpose of my study is to research faculty adoption and integration of technology.

As we are all aware, there are increasing demands for knowledge and use of technology in education, the workplace, and in society. The adoption and use of technology has become an important issue in higher education. This dissertation will provide valuable information regarding technology integration at East Tennessee State University.

The proposed title of my dissertation is "Faculty Adoption and Integration of Technology at East Tennessee State University". Included is a printed copy of the Faculty Adoption and Integration of Technology Questionnaire. It is the instrument being used to collect data for the doctoral dissertation. You have also been sent an e-mail copy of this same questionnaire. Please complete and return the questionnaire that is most convenient for you. You may return the completed questionnaire by mail to Tammy L. Barnes, P.O. Box 70684, College of Education or by e-mail at barnestl@mail.etsu.edu.

Your cooperation is very important to this research. Every survey instrument will be guaranteed complete confidentiality. You may also note a coding system the survey. I assure you this is for purposes of determining those that have completed the survey in efforts not to annoy you with further mailings. Likewise
on the e-mail response, the name will be eradicated and deleted from the investigator's computer. I will appreciate your support in the completion and participation in this study.

Sincerely,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University
423/439-4155
barnestl@mail.etsu.edu

Faculty Adoption and Integration of Technology Survey

Colleges and universities are undergoing a major transformation. New technologies function as indicators for this change with these technological advances. The success of the new methods of instruction with these technological advances will also be impacted by faculty integration of technology, utilization of technological tools, and the knowledge of computers and information technology. The purpose of this study is to examine faculty integration of technology, utilization of technological tools, and the faculty knowledge of computers and information technology in relation to selected demographic variables of full-time faculty members at East Tennessee State University.

All responses in this survey will be kept confidential.

Background Information

Please select an answer for each question. Write in a response for short answer questions.

1. Gender: 1. ____ Male 2. ____ Female
2. Age: _____
3. Ethnicity: 1. ____ White/Caucasian 2. ____ Hispanic 3. ____ African American 4. ____ American Indian
   5. ____ Asian/Pacific Islander 6. ____ Other (please specify) _____
4. College in which you teach: 1. ____ Education 2. ____ Arts and Sciences 3. ____ Continuing Studies 4. ____ Nursing
   5. ____ Developmental Studies 6. ____ Public and Allied Health 7. ____ Business and Technology
   8. ____ Other (please specify) _____
5. Number of years teaching: _____
6. Tenure Status: 1. ____ Tenured 2. ____ Non-Tenured
7. Over a course of a semester, what percentage of time do you use computers in the classroom? _____
8. Do you have access at home to a computer? 1. ____ Yes 2. ____ No
9. Do you access the ETSU network service from home? 1. ____ Yes 2. ____ No
10. Do you have access at home to the World Wide Web (WWW)? 1. _____Yes 2. _____ No

Section 2

Please indicate your experience with the following technologies. If you do not have access to the technology, select NA. *Circle the appropriate number for each item:*

4 = A great deal of experience	3 = Some experience	2 = Very little experience	1 = No experience	NA = No Access

11. Personal Computer or Apple Macintosh computer	4	3	2	1	NA
12. Productivity tools like word processing, spreadsheets, database	4	3	2	1	NA
13. Graphics and Multimedia software	4	3	2	1	NA
14. Instructional Software (specific to your academic area)	4	3	2	1	NA
15. Email	4	3	2	1	NA
16. Web Browsers (e.g. Netscape, Internet Explorer, etc.)	4	3	2	1	NA
17. Web Publishing (e.g. designing homepages)	4	3	2	1	NA
18. Imaging Devices (e.g. scanners, digital cameras, and/or video cameras)	4	3	2	1	NA
19. Discipline Devices (e.g. Graphing Calculators, Language Translators, Probeware)	4	3	2	1	NA
20. Computer Projection devices	4	3	2	1	NA
21a. Desktop video conferencing	4	3	2	1	NA
21b. Distance Learning (e.g. Blackboard or WebCT)	4	3	2	1	NA
22. Teaching in Multimedia Classroom	4	3	2	1	NA

Section 3

23. Have you ever received any type of computer training? 1. ____ Yes 2. ____ No

24. Where did you receive your training (check all that apply)? ____ Self taught ____ Computer store
____ College or University ____ In-Service Training or Professional Development
____ Other (specify :) _____

25. Do you believe computers increase your productivity? 1. ____Yes 2. ____ No

26. Do you believe computers are important for your personal educational enrichment? 1. ____Yes 2. ____ No

27. Number of computer training sessions or courses you have attended in the past 2 years? _____

28. Do you believe ETSU offers an adequate number of technology workshops for faculty? 1. ____Yes 2. ____No
If "no" what improvements would you recommend? 3. _____

4 = Daily	3 = Once a Week	2 = Once a Month	1 = Never	NA = No Access

29. How often do you use a computer?	4	3	2	1	NA
30. How often do you use a word processor (Word, Word Perfect, etc)?	4	3	2	1	NA
31. How often do you use a spreadsheet program (Excel, Lotus 123, etc)?	4	3	2	1	NA
32. How often do you use a presentation program (PowerPoint)?	4	3	2	1	NA
33. How often do you use electronic mail (Email)?	4	3	2	1	NA
34. How often do you use the Internet?	4	3	2	1	NA
35. How often do you use Distance Learning Tools (Blackboard or WebCT)?	4	3	2	1	NA
36. How often do you teach in a Multimedia Classroom?	4	3	2	1	NA

Section 4

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

37. I would like to learn more about computers.	SD	D	U	A	SA
38. Learning about computers is boring to me.	SD	D	U	A	SA
39. Figuring out computer problems does not appeal to me.	SD	D	U	A	SA
40. I would feel comfortable taking a test to assess my computer aptitude.	SD	D	U	A	SA
41. Faculty training should include instructional applications that apply to my curriculum area.	SD	D	U	A	SA
42. Computers can be a useful instructional aid in most subject areas.	SD	D	U	A	SA
43. I feel that my students use technology to solve problems in my courses.	SD	D	U	A	SA
44. Computers save time and help me to organize my work.	SD	D	U	A	SA
45. I would prefer to never use a computer.	SD	D	U	A	SA
46. Knowing how to use a computer is a worthwhile skill.	SD	D	U	A	SA
47. I am aware of the successful use of technology by my colleagues.	SD	D	U	A	SA
48. Computers stimulate creativity in students.	SD	D	U	A	SA
49. The use of technology in instruction is valued in my college for consideration of promotion and tenure.	SD	D	U	A	SA
50. I believe the use of technology in instruction should be a consideration in decisions regarding tenure and promotion.	SD	D	U	A	SA
51. External rewards (merit pay, tenure, promotion, performance appraisal, etc.) would be an incentive to integrate more technology into my teaching.	SD	D	U	A	SA

Section 5

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

52. The integration of technology into the curriculum is very important.	SD	D	U	A	SA
53. I would like to help other faculty in their use of technology.	SD	D	U	A	SA
54. Technology does not fit the way I teach. I have doubts about integration.	SD	D	U	A	SA
55. A personal goal of mine is to develop a learning environment that utilizes technology.	SD	D	U	A	SA
56. Using computers in the classroom takes too much time away from instruction.	SD	D	U	A	SA
57. I am concerned about not having enough time to learn, practice, and use technology skills	SD	D	U	A	SA
58. I believe that technology improve student learning.	SD	D	U	A	SA
59. I would like to know more about available technology resources.	SD	D	U	A	SA
60. I believe technology integration is good for the students, faculty, and the university.	SD	D	U	A	SA
61. I would like to motivate my students to use technology in the classroom.	SD	D	U	A	SA
62. I would like to know what other faculty members are doing with technology.	SD	D	U	A	SA
63. I have integrated technology into my teaching.	SD	D	U	A	SA
64. I believe that technological tools assist teachers with instruction and students with learning.	SD	D	U	A	SA
65. I would like to know more about instructional methods that utilize technology in the classroom.	SD	D	U	A	SA

I would like a copy of the executive summary 1. ____Yes 2. ____No

Thank you again for completing this survey.

APPENDIX C

LETTERS OF PERMISSION FROM COLLEGE DEANS

September 3, 2003

Tammy L. Barnes
216 Ferguson Avenue
Elizabethton, Tennessee 37643

Dear Dr. Rebecca Pyles:

I am a faculty member of the College of Education at East Tennessee State University. I am also a doctoral candidate at the university with a major in Educational Leadership and Policy Analysis. I am conducting a study on faculty adoption and integration of technology in higher education. The purpose of the study is to examine faculty integration of technology, utilization of technological tools, and knowledge of computers and technological tools at East Tennessee State University.

I would respectfully request your permission and cooperation to survey the full-time faculty in your college. Your permission, cooperation, and support are very important to this study and are greatly appreciated. A copy of the survey is attached for your information. I would appreciate you completing the information at the bottom of this form and fax it to me at 439-4155.

Thank you for you time and your response to this request. If you have any questions, please feel free to contact me at (423) 439-4155 or by e-mail at barnestl@mail.etsu.edu.
The results of this study will be available to you upon your request.

Sincerely yours,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University

Please Fax to _____

_____Yes, I am providing my permission for you to survey the full-time faculty in my college.

_____No, I prefer my college to be excluded from this survey.

I would like to receive a copy of the executive summary of this research project.
_____Yes _____ No

September 3, 2003

Tammy L. Barnes
216 Ferguson Avenue
Elizabethton, Tennessee 37643

Dear Dr. Linda Garceau:

I am a faculty member of the College of Education at East Tennessee State University. I am also a doctoral candidate at the university with a major in Educational Leadership and Policy Analysis. I am conducting a study on faculty adoption and integration of technology in higher education. The purpose of the study is to examine faculty integration of technology, utilization of technological tools, and knowledge of computers and technological tools at East Tennessee State University.

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The results of this study will be available to you upon your request.

Sincerely yours,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University

Please Fax to _____

_____Yes, I am providing my permission for you to survey the full-time faculty in my college.

_____No, I prefer my college to be excluded from this survey.

I would like to receive a copy of the executive summary of this research project.
_____Yes _____ No

September 3, 2003

Tammy L. Barnes
216 Ferguson Avenue
Elizabethton, Tennessee 37643

Dear Dr. Hal Knight:

I am a faculty member of the College of Education at East Tennessee State University. I am also a doctoral candidate at the university with a major in Educational Leadership and Policy Analysis. I am conducting a study on faculty adoption and integration of technology in higher education. The purpose of the study is to examine faculty integration of technology, utilization of technological tools, and knowledge of computers and technological tools at East Tennessee State University.

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The results of this study will be available to you upon your request.

Sincerely yours,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University

Please Fax to _____

_____Yes, I am providing my permission for you to survey the full-time faculty in my college.

_____No, I prefer my college to be excluded from this survey.

I would like to receive a copy of the executive summary of this research project.
_____Yes _____ No

September 3, 2003

Tammy L. Barnes
216 Ferguson Avenue
Elizabethton, Tennessee 37643

Dear Dr. Patricia Smith:

I am a faculty member of the College of Education at East Tennessee State University. I am also a doctoral candidate at the university with a major in Educational Leadership and Policy Analysis. I am conducting a study on faculty adoption and integration of technology in higher education. The purpose of the study is to examine faculty integration of technology, utilization of technological tools, and knowledge of computers and technological tools at East Tennessee State University.

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The results of this study will be available to you upon your request.

Sincerely yours,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University

Please Fax to _____

_____Yes, I am providing my permission for you to survey the full-time faculty in my college.

_____No, I prefer my college to be excluded from this survey.

I would like to receive a copy of the executive summary of this research project.
_____Yes _____ No

September 3, 2003

Tammy L. Barnes
216 Ferguson Avenue
Elizabethton, Tennessee 37643

Dear Dr. Wilsie Bishop:

I am a faculty member of the College of Education at East Tennessee State University. I am also a doctoral candidate at the university with a major in Educational Leadership and Policy Analysis. I am conducting a study on faculty adoption and integration of technology in higher education. The purpose of the study is to examine faculty integration of technology, utilization of technological tools, and knowledge of computers and technological tools at East Tennessee State University.

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The results of this study will be available to you upon your request.

Sincerely yours,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University

Please Fax to _____

_____Yes, I am providing my permission for you to survey the full-time faculty in my college.

_____No, I prefer my college to be excluded from this survey.

I would like to receive a copy of the executive summary of this research project.
_____Yes _____ No

September 3, 2003

Tammy L. Barnes
216 Ferguson Avenue
Elizabethton, Tennessee 37643

Dear Dr. Norma MacRae:

I am a faculty member of the College of Education at East Tennessee State University. I am also a doctoral candidate at the university with a major in Educational Leadership and Policy Analysis. I am conducting a study on faculty adoption and integration of technology in higher education. The purpose of the study is to examine faculty integration of technology, utilization of technological tools, and knowledge of computers and technological tools at East Tennessee State University.

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Thank you for you time and your response to this request. If you have any questions, please feel free to contact me at (423) 439-4155 or by e-mail at barnestl@mail.etsu.edu.
The results of this study will be available to you upon your request.

Sincerely yours,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University

Please Fax to _____

_____Yes, I am providing my permission for you to survey the full-time faculty in my college.

_____No, I prefer my college to be excluded from this survey.

I would like to receive a copy of the executive summary of this research project.
_____Yes _____ No

September 3, 2003

Tammy L. Barnes
216 Ferguson Avenue
Elizabethton, Tennessee 37643

Dear Dr. Rita Scher:

I am a faculty member of the College of Education at East Tennessee State University. I am also a doctoral candidate at the university with a major in Educational Leadership and Policy Analysis. I am conducting a study on faculty adoption and integration of technology in higher education. The purpose of the study is to examine faculty integration of technology, utilization of technological tools, and knowledge of computers and technological tools at East Tennessee State University.

I would respectfully request your permission and cooperation to survey the full-time faculty in your college. Your permission, cooperation, and support are very important to this study and are greatly appreciated. A copy of the survey is attached for your information. I would appreciate you completing the information at the bottom of this form and fax it to me at 439-4155.

Thank you for you time and your response to this request. If you have any questions, please feel free to contact me at (423) 439-4155 or by e-mail at barnestl@mail.etsu.edu.
The results of this study will be available to you upon your request.

Sincerely yours,

Tammy L. Barnes
Faculty, College of Education
East Tennessee State University

Please Fax to _____

_____Yes, I am providing my permission for you to survey the full-time faculty in my college.

_____No, I prefer my college to be excluded from this survey.

I would like to receive a copy of the executive summary of this research project.
_____Yes _____ No

APPENDIX D

From: Rhonda Christensen <rhondac@newmail.tenet.edu>
Subject: Re: Survey
Date: Sat, 8 Mar 2003 15:17:01 -0600
To: "Tammy Barnes" <barnest@btcs.org>
Cc: gknezek@tenet.edu

HI Tammy
Yes you have my permission to use those surveys. You may make changes but keep in mind the reliability reported is for the way it is written. It is always a good idea to run alphas anyway on your set of data. Wow, 2000 faculty members is a large number.
We have our most current instruments at www.iittl.unt.edu in an online book. I am cc:ing Dr. Gerald Knezek who is co-author with me on those instruments.
We look forward to hearing about your results.
Rhonda Christensen

>Ms. Christensen,
>
>Hi, My name is Tammy Barnes and I am a doctoral student and faculty member at
>East Tennessee State University in Johnson City, Tennessee. I have currently
>been searching for a survey to use in the collection of data for my
>dissertation. I ran across the TAC,TAT, and the FAIT online and thought they
>were very good surveys. I wanted to ask if I could use the surveys (or part
>of the surveys)to collect my data? I would need an e-mail or written letter
>stating that I may use the surveys and have permission to copy, add, or
>delete
>a few questions. I will be collecting data from approximately 2000 faculty
>members at ETSU and will be writing my dissertation on Technology
>Use/Technology Integration. I will await your reply.
>
>Thank you.
>
>Tammy Barnes
>College of Education
>(423)439-4155
>ETSU

Rhonda W. Christensen, Ph.D.
University of North Texas
E-mail: rhondac@tenet.edu
http://mail.btcs.org/Redirect/courseweb.tac.unt.edu/rhondac

From: "Barnes, Tammy L." <BARNESTL@mail.etsu.edu>
Subject: FW: Surveys
Date: Mon, 21 Jul 2003 10:06:16 -0400
To: <barnest@btcs.org>

-----Original Message-----
From: Anna Li [http://mail.btcs.org/Session/1329-cfNxEzpPunH3DDJ64TvH/Compose.wssp?To=ALI@serve.org]
Sent: Tuesday, March 11, 2003 9:53 AM
To: Barnes, Tammy L.
Subject: Surveys

Dear Ms. Barnes,

Sorry that it took me a while to respond to you as I was out of town. Yes, you have my permission to use the surveys. Since the surveys were developed in 1997, some of the items might be out of date. Please give acknowledge to SEIR*TEC somewhere in your research.

Good luck with your research! Let me know if you have more questions.

Anna Li, Ph.D.
Project Evaluator
SEIR*TEC & SUNRAY @ SERVE
P.O.Box 5367
Greensboro, NC 27435

(336)315-7300(O)
(336)315-7457 (Fax)
(336)855-5989 (Home Office)

www.serve.org

Barnes, Tammy Jan

From: Gerald Knezek [gknezek@tenet.edu] **Sent:**Mon 11/3/2003 12:58 PM
To: Barnes, Tammy Jan
Cc: rhondac@newmail.tenet.edu; Cindy Trussell
Subject: Fwd: Permission Letter
Attachments:

Tammy,

This is to grant permission for you to print the items derived from the Faculty Attitudes Toward Information Technology (FAIT) Questionnaire in your dissertation published through University Microfilms (UMI) and for Proquest/UMI to provide copies on demand of these items in your work.

Please include the scholarly courtesy of wording reflecting "adapted from", "based on" or "derived from" (as appropriate) and please let us know the outcome of your study.

Best Regards,
Gerald Knezek
Professor of Technology & Cognition
Director, Institute for the Integration of Technology into Teaching & Learning
University of North Texas
P.O. Box 311335
Denton, TX 76203

Rhonda Christensen
Research Scientist
Associate Director, Institute for the Integration of Technology into Teaching & Learning
University of North Texas 76203

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>Delivered-To: gknezek@tenet.edu
>Subject: Permission Letter
>Date: Thu, 30 Oct 2003 19:44:25 -0500
>Thread-Topic: Permission Letter
>Thread-Index: AcOfSCItTsU5Q/zMR+u4fk8+VowhcA==
>From: "Barnes, Tammy Jan" <BARNESTL@mail.etsu.edu>
>To: <gknezek@tenet.edu>
>
>Dr. Knezek,
>
>Hello, My name is Tammy Barnes and I emailed Dr. Christensen
>several months ago requesting permission to use the FAIT Survey to
>collect data for my dissertation. She gave her permission to use
>the survey....However, I decided to use only a few questions from
>the survey in the creation of a new survey that would better address
>my research questions. I did give credit to the FAIT survey in my
>dissertation.
>
>I am now at the point to submit my work to the graduate school and a
>publishing company which is requesting permission letters from all
>the resources used. Will you please send a short e-mail stating
>that I may use the questions and that ProQuest Information and

>Learning may supply copies on demand of my work. I really would
>apprecitate your quick response in hopes to graduate and to submit
>my work next week (by November 4, 2003).
>
>Thank you so much for your help. I will eagerly await your reply.
>
>Tammy Barnes
>Faculty, College of Education
>East Tennessee State University
>(423) 361-3171 or 423 439-4155
>barnestl@mail.etsu.edu
>
>
>
>
>

Barnes, Tammy Jan

From: Anna Li [ALI@serve.org] **Sent:**Mon 11/3/2003 12:49 PM
To: Barnes, Tammy Jan
Cc:
Subject: Permission Letter
Attachments:

Dear Ms. Barnes,

I am writing to let you know that you have SEIR*TEC's permission to use the questions from the survey(SEIR*TEC Faculty Technology Survey) and we also give permission to ProQuest Information and Learning to supply copies on demand.

I am glad that our survey can play a little part in your dissertation. Best wishes!

Anna Li, Ph.D.
Project Evaluator
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(336)315-7457 (Fax)
(336)855-5989 (Home Office)

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VITA

TAMMY L. BARNES

Education: East Tennessee State University, Johnson City, Tennessee; Education, B.S., 1987
East Tennessee State University, Johnson City, Tennessee; Education, M.S., 1998
East Tennessee State University, Johnson City, Tennessee; Education, Ed.D., 2003

Professional Experience: Planner, City of Johnson City, Johnson City Tennessee, 1991 – 1994
Corporate Instructor/Trainer, Alliance for Business and Training, Elizabethton Tennessee, 1994 – 2000
Technology Coach/Media Specialist, Bristol City School System, Bristol Tennessee, 2000 – 2002
Faculty, East Tennessee State University; Johnson City, Tennessee, 2002 - Present

Professional Presentation: Carter County Bank, Elizabethton, Tennessee "Microsoft Office Suite."
Mountain Electric Utilities, Newland, North Carolina "Teamwork in the Workplace."
American Water Heater, Johnson City, Tennessee "Tele-Sales Training."

Memberships: Phi Kappa Phi International Honor Society, Chapter Member.
Gamma Beta Phi Honor Society, Chapter Member.
Kappa Delta Pi Educational Honor Society, Chapter Member.