

**AN ASSESSMENT OF BUSINESS TEACHER EDUCATORS'  
ADOPTION OF COMPUTER TECHNOLOGY**

by

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# **AN ASSESSMENT OF BUSINESS TEACHER EDUCATORS'**

## **ADOPTION OF COMPUTER TECHNOLOGY**

Betty Foust Chapman

(ABSTRACT)

Federal legislation, the Office of Technology Assessment of the U. S. Congress, and national and state technological standards strongly encourage faculty to use computer technology in their lessons as a teaching tool. Technological standards have existed for several years that strongly encourage the use of computer technology in colleges and universities as a teaching tool. Yet it is difficult for faculty to infuse technology into their teaching.

The purpose of this study was to assess and identify the factors that influence business teacher educators to adopt computer technology methods and utilize them in their instruction and to determine the extent to which business teacher educators are adopting computer technology in their teaching. The population consisted of 95 members of the National Association of Teacher Educators for Business Education.

Findings from the descriptive statistics revealed that the largest percentage of the business teacher educators were early adopters. They indicated that they always used word processing and almost always integrated computers, projectors, and email in their instruction during the past semester. The study also found certain social, organizational, and personal motivational factors that the business teacher educators considered as very important in influencing them to adopt emerging computer technology for use in their instruction.

The means revealed differences within the respondents' personal and employment characteristics and the extent to which they adopt current computer technology as a teaching

tool; however, an analysis of variance (ANOVA) indicated no significant difference between these variables. Also, multiple regression analysis revealed that the importance of students, a specific adoption category, and the importance of physical resources (hardware) significantly predicted computer technology adoption.

The study also revealed that the business teacher educators in this study have the potential to serve as change agents and role models for their student clientele and peers since the findings suggest that these faculty members are among the first individuals to adopt computer technology for use in their instruction. The findings from the study have the potential to contribute to the development of an adopter profile that could be used to identify potential adopters of emerging computer technology.

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## DEDICATION

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CHAPTER I

INTRODUCTION

The change in society from a manufacturing environment to an information technology environment has created diverse problems in our educational system (Zakaria, 2001). The adoption of new technology in business and industry is placing additional emphasis on the need for training and education. Changes in the workforce due to the technological revolution have created a demand for business teacher educators who are computer literate and are adept in using computer technology in their teaching and in preparing future business teachers. Business teacher educators are a subset of all educators (Gbomita, 1995) and are unique since they often have the predominant responsibility of teaching computer technology applications, which is a critical part of the business education curriculum (McCoy, 2001). They need to be able to master computer technology and to teach others to do likewise. Business teachers need to be prepared to educate their students for these changing environments; therefore, business teacher educators must also adapt and be able to keep up with constantly changing technology. Since many jobs in the future will involve technology, it is critical for individuals to have the education and skills to perform new tasks in the twenty-first century (Dusick & Yildirim, 2000). These technological changes in business, industry, and education should be the basis for developing technologically proficient business teachers in our educational institutions.

Recently, there have been calls for education reform to improve the quality of education to adequately prepare students for changes in the workplace (Brown, 2000; Braathen & Robles,

2000). As a result, the National Association for Business Education heeded the call for educational reform and developed the *National Standards for Business Education* in 1995 (NBEA, 2001). Instructional technology standards are included in this document, which outlines curriculum standards related to business that students should know and be able to perform from elementary through postsecondary education. In addition, the National Council for Accreditation of Teacher Education (NCATE) and the International Society for Technology in Education (ISTE) jointly developed technological standards and implemented them in 1995. These technological standards have motivated educational institutions to establish teacher education programs to train educators to use computer technology effectively in their instruction (Bennett, 2001; Duhaney, 2001; Vannatta, 2000). Furthermore, the Carl D. Perkins Vocational and Technical Education Act of 1998 (Perkins III) strongly emphasized the importance of using technology in education (Hettinger, 1999).

### Background

Computer technology was introduced in educational institutions in the 1960s. Since that time, schools, colleges, and universities have spent billions of dollars on technology; however, there is growing concern that educators are not using this technology effectively in their instruction to enhance student learning (NCATE, 1997). The challenge for higher education is how to change the situation so that faculty members are provided a solid foundation in technological skills that they can use in the classroom as teaching tools (Wise, Leibbrand, & Williams, 1997).

According to Vannatta and Beyerbach (2000), educational institutions have tried to infuse technology into the teacher education curriculum, but technology infusion in the curriculum has been difficult to implement because the level of training educators have received may be inadequate. Literature revealed that some business teacher educators learn computer technology

applications by training themselves (Bartlett & Kotrlik, 2001), which may not be as effective as receiving specific training for their particular instructional needs. Also, the literature indicated that a technology course may help educators develop basic computer skills, but the educators are not adequately prepared to use technology in different instructional settings (Vannatta, 2000).

Yildirim and Kiraz (1999) contended that faculty members' behaviors are the determining factor of how successful the implementation of computer technology will be in educational institutions since faculty members make the ultimate decision whether to use computer technology in their lessons. Furthermore, Bryant (2001) maintained that investments in computer technology would not be successful unless educators receive the motivation, support, and training to help them utilize computer technology effectively as a teaching tool.

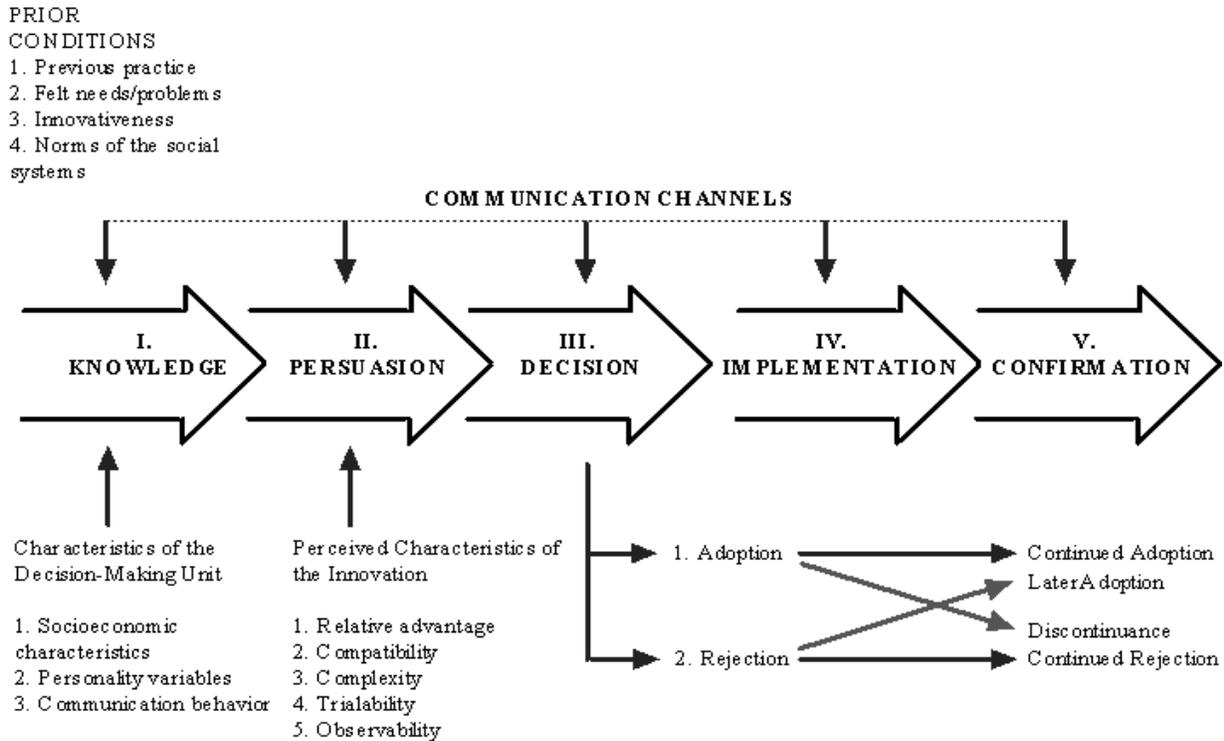
Since literature indicates that the use of computer technology in the curriculum is difficult for educators to implement (Vannatta & Beyerbach, 2000), the challenge for educational administrators is to develop and implement professional development technological training to help faculty members use emerging technology effectively (Dusick & Yildirim, 2000). It will also help them teach their students how to integrate computer technology into instruction, integrate technology across the curriculum, and model the use of computer technology to their students (Hasselbring, et al., 2000; NCATE, 1997).

### Theoretical Framework

Rogers (1995) Innovation-Decision Process Model (Figure 1) will provide the theoretical framework for this study. Roger's model has been used in many studies on the use and non-use of instructional technology by faculty (Medlin, 2001; Zakaria, 2001; Padgett & Conceicao-Runlee, 2000). This research study will examine the personal and employment variables and innovation factors that influence business teacher educators to adopt computer technologies and use it in their instruction in colleges and universities.

Roger's model consists of five stages: knowledge, persuasion, decision, implementation, and confirmation (refer to Chapter 2 for more detail). The innovation-decision process is a slow process that happens over a period of time in a series of actions and decisions.

Figure 1. The innovation-decision process model.



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Rogers (1995) and Means, Blando, Olson, Meddleton, Remz, and Zorfass (1993) concluded that the individual makes the final decision whether to use an innovation or change a behavior. An individual's attitude change is the determining factor in whether he or she will adopt and use computer technology in his or her teaching. If business teacher educators have unfavorable attitudes towards adopting emerging technology, that might prevent them from teaching these skills to others who need the skills for use in their careers.

The innovation-decision process model includes five distinct characteristics that help to explain the speed in which individuals adopt a new idea since innovations are different and thus are not equivalent in their adoption rate by individuals. The five characteristics include relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1995). The first characteristic, relative advantage, is the degree that an individual perceives that an innovation is better than the one used previously. For example, if the individual perceives that the new idea saves time, he or she will adopt the innovation faster. Next, compatibility is the degree that an innovation is consistent with an individual's values, past experiences, and needs. A new idea that is more compatible with the individual's life situation will be adopted faster. The third characteristic is complexity which is the extent that an innovation is perceived to be difficult to understand and utilize. Trialability concerns the degree that an individual will experiment with an innovation on a trial basis. Innovations that can be tried on a limited basis on an installment plan are usually adopted more rapidly. Finally, observability is the extent that the results of an innovation can be seen by other people. According to Rogers (1995), past diffusion research has been mainly composed of technological ideas.

In addition, Rogers (1995) classified adopters into five categories, which consist of innovators, early adopters, early majority adopters, late majority adopters, and laggards (see Chapter 2 for detailed information). The five adopter categories are organized into a distribution of an individual's change in adoptive behavior that results in a bell-shaped curve over time and is used to categorize the adopter distribution into a range along a continuum.

Rogers' Innovation-Decision Process Model will be used in the study to determine variables and factors that influence business teacher educators to adopt or reject technological innovations. Rogers' model will also help to understand the decision process that business teacher educators experience when they consider adopting and using computer technology in their instruction.

### Statement of the Problem

Advancements in instructional technologies and computers have created many challenges for business teacher educators in many colleges and universities. Furthermore, advanced levels of technology are increasingly being applied to all levels of business education. Since the business teacher educator's role is to understand, use, and teach this technology, the business teacher educators in colleges and universities are faced with the challenge of keeping up with the constantly changing technology. Many educational institutions, nationwide, have invested millions of dollars to build world-class technology infrastructures; however, a review of the literature revealed that business teacher educators may not be integrating technology into their instruction as a teaching tool (Jurist, 1999). Thus, a lack of findings from previous research through a review of the literature revealed a need for a research study to determine how business education faculty members utilize computer technology in their teaching (Lundgren, 1998). There was little literature found showing that business teacher educators are integrating technology into their lessons.

### Purpose of the Study

The purpose of this study is to assess and identify the factors that influence business teacher educators to adopt computer technology methods and utilize them in their instruction and to determine the extent to which business teacher educators are adopting computer technology in their teaching.

## Research Questions

1. What are the personal and employment characteristics of business teacher educators?
2. What are the innovation factors that influence business teacher educators' adoption of computer technology for instructional delivery?
3. To what extent are business teacher educators adopting current computer technology as a teaching tool?
4. Is there a significant difference within the personal and employment characteristics of business teacher educators and the extent to which they adopt current computer technology as a teaching tool?
5. Is there a relationship between the innovation factors that influence business teacher educators' adoption of computer technology and the extent to which they adopt current computer technology as a teaching tool?

## Significance of the Study

Identifying the extent that business teacher educators are adopting current computer technology will contribute to developing a profile of National Association of Teacher Educators for Business Education members who are adopters of computer technology. Determining if there is a significant difference within the personal and employment characteristics, relationship between the innovation factors that influence adoption, and the extent to which they adopt computer technology may assist in identifying potential business teacher educators who would use computer technology. In addition, this study will add data to the literature that relates to the degree to which business teacher educators are using computer technology in their instruction.

## Assumptions

The following assumptions are relevant to this study:

1. Using a five-point and six-point rating scale is an appropriate way to assess the perceptions of business teacher educators.
2. Business teacher educators have the responsibility to use computer technology in their teaching.
3. Business teacher educators can identify what influences them to adopt change.

## Delimitation and Limitation

This study is delimited to the self-reported perceptions of business teacher educators. In addition, the population for this study is delimited to the members of the National Association of Teacher Educators for Business Education. Therefore, the results of this study cannot be generalized to all business teacher educators in the United States.

## Definitions

The following are definitions of terms used in this study:

**Adoption:** A decision to make full use of an innovation as the best course of action available (Rogers, 1995).

**Adopter Behavior Categories:** Rogers (1995) identified five adopter behavior categories that include innovators, early adopters, early majority, late majority, and laggards.

**Business Teacher Educators:** Professionals in colleges and universities who prepare future business teachers. They specialize in the business area and also demonstrate knowledge of and commitment to business teacher preparation. They also supervise students during early field experiences and student teaching (Adapted from the National Council for Accreditation of Teacher Education, 1987).

**Change agent:** An individual who influences clients' innovation decisions in a direction desired by a change agency. A change agent usually seeks to obtain the adoption of new ideas, but may also try to slow down diffusion and prevent adoption of undesirable innovations (Rogers, 1995).

**Computer Instructional Technology:** Tools, techniques, and methodologies utilized to enhance teaching and learning through a computerized system. (Adapted from Medlin, 2001).

**Diffusion:** The process by which an innovation is communicated through channels over time among members in a social system (Rogers, 1995).

**Four-Year Institution:** "legally authorized to offer and offering at least a 4-year program of college-level studies wholly or principally creditable toward a baccalaureate degree" (National Center for Education Statistics, 2000).

**Heterophily:** "the degree to which pairs of individuals who interact are different in certain attributes" (Rogers, 1995, p. 287).

**Homophily:** "the degree that a pair of individuals who communicate are similar" (Rogers, 1995, p. 286).

**Ideal types:** Conceptualizations based on observations of reality that are designed to allow comparisons of adopter types (Rogers, 1995).

**Innovation:** An idea, practice, or object that is perceived as new by an individual (Rogers, 1995).

**Instructional Technology (IT):** "is the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning" (Seels & Richey, 1994, p. 9). According to Funderstanding (2001, p. 1), instructional technology concerns "using computers, CD-ROMs, interactive media, modems, satellites, teleconferencing, and other technological means to support learning."

**Non-research institution:** Characterized by diverse baccalaureate programs but not engaged in significant doctoral-level education. Low priority is given to research (Adapted from National Center for Education Statistics, 2000).

**Other educational institutions:** Includes other 4-year and 2-year institutions (Adapted from National Center for Education Statistics, 2000).

**Rate of adoption:** The relative speed that members of a social system adopt an innovation (Rogers, 1995).

**Rejection:** A decision not to adopt an innovation (Rogers, 1995).

**Research institution:** High priority is given to research and graduate education through the doctorate (Adapted from National Center for Education Statistics, 2000).

### Organization of the Study

Chapter 1 serves as the introduction to this study concerning business teacher educators' adoption of current computer technology as a teaching tool. Integration of current computer technology into the business education curriculum has the potential to help colleges and universities identify business teacher educators that are efficient in the use of current computer technologies. This chapter also includes the theoretical perspective, statement of the problem, purpose of the study, research questions, significance of the study, assumptions, delimitation, limitation, and definitions.

Chapter 2 includes a review of the literature related to business teacher educators' adoption of current computer technology as a teaching tool. This chapter begins with a discussion of Roger's innovation-decision process, which serves as the theoretical framework for this study. The next section examines technological trends in education and instruction and computer technology adoption by faculty. Personal and employment variables and innovation factors are discussed which include gender differences in the adoption of computer technology;

years of teaching experience; number of years of computer use; type of institution; faculty access to computers; faculty access to training; and social, organizational, and motivational factors.

Chapter 3 provides information related to the population and sample, research design, data collection procedures, validity and reliability, field testing of the survey instrument, and the procedures for the analysis of the data.

Chapter 4 reports the findings in relation to the research questions.

Chapter 5 provides conclusions and discussion based on the findings and recommendations for further study and practice.

## CHAPTER II

### LITERATURE REVIEW

A body of literature on the diffusion and adoption of computer technology in colleges and universities provides a basis for this study. This study was designed to determine the extent to which business teacher educators are adopting computer technology as a teaching tool. The researcher also determined the variables and factors that influence business teacher educators to adopt and use computer technologies in their delivery of instruction in higher education. Business teacher educators' experiences are examined in their relation to Everett M. Rogers' diffusion of innovation theory.

The review begins with Rogers' (1995) diffusion of innovations theory, which provides a theoretical framework for this study. Rogers' theory consists of four major components, which include innovation, communication channels, time, and social system. The second section will examine technological trends in education, instruction, and computer technology adoption by faculty, which will provide a foundation for the current call for educators to use computer technology as a teaching tool. The next section examines personal and employment variables that influence computer technology adoption by business teacher educators, which should be understood when determining whether or not adoption will occur. These variables include gender, type of institution, years of teaching experience, years of computer use, faculty access to computers, and faculty access to training. The last section will examine social, organizational, and personal motivational factors that should be understood when determining whether or not adoption will occur.

## Diffusion and Adoption

Studies of diffusion and adoption assist in explaining the reasons that technology is accepted or rejected in education (Holloway, 1997). Diffusion research is a type of communication research that helps in understanding why an individual or an organization adopts or rejects an innovation at a particular point in time. The process of diffusion and adoption of innovations in educational institutions includes four elements, which are innovation, communication channels, time, and the social system (Rogers, 1995). Roger's diffusion and adoption theory relates specifically to the study and will provide the theoretical framework to assess business teacher educators' adoption of computer technology in their teaching.

### *The Innovation-Decision Process*

Roger's Innovation-Decision Process model provides the framework for this study of the adoption of computer technology by business teacher educators in colleges and universities. An innovation is an idea, practice, or object that is perceived as new by the individual. However, newness of an innovation does not just involve new knowledge since an individual may have previously known about the innovation for some time but has not yet formed an attitude about the innovation, nor made a decision to adopt or reject it (Rogers, 1995).

Rogers' model (1995) consists of five stages through which an individual passes when deciding whether or not to adopt an innovation. This process is an information-seeking and information-processing activity in which an individual obtains facts at various stages that help to reduce uncertainty about the innovation. The five stages in the innovation-decision process are knowledge, persuasion, decision, implementation, and confirmation.

In stage one, the individual first acquires knowledge of the innovation's existence and some understanding of how it functions. The individual mainly wants to know what the

innovation is, how, and why it works. If the individual decides that the information is not relevant for use in his or her situation, the knowledge step is skipped (Rogers, 1995).

In the persuasion stage, an individual forms an attitude toward the innovation and determines the advantages and disadvantages to his or her situation. The individual may seek information from his or her near-peers who will give him or her evaluative information about the innovation. In this stage, the individual will form either a favorable or unfavorable attitude toward the innovation.

In the decision stage, subjective evaluations of the innovation from others influence an individual. The individual will seek additional information about the innovation, try the innovation, and decide whether to adopt or reject the innovation. However, this decision could be reversed or discontinued at a later time.

In stage four, implementation occurs when an individual decides to adopt the new idea. At this stage, the individual will acquire additional information about the innovation, implement the new idea, and make full use of the innovation on a regular basis. Implementation of an innovation in an organization is more complex than for an individual because the individuals who use the innovation are usually a different set of people from the decision makers. An organization may decide to adopt an innovation, but implementation may not always follow since decisions in organizations involve a hierarchy of individuals, some who have veto power in the innovation-decision process. In this stage, the implementers institutionalize the new idea and it becomes a routine function in the operation of the organization (Medlin, 2001).

In the last stage, the individual confirms the decision and seeks reinforcement of the decision to adopt the innovation. The individual recognizes the benefits of using the innovation, integrates the innovation into a continuous routine, and promotes the innovation to other

individuals. However, an individual may reverse his or her decision and discontinue the innovation if he or she receives conflicting messages about the innovation.

After using a new idea, an individual may discontinue its use due to uncertainty. There are two types of rejection of an innovation: active rejection and passive rejection. Active rejection occurs when an individual considers adopting the innovation but decides not to adopt it. In passive rejection, the individual never intended to use the innovation.

Rogers' Innovation-Decision Process model describes five stages that individuals experience when making a decision to adopt an innovation. The five stages will be used in this study to explain the business teacher educators' decision process when they consider adopting computer technology.

#### *Communication Channel*

The communication channel is essential in the diffusion and adoption of an innovation. Communication is the process that individuals use to create and share information to achieve a mutual understanding. Diffusion is a specific type of communication where a message is exchanged that concerns a new idea. The exchange of information between an individual who communicates an innovation to others is essential to the diffusion process. The diffusion process involves an innovation, an individual or unit of adoption that has knowledge of a new idea or experience using it, another individual or unit that does not have knowledge or experience with the innovation, and a communication channel connecting the two individuals or units.

Mass media communication channels consist of media such as radio, television, and newspapers and are usually the fastest way for an individual to exchange information about an innovation. However, interpersonal networks are more effective for an individual to persuade

another to accept a new idea especially if the interpersonal channel connects two or more individuals who are similar in socioeconomic status, education, or experience.

A basic principle of communication is the exchange of information between individuals who are homophilous. According to Rogers (1995), most people depend on a subjective evaluation of a new idea to be conveyed to them by individuals like themselves who previously adopted the innovation. However, heterophilous communication can occur in individuals who are different in rare situations. The heterophilous network can connect two cliques that link two socially dissimilar individuals. Thus, diffusion is a social process in which individuals usually depend on their near peers' experience with the innovation which suggests that the key to the diffusion process consists of modeling and imitation by potential adopters.

### *Time*

There are many different types of innovations and, as a result, they are not equivalent in their adoption rate by potential users. Individuals will adopt an innovation faster if they perceive that the innovation will give them an advantage over other methods. The rate of adoption is the speed that a social system's members adopt an innovation. Innovations have five characteristics that help to explain the speed that individuals adopt a new idea. These characteristics are relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1995).

The first characteristic, relative advantage is the degree to which an individual perceives an innovation to be superior to previous methods. Economic advantage, social prestige, convenience, and satisfaction are important factors; however, it does not matter that an innovation has a clear advantage over others since an individual must perceive the innovation as advantageous. The greater the perceived advantage of an innovation by an individual, the faster the innovation will be adopted.

Next, compatibility is the degree that an individual perceives an innovation to be consistent with his or her existing values, past experiences, and needs. An innovation that meets the needs of the individual will be adopted at a faster rate.

Third, complexity is the degree that an innovation is perceived as difficult to understand and use. Innovations that are easier to use will be adopted faster than an innovation that is more complicated.

Fourth, trialability is the degree that an innovation will be used on a limited basis. If the innovation is unsatisfactory, first adopters have two types of risk, financial loss and ridicule from others. However, if the innovation is satisfactory, the first adopters serve as a reference source for later adopters.

Fifth, observability is the degree that the results of an innovation are visible to other individuals. The easier it is for people to see an innovation's results increase the speed of adoption (Boone & Kurtz, 1995; Rogers, 1995). When people see an innovation, it triggers discussion of the new idea since friends and neighbors of the adopter will seek information about the new product.

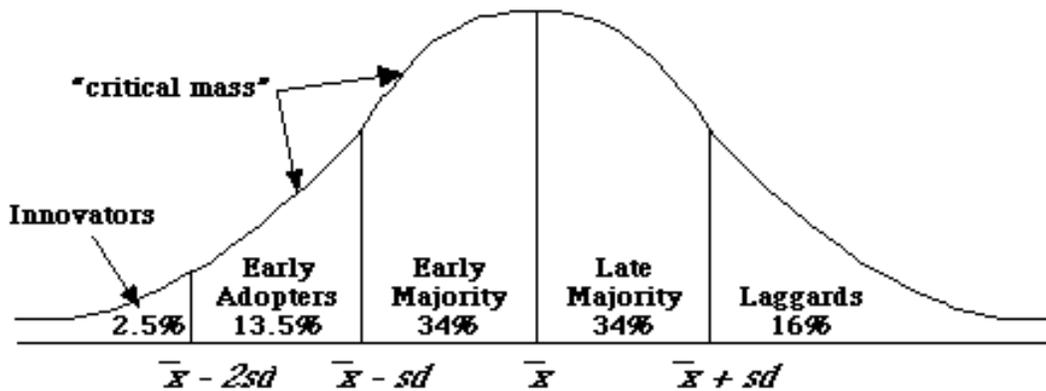
In summary, Rogers (1995) maintained that innovations perceived by individuals to have greater advantage, compatibility, trialability, observability, and less complexity are adopted faster than other innovations. Previous research indicates that these five characteristics are important in explaining how fast an innovation will be adopted. In addition to categorizing adopter characteristics, Rogers also organized innovation adopters into a social system.

### *Social System*

Rogers (1995) categorized adopters into five categories of a social system (Figure 2) in a bell-shaped curve based on their degree of innovativeness. A social system is a set of interrelated

units that engage in joint problem solving to accomplish a common goal. The adopter categories present a clear, concise method to measure innovativeness and classify individuals based on the length of time that an innovation is adopted. The adopter categories consist of innovators, early adopters, early majority, late majority, and laggards.

Figure 2. Adopter categorization on the basis of innovativeness.



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The adopter categories are ideal types that are based on conceptualizations of reality that allow comparisons of adopters. Today, the adopter categorization method is widely used in diffusion research (Rogers, 1995).

Innovators are the first to adopt a new idea in their system. They represent the first 2.5% of the individuals to adopt an innovation. Innovators are venturesome and are almost obsessed with innovations. They are able to cope with a higher degree of uncertainty than the other adopter categories and are considered gatekeepers of the flow of innovations into a social system. The innovators can cope with uncertainty at higher levels concerning an innovation than the individuals in the other adopter categories. They have a high level of media exposure and an

interpersonal network that covers a wide geographical area. Innovators are venturesome and are interested in new ideas, which lead them out of a local peer network into cosmopolite social relationships. Innovators usually control substantial financial resources and thus are able to recover from an unprofitable innovation. They also have the ability to understand and apply complex technical knowledge. The innovator has an important role in the diffusion process since he or she starts a new idea in the social system by importing the innovation from outside of the system's boundaries (Rogers, 1995).

Early adopters are an integrated part of the local social system, represent the next 13.5% to adopt a new idea, and have the greatest degree of opinion leadership than the other adopter categories. Early adopters are more a part of the local social system than the innovator. The early adopter serves as an opinion leader for individuals to obtain advice and instruction before adopting a new idea, are respected by their peers, and are usually the person individuals seek information from before using a new idea. These adopters speed up the adoption process because they are not far ahead of the average individual in innovativeness and serve as role models for some of the other members of the social system. According to Hasselbring et al. (2000), unless students see the effective use of technology modeled in their courses, they may not make the connection between technology and instruction and may be hindered in their adoption of technology since educators usually teach the way they are taught. In a recent research study, Vannatta and Beyerbach (2000) contended that in order for technology integration methods to be successful and meaningful for students; they must be modeled by the course instructor and connected to course content. According to Rogers (1995), the early adopter reduces uncertainty by adopting an innovation, conveying a subjective evaluation of the new idea, and modeling the innovation to their near-peers through their interpersonal network.

The early majority represents the next 34% of the adopters. They adopt innovations before the average member of the social system. The early majority interacts with their peers but seldom are opinion leaders. They provide an important link in the social process between the very early and the late majority since they provide interconnectedness in the social system's network. They may deliberate for a while before they completely adopt an innovation. The early majority are usually the followers in adopting innovations.

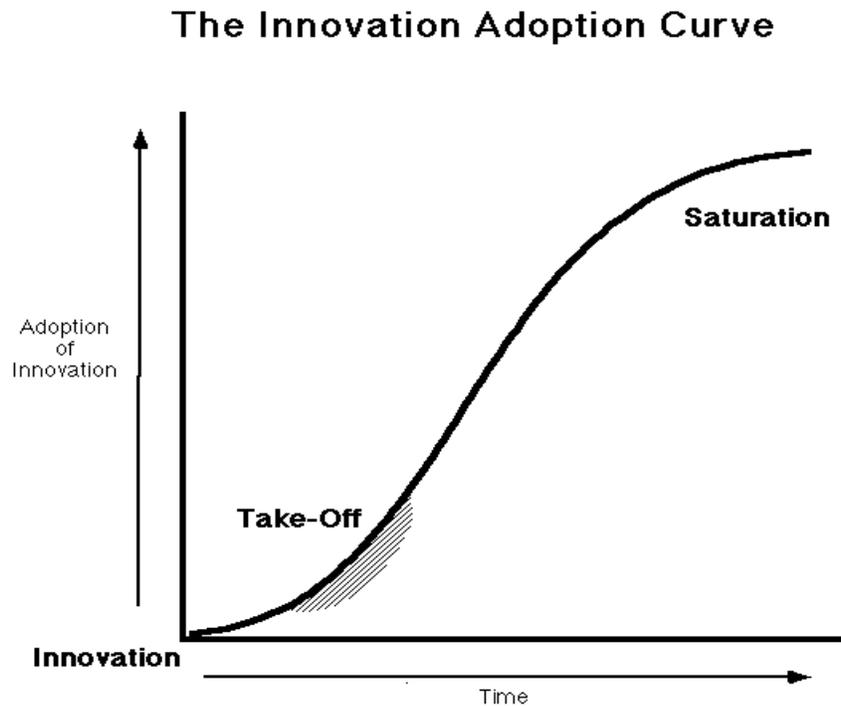
Late majority adopters make up the next one-third of the members of the social system. The late majority are skeptics and do not adopt new ideas until the majority of the members in their social system have done so. However, they usually adopt an innovation due to economic necessity and increasing pressure from their peers in their interpersonal network. They have scarce resources; thus, the majority of the uncertainty about the innovation must be removed before they feel it is safe to adopt.

Laggards are the last 16% to adopt the new idea as represented in the bell-shaped curve. The laggards are the last individuals to adopt an innovation in a social system. They usually are not opinion leaders, have limited resources, and make certain that a new idea will be successful before they will adopt. The laggards' point of reference is in the past and what has been done previously. They have traditional values, and are suspicious of innovations and change agents. Laggards have a longer innovation-decision process than the other adopters, which is rational from their viewpoint since they have limited resources and must ascertain that a new idea will be successful before they will adopt.

When the number of individuals adopting an innovation is plotted on a cumulative frequency over time, an S-shaped curve (Figure 3) is formed. Initially, only a few innovators adopt the new idea. Then the diffusion curve climbs as more individuals adopt the innovation;

then the curve levels off since fewer individuals remain who have not adopted the innovation until the diffusion process is finished (Rogers, 1995).

Figure 3: The innovation adoption curve.



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Rogers' innovation-decision process has been used in different studies to explain the adoption of change in individuals when a new technology is introduced in an organization. Carter used Rogers' innovation theory to determine the frequency with which Appalachian College Association faculty use computer technology (Carter, 1998). Carter found that the Appalachian College Association faculty used word processing, email, and Internet resources at school most frequently while other computer technologies were used infrequently or not at all.

Banks (2002) used Rogers' diffusion of innovations theory to explain Virginia Polytechnic Institute and State University's Faculty Development Institute's technological training program's effectiveness. Banks' findings revealed how some faculty feel about the use

of technology and how it relates to the quality of education. Banks found that Virginia Tech's Faculty Development Institute taught faculty to develop new ways to use technology to help students learn. Banks also found that technology enables faculty to teach in new and better ways, but it requires more work. Banks' study focused on introducing computer technology in a new setting. Roger's diffusion theory helped to explain how technological innovations are adopted and diffused in an educational institution.

Zakaria (2001) used Rogers' innovation theory to determine factors related to the Malaysian Ministry of Education Polytechnics' implementation of Information Technology into the curriculum. According to Zakaria, professional development training was greatly skewed in faculty non-use of resources. Results indicated that 69% of the respondents experienced barriers in the use of computers in their teaching such as limited accessibility to the technology. Zakaria concluded that the barriers help to explain why Malaysian Ministry of Education Polytechnic faculty members were unable to use information technology resources in their instruction. Rogers' theory was used in Zakaria's study "to investigate why Malaysian Ministry of Education Polytechnics' faculty use or do not use Information Technology in their teaching" (Zakaria, 2001, p. 16).

Rogers' innovation decision theory (1995) has been used in numerous research studies to help explain an individuals' adoption of an innovation when a new technology is introduced in an organization. Rogers' model (1995) will be used in this study to help determine the extent that business teacher educators have adopted computer technology in their instruction. In this study, the innovation is the adoption and use of computer technologies in instruction. (The units or individuals with experience with the innovation are the training resources such as instructors.) Units are the components of the communication elements of Rogers' diffusion and adoption

process for individuals and organizations. The units or individuals who lack experience with the innovation are the business teacher educators. The communication channels connecting the two units are professional development training, workshops, and seminars (Banks, 2002).

### Technological Trends in Education and Instruction

In addition to the diffusion and adoption of computer technology in organizations, researchers have also studied computer technology and how it has impacted education and instruction. Pownell and Bailey (2002) contend that there are four predominant waves in the evolution of computers in education. Each of these waves brought about new ways of teaching and learning with technology.

The first wave began during the 1960s and 1970s, which involved large, expensive mainframe computers (Pownell & Bailey, 2002). According to Logan (1995), mainframe computers were introduced in educational institutions in the early 1960s, which were primarily used as an administrative tool. This computer technology was first used in instruction to teach computer programming mostly in secondary and postsecondary education. Later, mainframes were used in educational institutions for computer-assisted instruction, simulations, tutorials, and educational games (Logan, 1995; Kizzier, 1995).

In the late 1970s, the second wave started, which consisted of desktop computers that became available to teachers and changed the face of computing due to the computer's increased power in a smaller package (Pownell & Bailey, 2002). Many schools adopted the use of computer technology in the classroom when Apple Computer introduced the Macintosh (Roach, 1999). The Macintosh was the first computer to use Graphical User Interface, which provided a visual output instead of text commands, which made the computer easy to use (Newby, Stepich, Lehman, & Russell; 2000). Also, the microchip fueled the computer revolution (Logan, 1995) since it enabled smaller and more powerful computers to be produced. Personal computers soon

became very popular and proliferated in educational institutions. These personal computers were first used by teachers mainly for programming and computation; however, “as their processing power increased, their uses became more sophisticated, and word processing, spreadsheets, and databases soon became standard uses of computers in school and homes” (Pownell & Bailey, 2002, p. 50).

The third wave of technology involved the Internet and the World Wide Web (Pownell & Bailey, 2002). The Internet started in 1969 when the U. S. Department of Defense (DOD) looked for a better way to move information between the DOD and military researchers (Descy, 1997). The Internet and the World Wide Web were introduced in educational institutions during the mid-1990s with the development of the *Mosaic* Web browser software, which made the technology conveniently accessible (Maddux & Johnson, 1997). The Internet had a tremendous impact on education since the computer technology was affordable, ubiquitous, and user friendly. West (1999) concluded that the response of higher education to this new technology was uncharacteristically rapid. By 1995, the Internet and World Wide Web and related technologies such as Hypertext Markup Language were incorporated into the business education curriculum (Bartholome, 1997). In just a few years, the growth in the use of the Internet in educational institutions was phenomenal. By 1999, Internet access in education institutions had increased to 95% (Means, 2001).

In the 1980s, teaching students about technology became widespread and computer technology started to be utilized as a learning and thinking tool, which incorporated critical thinking, problem solving, decision making, creativity, and exploration (Kizzier, 1995). Also, computer technology applications such as word processing, database, and spreadsheet became

popular (Means, 2001; McCoy, 2001; Bartholome, 1997) and business educators had the major responsibility to teach these courses (McCoy, 2001).

In 1983, a report titled *Nation at Risk: The Imperative for Education Reform* was published (Bartholome, 1997), and it reported that students in the United States were receiving a mediocre education. This report fueled a call for improved educational quality that brought about the educational reform movement in American educational institutions. As a result, national and state standards were developed to improve the quality of education. In the early 1990s, the National Council for Accreditation of Teacher Education (NCATE), in conjunction with the International Society for Technology in Education (ISTE) developed guidelines and standards to support computer use and encourage computer technology integration in teacher preparation programs (Bennett, 2001; Vannatta, 2000). Also, the National Association for Business Education responded to the call and developed the National Standards for Business Education in 1995 (Brown, 2000; NBEA, 2001). Included in these standards are guidelines for the incorporation of computer technology in the business education curriculum. Additionally, many state boards of education are adapting the NCATE and ISTE technological standards into their educational institutions (McCampbell, 2001; Bennett, 2001).

In the late 1980s and 1990s, computer technology was increasingly incorporated into the educational curriculum as a teaching tool. This computer technology enabled educators to teach students in new and creative ways (Kizzier, 1995) that previously had been impossible, such as conducting research via the Internet in the classroom. According to Bartholome (1997), “by 1995 many business education teachers were including Internet, World Wide Web, and Hypertext Markup Language as part of the business curriculum” (p. 13).

According to Pownell and Bailey (2002), the fourth wave of technology is beginning which concerns small, wireless devices such as handheld computers. These educational tools can be transported anywhere at anytime, transformed by adding different software or hardware, and functional learning tools in any educational environment.

In conclusion, current literature indicates that some educators believe computer technology is a tool that has the potential to change teaching and improve educational quality (McCoy, 2001). However, literature revealed that business teacher educators find keeping up with constantly changing computer technology challenging (Lundgren, 1998). The goal of this study is to determine the extent that business teacher educators have adopted computer technology as a teaching tool. In addition to an examination of computer technology trends in education and instruction, researchers have also studied faculty adoption of computer technology.

#### Computer Technology Adoption by Faculty

The Official Position of the National Association of Business Teacher Education (1992) includes the tenet that business teacher educators must prepare future business teachers to teach and use current and emerging technology for use in their careers. Also, business teachers must be constantly aware of technology changes and incorporate them into their instruction at the appropriate times (NABTE, 1993). In addition, Policy Statement Number 53, *This We Believe About the Role of Business Education in Technology* (The Policies Commission for Business and Economic Education, 1997) stated that business educators should adopt a philosophy of integrating technology into all business courses rather than teaching technology concepts in an isolated course. The Policies Commission also believes that the business educators' roles should be to integrate technology into their instruction to reinforce the students' technology knowledge,

prepare students with a broad background for their careers, and equip the students with lifelong learning skills.

Business teacher educators also use computers to help them deliver their instruction, manage the course, and perform administrative tasks (Brown, 2001). Business educators may use the computer in the classroom to deliver instruction using word processing, Internet, or PowerPoint (Newby et al., 2000). The computer is also used by educators to manage their courses with tools such as Blackboard and WebCT. In addition, professors use word processing, databases, and spreadsheets to perform administrative tasks (Roblyer & Edwards, 2000). Currently, computers are used by educators to organize and store huge amounts of data, perform research on the Internet, supplement classroom instruction, and transmit educational courses via the Internet to students in distant geographical locations (Rucker & Reynolds, 2002). In the not too distant past, educators used pencils, paper, and typewriters (Shaw & Giacquinta, 2000). Today, some educators still use these earlier methods of technology (Medlin, 2001). Computer technology can be used by educators not only to achieve their educational goals but also extend, supplement, and enhance the students' learning experiences (Green, 1997). Bartlett and Mansfield (2001) also maintained that integrating technology into the business education classroom is time-consuming and challenging for faculty. Duhaney (2001) contended that the lack of meaningful computer integration in the classroom includes inadequate access to equipment, instructional and technical support, and computer technology training. Duhaney (2001) and Vannatta (2000) listed several barriers that related to teacher effectiveness in their use of computer technology, which included lack of faculty training, insufficient technical support, and inadequate time to learn new technologies.

In a university focus group, Bryon (1995) found that faculty were frustrated with the inability to fully use technology because a lack of technical and administrative support with no models to follow in their educational disciplines. In a recent research study, the National Survey of Information Technology in Higher Education by The Campus Computing Project, (Green, 1999), surveyed 557 two and four-year public and private colleges and universities in the United States. The findings revealed that 75.8% of the educational institutions have information technology (IT) development programs and 69.5% maintain campus support centers to help faculty adopt technology into their courses. The survey also revealed that 39.2% of the respondents reported that information technology integration was their most significant IT challenge. The Campus Computing Project's founder and director, Kenneth C. Green (1999) stated that the major technology challenges to colleges and universities involve human factors such as assisting students and faculty to effectively use new technologies to support teaching, learning, and instruction. However, Bennett (2001, p. 11) maintained that, "with the integration of technology, new models for teaching and learning...are being designed." Vannatta and Beyerbach's (2000) ongoing Goals 2000 Preservice Technology Infusion Project attempted to teach higher education faculty, K-12 teachers, and preservice teachers to integrate technology into their instruction. The research objectives were to (a) increase technology proficiencies among higher education faculty and K-12 teachers; (b) increase technology integration and experiences in education courses; and (c) provide preservice teachers the opportunity to observe technology-rich classrooms through videoconferencing. Quantitative and qualitative methods and pretreatment and post-treatment surveys were administered to the participants. Participants were 12 higher education faculty and K-12 teachers and 122 preservice teachers. Major findings revealed that technology integration of instructional methods from pretreatment to post-treatment

increased from 33.4% to 93.3%. Also, more than half of the faculty and teachers integrated computer presentations, content-specific software, email, the Internet, electronic references, and word processing for student and instructor use. Vannatta and Beyerbach (2000) concluded that technology integration training for higher education faculty is a crucial component to developing technology-using preservice teachers.

The Virginia Tech Faculty Development Institute, as described in Banks' (2002) study, could be a successful model for others to follow when preparing faculty to adopt technology into their instruction. Banks (2002) found that when adequate training and technical support is available, faculty could learn to effectively infuse technology into their teaching. According to NCATE (1997), Vanderbilt's Peabody College faculty have developed a conceptual model to transform teaching and learning by integrating technology into their teacher education curriculum. The faculty's predominate goal is to introduce future teachers to different information technologies and help them become comfortable and capable with these technologies. Their second goal is to model highly effective and innovative teaching methods using information technologies into their teaching to promote greater student learning. In order to accomplish these goals, faculty have redesigned their courses to include various technological resources in their teaching. Peabody faculty helps the students' progress along a continuum from consumers to producers of technology-based applications. The teacher educators are preparing their students to understand how, when, and why technology should be used to support their teaching and students' learning by instructing, modeling, and adopting technology in their own teaching (NCATE, 1997).

The National Council for Accreditation of Teacher Education and the International Society for Technology in Education jointly developed standards that encourage faculty to use

and integrate technology in teacher preparation programs. In response to these standards, the SUNY Oswego School of Education developed a task force and a long-range technology plan to increase technology proficiency and integration among their faculty members. Faculty members were evaluated through two surveys, the SOE Technology Integration Survey and the NCATE Implementation Survey. Forty-five full-time faculty members responded to the surveys. Findings indicated moderate to high levels of faculty proficiency and integration in Internet, email, and word processing. Feeling proficient in technology integration instructional methods was a predictor of NCATE standards implementation and 60% of the faculty self-reported that the goal of future technology training should be to integrate technology into their instructional methods (Vannatta, 2000).

The literature review revealed that there is a need for teacher educators in colleges and universities to be effectively trained to integrate technology into their instruction. The literature also supported the following points: (a) There is a need for computer technology integration training for teacher educators; (b) lack of specific computer technology training is a barrier for many teacher educators; and (c) professional staff development should be planned, continuous, and systematic in order to effectively prepare faculty members to adopt computer technology and use it in their instruction. In addition to faculty computer adoption, researchers have also examined personal and employment variables and factors that assist in determining whether an individual will adopt and use an innovation.

## Personal and Employment Variables and Factors

The literature revealed various personal and employment variables and social, organizational, and motivational factors that should be understood when determining whether adoption of an innovation will occur. This study will examine the following personal and employment characteristics: Gender, level of education, type of institution, tenure, rank, years of teaching experience, and years of computer use. The research will also include social, organizational, and motivational factors that help to determine the extent to which faculty adopt current computer technology as a teaching tool.

### *Gender and Computer Technology Adoption*

Findings in the literature concerning gender use of computer technology are contradictory. Many studies have found that males are more inclined to use technology yet other research revealed differences in technology use by gender is very small or neutral (Whitley, 1996, Yaghi & Abu-Saba, 1998). Later research indicated women had more positive attitudes toward the use of computers than males (Ray, Sormunen, & Harris, 1999). In a meta-analysis by Whitley (1997), gender differences in computer-related attitudes and behavior were examined. According to Whitley (1997, p. 3), a “meta-analysis is a quantitative synthesis of the results of a set of studies that integrates the results of their statistical analysis, compared with the narrative literature review that uses qualitative techniques to integrate a body of research.” The research studies in the meta-analysis were completed from 1973 to 1993, which included adult, college, high school, and grammar school participants from the United States and Canada. The sample consisted of 82 studies that provided 104 effect sizes from 40,491 respondents. “*Affect* measures assessed emotional responses to computers, including such constructs as anxiety, liking, and fear” (p. 5). Whitley compared women and girls with men and boys and found that men and boys viewed computers more appropriate to themselves, saw themselves more competent on

computer-related tasks, and reported a more positive affect toward computers (p. 12). Whitley also found that the effect of gender differences in attitudes towards computers varied between males and females and was statistically significant, although it was functionally zero at  $d = .065$ . Whitley concluded that gender differences in the meta-analysis were statistically significant; however, they were small.

Okinaka's (1992) and Gordon's (1993) studies found no gender differences in using computer technology in education. However, in a research study by McAulay (1993), it was found that there was a significant difference in the frequency of computer use between men and women surveyed. Furthermore, in a research study of the National Association of Business Teacher Educators use of computer technology as an instructional tool in non-computer oriented courses, Lu (1995) found that a larger proportion of the female educators perceived computer technology as an effective tool than the male educators. Also, it was determined that there was an increased desire to own computers among males than females. Men also were significantly more likely to report that computers were of use to them as a job skill. More recently, Ray, Sormunen, and Harris's (1999) study found that females had more positive attitudes concerning the computer's value in making users more productive. Their research also revealed that women express greater comfort than men in using computers. Further, results from Liaw's (2002) recent research on the relationship between computer attitudes and web attitudes of doctoral students in a school of education revealed significant gender differences. Findings indicated that male students had more positive attitudes toward computers and the Internet than female students. Adams (2002) used descriptive statistics to examine the degree to which faculty attend technology development programs correspond to the use of faculty teaching methods. The population consisted of a convenience sample composed of 589 full and part-time faculty

members at a metropolitan postsecondary teaching institution. Adams found significant correlations between gender and technology development activities, integration levels, and higher-order concerns. Females reported a greater integration level than males.

The literature revealed conflicting findings in regard to gender in the use of computer technologies. Earlier studies indicate that males use technology more than females. Other studies reported that gender differences in the use of computers are very small; however, later research revealed that more females than males are more positive towards their use of computers. Gender may be a factor in determining whether a business teacher educator will adopt and use computer technology in his or her instruction. Therefore, gender will be used as a variable in this study. Researchers have not only studied gender and computer technology adoption, but they have also studied the number of years of teaching experience in which faculty members' computer technology adoption may occur.

#### *Years of Teaching Experience*

A review of the literature revealed few studies on the years of teaching experience and the impact it has on faculty technology adoption. An earlier study by Oscarson (1976) revealed that faculty members who had been in their position for a longer period of time appeared to be less prone to adopt technology than those who had been in their position for a short time period. In a recent report, the National Center for Education Statistics (U.S. Department of Education, 2000), revealed that teachers with nine or fewer years of teaching experience are more likely to teach using computers or the Internet than teachers with twenty or more years of experience. Adams (2002) studied 589 part-time and full-time postsecondary faculty in a metropolitan teaching institution and found a significantly high level of computer integration by faculty members with up to three years of teaching experience. Survey findings also revealed that

faculty with tenure and 10 to 19 years of teaching experience with the least integration of computers into their teaching. Adams concluded that faculty with less than ten years of teaching experience and faculty with 20 years or more of teaching experience demonstrated a large degree of technology integration into their teaching. Survey findings indicate that female faculty members with few years of teaching experience are more prone to integrate computers into their teaching than older, male faculty with more years of teaching experience (Adams, 2002).

#### *Years of Computer Use*

Furthermore, it appears that teachers may need a period of time working with technology before they become proficient. Sheingold and Hadley (1990) contended that teachers need five to six years working with technology to develop expertise, and when the teachers reach this level, they changed their instructional strategies and the classroom environment.

Additionally, Sandholtz, Ringstaff, and Dwyer (1997, pp. 37-47) determined that teachers experience an evolutionary process as they continuously increase their use of technology. They identified five phases that teachers go through: (1) Entry: Teachers adapt to the physical environment changes created by technology, (2) Adoption: Teachers support textbook instruction with technology, (3) Adaptation: Teachers integrate word processing and databases into their instruction, (4) Appropriation: Teachers change their attitude towards technology, and (5) Invention: Teachers master technology and create new learning environments.

The literature revealed that educators need a period of time to learn, master, and develop expertise with computer technology. This evolutionary process is different for each individual faculty member. Some may become proficient integrating computer technology into their instruction fairly quickly while for other educators it may take more time. Literature indicates that teachers need time to learn to use computer technology in their instruction. Therefore, years

of computer use will be used as a variable in this study to determine the time frame that a business teacher educator would need to become proficient with computer technology and adopt it in his or her teaching. Researchers have not only studied years of computer use in computer technology adoption, but they have also studied the type of educational institution in which computer technology adoption may occur.

### *Type of Institution*

There was little literature found concerning type of educational institution in the adoption of computer technology into instruction in higher education. However, literature revealed a research study by Sanderson (1998) that examined factors that contribute to the adoption or non-adoption of distance education technologies in instruction at the university level. The participants were business educators who were employed by 41 higher education institutions in the Intermountain West region of the United States. Of the 119 respondents, Sanderson found that 10.1% were employed in a research institution, 11.8% taught in a nonresearch institution, 12.6% reported a 4-year college, and 63.9% indicated a 2-year institution. Based on the final model analysis, Sanderson concluded that there was no difference between business educator adopters and non-adopters of distance education technologies and type of institution. Type of institution will be used as a variable in this study because the type of institution in which a business teacher educator is employed may have an influence on his or her use of a technological innovation. In addition to type of institution, this study will also examine faculty access to computers in relation to their adoption of an innovation.

### *Faculty Access to Computers*

In addition, it is important that faculty have convenient access to computers, updated software, and hardware to successfully adopt and use computers in their instruction. Vannatta

(2000) surveyed 65 tenure-track faculty members' in the SUNY Oswego School of Education concerning the extent of their computer technology proficiency and integration. Vannatta found that all participants have a computer at home, 95.3% have an office computer, and 50% have an office computer with insufficient software, hardware, and memory. The findings also indicated that faculty reported moderate to high levels of computer proficiency and integration in word processing, email, and Internet activities.

In another study concerning faculty computer use, Dusick and Yildirim (2000), surveyed 117 part-time and full-time faculty members at an urban California community college. They found that 85% had a computer at home and 15% reported that they do not use computers in their instruction. Dusick and Yildirim concluded that access to computers is significantly correlated with competency and also has an indirect effect on computer use in the classroom.

Banks' (2002) recently studied Virginia Tech's Faculty Development Institute. Banks found that each participant who completed computer technology training received a state-of-the-art computer installed in their office with specific software to support technology infusion into their teaching. The updated computers and software provides faculty with an equitable base of computing technology. Virginia Tech students and faculty have access to 24-hour technical support. Faculty also has access to professional technical staff, consultants, and a support lab to help them use technology in their teaching (The University Plan: Progress Toward 1991-1996 Goals, 1996).

As a review of the literature indicates, faculty members at some colleges and universities have access to a computer at home and in their office. Since literature revealed that computer access correlates to an educators' use of the computer in the classroom, access to computers will be used as a variable in this study.

### *Faculty Access to Training*

Hasselbring et al. (2000, p. 4) contended that educators might have access to the best hardware and software available; however, it is unlikely that the computer technology will be used effectively, or at all, if teachers are not properly trained. Currently, there is concern that business educators need more technological training to help them effectively infuse technology into their instruction (Means, 2001). Fabry and Higgs (1997, p. 393) contended that “[t]raining is a critical factor in the successful implementation and integration of technology.” According to Duhaney (2001), in order for present and future educators to effectively integrate technology into their classroom instruction, they must be trained in the use of technology in classroom activities, which are supported, by sound teaching and learning principles. According to Luke, Moore, and Sawyer (1998), in order for students to be better prepared to learn with technology, teachers should be better prepared to teach with technology.

Banks (2002) found that the Faculty Development Institute faculty training model at Virginia Tech is a successful model to follow to enable faculty to adopt technology in their instruction. However, Banks concluded that faculty needs and expectations should be assessed prior to training in order to meet faculty training expectations--not just introducing them to the technology.

Furthermore, Penn State is a large research university that provides 24-hour technological support services to its faculty. The Center for Academic Computing provides Penn State’s faculty with computing technology services. The Educational Technology Services unit of the Center for Academic Computing trains and supports faculty to use technology to improve their teaching and learning. Technological services include seminars on instructional use of technologies for novices and experts, consulting by technological specialists, and “sponsorship

of special events that feature the effective use of technologies for instruction” (Dwyer, 1999, p. 302).

Literature revealed that some business educators obtain new technology skills through self-directed learning (Stipp, 1997). In an earlier research study of National Business Education Association members, McEwen (1996) found that most of the business educators considered themselves proficient in technology skills such as word processing, spreadsheet, and database. The majority of the business educators were self-trained using reference materials, were most likely to teach using that approach, and their training needs were greatest in the use of electronic communications such as the Internet.

In a later study, Redmann, Kotrlik, Harrison, and Handley (1999) found that 93% of business educators received information technology training through self-directed learning and 73% of this group obtained learning by self-instruction in the past three years. Redmann et al. (1999) also reported that business educators held the opinion that computer technology such as the Internet promotes self-directed learning. According to Bartlett and Kotrlik (2001), business teacher educators, business education leaders, and business teachers should integrate self-directed learning skills in educating business teachers and encourage them to use self-learning resources such as professional organizations, demonstrations, observation, and mentoring.

A research study, by Dusick and Yildirim (2000), revealed that faculty at a California urban community college found that an effective way to encourage faculty to use computers in the classroom is to increase their level of competency. This competency can be achieved by providing training that is designed for each individual’s level of anxiety, liking, and confidence when using computers.

In a recent research study, Adams (2002) found that survey participants who attended faculty development programs are mostly younger females with few years of teaching experience. The majority of nonparticipants in faculty development programs are older males who have more years of teaching experience. Survey data also show that 25% of the respondents self-reported they are non-users of computers in their teaching.

The literature indicates that faculty members at some colleges and universities provide faculty access to training through campus computer support initiatives. It is also evident from the literature that many educators are teaching themselves to use computer technology through manuals. Faculty access to training will be used as a variable in the study since a review of the literature revealed that training is a critical factor in an educators' adoption and use of computer technology in their teaching. In addition to an examination of faculty access to training, researchers have also studied social, organizational, and motivational factors when determining whether an individual will adopt and use an innovation.

#### Social, Organizational, and Motivational Factors

In addition to adopter behavior factors and personal and employment variables, certain social, organizational, and motivational factors should be considered when assessing whether an individual would adopt an innovation (Rogers, 1995; Medlin, 2001). The literature revealed various social, organizational, and motivational factors that influence successful adoption and use of an innovation (Medlin, 2001).

First, the social factors involve social systems and networks that encourage an individual to adopt an innovation (Darley and Beninger, 1981). Rogers (1995) contended that friendship and advice networks influence diffusion of practices and products. Rogers defined diffusion as the process by which an innovation is communicated through channels over time among members in a social system. Hutchinson and Huberman (1993) examined knowledge use and

dissemination in math and science education and determined that intensity of contact between disseminators and receivers is the best predictor of knowledge use and gain. Davis (1991) studied social networks in innovation diffusion and determined that advisor, friends, and formal structures may influence the adoption of an innovation. Davis (1991, p. 7) maintained that “information alone does not produce adoption, but social contact made adoption more likely.” According to Havelock and Zlotolow (1995), the size of the personal network and the amount of influence that an individual has determines how rapid an innovation will be diffused among individuals in an organization. Friendship and advice networks that will be examined in this study include peer support, technological support, peer pressure, encouragement of a mentor, shared values in my department, friends, and students.

The literature revealed organizational factors that are an important influence in encouraging adoption of an innovation. According to Rogers (1995), organizational structures have internal and external characteristics. Internal characteristics include interconnectedness, centralization, formalization, size, and leadership. An external characteristic that affects organizational innovativeness is system openness that allows information exchange among organization members and also individuals outside the system. Rogers contended that certain internal and external organizational factors could affect the adoption and use of technology. Internal and external organization factors that will be examined in the study include mandate from the university, institutional reward system, formal recognition, as well as physical resources, which includes technological equipment, hardware, and software.

Faculty are motivated by striving to achieve personal and professional goals in their careers (Medlin, 2001). University faculty are motivated by various personal goals, professional level, and type of institution in which they are employed. Faculty employed by research

institutions may have different career goals and work experiences than faculty employed at teaching universities. According to Braskamp and Ory (1994), assistant and associate professors have more publishing and tenure pressures while the full professor is also concerned with consulting, advising, and administrative duties. This study will examine various career goals and work experiences in relation to the business teacher educator's adoption of computer technology in instruction. The career goals and work experiences include personal interest in computer technology use in my teaching, personal interest in improvement in my teaching, and personal interest in enhancing student learning,

Herzberg (1959) theorized that hygiene factors and motivator factors increase an individuals' motivation and satisfaction in his or her employment. Hygiene factors include basic work factors such as working conditions, job security, level of salary, and benefits. Herzberg maintained that if any of these basic work factors were absent, they would cause employees to be dissatisfied. Herzberg also contended that certain motivational factors such as self-actualization, self-fulfillment, and creative and challenging work influence an employee's performance and motivation. Recognition, responsibility, and growth that are connected to an individual's work environment are also motivational factors. Herzberg maintained that an employee's true motivation comes from within which suggests that both internal motivation factors and external motivation factors are important in influencing an individuals' adoption of an innovation.

Medlin (2001) used Rogers' theory to explain the adoption and diffusion process for accounting faculty in higher education. Medlin's study identified factors that motivated accounting faculty members in accredited North Carolina Schools of Business to adopt and use electronic technologies in their instruction. Significant differences were found in (a) social variables: friends, mentors, peer support, and students; (b) organizational variables: mandate

from the university and physical resource support; and (c) motivational variables: personal interest in instructional technology, personal interest in improvement in my teaching, and personal interest in enhancing student learning. These social, organizational, and motivational variables will be examined in their relation to the extent that business teacher educators adopt computer technology in their instruction.

### Summary

A review of the literature revealed Rogers' innovation-decision process model, which provides a theoretical framework for this study to assess the extent that business teacher educators adopt and use computer technologies in their instruction. Certain personal and employment variables and factors that motivate an individual to adopt an innovation were also examined. Rogers and other researchers contend that factors, which include adopter behavior; personal and employment variables; and social, organizational, and motivational factors, influence adoption of an innovation.

## CHAPTER III

### METHODOLOGY

The purpose of this study was to identify the factors and variables that influence business teacher educators to adopt computer technology methods and utilize them in their instruction and to determine the extent to which business teacher educators are adopting computer technology in their teaching. This study will also assist in identifying potential business teacher educators who would use computer technology. In addition, this study will add data to the literature that relates to the degree to which business teacher educators are using computer technology.

#### Research Questions

The following research questions guide this study:

1. What are the personal and employment characteristics of business teacher educators?
2. What are the innovation factors that influence business teacher educators' adoption of computer technology for instructional delivery?
3. To what extent are business teacher educators adopting current computer technology as a teaching tool?
4. Is there a significant difference within the personal and employment characteristics of business teacher educators and the extent to which they adopt current computer technology as a teaching tool?
5. Is there a relationship between the innovation factors that influence business teacher educators' adoption of computer technology and the extent to which they adopt current computer technology as a teaching tool?

This chapter describes the methods used to answer the research questions. It specifically describes the research design, population, instrument, data collection procedures, field test of the instrument, and data analysis.

## Design of Study

Survey research was used to identify business teacher educators' personal and employment characteristics, factors that influence business teacher educators' adoption of change, and the extent to which business teacher educators adopt current computer technology as a teaching tool. Survey research is used when a researcher seeks to assess attitudes, perceptions, and opinions (Glatthorn, 1998). The *Computer Technology Adoption Survey (CTAS)* was adapted from Medlin's (2001) survey instrument. Descriptive statistics were used to describe the personal and employment variables; innovation factors, and social, organizational, and motivational factors in their relation to business teacher educators' adoption of current computer technology as a teaching tool. Descriptive statistics involves using mathematical techniques to organize and summarize numerical data (Gall, Borg, & Gall, 1996). An ANOVA was used to determine significant differences within the business teacher educators' personal and employment characteristics and the extent to which they adopt current computer technology as a teaching tool. According to Gall, Borg, and Gall (1996), the ANOVA indicates whether any of the groups are significantly different from each other in a dependent variable.

Multiple regression was used to determine the relationship between the innovation factors that influence business teachers' adoption of computer technology and the extent to which they adopt current computer technology as a teaching tool. Multiple regression is an ideal method for analyzing separate and collective effects of two or more independent variables on a dependent variable (Pedhazur, 1997). For question four, the dependent variable is the extent to which business teacher educators are adopting current computer technology as a teaching tool. Independent variables included gender, type of institution, tenure, rank, level of education, years of teaching experience, and years of computer use. The dependent variable for question five is the extent to which business teacher educators are adopting current computer technology as a

teaching tool. The independent variables are the innovation factors. The research was a census study, in that the entire population of the National Association of Teacher Educators for Business Education (NATEBE) was surveyed.

### Population

The population for this study consisted of business teacher educators from the National Association of Teacher Educators for Business Education (NATEBE) database. NATEBE is an affiliate of the Business Education Division of the Association for Career and Technical Education (ACTE). Business teacher educators who are members of NATEBE have the professional knowledge and teaching experience to provide meaningful responses on the research instrument. A message containing an embedded link to the instrument was emailed to the entire population of 95 subjects.

### Instrumentation

A survey was determined to be the most effective way to collect data from the population. Surveys are used extensively in quantitative educational research to collect information from participants about their characteristics, experiences, and opinions (Gall, Borg, & Gall, 1996). Surveys are a cost effective, efficient, and concise way to gather data from a large geographically dispersed population (Anderson & Arsenault, 1998; Gall, Borg, & Gall, 1996). The literature did not reveal a survey that would be appropriate for use in this study. A survey instrument was developed based on Medlin's (2001) questionnaire. Medlin developed an instrument to investigate the factors that influence a faculty member's decision to adopt electronic technologies in the delivery of instruction. Some of the survey items were unchanged; however, others were adapted to the purposes of this study. The *Computer Technology Adoption Survey (CTAS)* (see Appendix B) was developed to identify the extent to which business teacher educators are using computer technology in their teaching. The results of the survey were used to

identify and assess factors and variables that influence business teacher educators to adopt computer technology methods. The findings from the study will contribute to developing a profile of business teacher educators who are adopters of computer technology and will also contribute to the knowledge of what encourages business teacher educators to adopt computer technology methods in their instruction.

External validity refers to the generalizability of the obtained results. The results of this study were not generalized to a larger population since a census study was conducted. The survey instrument was completed by each participant who indicated the appropriate response to a five-point rating scale. A five-point rating scale was used in part two of the survey instrument, Adoption of Computer Technology (see Appendix B), with this response range: 0 = “not important,” 1 = “somewhat important,” 2 = “important,” 3 = “very important,” and NA = “not applicable.” A six-point rating scale was used in part three, Computer Technology Integration, with this response range: 0 = “never,” 1 = “almost never,” 2 = “sometimes,” 3 = “frequently,” 4 = “almost always,” and 5 = “always.” Responses such as female/male, had the values 1 and 2 respectively. To calculate the data, the items were recoded in SPSS to mean 1 = “never” 2 = “almost never,” 3 = “sometimes,” 4 = “frequently,” 5 = “almost always,” and 6 = “always.”

#### Field Test

The researcher emailed the survey instrument (see Appendix A) to 10 members of the National Association of Business Teacher Educators who were not members of NATEBE to field test the survey instrument. The field test was conducted to identify ambiguities in the instructions, clarify the wording of questions, and detect omissions or unanticipated answers in the questionnaire. The researcher phoned the field test participants and asked them specific questions concerning the survey. Also, one field test participant emailed his input to the researcher. The researcher revised part three of the survey, Adoption of Computer Technology,

to add “5 = Always” to the rating scale. Question 66 was changed from “Other” to “Create custom designed web pages” and question 67 was revised from “Other” to “Teach on-line courses.” Several field test participants stated that it took them about twenty minutes to complete the survey. The researcher revised the instructions and the survey instrument to incorporate the changes.

### Relationship of Research Questions to Survey Instrument

The relationship of the research questions to the *Computer Technology Adoption Survey* is as follows:

Research question one: What are the personal and employment characteristics of business teacher educators? This question was answered by survey questions one through 12.

Research question two: What are the innovation factors that influence business teacher educators’ adoption of computer technology for instructional delivery? This question was answered by survey questions 13 through 46.

Research question three: To what extent are business teacher educators adopting current computer technology as a teaching tool? This question was answered by survey questions 47 through 68.

Research question four: Is there a significant difference within the personal and employment characteristics of business teacher educators and the extent to which they adopt current computer technology as a teaching tool? This question was answered by survey questions 1 through 12 in relation to survey questions 47 through 68.

Research question five: Is there a relationship between the innovation factors that influence business teacher educators’ adoption of computer technology and the extent to which they adopt current computer technology as a teaching tool? This question was answered by survey questions 13 through 46 in relation to survey questions 47 through 68.

## Data Collection

The researcher obtained permission from the Institutional Review Board at Virginia Tech prior to carrying out this research study (see Appendix E). The research data were collected through a survey administered to the members of the population during the 2003 spring semester. An Internet-based survey was used to collect the data. A cover letter was emailed to the subjects and a hyperlink was embedded in the message (Truell, Bartlett, & Alexander, 2002; Duffy, 2002). The respondents clicked the link, which took them to the survey. The participants completed the survey on-line, then clicked the submit button, and the data instantaneously entered the survey database (Underwood, Kim, & Matier, 2000; Harris & Dersch, 1999). The researcher restricted survey access by providing each participant a password to enter the survey website and a code to insert in the box on the survey. Data collection was monitored daily by viewing the codes of the completed surveys in the data file. The survey software sent the researcher an email message each time a survey was completed by a participant. Weekly follow-up emails were sent to non-respondents to encourage responses (Watt, 1997). When the data collection was completed, the database file was incorporated into the Statistical Package for the Social Sciences (SPSS) data file for statistical analysis (Liaw, 2002; Harris & Dersch, 1999).

The researcher monitored the data collection daily by observing codes on the surveys, which the researcher used to determine which participants had not responded to the survey. The business teacher educators' participation was voluntary with his or her informed consent, refusal to participate involved no penalty, there were no risks, and if at any time a person wished to stop participating, he or she was free to do so. All responses were kept confidential and anonymous.

Of the 95 surveys, 41 entered the database; however, three surveys were unusable. Three participants indicated on the first question on the survey instrument that they were not business teacher educators and therefore did not complete the surveys. Thirty-three subjects were

ineligible or unreachable. Some of these individuals were deceased, on a sabbatical, attending conferences, email was returned and could not be forwarded, or refused to participate. Of the responses, only 38 surveys were usable which constituted a final return rate 61%. The return rate was calculated by applying Dillman's (1978, p. 50) response rate formula as follows:

$$\frac{\text{Number returned}}{\text{Number in sample} - (\text{non-eligible} + \text{non-reachable})} \times 100$$

$$38 / 95 - (33) = 61\%$$

Babbie (1990) maintained that a 50 % return rate is adequate for analysis and reporting and a 60% return rate is considered good; therefore, a 61% return rate was acceptable for this research study. A non-respondent follow-up method consisted of a chi-square test of independence, which compared the frequencies on each of the items to determine if there were significant differences.

#### Non-Respondent Follow-up

Follow-ups were conducted to encourage non-respondents to return the survey. One week after the initial mailing, the researcher sent email reminders. One week after the email reminders, a second follow-up was sent to the non-respondents. According to Dillman (2000), one week is an appropriate period of time to make an appeal to jog participants' memories and to help them rearrange priorities. The second follow-up consisted of an email message to the non-respondents with a link to the survey website embedded in the message. After another week, a third follow-up message with a link to the survey site embedded in the message was emailed to the non-respondents. Six days later, a final follow-up with a twenty-four hour closing notice with a link embedded in the message was emailed to the remaining non-respondents.

The researcher performed a non-respondent bias check to determine whether the results of the survey would be different if all non-respondents had returned the questionnaire. According to Gall, Borg, and Gall (1996), non-respondent bias need not be performed if at least 80% of the surveys are returned. However, since the response rate for this study was 61%, a non-respondent bias check was performed. The researcher selected personal and employment characteristics, randomly selected ten items on the survey instrument, randomly selected 20 non-respondents (Gall, Borg, & Gall, 1996), and called them to request their cooperation in responding to the personal and employment characteristics and randomly selected items on the survey.

The researcher compared the frequencies of response choices for a randomly selected number of items to those of the same items from the non-respondents. Frequencies were compared using a chi-square test of independence to determine if there was a significant difference in the frequencies on each of the items. The researcher then analyzed the data to see whether the answers of those who responded differed from the non-respondents' answers, which enabled the researcher to determine whether the non-responding sample was biased (Gall, Borg, & Gall, 1996). Out of the 22 non-respondent bias checks, only one was significant, which suggests that this single finding could be due to chance (Howell, 1997). The significant chi-square results concerned the number of years business teacher educators have used computers in their instruction. The response frequencies for the other variables did not have significant differences.

### Data Analysis

The data analysis method used in this study is quantitative. After receiving the survey results, the database file was incorporated into SPSS to organize, reduce, and code the data. The researcher began analyzing the raw data by computing the basic descriptive statistics for all items on the questionnaire, such as frequencies, means, standard deviations, and measures of skewness.

Descriptive research involves describing an issue, event, or situation (Gall, Borg, & Gall, 1996). Descriptive research allowed the researcher to see the variance of each item (spread in responses). The researcher examined significant differences within the independent variables and the dependent variable utilizing descriptive statistics and an analysis of variance (ANOVA) to answer research question four. Multiple regression analysis in SPSS answered research question five.

Descriptive statistics and an ANOVA were used to answer research question four. The ANOVA indicated whether there was a significant difference within the personal and employment characteristics of business teacher educators and the extent to which they adopt current computer technology as a teaching tool. The ANOVA indicates whether groups are significantly different from each other in a dependent variable (Gall, Borg, & Gall, 1996).

The multiple regression analysis was used to answer research question five to determine predictors that help to explain the relationship between the innovation factors that influence business teacher educator's adoption of computer technology and the extent to which they adopt current computer technology as a teaching tool. Multiple regression is a widely used statistical technique in educational research which determines which variables are most efficient in predicting an outcome. It is ideally suited for determining the relationship between a dependent variable and two or more independent variables because of its versatility and the amount of information it gives about the magnitude and statistical significance of the relationship between variables (Pedhazur, 1997; Gall, Borg, & Gall, 1996). The level of significance was set at .05.

After the analysis was run on SPSS, the researcher determined the findings by analyzing the SPSS printout. Lastly, the researcher drew conclusions based on the findings.

## Summary

This chapter outlines methods that were used to conduct this research study. There was a discussion of the population, which included development of the *Computer Technology Adoption Survey (CTAS)*. A description of the field test and the procedures that were used to collect and analyze the data was also discussed. The next chapter presents the findings obtained with those methods.

## CHAPTER IV

### FINDINGS

This study was designed to identify and assess factors and variables that influence business teacher educators to adopt computer technology methods in their teaching and to identify the extent to which business teacher educators are using computer technology in their instruction. The purpose of this chapter is to present the findings of the *Computer Technology Adoption Survey (CTAS)*, which was used to seek the answers to the questions for this study. Results from the study will add to the literature regarding business teacher educators' adoption and integration of computer technology in their instruction. This chapter will present research findings as a result of this study for each of the following five research questions:

1. What are the personal and employment characteristics of business teacher educators?
2. What are the innovation factors that influence business teacher educators' adoption of computer technology for instructional delivery?
3. To what extent are business teacher educators adopting current computer technology as a teaching tool?
4. Is there a significant difference within the personal and employment characteristics of business teacher educators and the extent to which they adopt current computer technology as a teaching tool?
5. Is there a relationship between the innovation factors that influence business teacher educators' adoption of computer technology and the extent to which they adopt current computer technology as a teaching tool?

#### Population

The population for this study consisted of 95 business teacher educators from the National Association of Teacher Educators of Business Education (NATEBE) database. The

researcher emailed a message with an embedded link to the on-line survey to the entire population.

#### Data Collection

Of the 95 surveys, 41 were completed, and 33 subjects were not eligible or unreachable. Of the forty-one responses, only 38 were usable which constituted a final return rate of 61%.

#### Non-Respondent Follow-Up

Followups were performed to persuade non-respondents to return the survey. Four weekly follow-ups were emailed to the subjects with a link to the survey website embedded in the message.

#### Non-Respondent Bias Check

A non-response bias check was performed, using a chi-square test of independence to determine if there was a significant difference in the frequencies on each of the items. Out of the 22 non-respondent bias checks, only one was significant. The lone significant item concerned the number of years business teacher educators have used computers in their instruction (chi-square(3) = 10.97,  $p < .05$ ). No respondents had used computers in the 1-3 and 4-6 year categories. However, one non-respondent had used computers in the 1-3 year range and four non-respondents indicated that they have used computers in their instruction 4 to 6 years. The significant finding of the chi-square implies that the business teacher educators who responded to the survey had more years of experience using computers in their teaching than the non-respondents. The response frequencies for the other variables did not have significant differences. Considering that one in 20 significant results is expected by chance, the fact that one out of 22 tests were significant suggests that the one significant finding could be due to chance (Howell, 1997).

## Extent of Business Teacher Educator's Computer Technology Adoption

### *Research Question One*

*What are the personal and employment characteristics of business teacher educators?*

Survey questions one through four were used to determine whether the respondents were currently an employed, retired, full-time, or part-time business teacher educator. Questions five through 12 of the survey collected information about the respondents' personal and employment characteristics as shown in Tables one through eight.

Thirty-eight subjects responded to the survey. Of the thirty-eight respondents, the majority were employed full-time (see Table 1) and were female (see Table 2). Research questions concerning type of institution, tenure track, tenure status, rank, and level of education are summarized in Tables 3, 4, 5, and 6.

Table 1

#### *Employment Status*

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<u>Employment</u>	<u>N</u>	<u>%</u>
Full-time	37	97
Part-time	1	3
Total	38	100

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Table 2

*Population Composition by Gender*

<u>Gender</u>	<u>N</u>	<u>%</u>
Female	28	74
Male	10	26
Total	38	100

The largest percentage of the respondents (36.8%) were employed in a research university, eleven (29%) worked in a four-year college, almost one-fourth (N=9) were employed in a non-research university, and four were employed in other types of education institutions (see Table 3). A large majority (N=34) of the business teacher educators were employed in a tenure track position and twenty-seven (71%) had tenure (see Table 4). The largest percentage of the respondents were full professors (42%), almost one-third (32%) were associate professors, and eight (21%) were assistant professors (see Table 5). The business teacher educators' educational levels are presented in Table 6. The largest proportion of the respondents indicated that they had Ed.D.s (44.7%) and almost 80% of them possessed either an Ed.D. or Ph.D. A smaller percentage (15.8%) of the business teacher educators had master's degrees and one had a post doctorate.

Table 3

*Type of Institution*

<u>Institution Category</u>	<u>N</u>	<u>%</u>
Research	14	36.8
Non-research	9	23.7
4-year	11	28.9
Other	4	10.5
Total	38	100.0

Table 4

*Tenure track and tenure*

<u>Tenure Status</u>	<u>Tenure Track</u>		<u>Tenured</u>	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Yes	34	89	27	71
No	4	11	11	29
Total	38	100	38	100

Table 5

*Rank*

<u>Rank</u>	<u>N</u>	<u>%</u>
Full professor	16	42
Associate professor	12	32
Assistant professor	8	21
Other	2	5
Total	38	100

Table 6

*Level of Education*

<u>Education Level</u>	<u>N</u>	<u>%</u>
Master's degree	6	15.8
Ph.D.	14	36.8
Ed.D.	17	44.7
Post Doctorate	1	2.6
Total	38	100.0

The business teacher educators' years of teaching experience at the university or college level are presented in Table 7. Half of the respondents had taught at the university/college level more than 20 years while the other 50% had taught 20 years or less. As shown in Table 8, most

of the respondents (N=35 or 92%) indicated that they had used computers in the delivery of instruction over ten years.

Table 7

*Years of Teaching Experience*

<u>Teaching Experience</u>	<u>N</u>	<u>%</u>
1-5	4	10.5
6-10	4	10.5
11-15	6	15.8
16-20	5	13.2
Over 20	19	50.0
Total	38	100.0

Table 8

*Years of Computer Use*

<u>Computer Use</u>	<u>N</u>	<u>%</u>
7-10	3	8
Over 10	35	92
Total	38	100

## *Research Question Two*

*What are the innovation factors that influence business teacher educators' adoption of computer technology for instructional delivery?*

Survey questions 13 through 46 sought to answer the second research question. Survey question 13 asked the respondents to select the category that best described their disposition concerning their adoption of computer technology.

The respondents reported their computer technology adoption categories as presented in Table 9. The computer technology adoption categories were described using the adopter categorization method (Rogers, 1995) (see Chapter 2, Figure 2). A large percentage (71%) of the business teacher educators reported that they made judicious innovation decisions, decrease uncertainty by fully evaluating new things, and use interpersonal networks within their immediate area to gain more instruction. Six (16%) of the subjects indicated that they were almost obsessed with trying new innovations, sought instruction outside of the immediate area, and could cope with uncertainty, four (10.5%) indicated they considered fully all consequences, interacted frequently with their peers, were willing to change to a new method but not willing to be a leader in the change process, and only one (2.6%) of the business teacher educators reported that he or she required convincing of the economic necessity of a change and were uncomfortable with uncertainty. None of the respondents indicated that they resisted new innovations until certain the innovation would be successful.

Table 9

*Computer Technology Adopter Categories*

<u>Adopter Category</u>	<u>N</u>	<u>%</u>
Resist new innovations	0	0
Require convincing of change	1	2.6
Consider fully all consequences	4	10.5
Make judicious innovation decisions	27	71.0
Almost obsessed with trying innovations	6	16.0
Total	38	100.0

As shown in Table 10, the respondents identified the innovation factors that would encourage them to adopt emerging computer technology for instruction as outlined in Rogers (1995) Innovation-Decision Process Model (see Chapter 1, Figure 1). The respondents considered the following adoption rate factors: the innovation is better than the one used previously and the innovation is consistent with your values, past experience, and needs were “very important” when deciding whether to adopt computer technology for use in the delivery of instruction. In addition, the business teacher educators ranked the extent that the innovation is perceived to be easy to use; the innovation can be used on a trial basis; and other people can see the results of the innovation “important” when considering whether to adopt computer technology in their teaching.

Table 10

N = 38

*Computer Technology Adoption Rate Factors*

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<u>Adoption Rate Factors</u>	<u>M</u>	<u>SD</u>
The innovation is better than the one used previously.	3.74	0.64
The innovation is consistent with your values, past experience, and needs.	3.68	0.57
The extent that the innovation is perceived to be easy to use.	3.18	0.80
The innovation can be used on a trial basis.	3.05	0.80
Other people can see the results of the innovation.	2.89	1.06

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Note: Factor values were determined using the following rating scale:

1 = not important, 2 = somewhat important, 3 = important, 4 = very important.

NA = not applicable was not used in the calculation.

The respondents identified the computer technology adopter innovation factors that would influence them to adopt emerging computer technology for instruction as outlined in Table 11. The business teacher educators reported that access to a computer in your office at school with software installed for use in your teaching, access to a computer, technological equipment, and software in your classroom for use in your teaching, access to a computer at home with software installed for use in your teaching, and the ability to teach yourself new applications were “very important” when deciding whether to adopt emerging computer technology and use it in their instruction. Respondents also indicated that adequate time in training sessions, in-house training, seminars/workshops, and on-line tutorials were “important” when deciding to adopt an innovation for use in their teaching. Furthermore, the respondents

considered one-on-one technology training specific to the courses they are teaching “somewhat important” in encouraging them to adopt emerging computer technology.

Table 11

*Computer Technology Adopter Influence Factors*

<u>Adopter Influence Factors</u>	<u>M</u>	<u>SD</u>
Access to a computer in your office at school with software installed for use in your teaching	3.97	0.16
Access to a computer, technological equipment, and software in your classroom for use in your teaching	3.76	0.60
Access to a computer at home with software installed for use in your teaching	3.62	0.72
Ability to teach yourself new applications	3.50	0.69
Adequate time in training sessions	3.18	0.90
In-house training is provided	3.03	1.03
Seminars/workshops are provided	3.03	0.85
On-line tutorials are provided	2.66	1.05
One-on-one technology training specific to the courses you are teaching	2.37	0.94

Note: Factor values were determined using the following rating scale:

1 = not important, 2 = somewhat important, 3 = important, 4 = very important.

NA = not applicable was not used in the calculation.

As indicated in Table 12, the respondents further identified the computer technology innovation factors that were important in encouraging them to adopt emerging computer technology in their delivery of instruction. Of the social factors that influenced them to adopt

computer technologies in instruction, students, shared values in my department, and peer support were “important” and encouragement of a mentor, friends, and peer pressure were “somewhat important” in encouraging them to adopt emerging computer technology for use in their teaching. Next, the respondents reported the organizational factors that were important in encouraging them to adopt computer technologies in instruction. Physical resources such as hardware, software, and infrastructure and technological support were “very important;” specific technological training related to your teaching was “important,” and mandate from the university, institutional reward system, and formal recognition were “somewhat important” in encouraging the business teacher educators to adopt computer technologies in their instruction. Third, of the personal motivational factors: personal interest in enhancing student learning, personal interest in improvement in my teaching, adequate time to prepare to teach with technology, and personal interest in computer technology use in my teaching were “very important” and course management ease of use was “important” in encouraging them to adopt emerging computer technology for use in their teaching.

Table 12

*Computer Technology Innovation Factors*

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<u>Innovation Factors</u>	<u>M</u>	<u>SD</u>
Social Factors		
Students	3.16	0.95
Shared values in my department	2.62	0.87
Peer support	2.50	0.92
Encouragement of a mentor	2.00	0.94

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Friends	1.85	0.93
Peer pressure	1.54	0.70
Organizational Factors		
Physical resources (hardware)	3.86	0.35
Physical resources (software)	3.86	0.35
Physical resources (infrastructure such as Internet connectivity)	3.81	0.46
Technological support	3.62	0.68
Specific technological training related to your teaching	3.24	0.85
Mandate from the university	2.38	1.18
Institutional reward system	2.22	1.12
Formal recognition	1.89	1.04
Personal Motivational Factors		
Personal interest in enhancing student learning	3.86	0.35
Personal interest in improvement in my teaching	3.75	0.50
Adequate time to prepare to teach with technology	3.66	0.63
Personal interest in computer technology use in my teaching	3.59	0.69
Course management software ease of use (e.g., Blackboard, WebCT)	3.44	0.73

Note: Factor values were determined using the following rating scale:

1 = not important, 2 = somewhat important, 3 = important, 4 = very important.

NA = not applicable was not used in the calculation.

### *Research Question Three*

*To what extent are business teacher educators adopting current computer technology as a teaching tool?*

Survey questions 47 through 67, as shown in Table 13 answered the third research question. Many of the respondents (N=29) indicated that they “always” integrated word processing in their delivery of instruction the past semester. Respondents also reported that they “almost always” used a computer and projector in the classroom to deliver instruction and “almost always” used email as the primary source of student contact outside the classroom. Respondents also indicated that during the previous semester they “frequently” created an on-line syllabus with hyperlinks to class resources, used an on-line syllabus with hyperlinks to class resources, exchanged students’ written work via the web, performed Internet research in the classroom, and used commercial products such as Blackboard to present web-based lectures, notes, and tutorials. Also, the respondents reported that they “sometimes” used personally designed web-based lectures, notes, and tutorials, provided grades to students on-line, conducted academic advising in virtual environments, enabled and supported student group work in virtual environments, enabled and supported collaboration among students via web-based programs, created custom designed web pages, taught on-line courses, used personally designed web-based tests and quizzes, conducted asynchronous forums, and used online bulletin boards the past semester. Furthermore, the respondents indicated that they “almost never” used synchronous discussions i.e., on-line chats, totally video web-based systems for instruction and review, and totally audio web-based systems for instruction and review in their instruction last semester.

Table 13

*Computer Technology Integration Factors*

<u>Integration Factors</u>	<u>M</u>	<u>SD</u>
Use word processing	5.68	0.66
Use a computer and projector in the classroom (e.g., PowerPoint, Excel, Simulation software)	4.92	1.10
Use email as the primary source of student contact outside the classroom	4.74	1.00
Create an on-line syllabus with hyperlinks to class resources	4.00	1.86
Use an on-line syllabus with hyperlinks to class resources	3.95	1.84
Exchange student written work via the web (e.g., email attachments, digital drop boxes, discussion forums, etc.).	3.87	1.40
Perform Internet research and searches in the classroom	3.84	1.35
Use commercial products (e.g., Blackboard, WebCt) to present web-based lectures, notes, and tutorials	3.63	1.84
Use personally designed web-based lectures, notes, and tutorials	3.47	1.66
Provide grades to students on-line (e.g., Blackboard, WebCT)	3.45	2.01
Conduct academic advising in virtual environments (e.g., email discussion board)	3.32	1.45
Enable and support student group work in virtual environments	3.29	1.58
Enable and support collaboration among students via web-based programs	2.95	1.52
Create custom designed web pages	2.95	1.59
Teach on-line courses	2.92	1.71

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Use personally designed web-based tests or quizzes	2.68	1.71
Conduct asynchronous forums (e.g., on-line discussion board)	2.58	1.59
Use on-line bulletin boards	2.50	1.62
Conduct synchronous discussions (e.g., on-line chat room)	2.08	1.57
Use totally video web-based systems for instruction and review	1.89	1.35
Use totally audio web-based systems for instruction and review	1.63	0.97

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Note: Factor values were determined using the following rating scale:

1 = never, 2 = almost never, 3 = sometimes, 4 = frequently, 5 = almost always,  
6 = always.

#### *Research Question Four*

*Is there a significant difference within the personal and employment characteristics of business teacher educators and the extent to which they adopt current computer technology as a teaching tool?*

A visual comparison and one-way analysis of variance were used to compare the means of the personal and employment characteristics of survey questions one through 12 to the computer integration composite mean for survey questions 47 through 68. The computer technology integration variables (survey questions 47 through 68) were averaged into a computer integration composite variable. As shown in Table 14, there were no differences in the extent of current computer technology adoption based on gender. Females and males “sometimes” adopted current computer technology as a teaching tool. Business teacher educators employed in a research university “sometimes” used current computer technology as a teaching tool while those employed in a non-research university “frequently” used current technology as a teaching tool.

Professors employed in four-year colleges and other types of institutions “sometimes” adopted current computer technology as a teaching tool. Business teacher educators in tenure track positions and those not in tenure track positions “sometimes” used current computer technology as a teaching tool. The tenured respondents “sometimes” adopted current computer technology as a teaching tool and those without tenure “frequently” adopted current computer technology as a teaching tool. The assistant and associate professors “frequently” adopted current computer as a teaching tool; however, full professors “sometimes” used current computer technology as a teaching tool. The business teacher educators with masters, Ph.D.s, and Ed.D.s “sometimes” adopted current computer technology as a teaching tool while the professor with a post doctorate “almost never” adopted current computer technology as a teaching tool. Educators that had six to twenty years of teaching experience “frequently” adopted current computer technology as a teaching tool. Respondents with one to five years and over twenty years of teaching experience “sometimes” used current computer technology as a teaching tool. Concerning the number of years the respondents had used computers in their instruction; professors who had used computer in their instruction seven to over ten years “sometimes” used current computer technology as a teaching tool.

Table 14

*Means and Standard Deviations of the Personal and Employment Characteristics  
in Relation to Computer Technology Integration*

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<u>Variables</u>	<u>M</u>	<u>SD</u>
Gender		
Female	3.45	0.99
Male	3.03	0.90
Type of institution		
Research	3.12	0.92
Non-Research	3.72	1.03
4-year college	3.46	0.80
Other	2.98	1.46
Tenure track		
Yes	3.34	0.96
No	3.36	1.29
Tenure		
Yes	3.25	1.03
No	3.55	0.84
Current rank		
Assistant	3.52	0.71
Associate	3.50	1.26
Full	3.18	0.93

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Other	3.02	1.04
Level of education		
Master's	3.03	1.05
Ph.D.	3.42	0.97
Ed.D	3.45	0.99
Post Doctorate	2.33	0.00
Teaching experience		
1-5	3.23	0.96
6-10	3.56	0.40
11-15	3.71	0.82
16-20	3.81	1.43
Over 20	3.07	0.97
Computer use in instruction		
7-10	2.52	1.13
Over 10	3.41	0.95

As shown in Table 15, the ANOVA found no significant differences in computer technology integration between genders, types of institution, tenure track status, tenure status, current ranks, levels of education, years of teaching experience, or years of computer use in instruction.

Table 15

*ANOVA Results of the Personal and Employment Characteristics*

*in Relation to Computer Technology Integration*

<u>Variable</u>	<u>df</u>	<u>F</u>	<u>p</u>
Gender	1, 35	1.380	0.248
Type of institution	1, 35	0.928	0.438
Tenure track	1, 35	0.001	0.975
Tenure	1, 35	0.727	0.400
Current rank	3, 33	0.383	0.766
Level of education	3, 33	6.340	0.598
Years of teaching experience	4, 32	0.914	0.468
Years of computer use in instruction	1, 35	2.370	0.133

*Research Question Five*

*Is there a relationship between the innovation factors that influence business teacher educators' adoption of computer technology and the extent to which they adopt current computer technology as a teaching tool?*

To answer this question, a step-wise multiple regression analysis was calculated to predict business teacher educators' adoption of computer technology. Three innovation factors: adoption category, the importance of students, and the importance of physical resources (hardware) survey questions 13, 34, and 39 respectively were found to have a relationship with the extent that the business teacher educators adopted current computer technology as a teaching tool. The innovation factor "students" was entered first and explained 26.2% of the variance in

adopting an innovation in instruction ( $F(1, 21) = 7.443, p < .05$ ). The second variable, adoption category ( $F(1, 20) = 9.204, p < .05$ ) explained 23.2% of the variance. “Physical resources (hardware),” the third factor, ( $F(1, 19) = 6.848, p < .05$ ), explained another 13.4% of the variance. The total percent of variance for the three innovation factors is 62.8%.

A positive correlation was found for the innovation factors “students” and “adoption category;” however, a negative correlation was found for “physical resources (hardware).” The findings indicate that the importance of students, a specific adopter category, and the importance of computer technology such as hardware significantly predicted computer technology adoption. The positive correlation coefficient for students and adoption category revealed that the more importance the respondents placed on students and adoption category the more the business teacher educators adopted current computer technology for use in their instruction. However, the negative correlation coefficient for physical resources (hardware) suggests that the more important physical resources such as computer hardware are to them, the less likely they will adopt current computer technology as a teaching tool. The other innovation factors did not significantly add to the prediction of computer technology adoption. See Table 16 for information on the significant computer technology adoption predictors.

Table 16

*Multiple Regression Analysis Results of the Innovation Factors*

*in Relation to Computer Technology Integration*

<u>Variable</u>	<u>Beta</u>	<u>r<sup>2</sup></u>	<u>p</u>
Importance of students	.708	.262	.013*
Adoption Category	.679	.494	.001*
Importance of Physical Resources (hardware)	-.431	.628	.000*

\*p < .05

Summary

This chapter reported the findings of the research study. Descriptive statistics revealed the personal and employment characteristics of the business teacher educators, the innovation factors that influence them to adopt, and the extent to which they were adopting current computer technology as a teaching tool. An ANOVA revealed no significant difference in computer technology integration according to the subjects' personal and employment characteristics. A step-wise multiple regression analysis revealed that the innovation factors: the importance of students, adoption category, and importance of physical resources (hardware) significantly predicted computer technology adoption. A more detailed summary and a discussion of the findings are presented in the next chapter.

## CHAPTER V

### SUMMARY, CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

This final chapter presents a summary of the completed research, review of the research findings, conclusions, and discussion of the significant findings. Recommendations for future practice and further research are made at the end of the chapter.

Since the 1960s, the technological revolution has had a tremendous impact on business, society, and education. Due to the evolution of the computer, educational institutions have increased in the use of computer technologies uncharacteristically rapid (West, 1999). The literature revealed that educators have difficulty integrating constantly changing computer technology in their instruction because the training faculty members have received may not be sufficient (Vannatta, 2000). However, business teacher educators, who are a subset of all educators (Gbomita, 1995), must be proficient in using computer technology in their instruction since there is a link between their instructional use of computers and the end result of the business teachers who will be teaching students to use computers for business and personal applications (McCoy, 2001).

The purpose of this study was to assess and identify factors that influence business teacher educators to adopt and use computer technology methods in their instruction and to determine the extent to which business teacher educators are adopting computer technology in their teaching. Findings from the study will contribute to the development of an adopter profile of business teacher educators.

Rogers' diffusion of innovation theory provided the theoretical framework for this study. Literature was reviewed concerning technological trends in education, faculty adoption of computer technology, personal, employment, and innovation factors for importance to this study.

The population for this study consisted of the members of National Association of Teacher Educators for Business Education (NATEBE). NATEBE is an affiliate of the Business Education Division of the Association for Career and Technical Education (ACTE).

Since the literature did not reveal a survey that would be appropriate for use in this study, a survey instrument was developed based on Medlin's (2001) questionnaire. The *Computer Technology Adoption Survey (CTAS)* (see Appendix B) was developed to identify the extent to which business teacher educators were using computer technology in their teaching. The *CTAS* was field-tested and revised.

Data were collected during the 2003 spring semester. A message with a link embedded in the message was emailed to the members of the population explaining the purpose of the research with detailed instructions on completing the on-line survey. Four weekly follow-ups were made which consisted of an email message with a link to the survey embedded in the message to encourage the subjects to complete the survey. Of the 95 surveys emailed, 33 were either noneligible, unreachable, or refused to complete the survey. Forty-one surveys were returned; however, three were unusable. Thirty-eight surveys were used for the data analysis, which constituted a final return rate of 61% based on Dillman's (1998) response rate formula.

A non-respondent bias check was performed since less than 80% of the surveys were returned. A chi-square test of independence was used to compare the frequencies to determine if there was a significant difference in the frequencies on each of the items. The chi-square revealed a significant difference concerning the number of years the respondents and non-respondents have used computers in their instruction, which implies that the business teacher educators who responded to the survey had more experience using computers in their teaching than the non-respondents.

Descriptive statistics, ANOVA, and multiple regression analysis were used to identify the business teacher educators' personal and employment characteristics, innovation factors, and the extent that they were using computer technology in their instruction. The study's findings were drawn from data that was analyzed as it relates to the five research questions.

### Findings, Conclusions, and Discussion

The study found that almost all of the business teacher educators were employed full-time and the majority of the respondents were female. A large proportion of the respondents worked in a research university, four-year college, or non-research university in a tenure track position, and many of them had tenure. The largest percentage of the respondents were full and associate professors that possessed either an Ed.D. or Ph.D. Fifty percent of the respondents had taught in a university or college more than twenty years. Furthermore, a large percentage of the respondents had used computers in their instruction for more than ten years.

In conclusion, the subjects in this study were mostly full-time female professors who were tenured or were employed in tenure track positions. They were highly educated and had taught in higher education institutions for many years. According to Sheingold and Hadley (1990), teachers need five to six years working with technology to develop expertise. This study revealed that 95% of the business teacher educators had used computers in their instruction over ten years, which suggests that the females and males were experienced in using computers in their teaching.

This study also examined the innovation factors that influence business teacher educators' computer technology adoption for instructional delivery. Rogers' innovation theory categorized adopters into five categories of a social system in a bell-shaped curve. The adopter categories range from individuals who are almost obsessed with trying new innovations and are the first to adopt a new idea into their social system to those who resist new innovations until

they are certain that they will be successful. The adopter category percentages that the business teacher educators reported in the study do not agree with Rogers' adopter category percentages (see Chapter 2, Figure 2).

This study revealed that the majority of the business teacher educators' were early adopters of computer technologies. This finding relates to Rogers' (1995) theory that early adopters are opinion leaders and serve as change agents in the local social system and are among the first individuals to adopt an innovation. The next largest category of computer technology adopters in this study were respondents who are first to adopt an innovation in a social network. These respondents indicated that they are almost obsessed with trying new innovations, seek instruction outside of the immediate area, and are able to cope with uncertainty. This finding indicated that the business teacher educators within this study might be among the first to adopt the innovation of computer technology for use in their teacher education courses. Therefore, they have the potential to serve as role models or change agents for their student clientele, peers, and others. Four (10.5%) respondents indicated that they consider fully all consequences, interact frequently with their peers, and are willing to change to a new method but are not willing to be a leader in the change process. One (2.6%) respondent reported that they required convincing of the economic necessity of a change and were uncomfortable with uncertainty; however, none of the subjects indicated that they resist new innovations until they were convinced that they would be successful. The findings supported Roger's diffusion of innovation theory (1995) when the business teacher educators' identified their adopter categories. However, the faculty member adopter categories were skewed on the left side of the distribution toward the earlier adopters of computer technology.

The study examined the importance that the innovation factors would have in encouraging the business teacher educators to adopt emerging computer technology for instruction. The business teacher educators identified how important the innovation characteristics would be in motivating them to adopt emerging computer technology in their instruction. The innovation characteristics include relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1995).

The business teacher educators indicated that relative advantage (the innovation is better than the one used previously) was very important in influencing their adoption of new computer technology for use in the delivery of instruction. The faculty members considered compatibility (the innovation is consistent with their values, past experience, and needs) as being, the next highest in importance in encouraging them to adopt an innovation. In addition, the respondents reported that complexity (the innovation is easy to use), trialability (the innovation can be used on a trial basis), and observability (other people can see the results of the innovation) as the next highest in importance, respectively.

In conclusion, the findings in this study maintain that certain innovation characteristics were important in encouraging the business teacher educators to adopt emerging computer technology for instruction. The study's results support Rogers' theory (1995) that certain innovation factors are important in encouraging an individual to adopt an innovation.

Faculty members also considered the importance of access to computers in influencing them to adopt and use computer technology in their teaching. Survey results indicated that access to computers in their homes, offices, and classrooms, with sufficient technological equipment and software, were very important factors in encouraging the business teacher educators to adopt computer technology for use in their delivery of instruction. This supports Dusick and Yildirim's

(2000) research, which found that access to computers, was positively correlated with technological competency and computer use in the classroom.

According to Hasselbring et al. (2000), educators may have the best hardware and software available; however, they must be properly trained to effectively adopt and use the technology in their instruction. When the business teacher educators considered access to training, they indicated that the ability to teach themselves new technological applications was very important in encouraging them to adopt emerging computer technology for instruction. This finding supports the research of McEwen (1996) and Redmann et al. (1999) who found that the majority of business educators were using self-directed learning. The business teacher educators further indicated that in-house training, seminars, and on-line tutorials were important factors that motivated them to adopt computer technology for instructional use. In addition, the respondents indicated that one-on-one technology training specific to the courses they were teaching and specific technical training related to their teaching were not as important as self-directed instruction. This result agrees with Bartlett and Kotrlik's (2001) research, which suggested that self-instruction in technology use has increased in importance in recent years because computer technology such as the Internet promotes self-directed learning.

The findings of this study agree with previous research that educators regard shared values and peer support to be important influences that encourage them to adopt an innovation. Rogers (1995) contended that faculty members in a department are dependent on each other and peers can positively or negatively influence a decision to adopt an innovation. Also, individuals who have their colleagues' respect and provide peer support in large social networks can speed up innovation decisions (Havelock & Zlotolow, 1995). Furthermore, Medlin's (2001) research found that shared values and peer support were important in influencing an individual to make an

informed decision to adopt an innovation. The study also revealed that social factors such as peer pressure, friends, and encouragement of a mentor were important factors in influencing adoption and use of an innovation; however, they were not as important in influencing adoption and use of an innovation as shared values in a department and peer support. This finding supports Medlin's (2001) research, which found that social factors such as shared values within the department and peer support were important influences that encouraged faculty members to adopt electronic technologies in instruction.

The business teacher educators identified specific organizational variables that would encourage them to adopt an innovation, which included technological support, mandate from the university, institutional reward system, formal recognition, and physical resources. The study found that physical resources support and technological support were the most influential of the organizational variables in influencing adoption of an innovation. However, mandate from the university, institutional reward system, and formal recognition (which had the lowest mean) were somewhat important in encouraging adoption and use of computer technology.

This study examined personal motivational factors and found that personal interest in computer technology use in teaching, personal interest in improvement in teaching, and personal interest in enhancing student learning were very important in encouraging business teacher educators to adopt emerging computer technology for use in their teaching. This result supports Medlin's study, which found that the personal motivational factors were statistically significant in influencing a faculty member to adopt and use electronic technologies in the classroom.

Other personal motivational factors that were examined in this study included adequate time to prepare to teach with technology and ease of using course management software (i.e., Blackboard). The business teacher educators indicated that it was very important for them to

have time to prepare to teach with technology. The finding in this study is supported by previous research, which indicated that in order for teachers to be effective in the use of computer technology in their instruction, they must have adequate time to prepare to teach with the new technology (Vannetta, 2000). The respondents also indicated that ease of use of course management software (Blackboard) was important in influencing them to adopt computer technology for instructional delivery. This result was encouraging since educators use computers to help them deliver their instruction, manage their courses, and perform administrative tasks (Brown, 2001).

It was concluded that certain innovation factors influenced the business teacher educators to adopt computer technology for instructional delivery. Various social, organization, and personal motivational factors were important in encouraging the business teacher educators to adopt computer technology for use in their teaching.

The business teacher educators in this study adopted current computer technology as a teaching tool into their instruction on a regular basis; however, some of the technologies were used more frequently than others. The business teacher educators used word processing more than any other computer technologies. It was also encouraging that the faculty members used email as the primary source to communicate with their students outside the classroom. Since many classrooms are equipped with computers, projectors, and laptop computers and portable projectors are easy to transport, it was anticipated that faculty members would use a computer and projector in their teaching on a frequent basis. This finding supports Vannatta (2000) and Carter's (1998) research, which found high levels of faculty proficiency and integration in word processing, email, and the Internet.

Also, the faculty members indicated that they frequently used course management tools such as Blackboard, researched the Internet in the classroom, exchanged work with their students via the web, and created and used on-line syllabi with hyperlinks to class resources. However, the business teacher educators infrequently provided grades to students on-line, enabled student group work in virtual environments, and created custom designed web pages. Also, synchronous discussions through on-line chats, totally video and totally audio web-based systems for instruction and review were rarely used.

In conclusion, the business teacher educators used word processing in their teaching more frequently than any of the computer technologies examined in this study the past semester. The faculty members indicated that they almost always used computers, projectors, and email in their teaching. Other computer technologies such as Blackboard, Internet research in the classroom, and file exchange via the Web were used on a frequent basis. However, many of the computer technologies were used infrequently and several were almost never used. The low use of these technologies suggests that the business teacher educators may need specific training, adequate time to prepare, and technological support to help them infuse newer technologies into their delivery of instruction or the computer technology may not be relevant to their goals and/or purposes in the classroom.

This study examined the business teacher educators' personal and employment characteristics to determine whether there were significant differences within each characteristic as to the extent that the business teacher educators adopted current computer technology as a teaching tool. The personal and employment characteristics that served as independent variables include gender, type of institution, tenure track, tenure, current rank, level of education, years of

teaching experience, and years of computer use. The following are conclusions based on the findings regarding the analysis of these differences:

*Gender.* The literature revealed contradictory findings concerning the adoption and use of computer technology based on gender. However, based on the findings in this study, there was no difference between the female and male respondents in their adoption of current computer technology as a teaching tool.

*Type of institution.* It was concluded from the findings of this study that there was a difference in the extent of adoption of computer technology as a teaching tool according to the type of institution in which the respondents were employed. Business teacher educators in this study who were employed in non-research universities adopted computers more frequently than the respondents who were employed in research universities, four-year colleges, and other types of educational institutions, which includes two-year colleges.

*Tenure track.* There were no differences in the extent of adoption of computer technology as a teaching tool according to whether a respondent was employed in a tenure track position or not. Professors in tenure track positions and faculty members not employed in tenure track positions adopted current computer technology as a teaching tool with the same frequency.

*Tenure.* Tenured professors adopted current computer technology less frequently as a teaching tool than non-tenured professors. Tenured professors may have been more secure in their positions and as a result adopted computer technology as a teaching tool less often. On the other hand, non-tenured professors in this study might have been more comfortable integrating computers into their instruction as a teaching tool since they may have been younger and grew up in a computer technology environment, recently completed their educational programs and

may have completed up-to-date instruction in computer technology use, and did not have to spend time learning to use the technology.

*Current rank.* Current rank did make a difference in the extent of adoption of current computer technology as a teaching tool. Assistant and associate professors adopted current computer technology more frequently as a teaching tool than full professors. Assistant and associate professors may have used computers more often as a teaching tool since they may have more teaching, research, and publishing responsibilities. On the other hand, the full professors may have been less inclined to use computers as a teaching tool since they often have more managerial, advising, and administrative responsibilities (Braskamp & Ory, 1994).

*Level of education.* There were no differences in the extent to which the business teacher educators adopted current computer technology as a teaching tool among faculty members who had achieved master's degrees, Ph.Ds, and Ed.Ds. The one professor who reported having a post doctorate almost never used current computer technology as a teaching tool.

*Years of teaching experience.* There are conflicting findings in the literature concerning years of teaching experience and the extent of computer use in instruction. Based on the findings of this study, business teacher educators with one to five years and over twenty years of teaching experience used computers less often as a teaching tool than professors who had taught six to twenty years.

*Years of computer use.* In this study there were no differences in the extent of current computer technology adoption as a teaching tool according to the number of years the respondents had used computers in their instruction. Faculty members with seven to over ten years of computer use in instruction sometimes used current computer technology as a teaching tool. According to the literature, educators need time to learn, master and develop technological

skills (Sandholtz, Ringstaff, & Dwyer, 1997). Also, Sheingold and Hadley (1990) contended that teachers require five or six years working with technology to develop proficiency. It can be concluded from the findings in this study that the business teacher educators were experienced in using computers as a teaching tool since they had used computers in their instruction for seven or more years. A step-wise multiple regression analysis was calculated to determine the relationship and predict the business teacher educators' adoption of computer technology. The findings indicated that there was a significant relationship between three innovation factors: the importance of students, adoption category, and the importance of physical resources (hardware), and the extent that the business teacher educators adopted current computer technology as a teaching tool. The study revealed that students, adoption category, and physical resources (hardware) significantly predicted computer technology adoption. The variable "students" was entered first and explained 26.2% of the variance, "adoption category" was entered second, which explained an additional 23.2%. "Physical resources (hardware)," the third variable, explained another 13.4% of the variance. The total percent of the variance for the three factors was 62.8%. No relationship was found among the remaining computer technology adoption variables.

In conclusion, the researcher found that there was a significant relationship between three innovation factors that influence business teacher educators' adoption of computer technology and the extent to which they adopt current computer technology as a teaching tool. Multiple regression analysis indicated that the importance of students, adoption category, and the importance of physical resources (hardware) significantly predict computer technology adoption. In this study, physical resources (hardware) was negatively correlated with the extent that the business teacher educators were adopting current computer technology as a teaching tool. This

negative correlation indicates a negative relationship between the importance of physical resources such as hardware and the extent that current computer technology was used as a teaching tool. This finding supports the conclusions of Rogers (1995) and Means, Blando, Olson, Meddleton, Remz, and Zorfass (1993), which maintained that the individual makes the final decision whether to use an innovation. Faculty members may have access to state-of-the-art computer technology; however, if they have unfavorable attitudes towards adopting the emerging technology, it might prevent them from using computer technologies in their instruction.

According to Rogers (1995), individuals can be categorized in a specific adopter category. Roger's (1995) adopter categorization theory would have predicted that the business teacher educators' degree of innovativeness would result in a bell-shaped curve (see Chapter 2, Figure 2). However, the business teacher educators in this study were skewed on the left side of the curve toward the earlier innovators. Rogers' maintained that the innovators represent the first 2.5% of the individuals to adopt a new technological innovation. However, in this study, a much higher percentage (16%) of the business teacher educators indicated that they considered themselves the first to adopt current computer technology as a teaching tool. According to Rogers' theory, these faculty members would be considered the gatekeepers and control the flow of technological innovations into their educational environments. Rogers' theory further contended that the early adopters represent the next 13.5% to adopt a new idea in their social system. This study revealed that 71% of the business teacher educators indicated that they tend to be early adopters of computer technology in their environment. Rogers (1995) theory supported the fact that this subset of business teacher educators serve as opinion leaders for individuals to obtain technological advice before adopting a new innovation. Also, these early adopters of technology were respected by their peers, sped up the adoption process, and were role models for

other individuals in their environment. Furthermore, Rogers' theory maintained that the early majority consists of the next 34% of the adopters. However, only 10.5% of the business teacher educators in this study indicated that they would adopt an innovation before the average member of their social system. In addition, Rogers theorized that the late majority adopter category represented the next 34% to adopt an innovation in their social system. However, only 2.6% of the business teacher educators indicated that they were skeptics who resist adopting new computer technology until the majority of the faculty members in their educational organization have done so. Finally, Rogers theorized that laggards represent the last 16% of their social system. However, none of the business teacher educators considered themselves to be the last to adopt an innovation in their educational institutions.

The study indicated that the business teacher educators' were encouraged to adopt and use current computer technology as a teaching tool by their degree of innovativeness, which was classified into a specific adopter category. The largest proportion of the business teacher educators in this study identified themselves as early adopters.

Furthermore, the business teacher educators may be concerned about their students' achievements and were early adopters of computer technology in their instruction; however, the business teacher educators must have adequate physical resources in order to incorporate emerging computer technology in their teaching. Physical resource support such as hardware has been examined in many studies based on Rogers' (1995) innovation diffusion theory (Brace & Roberts, 1996; Kelly, 1996; Medlin, 2001). Banks (2002) contended that university and college administrators must provide up-to-date physical resources to their faculty members on a planned, systematic basis in order to enable the faculty members to infuse computer technology into their teaching. However, findings in this study suggest that physical resources such as hardware may

not have the expected outcome of faculty members integrating computer technology in their teaching.

### Recommendations

Findings and conclusions from this study suggest several implications for future practice and research. The results from the study can benefit both educational administrators and business teacher educators in their adoption and use of computer technologies.

#### *Future Practice*

Business teacher educators may be able to use the findings from the research study in their profession in several ways. Faculty members should be aware that they are an important link in the diffusion of an innovation among individuals in their educational institutions and thus their students and colleagues might see them as change agents and role models. The business teacher educators should make the connection between computer technology and their instruction in educating future teachers since educators usually teach the way they are taught (Hasselbring et al., 2000). The business teacher educators should be aware that as change agents, they may be able to reduce uncertainty among their students and peers in their educational environment by adopting an innovation, conveying their ideas about the new technology, and modeling the use of the new computer technology (Rogers, 1995).

Recently, some instructional methods have changed due to the technological revolution's impact on business, industry, and education. Therefore, business teacher educators must be flexible, easily to adapt, and keep up with constantly changing technology. The findings revealed that the faculty members used several computer technologies practically all the time. However, they seldom used many of the computer technologies that were examined in this study. This finding suggests that as new computer technologies emerge, faculty members may need specific

training to help them prepare to teach with the new technology even though the respondents indicated that they often teach themselves new technology.

Administrators may need to provide faculty members specific technological training on a constant basis to help them keep up with constantly changing technology. If teachers are better prepared to teach with technology, then they can better prepare their students to use the technology in their careers (Luke, Moore, & Sawyer; 1998). Banks (2002) contended that faculty needs and expectations should be assessed prior to training sessions to help faculty members acquire technological skills to meet specific educational goals.

The study also indicated that faculty members may have access to state-of-the-art computer technology; however, if they have unfavorable attitudes towards adopting the emerging technology, it might prevent them from using computer technologies in their instruction. As computer technology becomes smaller, more powerful, and more complicated, computer technologies must constantly be replaced and updated. Therefore, administrators must ensure that technology plans include procedures and funding to train faculty members to use emerging computer technology in their instruction. Providing faculty members an intensive workshop to help them integrate emerging computer technology into the delivery of instruction on a regular basis may be beneficial. Incentives such as state-of-the-art computers with expanded memory may encourage the faculty members to attend on-going training initiatives (The University Plan: Progress Toward 1991-1996 Goals, 1996).

In summary, educational administrators may need to provide specific on-going computer technology training that would enable business teacher educators to adopt and use emerging computer technologies in their teaching. Also, in order for business teacher educators to keep up with constantly changing technology, they must be provided the fiscal and technological

resources they need in order to successfully adopt and use an innovation in the delivery of instruction. However, even though the faculty members are provided current computer resources such as hardware, they may need incentives to encourage them to attend training sessions and use emerging computer technology in their instruction.

### *Future Research*

This study presents opportunities for future research that could be useful in preparing business teacher educators to adopt new technologies for use in the delivery of instruction. The following research should be considered as a follow-up to this study:

1. This census study consisted of a limited number of business teacher educators in a national professional organization. This study could be replicated using a random sample of business teacher educators nationally making the results generalizable to a larger business teacher educator population.
2. This census study could also be replicated in other professional organizations, colleges, and universities.
3. A research study to identify computer technology instructional methods that would be useful to business teacher educators in preparing preservice business teachers to use computer technology in the classroom with their future students may be beneficial.
4. Further examination needs to take place regarding the negative correlation found in this study between the importance of physical resources (hardware) and the use of current computer technology as a teaching tool.
5. Computer technology adoption could be examined using different measurement scales. For example, a research study could be conducted using a multi-item scale to measure computer technology adoption.

## Summary

The findings of the research study suggest that business teacher educators are early adopters of computer technology; therefore, they have the potential to serve as change agents and role models for their student clientele, peers, and others. Rogers (1995) and Herzberg (1959) theorized that specific social and organizational factors encourage the adoption of an innovation. The business teacher educators were motivated to adopt emerging computer technology for use in their instruction when the innovation was better than the one used previously and was consistent with their values, past experience, and needs.

Also, there were certain personal, organizational, and motivational factors that influenced business teacher educators to adopt an innovation and use it in their delivery of instruction. The study also indicated that the business teacher educators were frequent users of word processing, a computer and projector in their instruction, and email to communicate with their students outside the classroom. The study revealed that highly educated tenured faculty members who had taught twenty years on the average and used computers in their instruction over ten years were more inclined to use computer technology in their instruction. In addition, the business teacher educators' students and adoption category were important factors that encouraged them to adopt and use computer technology in their instruction. However, physical resources such as hardware may not have the expected outcome of faculty members adopting and using computer technology in their instruction.

Although the business teacher educators were inclined to train themselves to use emerging computer technology, universities and colleges should provide planned, continuous, and systematic technological training to encourage the faculty members to incorporate emerging computer technology in their instruction. This study identified specific personal, social, and organizational factors that may influence business teacher educators to adopt computer

technology. The factors could contribute to the development of a profile of computer technology adopters that could be used by administrators and faculty members to identify potential users of computer technology instructional methods.

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## APPENDICES

APPENDIX A

Instrument for Field Test

CODE

## COMPUTER TECHNOLOGY ADOPTION SURVEY (CTAS)

Please **DO NOT** put your name on this form. Surveys are coded for follow-up purposes **ONLY**. All survey responses will remain confidential. Thank you for your participation.

### Part I Personal and Employment Characteristics

**Directions:** For the following personal and employment characteristics, please put an **X** in the box next to the appropriate answer.

1. Are you currently employed as a business teacher educator?
  - Yes - Please continue to the next question and complete the survey.
  - No - **Do not** complete the survey. Please return the survey to the researcher.
  
2. Are you currently a retired business teacher educator?
  - Yes – **Do not** complete the survey. Please return the survey to the researcher.
  - No - Please continue to the next question and complete the survey.
  
3. Are you currently employed fulltime as a business teacher educator?
  - Yes
  - No
  
4. Are you currently employed part time as a business teacher educator?
  - Yes
  - No
  
5. What is your gender?
  - Female
  - Male
  
6. In what higher education institution category do you teach?
  - Research university
  - Non-research university
  - 4-year college
  - Other (Please specify) \_\_\_\_\_

7. Are you employed in a tenure track position?
- Yes
  - No
8. Do you have tenure?
- Yes
  - No
9. What is your current rank?
- Adjunct Instructor
  - Assistant Professor
  - Associate Professor
  - Full Professor
  - Other (Please specify) \_\_\_\_\_
10. What is your highest level of education?
- Bachelor's degree
  - Master's degree
  - Ph.D.
  - Ed.D.
  - Post Doctorate
11. How many years of teaching experience as a business teacher educator do you have at the university/college level?
- 1-5
  - 6-10
  - 11-15
  - 16-20
  - Over 20
12. How many years have you used computers in your instruction?
- Less than 1
  - 1-3
  - 4-6
  - 7-10
  - Over 10

Part II  
**Adoption of Computer Technology**

**Directions:** For the following categories, please put an X in the box next to the appropriate answer:

13. Please select one of the following categories that best describes your disposition toward the adoption of computer technology:
- Resist new innovations until certain that they will be successful.
  - Require convincing of the economic necessity of a change, uncomfortable with uncertainty.
  - Consider fully all consequences, interact frequently with peers, willing to change to a new method but not willing to be a leader in the change process.
  - Make judicious innovation decisions, decrease uncertainty by fully evaluating new things, use interpersonal networks within your immediate area to gain more instruction.
  - Almost obsessed with trying new innovations, seek instruction outside of the immediate area, and can cope with uncertainty.

**Directions:** Indicate how important the following innovation factors would be in encouraging you to adopt emerging computer technology for instruction. Please select the most appropriate response option. Innovation is defined as an idea, practice, or object that is perceived as new by an individual (Rogers, 1995).

**Rating Scale**

- 0= Not Important
- 1= Somewhat Important
- 2= Important
- 3= Very Important
- NA= Not Applicable

14. The innovation is better than the one used previously.	0	1	2	3	NA
15. The innovation is consistent with your values, past experience, and needs.	0	1	2	3	NA
16. The extent that the innovation is perceived to be easy to use.	0	1	2	3	NA
17. The innovation can be used on a trial basis.	0	1	2	3	NA
18. Other people can see the results of the innovation.	0	1	2	3	NA
19. In-house training is provided	0	1	2	3	NA
20. Ability to teach yourself new applications	0	1	2	3	NA
21. Seminars/workshops are provided	0	1	2	3	NA
22. Online tutorials are provided	0	1	2	3	NA
23. Adequate time in training sessions	0	1	2	3	NA
24. One-on-one technology training specific to course content	0	1	2	3	NA
25. Access to a computer at home with software installed for use in your teaching	0	1	2	3	NA
26. Access to a computer in your office at school with software installed for use in your teaching	0	1	2	3	NA
27. Access to a computer, technological equipment, and software in your classroom for use in your teaching	0	1	2	3	NA

**Directions:** Indicate how important the following factors have been in your decision to adopt emerging computer technologies in the **delivery of instruction**. Please select the most appropriate response option.

**Rating Scale**

0= Not Important

1= Somewhat Important

2= Important

3= Very Important

NA = Not Applicable

28. Peer support	0	1	2	3	NA
29. Technological support	0	1	2	3	NA
30. Peer pressure	0	1	2	3	NA
31. Encouragement of a mentor	0	1	2	3	NA
32. Shared values in my department	0	1	2	3	NA
33. Friends	0	1	2	3	NA
34. Students	0	1	2	3	NA
35. Mandate from the university	0	1	2	3	NA
36. Institutional reward system	0	1	2	3	NA
37. Formal recognition	0	1	2	3	NA
38. Physical resources (infrastructure such as Internet connectivity)	0	1	2	3	NA
39. Physical resources (hardware)	0	1	2	3	NA
40. Physical resources (software)	0	1	2	3	NA
41. Personal interest in computer technology use in my teaching	0	1	2	3	NA
42. Personal interest in improvement in my teaching	0	1	2	3	NA
43. Personal interest in enhancing student learning	0	1	2	3	NA
44. Course management software ease of use (e.g. Blackboard, WebCT)	0	1	2	3	NA
45. Adequate time to prepare to teach with technology	0	1	2	3	NA
46. Specific technological training related to your teaching (e.g., web-based instruction)	0	1	2	3	NA

Part III  
**Computer Technology Integration**

**Directions:** Indicate the extent to which you are using the following to integrate computer technology **in your instruction**. Please select the response option that best describes the frequency of your use **this past semester**.

**Rating Scale**

- 0= Never
- 1= Almost Never
- 2= Sometimes
- 3= Frequently
- 4= Almost Always

47. Use a computer and projector in the classroom (e.g., PowerPoint, Excel, Simulation software)	0 1 2 3 4
48. Use email as the primary source of student contact outside the classroom	0 1 2 3 4
49. Create an <b>on-line</b> syllabus with hyperlinks to class resources	0 1 2 3 4
50. Use an <b>on-line</b> syllabus with hyperlinks to class resources	0 1 2 3 4
51. Use <b>personally designed</b> web-based lectures, notes, and tutorials	0 1 2 3 4
52. Use <b>personally designed</b> web-based tests or quizzes	0 1 2 3 4
53. Use <b>commercial products</b> (e.g., Blackboard, WebCT) to present web-based lectures, notes, and tutorials	0 1 2 3 4
54. Provide grades to students <b>on-line</b> (e.g., Blackboard, WebCT)	0 1 2 3 4
55. Perform Internet research and searches in the classroom	0 1 2 3 4
56. Exchange student written work via the web (e.g., email attachments, digital drop boxes, discussion forums, etc.)	0 1 2 3 4
57. Enable and support student group work in virtual environments	0 1 2 3 4
58. Enable and support collaboration among students via web-based programs	0 1 2 3 4
59. Use totally audio <b>web-based</b> systems for instruction and review	0 1 2 3 4
60. Use totally video <b>web-based</b> systems for instruction and review	0 1 2 3 4
61. Conduct asynchronous forums (e.g., <b>on-line</b> discussion board)	0 1 2 3 4
62. Conduct synchronous discussions (e.g., <b>on-line</b> chat room)	0 1 2 3 4
63. Use <b>on-line</b> bulletin boards	0 1 2 3 4
64. Use word processing	0 1 2 3 4
65. Conduct academic advising in virtual environments (e.g., email, discussion board)	0 1 2 3 4
66. Other (please specify) _____	0 1 2 3 4
67. Other (please specify) _____	0 1 2 3 4
68. Other (please specify) _____	0 1 2 3 4

Adapted from: Medlin, B. D. (2001). *The factors that may influence a faculty member's decision to adopt electronic technologies in instruction*. Unpublished doctoral dissertation, Virginia Polytechnic Institute and State University.  
 Adapted and used with permission of B. Dawn Medlin.

**THANK YOU FOR COMPLETING THIS SURVEY.**

Please return the survey to: **Mrs. Betty Foust Chapman, 2330 Glenhaven Drive, Greensboro, NC 27406**

## APPENDIX B

### Computer Technology Adoption Survey

CODE

## COMPUTER TECHNOLOGY ADOPTION SURVEY (CTAS)

Please **DO NOT** put your name on this form. Surveys are coded for follow-up purposes **ONLY**. All survey responses will remain confidential. Thank you for your participation.

### Part I

#### Personal and Employment Characteristics

**Directions:** For the following personal and employment characteristics, please put an **X** in the box next to the appropriate answer.

13. Are you currently employed as a business teacher educator?
- Yes - Please continue to the next question and complete the survey.
  - No - **Do not** complete the survey. Please return the survey to the researcher.
14. Are you currently a retired business teacher educator?
- Yes – **Do not** complete the survey. Please return the survey to the researcher.
  - No - Please continue to the next question and complete the survey.
15. Are you currently employed full-time as a business teacher educator?
- Yes – Please skip the next question and complete the survey.
  - No - Please continue to the next question and complete the survey.
16. Are you currently employed part-time as a business teacher educator?
- Yes
  - No
17. What is your gender?
- Female
  - Male
18. In what higher education institution category do you teach?
- Research university
  - Non-research university
  - 4-year college
  - Other (Please specify) \_\_\_\_\_

19. Are you employed in a tenure track position?
- Yes
  - No
20. Do you have tenure?
- Yes
  - No
21. What is your current rank?
- Adjunct Instructor
  - Assistant Professor
  - Associate Professor
  - Full Professor
  - Other (Please specify) \_\_\_\_\_
22. What is your highest level of education?
- Bachelor's degree
  - Master's degree
  - Ph.D.
  - Ed.D.
  - Post Doctorate
23. How many years of teaching experience as a business teacher educator do you have at the university/college level?
- 1-5
  - 6-10
  - 11-15
  - 16-20
  - Over 20
24. How many years have you used computers in your instruction?
- Less than 1
  - 1-3
  - 4-6
  - 7-10
  - Over 10

Part II  
**Adoption of Computer Technology**

**Directions:** For the following categories, please put an X in the box next to the appropriate answer:

13. Please select one of the following categories that best describes your disposition toward the adoption of computer technology:
- Resist new innovations until certain that they will be successful.
  - Require convincing of the economic necessity of a change, uncomfortable with uncertainty.
  - Consider fully all consequences, interact frequently with peers, willing to change to a new method but not willing to be a leader in the change process.
  - Make judicious innovation decisions, decrease uncertainty by fully evaluating new things, use interpersonal networks within your immediate area to gain more instruction.
  - Almost obsessed with trying new innovations, seek instruction outside of the immediate area, and can cope with uncertainty.

**Directions:** Indicate how important the following innovation factors would be in encouraging you to adopt emerging computer technology for instruction. Please select the most appropriate response option. Innovation is defined as an idea, practice, or object that is perceived as new by an individual (Rogers, 1995).

**Rating Scale**

- 0= Not Important
- 1= Somewhat Important
- 2= Important
- 3= Very Important
- NA= Not Applicable

14. The innovation is better than the one used previously.	0	1	2	3	NA
15. The innovation is consistent with your values, past experience, and needs.	0	1	2	3	NA
16. The extent that the innovation is perceived to be easy to use.	0	1	2	3	NA
17. The innovation can be used on a trial basis.	0	1	2	3	NA
18. Other people can see the results of the innovation.	0	1	2	3	NA
19. In-house training is provided	0	1	2	3	NA
20. Ability to teach yourself new applications	0	1	2	3	NA
21. Seminars/workshops are provided	0	1	2	3	NA
22. Online tutorials are provided	0	1	2	3	NA
23. Adequate time in training sessions	0	1	2	3	NA
24. One-on-one technology training specific to the courses you are teaching	0	1	2	3	NA
25. Access to a computer at home with software installed for use in your teaching	0	1	2	3	NA
26. Access to a computer in your office at school with software installed for use in your teaching	0	1	2	3	NA
27. Access to a computer, technological equipment, and software in your classroom for use in your teaching	0	1	2	3	NA

**Directions:** Indicate how important the following factors have been in your decision to adopt emerging computer technologies in the **delivery of instruction**. Please select the most appropriate response option.

**Rating Scale**

0= Not Important

1= Somewhat Important

2= Important

3= Very Important

NA = Not Applicable

28. Peer support	0	1	2	3	NA
29. Technological support	0	1	2	3	NA
30. Peer pressure	0	1	2	3	NA
31. Encouragement of a mentor	0	1	2	3	NA
32. Shared values in my department	0	1	2	3	NA
33. Friends	0	1	2	3	NA
34. Students	0	1	2	3	NA
35. Mandate from the university	0	1	2	3	NA
36. Institutional reward system	0	1	2	3	NA
37. Formal recognition	0	1	2	3	NA
38. Physical resources (infrastructure such as Internet connectivity)	0	1	2	3	NA
39. Physical resources (hardware)	0	1	2	3	NA
40. Physical resources (software)	0	1	2	3	NA
41. Personal interest in computer technology use in my teaching	0	1	2	3	NA
42. Personal interest in improvement in my teaching	0	1	2	3	NA
43. Personal interest in enhancing student learning	0	1	2	3	NA
44. Course management software ease of use (e.g. Blackboard, WebCT)	0	1	2	3	NA
45. Adequate time to prepare to teach with technology	0	1	2	3	NA
46. Specific technological training related to your teaching (e.g., web-based instruction)	0	1	2	3	NA

Part III  
**Computer Technology Integration**

**Directions:** Indicate the extent to which you are using the following to integrate computer technology **in your instruction**. Please select the response option that best describes the frequency of your use **this past semester**.

**Rating Scale**

- 0= Never
- 1= Almost Never
- 2= Sometimes
- 3= Frequently
- 4= Almost Always
- 5= Always

48. Use a computer and projector in the classroom (e.g., PowerPoint, Excel, Simulation software)	0 1 2 3 4 5
48. Use email as the primary source of student contact outside the classroom	0 1 2 3 4 5
49. Create an <b>on-line</b> syllabus with hyperlinks to class resources	0 1 2 3 4 5
50. Use an <b>on-line</b> syllabus with hyperlinks to class resources	0 1 2 3 4 5
51. Use <b>personally designed</b> web-based lectures, notes, and tutorials	0 1 2 3 4 5
52. Use <b>personally designed</b> web-based tests or quizzes	0 1 2 3 4 5
53. Use <b>commercial products</b> (e.g., Blackboard, WebCT) to present web-based lectures, notes, and tutorials	0 1 2 3 4 5
54. Provide grades to students <b>on-line</b> (e.g., Blackboard, WebCT)	0 1 2 3 4 5
55. Perform Internet research and searches in the classroom	0 1 2 3 4 5
56. Exchange student written work via the web (e.g., email attachments, digital drop boxes, discussion forums, etc.)	0 1 2 3 4 5
57. Enable and support student group work in virtual environments	0 1 2 3 4 5
58. Enable and support collaboration among students via web-based programs	0 1 2 3 4 5
59. Use totally audio <b>web-based</b> systems for instruction and review	0 1 2 3 4 5
60. Use totally video <b>web-based</b> systems for instruction and review	0 1 2 3 4 5
61. Conduct asynchronous forums (e.g., <b>on-line</b> discussionboard)	0 1 2 3 4 5
62. Conduct synchronous discussions (e.g., <b>on-line</b> chat room)	0 1 2 3 4 5
63. Use <b>on-line</b> bulletin boards	0 1 2 3 4 5
64. Use word processing	0 1 2 3 4 5
65. Conduct academic advising in virtual environments (e.g., email, discussion board)	0 1 2 3 4 5
66. Create custom designed web pages	0 1 2 3 4 5
67. Teach <b>on-line</b> courses	0 1 2 3 4 5
68. Other (please specify)	0 1 2 3 4 5

Adapted from: Medlin, B. D. (2001). *The factors that may influence a faculty member's decision to adopt electronic technologies in instruction*. Unpublished doctoral dissertation, Virginia Polytechnic Institute and State University.  
 Adapted and used with permission of B. Dawn Medlin.

**THANK YOU FOR COMPLETING THIS SURVEY.**

## APPENDIX C

### Permission to Use Survey Instrument

February 7, 2003

Betty Foust Chapman  
Doctoral Candidate  
Career and Technical Education  
Virginia Tech  
Blacksburg, VA 24061

Dear Ms. Chapman,

I am in receipt of your request to use my survey instrument in conducting the data gathering phase of your dissertation. This letter shall serve as my official permission for you to use this survey instrument.

I wish you good luck in your dissertation efforts. If you should have any questions please feel to email me at [medlinbd@appstate.edu](mailto:medlinbd@appstate.edu).

Sincerely,

B. Dawn Medlin

## APPENDIX D

### Permission to Use Figures

From: "Everett M. Rogers" [erogers@unm.edu](mailto:erogers@unm.edu)  
Date: 2002/08/11 Sun PM 06:06:19 EDT  
To: Betty Chapman [bfchapm@bellsouth.net](mailto:bfchapm@bellsouth.net)  
Subject: Re: Permission to use Figures

Dear Betty:

You have my permission to use the figures. Good luck with your research.

Cordially,

Ev Rogers

APPENDIX E

Notice, Reminder, and Closing Notice

(1) Notice

Dear National Association of Teacher Educators for Business Education member,

I am conducting a research project concerning business teacher educator's computer technology adoption. The objectives of this survey are to identify factors that influence your adoption of computer technologies in your delivery of instruction and to determine to what degree you are using computer technology in your teaching. Your help is needed to gather information about this important topic. Could you please complete a survey related to this topic? The total time required to fill out the survey is approximately 20 minutes.

This note contains a link to the survey site and instructions for completing the survey. The survey is posted on a website and will be accessible for four weeks from today, March 18 until April 15, 2003. You may access the survey 24 hours a day, seven days a week during this time period.

The Institutional Review Board of Virginia Polytechnic Institute and State University approved this survey project on February 27, 2003 (IRB # 02-574). All information regarding participants and their responses will be kept confidential. Please contact me at the email address below at any point in this survey if assistance is needed. The **instructions** are as follows:

1. **When you click the *link* below, you will be prompted for a password**
2. **In the *Password* box, enter the Password: itsurvey**  
By entering the password, you agree to accept the risks involved in participating
3. **When entering the survey site, please put the three-digit code \_\_\_\_ in the box at the top of the survey**
4. **Click on the *link* when you are ready to begin**
5. **Click the submit button when you complete the survey**
6. **If you prefer, you may print, complete, and mail the survey to:**

**Mrs. Betty Foust Chapman, 2330 Glenhaven Drive, Greensboro, NC 27406**

The following link should take you directly to the survey page:

<http://survey.vt.edu/survey/entry.jsp?id=1047923487303>. If it does not, you may copy and paste the website address into your web browser.

If you have any questions, comments, or require assistance, please contact me at [bechapma@vt.edu](mailto:bechapma@vt.edu). I look forward to receiving your input on the survey. Thank you very much for your help.

Betty Foust Chapman, Doctoral Candidate, Virginia Tech

## (2) Reminder Notice

Dear National Association of Teacher Educators for Business Education member,

This note is a reminder that the Computer Technology Adoption Survey is still open (until April 15, 2003). I really need your response. If you have not completed the survey, you may do so by accessing the web site and entering the password. **The password is: itsurvey. Your three digit code is \_\_\_\_\_.** You may use this link to access the survey site:

<http://survey.vt.edu/survey/entry.jsp?id=1047923487303>. To those of you who have already completed the survey –THANK YOU! I appreciate your assistance with this research project.

Also, if you are interested in receiving the results of the survey please **send me an email ([bechapma@vt.edu](mailto:bechapma@vt.edu)) with “results” in the subject line** and I will contact you with the results later. Thank you very much for your help.

Sincerely,

Betty Foust Chapman, Doctoral Candidate, Virginia Tech

## (3) Closing Notice

Dear National Association of Teacher Educators for Business Education member,

This note is the final reminder notice that the Computer Technology Adoption Survey will close tomorrow evening, April 15, at midnight. If you have already completed the survey, thank you – you need not respond to this note. **If you have not yet completed the survey, please do so by accessing the website and entering the password: itsurvey and your three digit code: \_\_\_\_\_.** You may use this link to access the site:

<http://survey.vt.edu/survey/entry.jsp?id=1047923487303>. If it does not, you may copy and paste the website address into your web browser.

I deeply appreciate your interest and assistance with this research project. I look forward to analyzing and sharing the results. I am compiling a list of participants who are **interested in getting the results of the survey**. I plan to have the results available in a couple of months after the survey is completed. If you are interested in getting the survey results, please **send me ([bechapma@vt.edu](mailto:bechapma@vt.edu)) an email with “results” in the subject line** and I will contact you with the results later. Thank you very much for your help.

Sincerely,

Betty Foust Chapman, Doctoral Candidate, Virginia Tech

APPENDIX F

Human Subjects Clearance Letter



VIRGINIA POLYTECHNIC INSTITUTE  
AND STATE UNIVERSITY

**Institutional Review Board**

Dr. David M. Moore  
IRB (Human Subjects) Chair  
Assistant Vice Provost for Research Compliance  
CVM Phase II - Duckpond Dr., Blacksburg, V A 24061-0442  
Office: 540/231-4991; FAX: 540/231-6033  
e-mail: moored@vt.edu

February 27, 2003

MEMORANDUM

TO: Betty Heath-Camp T& L 0313  
Betty Foust Chapman

FROM: David M. Moore ~

SUBJECT: Expedited Approval- "An Assessment of Business Teacher Educators' Adoption of Instructional Technology" -IRB # 02-574

This memo is regarding the above-mentioned protocol. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. As Chair of the Virginia Tech Institutional Review Board, I have granted approval to the study for a period of 12 months, effective February 27, 2003.

Approval of your research by the IRB provides the appropriate review as required by federal and state laws regarding human subject research. It is your responsibility to report to the IRB any adverse reactions that can be attributed to this study.

To continue the project past the 12 month approval period, a continuing review application must be submitted (30) days prior to the anniversary of the original approval date and a summary of the project to date must be provided. My office will send you a reminder of this (60) days prior to the anniversary date.

cc:File

*A Land-Grant University-The Commonwealth Is Our Campus*

An Equal Opportunity / Affirmative Action Institution

## VITA

Betty Foust Chapman

### EDUCATION

- Ph.D.** Virginia Polytechnic Institute and State University  
Blacksburg, VA  
Career and Technical Education, 2003
- MBA** North Carolina Central University, Durham, NC, 1998
- BS Business Administration** Shaw University, Raleigh, NC, 1995

### FELLOWSHIPS AND AWARDS

- Southern Regional Education Board Dissertation Year Fellowship 2002 - 2003
- \$400 Beamer Award from Virginia Polytechnic Institute and State University  
and \$200 New Professional stipend from Association for Career and Technical  
Education to attend the annual ACTE Convention in New Orleans, LA 2001 - 2002
- UNCF Avon Corporation Scholarships, \$3000 and \$2500 respectively 1993, 1994
- Member of the Alpha Chi Honor Society 1993, 1994

### TEACHING EXPERIENCE

- Virginia Polytechnic Institute and State University
- Administrative Office Management integrating Microsoft Word, PowerPoint, and Blackboard Course Info software. Instruction in the computer lab. 01/01 - 05/01
  - Office Technology, Trends and Computer Technology in Career and Technical Education. Instruction in the computer lab. 09/01 - 12/01
- North Carolina Central University, Durham, NC
- Computer Laboratory Assistant 02/97 - 05/97
- Randolph Community College, Asheboro, NC, Adjunct Professor 08/98 - 08/00
- Introduction to Marketing
  - Principles of Marketing Distance Learning course
  - Fundamentals of Selling (taught both in the classroom and Distance Learning)
  - Marketing Distance Learning, Word97, and Access
  - Keyboarding and PowerPoint Graphics Presentation Software courses
- Winston-Salem State University, Winston-Salem, NC, Adjunct Professor 08/98 - 12/98
- Undergraduate Microeconomics course in the Department of Business and Economics

## RESEARCH EXPERIENCE

- Graduate Research Assistant 08/00 – 12/00

Project sponsored by Virginia Polytechnic Institute and State University, College of Human Resources and Education and the Virginia Department of Education, Career, Technical, and Adult Education Office. Researched and developed lesson content for web-based courses in Career and Technical Education which are used to satisfy the Virginia teacher licensure requirements.

## CONFERENCE PRESENTATION

Guilford Technical Community College, Distance Learning Alliance Conference 07/99  
“Tasks of Distance Learning Instructors: Student Orientation/Syllabi Development/Textbook/Study Guide/Video Lessons/Instructor-Student Interaction: Keeping in Touch/Assignments/Exams for Internet, Tele-Web, and Telecourses.”

## PROFESSIONAL EXPERIENCE

North Carolina A&T State University, Greensboro, NC 05/00-07/00  
Consultant, School of Graduate Studies

Set up Blackboard Course Info website, developed a student’s manual, developed a Moderator’s manual, and set up discussion groups based on the students’ areas of research.

NCA&T State University, Upward Bound Program, Greensboro, NC, Math Tutor 02/97-05/98  
Tutored high school students Algebra II, Geometry, and Advanced Math at UNCG and NCA&T.

NAACP Academy, Greensboro, NC, Tutor/Counselor 06/96-08/96; 01/98-05/98  
Planned curriculum, lessons, and tutored math, English, and Science. Counselor for educational, recreational, and cultural enrichment activities.

North Carolina Central University, Durham, NC, Graduate Assistant 02/97-05/97  
Assisted college students with computer applications in the computer laboratory. Instructed correct usage of computer hardware, software, and provided lab security.

US Department of Housing and Urban Development, Greensboro, NC  
Clerk-Typist, Legal Technician, Multifamily Loan Specialist 03/79-04/91  
Assisted Legal Counsel and two attorneys. Prepared Federal Housing Contracts valued in the millions of dollars. Provided routine, preventative, and specialized technical servicing of a caseload of 80 housing projects valued in the millions of dollars. Performed on-site and agency team management reviews. Operated a computer, prepared rent adjustments, wrote detailed reports, and traveled.

## **PROFESSIONAL AFFILIATIONS**

- Delta Pi Epsilon (**DPE**)
- Omicron Tau Theta (**OTT**)
- American Vocational Educational Research Association (**AVERA**)
- National Business Education Association (**NBEA**)
- National Association of Teacher Educators for Business Education (**NATEBE**)
- Association for Career and Technical Education (**ACTE**)
- North Carolina Business Education Association (**NCBEA**)