Faculty Attitude towards Integrating Technology in Teaching at a Four-Year Southeastern University

by

Donna Venetta Palmore

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Approved by

Ivan Watts, Chair, Associate Professor of Educational Foundations, Leadership and Technology
David DiRamio, Associate Professor of Educational Foundations, Leadership and Technology
Ellen Reames, Assistant Professor of Educational Foundations, Leadership and Technology
Charles Eick, Associate Professor of the Department of Curriculum and Teaching

Abstract

Studies have shown that computer technology has brought about a noticeable change in the manner in which education is delivered to students. Further research suggests that the use of technology enables educators to effectively communicate with their students in an interactive learning environment designed to meet their individual needs. Moreover, further studies noted the importance of an individual's computer self-efficacy on their level of technology integration in their classroom instructions. The purpose of this study was to investigate faculty members' attitude towards technology integration into their curriculum as well as their perceptions of professional development needs to aid in technology integration, and how these factors influence their decisions to use technology in their educational practices. The study surveyed 212 teaching faculty members at a southeastern institution of higher education.

Simple regression analyses revealed that the availability of technology, technical training, and support through professional development opportunities affected faculty's adoption of technology integration in their classroom instructions ($F(1, 194) = 40.112$, $p=<0.001$); $R^2=0.414$). In addition simple regression also revealed that faculty members' age had an effect on whether or not they planned lessons and designed instruments that incorporated some form of technology, it resulted in a significant relationship (x^2-df = 26.015, p=0.054) and (x^2-df = 35.184, p=0.004) respectively.

Chi squares analysis found that there is a significant positive relationship between the amount of professional development faculty received and the level at which they incorporate technology in their overall classroom assessments. Moreover, crosstab analysis showed that there is a significant relationship between faculty members' age and their decision to plan lessons and design instruments that incorporated some form of technology (x^2-df = 26.015, p=0.054) and (x^2-df = 35.184, p=0.004) respectively.

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List of Abbreviations

3-D	Three Dimensional
CBAM	Concerns Based Adoption Model
DOI	Theory of Diffusion of Innovations
FAIT	Faculty Attitudes Towards Information Technology
IDM	Information Display Matrix
IDC	International Data Corporation
IT	Information Technology
IP	Internet Protocol
LCD	Liquid Crystal Display
PD	Professional Development
SPSS	Statistical Package for the Social Sciences

CHAPTER ONE

Introduction

There are great concerns about the future of higher education with special concentration on academic and research program support budgets. Thus in an effort to curtail spending many university administrators have tried to cut cost by reallocating scarce resources and eliminating programs that are not very financially lucrative. Despite the obvious financial problems many higher education institutions are facing they are still very vital to many citizens, however, it is surprising that some of these institutions will not change their design to reflect external pressure. During these times however, it is important for these institutions to be innovative in ensuring their continuity (Heath, 1993).

There has been increased internal and external pressure for higher education educators to incorporate technology into classroom instructions to aide students' success in a world rich with technology. When technology is utilized to make changes to the existing education paradigm, learning moves from a more teacher-centered environment to a more desirable learner-centered environment. Interestingly, new students anticipate a college environment which is rich in technology at the most affordable costs ever (Owen & Demb, 2004).

Consequently, state financing for higher education has been a central focus for many educational institutions. This focus is now even more pronounced since there has been a very substantial reduction in state appropriations to institutions of higher education. The reduction in state financial support has great implications for the long-term funding of higher education (Wellman, 2003). Moreover, there is warranted public concern about higher education funding, the reduction in state appropriations, and the ways in which public institutions are going about curtailing their spending. Higher educational institutions are increasing tuition rates in order to compensate for the reduction in state revenues. Therefore, with an increase in enrollment and a decrease in state appropriations institutions are employing innovative measures to address this lack of funding (Wellman, 2003).

The best solution to combating the financial problems higher institutions face is technology (Morrison, 2003). Through technology a wider array of college students can be served which can ultimately expand the higher education market to include distance education providers, for-profit institution, and corporate universities. While it is important for college graduates to have a firm grasp of their content areas in it equally important for them to have some mastery of technology to enable them to keep cope with current technological advancements (Owen & Demb, 2004).

Background

The main aim of technology integration is to effectively solve problems and increase knowledge in the learning environment. Through technology, students and instructors can move beyond the physical structure of the classroom to a more open atmosphere where students can prosper and thrive (Sung Youl, 2009). Instruction that utilizes some form of technology allows the instructors to improve their teaching process by allowing their students to utilize more modern skills with technology to achieve traditional learning objectives thus allowing them to become lifelong learners (Lin& Lu, 2010). Research has shown that there are several factors that influence whether or not an educator will integrate technology into their instruction, these include the teachers' knowledge, teachers' backgrounds, available resources, and adequate professional development and training (Conrad & Munro, 2008; Morales, Knezek, &

Christensen, 2008 ; Sitzmann, Bell, Kraiger, Kanarm, 2009; & Sung Youl, 2009). Morrison (2003) explained that technology is an effective teaching tool in part because it provides a social laboratory for experimentation in role-playing, simulations, exploration, and experimentation in a virtually risk-free environment. Similarly, students are given the opportunity to interact with people around the world, which provides the opportunity for education in other cultures (Morrison, 2003).

Statement of the Problem

This study seeks to investigate faculty members' attitude towards technology integration into their curriculum as well as their perceptions of professional development needs to aid in technology integration, and how these factors influence their decisions to use technology in their educational practices.

Computer technology has brought about a noticeable change in the manner in which education is delivered to students. Through technology, educators have the ability to communicate with students in an interactive learning environment designed to meet their individual needs. In addition, they are able to effectively use data analysis to determine whether or not their teaching style was effective. When educators utilize some form of technology into their instruction, it affords students who were often too shy to communicate in a traditional learning environment to effectively collaborate with others (Brown, 2006).

Integrating technology into classroom instructions has indeed revolutionized educational practices and has caused technology firms to work untiringly to meet the demand for software that would aid in enhancing the technology centered learning environment. According to a study by the research firm IDC, in 2004 over $7 billion was spent developing the online market, and this number was expected to drastically increase by 30 percent during the succeeding four years.

It is believed that the introduction of broadband Internet helped to fuel the demand for online education as this type of technology proved more reliable in accommodating the demands for technological content that incorporated technology (Brown, 2006).

Spotts & Bowman (1995) explained that even though there has been a dramatic increase in the availability of technology in educational settings there are still only a small number of faculty members who actually use technology in their classroom instructions. Coincidentally, there is very little research on technology's impact on learning in relation to entrance, recruitment, and retention. However, even though research in this area is limited there is evidence that students' level of knowledge is peaked when technology is integrated into classroom instruction (Muller et al, 2009). The reasons provided for the minimal or no use of technology in the learning environment have been linked to college leadership, the availability of technological resources, faculty support, program readiness, and faculty behavior towards incorporating technology into their classroom instructions (Koehler & Mishra, 2008).

It is indeed important for higher education administration to garner a better understanding of the factors that influence or affect faculty behavior and decision in integrating technology into their classroom instruction. In addition, it is necessary to identify the factors within the organization and staff development opportunities that can in fact bring about a positive change in faculty behavior in embracing technology integration (Koehler & Mishra, 2008). This study will utilize Hall & Hord (1987) Concerns Based Adoption Model and Rogers' (1995) Theory of Diffusion of Innovations models to help to assess faculty's level of technology adoption.

Purpose of the Study

The primary purpose of this study was to investigate issues that relate to the availability of technological resources, faculty support, program readiness, and faculty behavior towards incorporating technology into their classroom instructions. In order to effectively examine this problem, the study sought to assess how professional development opportunities affected a select higher education faculty and teaching staff members' decision to integrate technology into their regular teaching instructions.

Technology incorporation allows the educator to cater to a diverse population of students; therefore it is imperative for educators to receive technical assistance in addressing perceived barriers in using technology in their classroom instruction (Doutrich, Hoeksel, Wykoff, & Thiele, 2005). However, this is quite difficult to dictate, according to Muller, Buteau, Klincsik, Perjési-Hámori, & Sárvári (2009), "Anyone who has chaired a university department knows that academic freedom and other factors of autonomy make it very difficult to insist that a faculty member teach a course in a particular way. However, having a majority of the department's faculty in favour of a particular philosophy allows systemic change in the curriculum." (p. 140). It is important for technology to be integrated into the learning environment in the most seamless way possible. However, in order to effect any change in any environment the subject matter should be relevant to the population and there should be a culture of acceptance in making the necessary change (Seo, Templeton, & Pellegrino, 2008). Therefore, it is imperative for higher education to make the necessary arrangements for educators to receive necessary training and resources in order for them to make the transition from what is traditionally practiced in educating their students to embracing a new approach to the learning environment.

The study assessed the background information that pertains to participants' characteristics which was gathered through a collection of data based on their previous knowledge about technology, their rank or position within the university, and their respective gender classification. The gathering of background information allowed for an analysis of the factors that contributed to the differences in participants' behavior and practice in integrating technology. Furthermore, the study reviewed the professional development opportunities that helped to impact faculty beliefs, knowledge, and behaviors in integrating technology into their instructions. Finally, the study examined the relationship among faculty members' background, the availability of professional development opportunities in technology integration, and organizational leadership in order to determine how to cultivate positive faculty efficacy and general practice towards integrating technology into instruction in the higher education classroom.

The university departments that participated in this study are a part of a university that promotes technology incorporation and houses various computer labs with the latest technologies and classrooms that are equipped with at least one computer workstation, an Elmo Projector, and an LCD projector. In addition, offices throughout the university are equipped with desktop and laptop computers.

Theoretical Framework

Abrahamson & Rosenkopf's (1997) Network Theory has been highly utilized to conceptualize why some innovations are easily adapted as opposed to others; however it was necessary to also analyze the use of two influential theoretical perspectives in relation to acceptance and use of new innovations. For this reason, Rogers's (1985) Theory of Diffusion of Innovations (DoI) and Hall & Hord's (1987) Concerns-Based Adoption Model (CBAM) were also used to aid in understanding the ways in which educational institutions deal with the change process in relation to technology integration.

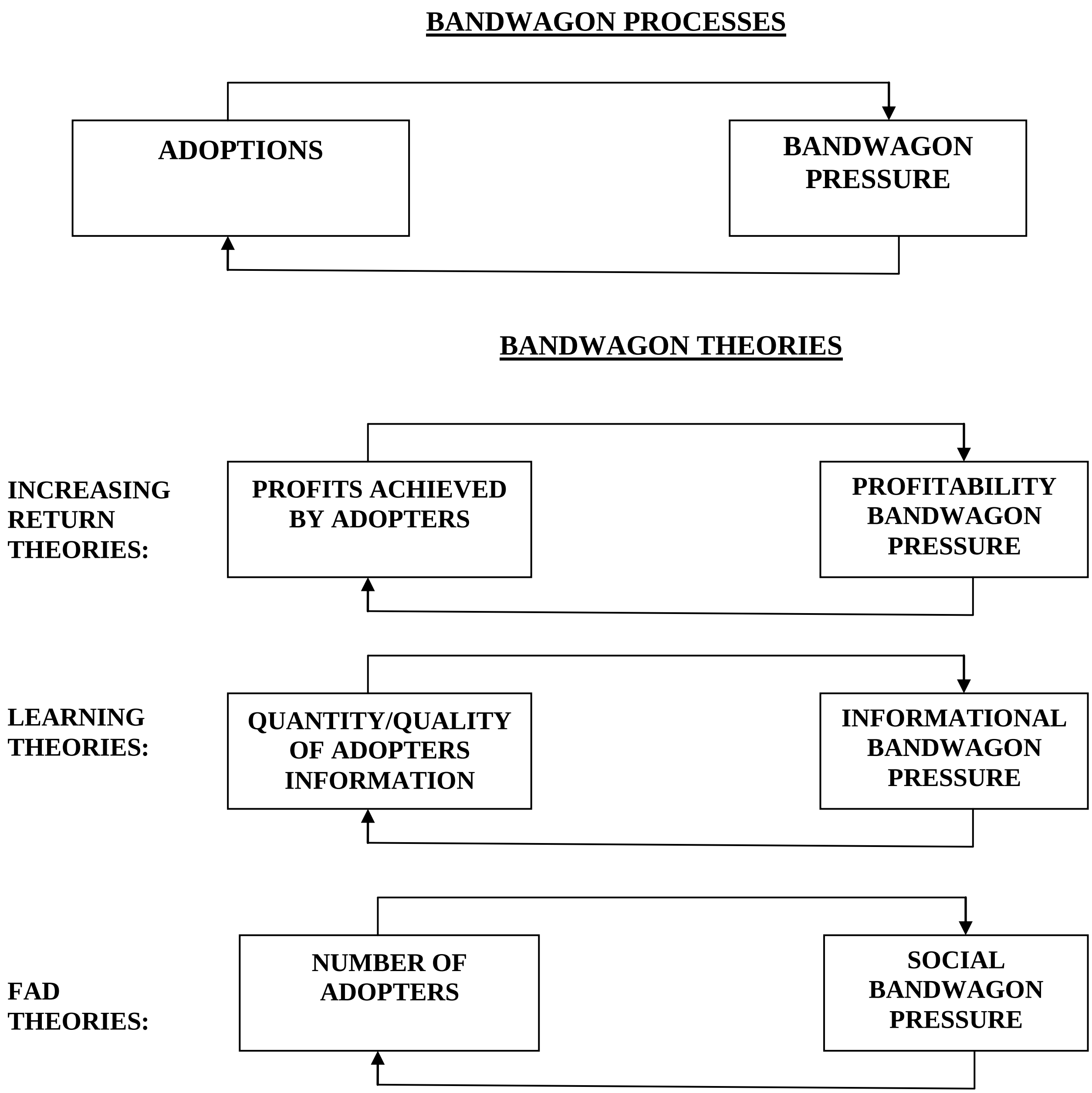
Abrahamson & Rosenkopf's Network Theory

The introduction of highly beneficial innovations into new areas of existing social networks does not guarantee its automatic infusion into the existing structures (Rogers, 1995). Even when the benefits of an innovation are realized its acceptance might not come readily, thus much research has been conducted to examine the rate at which innovations were diffused as opposed to the reasons why the innovations were diffused or were adopted (Rogers, 1995). However, recently there has been a focus on the reasons why some innovations completely diffuse at particular times whereas some only partially diffuse or simply fail to diffuse (Granovetter & Soong 1986, 1988; Abrahamson & Rosenkopf 1990, 1993a).

According to Abrahamson & Rosenkopf (1997), theories that are based on innovations have three main bandwagon processes that they go through (figure 1). Therefore as the number of people who adopt the innovation increases new information is generated about the innovation, thus as the number of people who adopt to the new innovation increases it triggers pressure for others to adopt. This stronger bandwagon in turn helps to propel the increase in the number of individuals who adopt the innovation. This therefore means that for an innovation like technology to be used to improve overall productivity, it must be accepted and utilized by individuals within an organization (Venkatesh, Morris, Davis, & Davis, 2003). Some of the main issues that researchers on technology integration seek to understand are mainly the reasons why some technologies are more easily adapted than others; the reasons why some technologies are readily adapted by some educators while others are resistant to the adaptation; and the factors that are at play when new technologies are utilized at an institution (Wilson, Sherry, Dobrovolny, Batty, & Ryder, 2001).

Figure 1

Bandwagon Processes and Theories (Abrahamson & Rosenkopf, 1997)



Rogers' (1995) Theory of Diffusion of Innovations

According to Rogers (1995) there are five stages to the process of diffusion: knowledge, persuasion, decision, implementation, and confirmation. However, adopting the innovation can in fact be viewed as a part of information diffusion, which results in the choice to use or not use the new technology (Wilson et al., 2001). This method of tracing the process of diffusion is referred to as information display matrix (IDM), which focuses primarily on information acquisition behavior (Aschemann-Witzel & Hamm, 2011). Rogers (1995) noted that individuals react quite differently when they are faced with new situations. Some people struggle at first to accept the new situations then they make changes to their existing situations to accommodate the new information. When individuals become more versed with the new information, they develop a sense of confidence which is evident in the ways in which they use their innate creativity to make the information more accessible to others (Dwyer, Ringstaff, & Sandboltz, 1991).

Similarly, the introduction of new information technology creates anticipated as well as unexpected occurrences for users (Griffith, 1999; Weick, 1990). In fact adapting technology is viewed as assimilating new cultures into an existing culture (Rogers, 1995). There are various levels of assimilation when it comes to technology adaptation. Focused assimilation refers to information technology utilization for a specified group, in that the technology is only assimilated for that particular group with the aim of attaining a specified goal. On the other hand, lagging assimilation is the abundant availability of technology that is only used on a very limited scale. This assimilation gap may sometimes be due to lack of knowledge to use the technology. Pervasive assimilation represents the abundant availability and wide utilization of technology. In such a situation there is significant support for users in order for them to use the technology effectively. These various types of assimilation of technology widely represents why some institutions have various employees who do not utilize technology while some institutions use technology on a regular basis (Bajwa, Lewis, Pervan, Lai, Munkvold, & Schwabe, 2008).

The Concerns-Based Adoption Model

In order for some individuals to effectively incorporate technology into their classroom instructions they will have to make dramatic changes to their instructional strategies to one that embraces and utilizes various technological aspects in the learning environment. In order to assess faculty's concerns about adopting new technologies, this study utilized the Concerns Based Adoption Model framework.

The Concerns Based Adoption Model (CBAM) was originally developed by Hall, Wallace, and Dossett (1973). Its main emphasis was on the seven different stages (awareness, information, personal, management, consequence, collaboration, and refocusing) that teachers go through when they become involved with implementing a new innovation. Hall & Hord (1987) grouped these seven stages into three major categories (self concerns, task concerns, and impact concerns). Sometimes observable traits among individuals who are implementing a new innovation do not provide an explanation of their subjective views of the proposed change, it is important to get an understanding or have some knowledge of these views as they can have a profound effect on these individual's commitment to make any desired change. CBAM's framework provides an evaluative platform to consider individual's attitudes at all levels of implementation of the new innovation (Rogers, 1995).

Research Questions

This study investigated issues that relate to the availability of technological resources, faculty support, program readiness, and faculty behavior towards incorporating technology into their classroom instructions. In order to effectively examine this problem, the study assessed how professional development opportunities affect selected higher education faculty and teaching staff members' decision to integrate technology into their regular teaching instructions.

The following research questions guided the investigation of this study:

1. Do professional development opportunities affect college faculty efficacy and practice of incorporating technology into their instruction?
2. What are the characteristics of faculty members that are incorporating technology into their instruction (i.e. age, gender, technology expertise, academic, and rank)?
3. Do professional development opportunities affect college faculty attitude towards incorporating technology into their instruction?

In order to address the above questions, the researcher generated the following six hypotheses:

1. The majority of the faculty members are integrating some form of technology into their teaching practice.
2. The majority of the faculty members are willing to learn more about strategies to incorporate technology into their instruction.
3. There is a relationship between faculty's demographics (age, gender, academic rank, tenure status) and their level of technology integration.
4. There is a relationship between faculty's members' beliefs and attitudes towards the effectiveness of technology integration and the level at which they have incorporated.
5. There is a relationship between faculty's efficacy and behavior toward technology and their level of technology integration.
6. The availability of technology, technical training, and support through professional development opportunities has a direct impact on faculty's adoption of technology integration.

The results of the study specifically examined the question: Is college faculty's efficacy and behavior toward integrating technology into their curriculum affected by their academic background and the availability of professional development activities?

Design of the Study

In order to effectively examine the research questions, a quantitative study was conducted using a survey design. Survey design allows the researcher to gather information from participants using predesigned questions aimed and satisfying the research questions (Alessi & Martin, 2010). The target population for this study was the faculty and teaching staff from seven departments at Auburn University: the College of Agriculture, the College of Business, the College of Education, the Samuel Ginn College of Engineering, the College of Liberal Arts, the Harrison School of Pharmacy, and the College of Sciences and Mathematics.

Limitations of the Study

The study is limited to a selected number of college departments at a university, as only faculty from one university participated in this study. Further investigations on the issues that relate to the availability of technological resources, faculty support, program readiness, and faculty behavior towards incorporating technology into their classroom instructions should include all departments at various colleges and universities. Another limitation is the sample size as only seven departments were used in this study. Likewise, population samples were only taken from one university in Alabama. Future research should address this limitation by conducting a study of this nature at other colleges located in other geographical regions in the United States. This approach would provide a larger means of determining the issues that relate to the availability of technological resources, faculty support, program readiness, and faculty behavior towards incorporating technology into their classroom instructions. Finally, the study is limited to the information acquired from a review of literature and survey questions.

Delimitations of the Study

The study was limited to seven college departments' faculty and administration at one university. Although it is likely that the amount of times technology is used and the purpose for using technology may affect faculties' decision to integrate technology into their instruction, this will not be addressed in this study. Instead, the study focused on the effects of academic background and the availability of professional development activities on faculties' decision to integrate technology into their classroom instructions.

Significance of the Study

There is an increased trend at higher education institutions to use some form of technology in classroom instruction. This trend is mainly as a result of the change in demographical make up of college students (Park, 2009). There is an increased reliance on technology into the learning environment; therefore it is necessary to analyze critical factors that may enhance or increase its successful implementation (Yi & Hwang, 2003). Generally, there are very little challenges that educators face in integrating technology into their instruction. However, instructors are faced with the challenge of utilizing three bodies of knowledge in order to incorporate the necessary technologies; pedagogical knowledge; content knowledge; and technological knowledge (Koehler & Mishra, 2008).

Coincidentally, Hall (2006) found that when instructors model the proper use of technology in their instruction, it would in turn positively affect their students' desire to use technology. Likewise, university instructors need to be exposed to ways in which technology can be effectively integrated into instruction in addition to receiving training in order to integrate it into their instruction (Graham, Tripp, & Wentworth, 2009). Chitiyo & Harmon (2009) noted, "integrating technology into education is not just a matter of having the necessary infrastructure however. To be successful, technology integration plans must ensure that faculty is prepared to use the technology effectively. While it is fairly easy to determine the state of a country's infrastructure, it is more difficult to determine faculty readiness." (p. 809).

Instruction in an education setting is extremely important to students' learning and retention; therefore it is necessary to utilize various methods to help students to be successful. One such method is through technology, research shows that technology-delivered instruction allows students to be more in control of their learning experience than in traditional classroom settings (Sitzmann, Kraiger, Stewart, Wisher, 2006). However if the educators are given the necessary training, but do not possess the necessary self-efficacy, this may create negative circumstances for their ability and interest in integrating technology. Yet those educators who possess the resilience to increase their knowledge and practice will not be deterred by their inability to grasp new technologies on their first attempt (Sitzmann, Bell, Kraiger, & Kanar, 2009).

This study aimed at contributing to the current body of literature on the ways in which instructional technology is integrated into the higher education curriculum. It particularly sought to garner insight into faculty members' attitudes toward technology integration in relation to organizational support and available professional development opportunities which are geared towards enhancing faculty efficacy and attitudes towards using technology within their institutions. It is hoped that the research findings will help to support the integration of technology into the higher education curriculum and provide a vehicle of inspiration that guide faculties' drive to improve their technological abilities.

Definitions of Terms

The following glossary of terms was developed to ensure readers' understanding of the way in which concepts were used throughout the study.

Autonomy is the degree of freedom students feel from the influence of others in their choices of attitudes, values, and behaviors.

Attribution refers to the reasons individuals give for their successes of failures, including luck, timing, motivation, effort, or health.

College is a post-secondary institution created to educate and grant degrees; this is often a part of a university.

Curriculum refers to an institution's educational program. In colleges, this serves as the focal point of educational accountability in assessing whether or not students have attained the necessary courses that would lead them to earn a degree or certification in their individual fields.

Curriculum planning involves various organizational strategies which are in place to aide students in maximizing their learning potential. It is a plan designed to help students to apply the knowledge they have learned to real life situations and bridge past knowledge to new information.

Curriculum implementation is putting the curriculum plan into action; it aimed at maximizing student potential in the learning environment.

Effective Training is the ongoing training which can be in the form of a series of well-planned workshops or professional development, where participants are offered practical support in applying techniques learned.

Faculty refers to the academic staff of a university who teaches on a full-time or part-time basis.

Goal Orientation are the motives that faculty members have for completing tasks, which may include developing and improving ability, demonstrating ability, and hiding lack of ability.

Information Technology is the process in which information is manipulated, stored, and retrieved from the computer's hardware and software.

Instructional Technology refers to the way in which various teaching tools are utilized in the educational setting to enhance learning.

Learning Community is deliberately structuring the curriculum so that students are more actively engaged in a sustained academic relationship with other students and faculty over a longer period of time than in traditional course settings (Smith & Hunter, 1988).

Locus of control this is the extent to which individuals are self-directed, believing themselves to be in control of their fate.

Professional Development Opportunities is a comprehensive, ongoing, and intensive approach to improving teachers' effectiveness in raising student achievement through collaboration.

Remediation is correcting or counteracting a prior event or condition.

Self Concept refers to one's perception of their competence compared to that of another.

Self Efficacy refers to people's judgments about their abilities to complete a task.

Self-esteem is the expression of an attitude of approval or disapproval, and indicates the extent to which the individual believes himself to be capable, significant, successful, and worthy.

Technology refers to computer-based tools such as computers, the internet, and other multimedia that is utilized in the learning environment.

Transactional Leadership is defined as a leadership approach based on the belief that people are motivated rewards or punishment.

Transformational Leadership is defined as a leadership approach that aims at bringing about a desired change through ongoing reinforcement which aid in developing followers into leaders (Bass, 1985).

University is a post-secondary educational institution for higher education and research, which grants academic degrees in a variety of subjects areas (Bass, 1985).

Organization of the Study

This study was organized into five major chapters. Chapter 1 introduced the study, presented the definition of the problem, its purpose, as well as the research questions, limitations, and definitions of terms were presented. Chapter 2 contained a review of related literature on technology integration and the factors that contribute to the varying levels of technology adaptation into school curriculums. Chapter 3 reported the procedures utilized in this study, including the population sample, instrumentation; data collection; and the data analysis. The findings were presented in Chapter 4. Chapter 5 consisted of a summary of the study, conclusions, implications, and recommendations for further practice and research.

CHAPTER TWO

Literature Review

This chapter reviews the literature that is directly related to faculty use of technology in their instruction and the factors that affect their decision to integrate technology. The literature review highlights the theoretical framework of the study, faculty perception of the availability of or the need for technology-related professional development, faculty use of technology to guide their instructions, and their overall attitude towards incorporating technology into their curriculum.

Theoretical Framework

The theoretical framework for this study was built on the basic assumption that technology can serve as a catalyst to transforming the teaching and learning process. According to Ekholm and Trier (1987), when an institution embarks upon a new venture or innovation and uses it in a routine manner and there is overall acceptance of this innovation, then it is incorporated into the organizational framework and daily processes and eventually becomes a natural pattern. There are many existing theoretical frameworks that deal with faculty use of available technologies in their classroom instructions. Among these are Rogers (1995) Diffusion of Innovation (DoI) model, Hall and Hord (1987) Concerns Based Adoption Model (CBAM), and Abrahamson & Rosenkopf's Network Theory (1990). These models helped to guide the review of related literature on new inventions for this study. However, the Concerns Based Adoption Model (CBAM) served as the theoretical framework for this study.

Rogers (1995) Diffusion of Innovation (DoI) Model

The Diffusion of Innovation (DOI) model's main aim is to show how many technology-related innovations progress from being invented to being utilized or rejected by potential adopters (Rogers, 1995). The four main elements that are involved in the diffusion of new ideas are the innovation, communication channels, time, and the social system. It is very important to understand the process of diffusion as it aids in determining why some innovations or technologies are readily adopted and some are rejected, also it also sheds light on why some people are more apt to change and to adapt to new technologies while others are either slow or resistant to change. Finally, it sheds light on the factors that contribute to individuals' decisions to embrace new technologies (Botturi, 2009).

The Innovation Decision Process is the mental process through which people first gain knowledge about an innovation to where they formulate their own opinion about the innovation based on that knowledge. Ultimately, individuals make a decision to adopt or reject the innovation which is based largely on the information they gathered throughout the various stages of the innovation-decision process (Rogers, 1995). The Diffusion of Innovation (DOI) model utilizes five stages to illustrate the innovation decision process: knowledge, persuasion, decision, implementation, and confirmation (Chen& Chen, 2006).

Knowledge occurs when an individual becomes aware of the existence of an innovation and has some idea of how it functions. There are varying degrees of knowledge that a person experiences in relation to a new innovation, these can range from being aware of the innovation, knowing how to use the innovation, to principle knowledge of the inner workings of the innovation (Rogers, 1995).

Persuasion occurs when an opinion is derived based on the individual's perception of the innovation. This persuasion can be either favorable or unfavorable and is sometimes influenced by information gathered from others who have interacted with the innovation. Diffusions of innovations are fueled by the social relationships that exist among individuals; therefore one's decision to adopt or reject an innovation is sometimes based on convincing subjective opinions that are shared by other individuals (Rogers, 1995).

Decisions occur when an individual engages in activities that lead to the innovation's acceptance or rejection based on the experience (Rogers, 1995).

Implementation occurs when the individual utilizes the innovation. It is at this stage that the process becomes more practice than theory. During this stage there is a recognized change in behavior as the new innovation is put into practice. This stage can consume a large amount of time as the individual becomes more familiar with the innovation and thus causing it to cease from being a noticeable new concept. In addition, re-invention can also occur if the user makes some form of modification or change to the innovation (Rogers, 1995).

Confirmation occurs when the individual evaluates or seeks reinforcements of an innovation-decision already made or reverses a previous decision to adopt or reject the innovation if they are faced with conflicting messages about the innovation. Interestingly, every stage in the innovation-decision process is a potential rejection point. Rejection can even occur after a decision was already made to adopt an innovation, this is called discontinuance (Rogers, 1995).

The innovation decision process is built on the premise that a decision is made through a cost-benefit analysis which is largely fueled by uncertainty between the adopter and the innovation. Individuals are more apt to adopt innovations if there are perceived benefits that can be had from its implementation as opposed to continuing to perform tasks in the same matter at which the individual is accustomed. Rogers (1995) further explained that there are five characteristics or attributes of innovation: relative advantage, compatibility, complexity, trialability, and observability. He defines these characteristics as follows:

Relative advantage describes the degree to which an innovation is perceived as better than that which it supersedes. It can be measured in economic terms, but social prestige, convenience, and satisfaction are also very important factors that must be considered. In order for potential adopters to embrace a new innovation, they have to be convinced that it will serve their needs better than the one that is currently in place. An innovation has the potential to be accepted or adopted if the potential adopter can readily recognize or envision its potential as advantageous.

Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of the potential adopter. If the innovation meets the accepted norms and values of the existing social system it would be more readily adapted than one that is viewed incompatible. Adoption of an incompatible innovation would often require a prior adoption of a new value system, which often takes a very long time to materialize.

Complexity is the degree to which an innovation is viewed as difficult to understand and use. Some innovations are more easily understood than others which can have an impact on the rate at which the innovation is adopted. New ideas that are quite simple to understand are adopted quicker than innovations that require the adopter to develop new skills in order to interact with the innovation.

Triability is the level at which an innovation may be experimented with on a limited basis. If a new innovation allows for the potential adopter to use it in stages in order for them to become more familiarize with it, it will be more easily adopted than one that does not allow them to divide it into small more achievable steps.

Observability is the degree to which the results of an innovation are visible to others. Individuals are more apt to adopt an innovation if its results are measurable and there is evidence of its effectiveness.

Figure 2

The Adoption Cycle. (Adapted from Moore 1991, quoted in Daniel, 1996, p. 87)

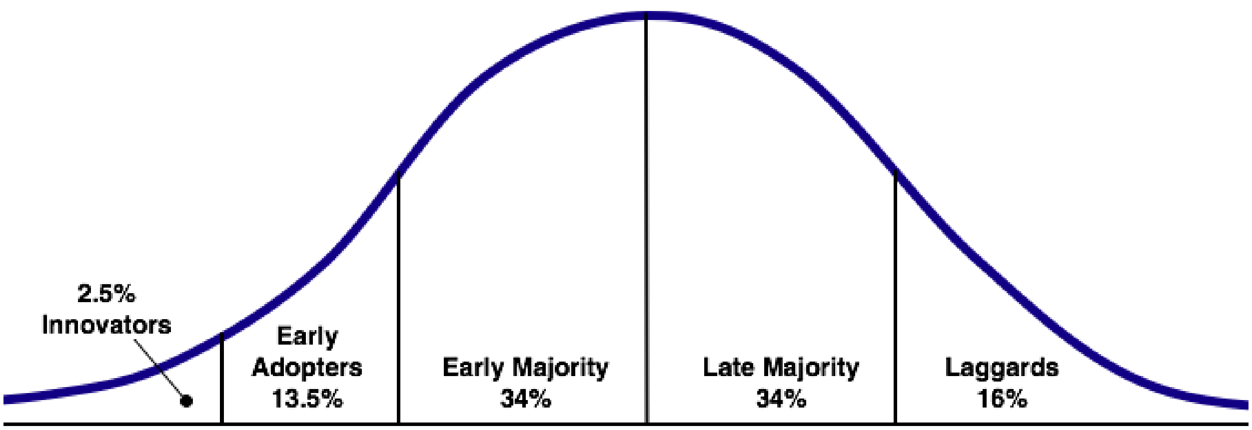


Figure 2 illustrates the dynamics that are in place when it comes to technology transformational change associated with an institution-wide effort to integrate technology. The Technology adoption lifecycle is represented graphically as a bell curve illustrating how new innovations are adopted over time (Owen & Demb, 2004). According to (Moore 1991):

The innovators are referred to as the "alpha nerds" who are completely committed to new technology within their respective field of interest. These individuals remain abreast of new innovations or versions of existing technology and readily secure the latest innovations as soon as they are introduced to the market. Interestingly their behavior towards a new innovation often influences the rest of the technology life cycle. Therefore, if they reject an innovation no one would give this product any consideration.

The Early Adopters are referred to as the "Visionaries." These individuals often seek out new capabilities that would give them the competitive advantage over the existing products. They are the ones who market the product by telling others about the product.

The Early Majority are referred to as the "Pragmatists." They differ from the early adopters in that they do not have the same love for technology; they simply appreciate what technology can do to help them be more efficient in their tasks. As a result, they are never among the first ones to adopt a new technology, instead they tend to wait to assess whether or not a new technology has been proven to be useful and productive based on the recommendations of trusted individuals.

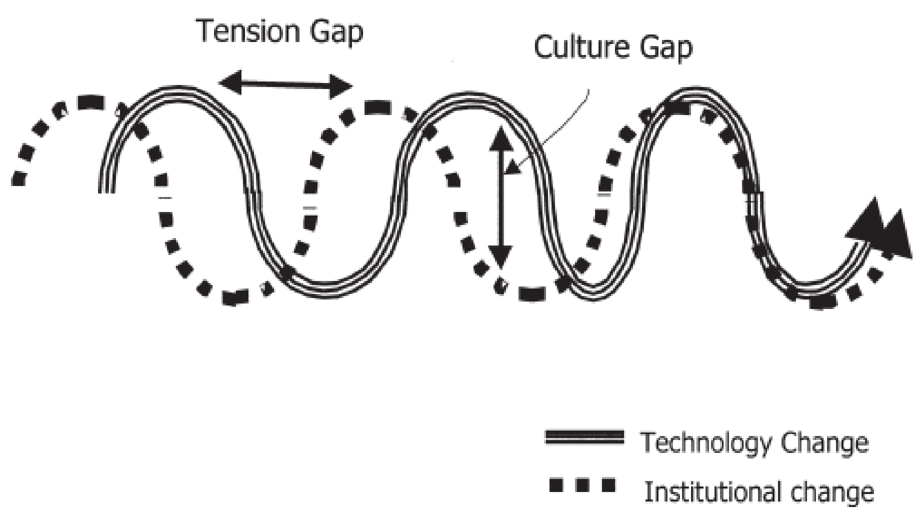
The Late Majority are referred to as the "Conservatives." These individuals are usually very pessimistic about the value that can be gained from investing in technology. They are very price-sensitive, yet very demanding about their expectations which are largely fueled by their skepticism.

The Laggards are referred to as the "Skeptics." These individuals are very conservative and tend to only purchase some form of technology if they are made to do so by someone who has authority over them. They are usually very critical of the technology and tend to seek out and focus on what is wrong with the technology or change.

In any organization there will be individuals who fall in every stage of technology adoption. Some faculty would be the first to get involved in utilizing the new technology while others would prefer to obtain some form of evidence that the technology can actually bring some value to their program (Moore, 1991). At this stage, the role of leadership is very important in establishing incentives to help alleviate anxiety and skepticism among faculty members. The rewards and recognition that can be offered to faculty can be through the form of supporting travel to conferences to present papers about their projects. In addition, there would need to be changes made to the budget to reflect resource allocations for technology projects (Owen & Demb, 2004). Support initiatives can also include providing support for peer mentoring and faculty institutes in order to engrain technology integration into the institution's overall culture and help to bridge the existing chasm in technology integration (Furco & Billig, 2002).

Figure 3

Technology and Institutional Change



Technology and Institutional Change (Adapted from Owen & Demb, 2004).

Figure 3 illustrates how an institution is transformed due to the integration of technology (Owen & Demb, 2004). They explained that the two curves illustrate the constant dislocation institutions experience when they engage in technological change. The second curve represents the organizational changes that occur when technological change is instituted. Both curves are always out of sync as technological change always outpaces the level of institutional adjustments, which in turn creates a permanent gap. Even though the gap is permanent its size varies throughout the change process. There are times when the gap appears to close as the organizational culture evolves to cope with the existing technology. However, as technology develops quite rapidly another gap will soon be created. The larger gaps reflect a need for intervention as they signify inconsistencies that exist between the institutional structures and the technology (Owen & Demb, 2004).

The Concerns-Based Adoption Model (CBAM)

Hall and Hord's (1987) Concerns-Based Adoption Model (CBAM) is a framework which provides the necessary tools for assessing, understanding, and managing a changed or reformed environment in general or a changed people in particular. The content of change incorporates having a new program or practice where tasks performed are quite different to what was done originally. However, the CBAM model deals more with the parallel process of change, where one assess the natural progression of stages individuals progress through as they interact with a new or different innovation. As a result of this, the CBAM model will be used as a means of assessing faculty's level of technology integration into their curriculum. The Concern-Based Adoption Model examines the change process in three very distinct ways:

(i) Stages of Concern

(ii) Levels of Use

(iii) Innovation Components

Stages of Concern

The Concern-Based Adoption Model highlights seven stages of concern that educators experience as they adopt a new practice. However, there are mainly four general categories of concern: Awareness, Self, Task, and Impact. Hall & Hord (1987) explained each stage in relation to the educator:

(i) *Awareness:* this is where the educator has very little concern for or involvement with the innovation

(ii) *Informational:* here the educator has developed some general interest in the innovation and has peaked interest in learning more about it.

(iii) *Personal:* at this stage the educators want to learn about how the innovation can affect them personally.

(iv) *Management:* at this stage the educators learn about the various aspects of the innovation as they focus more on information and available resources.

(v) *Consequence:* at this stage the educators focus on the impact of the innovation on their students.

(vi) *Collaboration:* at this stage the educators work together in order to effectively implement the innovation.

(vii) *Refocusing:* at this stage the educators consider additional benefits that can be had from the innovation other than the ones that are evident.

The CBAM's awareness stage, informational stage, and personal stage, deal directly with the individuals' feelings about the innovation and the impact it has on them personally. As a result there is a definite focus on oneself. By contrast the middle stage management changes the vision of the focus to the actual mastery of the tasks where the individuals are more accustomed to the innovation and using it has become more routine making it easier to organize their time. The upper Stages of Concern are more focused on the impact of engaging in the activity where it allows the individuals to become reflective practitioners and assess how the innovation has actually enhanced their lives as well as the lives of others. Table 1 which was adopted from Hall and Hord, (1987) Concerns-Based Adoption Model provides a depiction of the typical expressions of concerns that educators may have about an innovation (Hall & Hord, 1987).

Table 1

Typical Expressions of Concern about an Innovation

Stage of Concern	Expression of Concern
6. Refocusing	Is there anything else that's better?
5. Collaboration	It's working fine, but how do others do it?
4. Consequence	Is it worth it? Is it working?
3. Management	How can I master the skills and fit it all in?
2. Personal	How does this impact me? What's my plan to do it?
1. Informational	How does it work?
0. Awareness	What is it?

Stages of Concern-Based Model (CBAM) (Hall & Hord, 1987)

Levels of Use

The level of use stage deals with the various behavioral dimensions of change. It is in this stage that educators make some form of change in their classroom instructions as they transition from teaching in one way to teaching using the new innovation or method. It was often believed that once individuals decided to engage in a new practice they usually develop a standard routine in executing their tasks on a daily basis. However, CBAM research revealed that when individuals embark on a new venture they progress through various stages of mastery which cause them to alter their procedures as they progress through the different levels. Table 3 depicts the various levels of use of the innovation and the typical behaviors that individuals display at the various levels of use of the innovation.

Table 2

Levels of Use of the Innovation: Typical Behaviors

Levels of Use	Behavioral Indicators of Level
VI. Renewal	The user is seeking more effective alternatives to the established use of the innovation.
V. Integration	The user is making deliberate efforts to coordinate with others in using the innovation.
IVB. Refinement	The user is making changes to increase outcomes.
IVA. Routine	The user is making few or no changes and has an established pattern of use.
III. Mechanical	The user is making changes to better organize use of the innovation.
II. Preparation	The user has definite plans to begin using the innovation.
0I. Orientation	The user is taking the initiative to learn more about the innovation.
0 . Non-Use	The user has no interest, is taking no action in learning about the innovation.

Stages of Concern Model (CBAM) (Hall & Hord, 1987)

Innovation Components

Innovation Component deals with identifying the pertinent parts of a change and providing administrators with the necessary tools to address these changes through ongoing professional development sessions (Hall & Hord, 1987). In order to effectively develop innovative components of a new venture leaders of the innovation should formally and clearly outline how it can be used in the setting it was designed to change. Thus potential adopters will have a precise description of the necessary resources and the desired conditions that would be necessary for successful program implementation (Hall & Hord, 1987).

After these initial steps are satisfied then the identification of the critical components of the program can be developed. In addition, it would be important to provide samples of what each component would look like when put into practice. In the education setting for example, classroom practices, teacher, and student behaviors should be addressed and samples of the desired behaviors should be provided (Hall & Hord, 1987).

Abrahamson & Rosenkopf's Network Theory, (1997)

When individuals are faced with a new innovation they experience some degree of uncertainty with regards to its profitability to their current situation. When such uncertainty exists, users tend to subjectively derive their own outcomes as a result of adapting this new innovation. In addition, even the decision makers would weigh the potential advantages and disadvantages of utilizing the new innovation then make the decision as to whether or not it should be adapted (Abrahamson & Rosenkopf, 1997). Even though the new innovation might be beneficial to an organization or even make daily tasks much easier for employees, it does not guarantee one hundred per cent acceptance among employees. It is therefore necessary to analyze the reasons why some innovations are diffused more easily than others (Rogers, 1995).

Coincidentally, innovations go through three main bandwagon processes: increasing returns theories of bandwagons, learning theories of bandwagons, and fad theories of bandwagons.

Increasing Returns Theories of Bandwagons

This theory generally assumes that there is lack of ambiguity in the profitability of innovations. Therefore, potential adopters can make the decision to adopt the innovation based on the benefits that can be derived from using the innovation (Abrahamson & Rosenkopf, 1997). The Increasing Returns Theories advocate that as the number of adopters to the innovation increases its profitability also increases, which in turn causes more potential adopters to adopt (Katz & Shapiro, 1985).

Learning Theories of Bandwagons

The Learning Theories of Bandwagons incorporates incomplete information making the ability to determine whether or not the innovation is profitable a difficult task for potential adopters, causing them to choose to learn more about the innovation before actually adopting it. However, as more potential adopters adopt the innovation more information about its profitability is generated, thus allowing potential adopters to assess the potential profitability they can benefit from with the adoption of the innovation (Rogers, 1995).

Fad Theories of Bandwagons

Fad Theories of Bandwagons assume that information about innovations' profitability is ambiguous. In addition the theories assume that information about the innovations' profitability does not flow from early adopters to late adopters thus it does not affect their decision to adopt the innovation. Instead, it is the information about who has adopted the innovation as opposed to the innovation itself which causes more potential adopters to adopt the innovation (Abrahamson & Rosenkopf, 1997). Furthermore, there is a variation to this theory that suggests that when more potential adopters adopt an innovation it becomes accepted as the norm and those individuals who do not adopt the invention are looked upon less favorably, as a result they tend to adopt the innovation for fear of loss of authenticity (Meyer and Rowan, 1977, Abrahamson & Rosenkopf, 1993a, Wade 1995).

Framework for Sustainable Innovations

The framework for sustainable innovations' main aim is to provide a description of the various reasons that govern the existence and sustenance of a project or innovation (Billig, Sherry, & Havelock, 2005). In order for any initiative to be sustained there must be strong leadership, strong infrastructure, support structures, incentives, visibility, credibility, strong, mutually beneficial partnerships, macro-culture development, and sufficient funds (Furco & Billig, 2002).

Strong leadership is essential to the growth and development of any plan. Strong leadership inspires the development of shared vision, cultivates a sense of community, and motivates the desired action and commitment needed to seeing the innovation to fruition (Furco & Billig, 2002).

Strong infrastructure and organizational development epitomize a culture of support and strong human and fiscal management. In such a culture human interdependence and autonomy are simultaneously stressed so that the channels of communication can be available to help identify and understand ways of making improvements for the benefits of all involved (Furco & Billig, 2002). Sustainability is very largely dependent on the visible results that are produced by the innovation (Senge, 1990).

Support structures include clear directives aimed at the completion of assigned tasks, ongoing professional development to aid in skill achievement and retention, and ongoing reflection to garner insight on ways of improving the use of the innovation (Furco & Billig, 2002).

Incentives provide the means to attract people and secure their commitment to stay with the system for its duration. These incentives can be mainly of an intrinsic or extrinsic nature which is nurtured through the positive interdependence shared among participant, self-efficacy that is developed through prolonged engagement in the system, and an overall feeling of satisfaction as demonstrated through successful records of achievements (Furco & Billig, 2002).

Visibility is of uttermost importance as this is the main way that others can learn about a project or develop a better understanding of its purpose, benefits, and support efforts (Furco & Billig, 2002).

Credibility is represented by the valid documented evidence that supports claims of the success of the program (Furco & Billig, 2002).

Strong, mutually beneficial partnerships is characterized by the mutual support of participants who have a shared vision for program outcomes and very high regards for each other (Furco & Billig, 2002).

Macroculture development represents the norms, values, rituals, and symbols that help to promote the organization's unique identity and overall relevance (Furco & Billig, 2002).

Sufficient funds are usually generated from multiple sources with the aim of sustaining the use of the system over the desired period of time (Furco & Billig, 2002).

These multiple sets of factors associated with sustainability can be used to determine their applicability with technology integration at any institution. They can guide the way in which faculty use technology to support their curriculum and enhance faculty overall expertise in using technology in their classroom instructions.

Faculty Attitude towards Integrating Technology

Computer technology has brought about a noticeable change in the manner in which education is delivered to students. Through online learning, educators have the ability to communicate with students in an interactive learning environment designed to meet their individual needs. In addition, professors are able to effectively use data analysis to determine whether or not their teaching style is effective in individual classroom settings. In addition, online learning has also allowed students who were often too shy to communicate in a traditional learning environment to effectively collaborate with others (Sung Youl, 2009).

The use of technology is a relatively new phenomenon which has only been incorporated into some form of classroom instruction over the last 20 years. The first microcomputer was introduced in 1997 and this is when teachers began having more control over technology use in their classrooms (Becker, 2001; Robler & Edwards, 2000; Mehlinger, 1996). However, recently there has been a dramatic increase in the number of people utilizing technology in the educational field, yet there are issues that concern many in terms of appropriate use and the actual relevance of technology in the educational setting. Some of the issues that are of main concern to educators are the availability of adequate training, funding for technology to maintain adequate equipment, and the proper way of incorporating technology into their curriculum (Al-Bataineh & Brooks, 2003; Bryant, 2000).

According to Wang (2005), “Computer technologies have dramatically changed the way people gather information, conduct research, and communicate with others worldwide” (p. 38). Technology is becoming a permanent fixture in everyday living. This is also evident in the classroom as more students are entering college expecting for there to be some level of technology utilization in their classes, therefore perceived instructors’ overuse or underuse of technology can have a negative effect on students' overall performance (Turman & Schrodt, 2005). Many educators are quite critical about the haphazard way in which some instructors use technology which in their opinions yields little or no benefit for students (Witmer, 1998; Flanagin, 1999; Lane & Shelton, 2001). As a result of this increasing scrutiny, many college professors are faced with the task of effectively incorporating technology into their classroom instruction (Witt & Schrodt, 2006). Professors are therefore vigilant about finding the most appropriate technology for their classroom instructions. According to Sandholtz, Ringstaff, & Dwyer (1997), there are five stages of technology integration that educators employ in their classrooms: entry, adoption, adaptation, appropriation, and invention.

> Adoption stage teachers use technology for keyboarding, word process, or drill and practice software. Adaptation-phase teachers integrate new technologies into classroom practice and students use word processors, databases, graphic programs, and computer-assisted instruction. Appropriation-stage teachers begin to understand the usefulness of technology and students work at computers frequently as project-based instruction begins to take place. In the invention stage, learning becomes more students-centered as multi-disciplinary, project-based instruction, peer tutoring, and individually placed instruction occur (Mills & Tincher, 2003. p. 383).

History of Cyber Education

In the United States, cyber education came into existence in the 1970s. It became more popular in the 1980s, but really expanded in the 1990s. According to the National Center for Education Statistics (2001b), there was an increase in educational institutions' participation in web-based services from thirty-three percent in 1995 to 90 percent in 2003. There are evident trends in the evolution of today's education system according to a report by U.S. News and

World Report (2002/2003, cited in Yu-Feng, & Hien, 2007), who studied the advancements of the modern educational system. They found that individuals who enroll in online classes are quite different to those who enroll in traditional classes. Most traditional students tend to be between 18 and 23 years old and often began college classes immediately after graduating high school. On the other hand, online learners were people who had a career or a family and tended to be older with ages ranging from 35 years to 50 years. Differences also exist when comparing enrollment growth. It was found that traditional classes had been experiencing a 3 percent annual growth rate which pales in comparison to the 40 percent annual growth rate experienced by online learning enrollment (Yu-Feng & Hien, 2007).

Understanding and embracing technology can sometimes prove difficult for many people, therefore, in order to address the demand to effectively conceptualize computer mediated communication in education settings, social presence theory was developed by John Short, Ederyn Williams, and Bruce Christie. They extended this theory to incorporate media richness which assesses the extent to which multimedia technologies such as PowerPoint and video enhance the learning environment in comparison to lecture only instruction (Daft & Lengel, 1984). It is important for an instructor to be socially present in the classroom as this enhances students' optimal learning potential and incorporating the right type of technology into instruction helps to facilitate that learning (Witt & Schrodt, 2006).

Overall, faculty would like to incorporate technology into their instruction in very unique and innovative ways (Sumner & Hostetler, 1999), however there are several reasons why they embark on this venture, these reasons range from the need to reach their individual students' learning styles, to improve their classroom delivery, or to appear more tech savvy to their technologically advanced students (Witt, 2003). Research shows that incorporating technology into classroom instruction in an appropriate manner can increase student communication and afford students the opportunity to have experiences that are impossible in the traditional face-to-face classrooms (White & Fredericksen, 2000; Carrell & Menzel, 2001; Lim, Lee, & Hung, 2008). However, Lane & Shelton (2001) note, that many educators are embracing available technologies, but they are not taking the time to ensure that what they use are effectively meeting their students' educational needs.

Turman & Schrodt (2005) conducted an experiment reviewing four different levels of instructional technology in classroom sessions. They found that students enter the classroom with some expectation that their instructors will incorporate some form for technology and they tend to perform and respond better in classroom situations where some level of technology is utilized. This study also found that students also respond more positively to their instructors when they are allowed to interact with some form of technology during instructions as opposed to learning in the traditional classroom setting. On the other hand, where students expect some level of technology incorporation in the classrooms and there is no form of technology used, they tend to feel less positive towards both the course and the instructor.

There have been various models in place since 1960s to help determine the reasons why people stay in college and the reasons why there were so many dropouts (Nagasawa & Wong, 1999). Nagasawa & Wong (1999) used five categories to classify these models; (1) psychological models which determined that attrition is mainly the results of students' psychological characteristics; environmental models which emphasized the influence of social and political forces on students' behaviors; economic models which encompassed students' assessment of the economic cost of pursing an education versus employment; organizational models which placed students in the position as the decision makers as they compare institutions;

and interactional models which incorporated external (institutional, structural) and internal (psychological) factors that affect students. It is therefore imperative that faculty engage students in activities that not tap into their creativity, but also allow them to obtain marketable skills that can transfer to the workplace. Technology integration can be that vehicle of change (Ma, Wan, & Lu, 2008).

Faculty Use of Technology

E-learning

Yu-Feng, & Hien (2007), explained that e-learning is a means of delivering instruction to numerous locations away from the physical classroom or even the university site through various avenues such as audio, video, multimedia communications, and the computer. E-learning however can be used in conjunction with the traditional educational delivery methods. They note that learning through the integration of some form of technology ably satisfies the need for alternative forms of education. The main aim of technology integration is to effectively solve problems and increase knowledge in the learning environment. Through technology, students and instructors can move beyond the physical structure of the classroom to a more open atmosphere where students can prosper and thrive (Ma, Wan, & Lu, 2008).

Instruction that utilizes technology allows the instructor to improve their teaching process by affording their students the opportunity to utilize more modern skills with technology to achieve traditional learning objectives thus allowing them to become lifelong learners (Lin & Lu, 2010). Generally, there are many pedagogical benefits of online learning as students have flexible access to the course content which they can utilize at their leisure and from any location of their choosing. In addition, this is a very cost efficient alternative to the host institution as onsite accommodations would not have to be made for students who opt to take their classes online (Castle & McGuire, 2010). Even though this information is evident, many educators fail to utilize technology in their classroom instruction. Research has shown that there are several factors that influence whether or not educators will integrate technology into their instruction, these include the educators' knowledge, educators' backgrounds, educators' self-efficacy, available resources, and adequate professional development and training (Conrad & Munro, 2008; Morales, Knezek, & Christensen, 2008; Sitzmann, Bell, Kraiger, Kanarm, 2009; & Sung Youl, 2009).

According to Lim, Lee, & Hung (2008) "technology integration has been purported to be an impetus for educational reform; when using technology, students can be engaged in ways of learning that improve the meaning-making process" (p. 216). In addition, the demand for access to some form of post-secondary education is becoming increasingly significant. A large percentage of high school graduates are enrolling in college and it is projected that a large percentage of the size of the graduating class will increase by more that 20 per cent. Similarly, it is projected that the college enrollment will increase dramatically as the college age population increases (Morrison, 2003). The demand for education is exacerbated by a general shortage of postsecondary faculty members; the US Bureau of Labor Statistics estimates that the number of college and university faculty will need to grow by 16.6 percent during this decade to meet replacement and growth demand (Synder, Edwards, & Folsom, 2002).

Global Economy

In assessing the global economy one can surmise that Information Technology (IT) plays a major role in the types of employments that are available to the working population (Morrison, 2003). According to the US Bureau of Labor Statistics (2002) computer-related occupations will grow 86 percent from 2000 to 2010. Consequently, it reports some 95 percent of the workforce will soon need to use some type of information technology in their jobs. In an attempt to respond to the emerging free trade initiative, business organizations are constantly downsizing and restructuring their companies in order to adapt to an increasingly competitive global economy (Morrison, 2003). The demand for access to higher education is increasing in not only the US but also in mature industrial democracies around the world. Morrison (2003) surmised "when we combine this demand for higher education from youth with the growing need to retrain employees mid-career, we can confidently assume that the existing labor-intensive, bricks-and-mortar campuses will not have the resources (physical or financial) to meet the demand" (p. 7). This therefore has implications for colleges and universities to expand their IT tool via online learning, which will enable them to effectively educate more students without building more physical structures. This is indeed critical as there is a need for professors to not only prepare their students for success in the global market, but also engage them in self-directed learning (Morrison, 2003).

Furthermore, IT has a major effect on individuals' lives and will have increasing impact in the future (Morrison, 2003). According to Yu-Feng, & Hien, (2007) the power of computer technology effectively doubles every 18 months, while the price of technology decreases at the same rate. In this report San Jose state University School of Library and Information Science was highlighted and the numerous changes and advancements that have been made in order to embrace technology were discussed in great detail. The author described one professor who used an online 3-D virtual world as a main staple in his classroom. In this example the professor is in avatar form and conduct classes. This course is taught using Second Life, an online 3-D virtual world created by San Francisco-based Linden Lab. As a result, there has been a marked increase in students' participation and success in this course as opposed to when it was taught in the traditional classroom. The report further noted that many Ivy League universities such as Harvard Law School and Princeton University have bought their own digitally designed islands and conduct classes that a Second Life user could attend.

Impact of Technology Integration

Morrison (2003) explained that information technology has a major effect on individuals' lives and will have an increasing impact in the future. Proponents of advancement in technology in higher education postulate that in cases such as natural disasters, the virtual campus would still be intact and students in various areas of the world could still assemble in the virtual conference room and have some real-time communication (Yu-Feng, & Hien, 2007). Furthermore, it is believed that this is an effective teaching tool because it provides a social laboratory for experimentation in role-playing, simulations, exploration, and experimentation in a virtually risk-free environment. In order to meet the extraordinary demand for access, colleges and universities need to expand their online learning classes, which will enable them to teach more students. Similarly, students are given the opportunity to interact with people around the world, which also provides the opportunity for education about other cultures (Morrison, 2003).

In addition, the Internet and World Wide Web are becoming vital tools in every institution of learning; online learning is already affecting the lives of many individuals through interventions in their patterns of learning. Online learning allows the learner to independently acquire information and interact one-on-one with instructors in an enhanced learning environment; it offers the means to considerably alter the structure of education as we know it today. Simultaneously it rapidly improves educational attainment levels in developing nations and regions of the world (Bain & McNaught, 2006).

Despite the many advantages that both students and educators enjoy, the online learning can be very difficult to design. Thus, as a result there are many difficulties that can be had from an online learning experience. The online learning has indeed revolutionized education and not only were the educational institutions, but also technology firms which work untiringly to meet the demand for software that would aid in enhancing learning in the online environment.

According to a study by the research firm IDC, in 2004 over $7 billion was spent developing the online market, and this number was expected to drastically increase by 30 percent during the succeeding four years. It is believed that the introduction of broadband Internet helped to fuel the demand for online education as this type of technology proved more reliable in accommodating the demands for technological content that incorporated technology. Even though online learners enjoy many advantages of their classes' design, the main advantages they enjoy are based on time management and the actual flexibility that it affords students in addition to the feeling of equality in the learning environment. This is based on the notion that online individuals can share their ideas in an atmosphere that does not focus on their gender, ethnicity, or level of overall experience. Moreover, online learners can also simultaneously manage multiple responsibilities, such as parent and full-time employee while being a student. These roles are all individually time consuming, therefore being provided with the opportunity to meet the demands of their jobs while spending time at home with their families and learning in their own homes is quite beneficial to the learner (Yu-Feng, & Hien, 2007).

Online Instruction

According to Yu-Feng & Hien, (2007), online instructors reported that there are many benefits that can be derived from online instructions. They explained that in fact students performed better and experienced deeper more meaningful interaction with their instructors in an online environment. They also expressed that students who attended on-line sessions on a regular basis were more involved in their learning than in-class students. On the whole, this attitude toward education often leads to higher learning and better grades. This is due in part to their desire to improve themselves or to enhance their employability skills through educational attainments.

In addition, the course materials and online instructions were also quite beneficial to online students as there is an evident lack of face-to-face contact between students and instructors, the constant online instructor availability provides a more amenable alternative. Even though instructors often have to devote more time preparing online course materials for their online students than they would their traditional students, they still feel a sense of accomplishment as their online students tend to exert more effort and display more self motivation in their learning (Witt& Schrodt, 2006). On a whole, many strides have been made in online education today, as it can now be viewed as a seamless educational resource that knows no boundaries in terms of time and geographical location (Yu-Feng, & Hien, 2007).

Benefits of Technology Integration

Lim, Lee, & Hung (2008), explain that research is not very clear about why some educators become quite versed in utilizing technology in their classrooms as opposed to others, yet there is a very large amount of research charting the successes of educators that incorporate technology into their instruction. Interestingly, technology integration allows students to use technology as a tool to enhance learning as opposed to technology being the source of their learning. White & Fredericksen (2000) note that by using technology, educators can utilize various methods to communicate their curriculum to their students to meet their individual learning needs and this approach to education is highly supported by research. Furthermore, they added that using technology in the classroom can aide students in concept formation and in constructing meaning for themselves from the information that is presented. Through this method of instruction students are able to utilize their thinking skills in making meaning of abstraction while tapping into their prior knowledge to make necessary connections between their personal lives and their learning.

Leadership Role

Leaders play a critical role in improving employee performance which is fostered by employee engagement. In order to fully understand the framework for engagement the role-based model of performance is introduced. This model highlighted five specific roles that employees engage in at work and it explained the links between these roles and improved firm performance which is due in part to employee engagement. It is important to know the relationship that exists between employee behavior, firm performance, and the workplace dynamics resulting from the ways in which leaders are running the organization. This analysis helps to determine how critical engagement is to the organization (Welbourne, 2007).

Many case studies concentrate on employee attitudes such as absenteeism and customer service scores when determining efforts to improve employee engagement. However, it is necessary to look at employee behaviors in addition to employees' attitude. For this reason a role-based model approach is needed. The role-based performance model helped to explain employee engagement by starting with the end goal in mind. The model identified five key behaviors needed from employees to drive performance. Core job-holder role focuses on the employees' job description. Entrepreneur or innovator role looks at ways of improving process by coming up with new ideas and participating in others' innovations. Team members' role involves having employees participate in teams and working with others in different jobs.

Career role involves learning, engaging in activities in order to improve personal skills and knowledge. Organizational member role entails doing things that are good for the company (Welbourne, 2007).

Employees' involvement in non-core job roles which results in new ideas, improved process, enhanced product lines, more skilled employees, higher service levels, and career movement within the organization is of uttermost importance. In order to create an environment where employees are successful in both the core jobs and the non-core jobs it is necessary for leaders to be successful in both their core and non-core jobs. Similarly, leaders need to clearly express how each role aids in support of business strategy and plan. Leaders also have to create an environment where the non-core job roles are valued, and all barriers to the employees are removed in the non-core job roles (Welbourne, 2007).

Self-Efficacy

Bandura (1997) defined self-efficacy as "the belief in one's capabilities to organize and execute courses of action required to produce given attainments" (p. 3). It is generally believed that individuals with high self-efficacy find it easier to participate and put forth the necessary effort whether or not the task is challenging (Bandura, 1997). Therefore, it is important for faculty who want to successfully integrate technology into their curriculum to embrace a sense of belief that they can actually utilize the technology with a high degree of success. Moreover, Hsieh, Sullivan, & Guerra (2007) noted that individuals perform better when they believe they are capable of successfully completing a task. (Chemers, Hu, & Garcia, 2001) noted that "confidence in one's relevant abilities and optimism play a major role in an individual's successful negotiation of challenging life transitions" (p. 55). Similarly, (Allen, 1999) posited that motivation and the desire to successfully achieve goals greatly influenced achievement. According to Fashola & Slavin (1998),

> The significant problem that institutions face is to create programs that assist the diverse population of students that would assist them in making the decision to graduate from college. In general, successful programs emphasized creating meaningful bonds between students and teachers, connecting students to an attainable future, giving the students opportunities to work while in school, providing academic assistance, and giving students high-status roles in the school (p.1).

However, Zeidenberg (2008) believed that there are some promising strategies that can help to increase self-efficacy. He noted that the learning community can improve self-efficacy where a number of individuals meet on a regular basis to exchange ideas and work on problems in a nurturing environment. This he believed creates a sense of teamwork that can promote motivation and success. Faculty members' practices can have a very profound impact on student behavior in the learning environment. Students have a number of expectations about their interaction with faculty members and if these expectations are not met it can lead to an increase in student dropout rates (Edwards, Cangemi, & Kowalski, 1990).

Some students lack the knowledge of how to be successful in college (Zeidenberg, 2008). He explained that sometimes these students might be the first to attend college and had no prior teachings about college life from significant people in their lives. Further confusion may be presented when they have to interact with the faculty and utilize available college resources, for example, tutors, labs, and the library. Zeidenberg (2008) explained that this can be a tumultuous experience as they might have problems finding a balance between school life and personal life. Thus, the resulting factor is a decrease in motivation and self-efficacy. If faculty members utilize various strategies in their teaching methods, they will more likely to cater to the individual needs of all of their students which in turn can help to combat the dropout rate (Wellman, 2003).

According to Bandura (1997) self-efficacy gravely impact choice of activities, effort, and persistence. Elements of successful college life incorporate academic planning, family involvement, college counseling, and academic and financial support; however there are barriers that prevent some students from attaining these basic components (Raley, 2007). Jacobs (1989) noted that faculty members should be actively involved in curriculum planning in order to determine what should be taught as well as what should be eliminated from the curriculum. He further explained that the education curriculum is designed in such as way that it is seen as fragments of what a student needs to complete in order to achieve academic success. Instead, education should be an interdisciplinary approach to the curriculum which has built in links of knowledge from one discipline to another. However, if the faculty member is uncomfortable with some new educational phenomenon that could help to bridge the gap between faculty and student they will opt not to incorporate it into their curriculum and continue instructing in the traditional manner (Harris, Misra, & Koehler, 2009). However, some faculty explained that the reason why they have chosen not to integrate technology into their instruction is because it is a relatively new phenomenon that can prove problematic in the long run (Stella & Gnanam, 2004).

Concerns about Technology Integration

Many educational institutions are plagued with an increased numbers of students who cheat on assignments (Patry, 2009). This has caused many frustrated instructors to try to devise ways of combating this problem. Many believe that increased academic dishonesty is mainly a result of the varied advancements in technology. Levy & Rakovski (2006) define academic dishonesty as any cheating that occurs in an academic setting. They explain that this can be plagiarizing, falsifying information, or giving and receiving information without acknowledging the source. The question is who is to blame for the increase in academic dishonesty cases at educational institutions? Some firmly believe that the internet is a major contributor to students' cheating, while some assert that there are many other factors that existed before the internet that have contributed to academic dishonesty (Plair, 2008).

There have been significant changes in American higher education in terms of the way colleges and universities are organized and function (Plair, 2008). This change can be attributed to the combined forces of economic restructuring, demographics, globalization, and the advancement in information technology (Doering, Hughes, & Huffman, 2003). It is believed that in the future these forces, will lead institutions of higher learning to adopt new concepts of educational markets and organizational structures (Harris, Misra, & Koehler, 2009). Effectively incorporating technology into the curriculum has become a main issue of concern for many education professionals. According to Plair (2008), in order to effectively integrate technology into instruction there must be clearly defined objectives with measurable ways of assessing whether or not these objectives were met.

Academic Integrity

Through the advancements in technology, students are no longer restricted by geographical location; therefore accessing information can be as simple as turning on a cell phone (Moody & Kindel, 2004). This easy access to technology has resulted in a great increase in plagiarism cases at educational institutions (Bracey, 2005). Despite this increase in plagiarism, it is important to note that plagiarism existed prior to these technological advancements (Morling McAuliffe, Cohen, & DiLorenzo, 2008). As opportunities for academic dishonesty increase so does the need for educational institutions to become more vigilant in addressing this problem. The computer age has created the avenue to make the means of cheating more creative and attractive. However, it is important to note that sometimes students are guilty of cheating simply because of ignorance of what constitutes plagiarism (Ma, Wan, & Lu, 2008).

Challenges in Addressing Academic Integrity

Prior to the influx of technology there was only a small percentage of students who were found guilty of academic dishonesty and students also had very limited means to successfully cheat on any assignment (Levy & Rakovski, 2006). Interestingly, it was very difficult for instructors to detect cases of cheating as they lacked the necessary tools to effectively verify whether or not submitted assignments were plagiarized (Keller & Bichelmery, 2004). Ma, Wan, & Lu (2008) believe that students were once concerned with their instructors' perceptions of them; therefore they strived to obey institutional rules and guidelines. However, this attitude is not as prevalent in today's students as there appears to be a deterioration in societal ethics which have altered students' perception of academic integrity (Bracey, 2005).

Furthermore, many students believe that cheating is an inescapable part of the academic process as instructors assign too much work in proportion to students' available time (Patry, 2009). Moreover, some instructors have no desire to attain the necessary technological skills to help them gain awareness of the various ways technology can aid in cheating on assignments (Stella & Gnanam, 2004). Some instructors are adamant about not learning how to use existing technology; therefore, they are not completely absolved from responsibility when it comes to the ease in which students are able to use these means to cheat on assignments (Harris, Mishra, & Koehler, 2009). If students are using technology to cheat and instructors refuse to adapt strategies to combat this escalating problem, then the instructors and not the technology is partly to be blamed for the behavior (Plair, 2008).

In addition, some instructors have had the occasion to catch students cheating or even have evidence that a student may have plagiarized a paper, and all they do is simply ask the students to refrain from such behaviors without actually punishing the student for the behavior (Harris, Mishra, & Koehler, 2009). On the other hand, there are instructors who continuously receive professional development training in technology integration and adopt policies to address cases of academic dishonesty within their classrooms (Doering, Hughers, & Huffman, 2003; Plair, 2008). Despite the instructors' efforts, some students are more knowledgeable, skilled, and have more access to very sophisticated technologies; therefore they can easily find avenues to cheat on assignments without their instructors' knowledge (Harris, Mishra, & Koehler, 2009).

Equally important, is the fact that many students are found guilty of plagiarism, but their intention was not to deceive their instructors, instead they simply lack the skill of effectively citing the documents used to obtain the information (Devlin & Gray, (2007). To further compound this issue, there are an increasing number of entrepreneurs who view the students' demise as a perfect market to peddle their services by providing them with completed papers and help on projects for a pre-determined price (Stella & Gnanam, 2004). Regardless of the source of information, there is a desperate need to develop plans and implement policies that effectively deal with the issue of academic dishonesty.

Combating Academic Dishonesty

Patry (2009) conducted a study and found that many instructors are using handheld digital responders as a means of incorporating technology into their instruction. However, he noted that because of large class sizes some instructors are also using this technology to quiz students on concepts taught. Interestingly, results showed that students have found ways to use these handheld devices to cheat on their quizzes. To address this problem, Morling, McAuliffe, Cohen, & DiLorenzo (2008) suggest using different versions of the same examination when using digital responders as a way of reducing cheating during quizzes.

In discussing cases of plagiarism, Ma, Wan, & Lu (2008) propose using anti-plagiarism software when students submit assignments. In this way the instructor will use technology to identify cases of academic dishonesty by simply asking students to submit an electronic copy of their papers and run it through the anti-plagiarism software to check for instances of plagiarism. When students are aware that there are academic honesty policies in place and that their instructors will ensure that these policies are honored, this helps to reduce the number of dishonesty cases that may arise during the school year (Levy & Rakovski, 2006).

We live in a very competitive society where there is a great focus on achievement, without much regard for the skills that determine the level of achievement (Doering, Hughes, & Huffman, 2003). This is even reflected in students' attitudes towards cheating. According to Ma, Wan, & Lu (2008), some students are more focused on the end result, and therefore the process involved in achieving a goal almost pales in comparison to successfully achieving the goal. Therefore, getting a good grade on an assignment neutralizes the guilt from cheating to get that grade.

Some students view cheating as something that happens on a regular basis; therefore, it is almost acceptable behavior among their peers. It is important for instructors to cultivate a culture of ethical behavior to help combat the increasing academic dishonesty cases (Harris, Mishra, & Koehler, 2009). In order to effectively accomplish this task, institutions will have to do more than simply mention academic dishonesty at the beginning of class and never revisit the issue until a student is in violation of the rules. Instead, there is a need to develop an ethics rich culture within the institution. An ethics rich culture requires constant displays of the behavior that one wants to be modeled in order to foster acceptance and compliance from key players (Ugar, Martindale, & Crawley, 2007). To effectively address academic dishonesty the institution has to use data to drive decisions. Therefore, incidents of academic dishonesty should be recorded on a regular basis and reviewed to determine if there is a recurring trend in the type of violation to help in the modification of the institution's policies and procedures (Harris, Mishra, & Koehler, 2009).

Impact of Academic Dishonesty on Current Educational Practices

For many institutions the most common form of academic dishonesty is plagiarism (Ma, Wan, & Lu, 2008). Park (2003) defines plagiarism as "a form of cheating or academic malpractice, which also includes cheating in examinations, fabrication of results, duplication, and false declaration" (p. 472). Interestingly, there has been a steady rise in plagiarism cases; therefore, some instructors have very strict rules that address plagiarism with clearly outlined repercussions for violating these rules. In addition, educational institutions are ensuring that there are clear definitions of the various types of behaviors that are considered dishonest in an educational setting by restructuring academic policies and designing holistic and supportive institutional frameworks (Levy & Rakovski, 2006).

Likewise, some institutions are being proactive in deterring intentional and unintentional plagiarism by aiding students in acquiring the skills needed to meet assessment requirements and creating and encouraging an educational culture that promotes and supports academic integrity (Ma, Wan, & Lu, 2008). According to Bracey (2005), institutions are endorsing the use of plagiarism detection tools to help combat cheating on assignments. Students are also held accountable for the work they submit by having to provide evidence of how their individual projects or coursework was created. Above all, instructors are encouraged to effectively manage large classes by following procedures that are in place which focus on the values underpinning academic integrity and punish students who do not comply with these values (Stephens, Young, & Calabrese, 2007).

In the same way, instructors are providing students with examples of effective note-taking, summarizing, and paraphrasing skills that preserve the link between the sources of the information (Devlin & Gray, 2007). In fact, instructors are managing cheating in the classroom by giving students more meaningful assignments and being more respectful of students' views. It is believed that students are usually more comfortable in these environments and tend not to cheat because it shows lack of respect for someone who respects them (Doering, Hughes, & Huffman, 2003). In addition, many instructors are participating in technology literacy workshops and professional development activities (Livingston & Condie, 2006). Interestingly, instructors often remind students of their expectations before administering a test or assignment. Some instructors are also using higher level questions on their tests or assignments which aid in reducing the opportunities for students to engage in academic dishonest behaviors (Doering, Hughers, & Huffman, 2003). Also, some instructors have very specific rules about using electronic devices such as cell phones and iPods during classroom instruction time (Harris, Mishra, & Koehler, 2009).

Future Outlook on Academic Honesty Future Prediction

There are many speculations made as to who is to blame for the increase in academic dishonesty cases on college campuses. Some researchers firmly believe that the internet is a major contributor to students' cheating while others assert that other factors such as the change in societal ethics and uncaring technology illiterate instructors are contributing to the rise in academic dishonesty cases (Harris, Mishra, & Koehler, 2009). However, despite the various assumptions about who is to be blamed for the increase in academic dishonesty, everyone agrees that it is a problem that needs to be alleviated. In order for this to be done effectively many changes need to be made within the educational setting to promote and support this venture.

Academic dishonesty undermines the learning process and leaves instructors unaware of their students' limitations, which makes it almost impossible for them to provide these students with the help they need. Similarly, it hampers students' creativity and critical thinking which reduces the value of their education (Plair, 2008). Research shows that students believe that it will always be possible to cheat, because some instructors are afraid of technology (Harris, Mishra, & Koehler, 2009). This implies that one of the requirements for future instructors will be to have some form of technology skills and to engage in ongoing professional development that is geared towards helping them in becoming more technology literate. If instructors are educated about the various ways technology can aid in academic dishonesty then they will be more apt to recognize instances of such occurrences.

Similarly, research shows that academic dishonesty policies are often discussed with students at the beginning of the semester (Devlin & Gray, 2007). Students simply view these policies as directives; therefore they are somewhat impartial to whether or not they are followed (Keller & Bichelmeyer, 2004). In the future, even if there is a general university policy that addresses academic dishonesty, individual classes should devise their own policies with the help of the students. When students are viewed as competent by others in authority they tend to start seeing themselves in that manner (Devlin & Gray, 2007). Therefore, having students be a part of the team that create academic dishonesty policies will be quite beneficial as they will tend to feel more a part of their learning environment and resist behaviors like cheating that would negatively impact their institutions. To aid in this effort, instructors will be required to regularly integrate academic policies into their lessons.

Finally, at the rate in which technology changes, one can anticipate an increase in plagiarism detection devices to help identify cases of academic dishonesty. However, there will also be programs that would alter documents so that plagiarism detection software will not be able to identify any evidence of plagiarism. Thus, instructors will be required to make research assignments more narrow and effective where students will have to provide conclusions, make comparisons, or recommend solutions which would require original writing that calls for higher order thinking. Finally, despite the many views on the cause for the increase in academic dishonesty it is necessary for the institution as a whole to work together to effectively eradicate this problem.

Professional Development

Professional Development Model Center for Technology School Change (CTSC)

There are instances when it is necessary to foster change in educational institutions. Making such changes is not an easy feat as one has to take into consideration educators' individual beliefs, classroom practices, and they ways in which they utilize available resources. Therefore in order to address these three concerns there must be careful consideration made for individuality through professional development and the creation of a solid supportive environment. In addition, in making changes in any educational community that institution must be ready for such transformation to take place and consideration must be made for the role technology will play in the actual transformation (Fullan, 2001). To successfully integrate technology there must be an explicit link between teaching and learning; however, this link is rarely acknowledged in available literature (Christensen, Griffin, & Knezek, 2001). Teaching practices provide the link between successful curriculum reform and student outcomes, therefore it is necessary for educators to be meaningfully involved in professional development that is geared towards technology integration (Gallimore & Stigler, 2003).

Design Perspective for Integrating Technology

In order to effectively integrate technology into instruction there must be measures in place to help teachers engage to utilize the resources to actively engage their students in the learning process (Meier & Budin, 2001; Meier, Swan, Jennings, & Rubenfeld, 2001; Meier, Swan, Jennings, & Rubenfeld, 2003; Meier & Horton, 2005). Teaching with technology and learning with technology are two different phenomena; teaching with technology incorporates using technology as a conceptual tool to engage students in learning that involves analyzing, synthesizing, and evaluating the knowledge (Honey, Culp, & Spielvoge, 1999). In order to engage students in such a manner, the educator would have to move beyond the traditional paradigms and tap into students' higher order thinking skills. More importantly, professional development can help educators design assignments that meet their individual students' needs.

Classroom Design Perspective in Working with Technology

Situational Perspective

This theoretical element recognizes the value of the learning process (Meier, 2005). Putnam & Borko, (2000) explored the situated perspective's views on professional development, they analyze how professional development can expand the view of knowledge to incorporate the ways in which knowledge is viewed as social in nature, relative to the situation, and it is nurtures the entire person. Situated learning incorporates socializing the individual in such a way that it brings about a desired change "individuals' use of knowledge as an aspect of their participation in social practices" (Borko, 2004, p. 4). Putnam and Borko (2000) explain that two important aspects of learning are what is learnt and the situation in which the learning took place. Therefore, it is important to provide professional development that would afford educators the opportunity to model the behavior in their own classrooms, but has support system in place to assist them with implementation (Meier, 2005).

Developmental Orientation

Developmental orientation deals with the educators been portrayed as learners as they scaffold their technology integration training and learning (Meier, 2005). Technology related professional development incorporates more than simply teaching educators how to use the computer instead it is an ongoing opportunity to organize their knowledge about various elements of the computer with the aim of satisfying their daily circumstances (Wang, 2002). It is important to view technology integration as more than just computer application it also entails knowledge and understanding of the educator's content area which is heightened with ongoing professional development activities (Cochran-Smith & Fries, 2001).

Transformational change associated with technology can be very disruptive for faculty than change without the utilization of some form of technology. Changes that occur within the organization as result of changes in technology impact people both personally and professionally (Owen & Demb, 2004). At the personal level, there are dramatic differences among people when it comes to their degree of comfort in dealing with technology. At the professional level, the nature of transformational change require some alterations to the existing cultural assumptions, roles, norms, and values which could cause faculty member to experience some tension in coping in an environment where their level of control has been altered (Furco & Billig, 2002). These dynamics increase the importance of the need for maximum participation to engage talent and expertise in guiding the change process and increase faculty buy-in (Owen & Demb, 2004). Having faculty participation will help to increase their perception of their level of control which can affect whether or not they engage with or resist the new innovation (Rogers, 1995).

Owen & Demb (2004) noted that there will be institutional and professional tensions with technology use as faculty are being asked to change from their well-established way of instructions to adopting something new and in their opinion potentially unstable. As a consequence, institutional cultures are not easily changed, they simply shift at a glacial pace which tends to conflict with the new modes of interaction Wade 1995). The unpredictable changes in the potentials of the new technologies can generate anxiety among decision makers as they attempt to select the most effective technology options (Rogers, 1995). This can also cause frustration among users who experience problems with staying current with the ever-changing hardware and software options (Abrahamson & Rosenkopf, 1997). As institutions engage in true innovations the chances for problems to arise increases as there are usually few role models to consult especially if it is relatively new technology. This is often coupled with institutional obstacles and individual efforts to undermine the change process which create barriers that further exacerbate the underlying feelings of uneasiness (Owen & Demb, 2004).

Integrating technology may require a need for campus-wide classroom renovations to install more favorable media rich classrooms. Therefore, this may be met with tensions created from uncertainty about technology's impact on improving student learning outcome. However, in order to assess whether or not technology integration is advantage to student learning outcome, the institution has to invest in technology in order to gather the necessary data to evaluate the effectiveness of the experiment (Chickering & Gamson, 1987). Regardless of the method of choice, technology is indeed becoming a necessary means of education that is quite unmatched by the traditional method of content delivery (Ma, Wan, & Lu, 2008).

CHAPTER THREE

Methodology

Introduction to the Study

There is considerable change in American higher education in terms of the way colleges and universities are organized and function. This change is as a result of the combined forces of economic restructuring, demographics, globalization, and the advancement in information technology. It is believed that these forces will be the driving force behind academic institutions' decision to adopt new conceptions of educational markets, organizational structures, including how and what they teach (Morrison, 2002). Utilizing a survey methodology in conjunction with multiple linear regressions and chi-square analyses, this study seeks to investigate faculty attitude towards the availability of technological resources, faculty support, program readiness, and faculty perception of professional development opportunities affect selected higher education faculty and teaching staffs' decision to integrate technology into their regular teaching instructions.

A review of related literature provided a wide variety of issues surrounding integrating technology into instruction, faculty attitudes towards technology integration, faculty overall use of technology in their instruction, and the faculty professional development needs with regards to effectively integrating technology into their curriculum. Even though the literature provided extensive information on these factors there is no adequate amount of information that deal with how these factors interact with each other and how they can influence faculty's decision to integrate technology.

This chapter covers: research design and rationale, sample participants, data description and collection, instrumentation, pilot testing, data analysis, concerns for internal/external validity methodology.

Research Questions

The following research questions will guide the investigation of this study:

1. Do professional development opportunities affect college faculty efficacy and practice of incorporating technology into their instruction?
2. What are the characteristics of faculty members that are incorporating technology into their instruction (i.e. age, gender, technology expertise, and academic rank)?
3. Do professional development opportunities affect college faculty attitude towards incorporating technology into their instruction?

In order to address the above questions, the researcher generated the following six hypotheses:

1. The majority of the faculty members are integrating some form of technology into their teaching practice.
2. The majority of the faculty members are willing to learn more about strategies to incorporate technology into their instruction.
3. There is a relationship between faculty's demographics (age, gender, academic rank, tenure status) and their level of technology integration.
4. There is a relationship between faculty's members' beliefs and attitudes towards the effectiveness of technology integration and the level at which they have incorporated technology.

5. There is a relationship between faculty’s efficacy and behavior toward technology and their level of technology incorporation.
6. The availability of technology, technical training, and support through professional development opportunities has a direct impact on faculty’s adoption of technology integration.

Research Design and Rationale

In order to effectively examine the research questions the researcher utilized a survey research methodology using some of Auburn University’s teaching faculty as its targeted sample. Surveys are usually assigned to a selected number of respondents and are under the active control of the researcher (Schlueter & Schmidt, 2010). Online survey allows researchers to easily collect data of a sensitive nature which involves hard-to-reach populations (Alessi & Martin, 2010). In fact, survey research and especially online research allows researchers the opportunity to gather large amount of data in the most accurate way possible (Taylor, Bremer, Overmeyer, Siegel, & Terhanian, 2001).

Survey methodology, has become increasingly successful and Andrews, Nonnecke, and Preece (2003), outlined that the main reasons why survey methodology is so successful are: researcher credibility is established as the researcher has to disclose the purpose of the study and the procedures that are involved in selecting the sample. In essence, this solidifies researcher credibility as there is also mention of confidentiality in sharing respondents’ information. The Independent Variables for this study are the professors’ beliefs about professional development opportunities and their knowledge and experience about computers. The dependent variable for this study is faculties’ incorporation of technology.

The population for this study was faculty members from seven colleges and schools at Auburn University: the College of Agriculture, the College of Business, the College of Education, the Samuel Ginn College of Engineering, the College of Liberal Arts, the Harrison School of Pharmacy, and the College of Sciences and Mathematics. Auburn University's vision incorporates the effectiveness of its research and outreach programs and the broad access to the University provided through the innovative use of information technology. The study is limited to these schools and colleges in order to assess the ways in which departments are operating within the school's vision.

Sample Participants

The survey for this study was administered to the fulltime and part-time teaching and staff from seven colleges and schools at Auburn University; College of Agriculture, College of Business, College of Education, Samuel Ginn College of Engineering, College of Liberal Arts, Harrison School of Pharmacy, and the College of Sciences and Mathematics, with the approval of the researcher's research team. Auburn University is a public university, with an enrollment of 25,078 students. Currently, Auburn employs 1162.82 full time faculties for their 13 colleges and schools (Auburn Common Data Sets, 2010). Participants were selected on a voluntary basis and were not compensated for their participation. Every faculty members in the selected departments who have some form of teaching responsibility at Auburn University during fall 2010 were sent an email directing them to an online copy of the survey. According to Office of Information Technology at Auburn University (2010), one of Auburn University's institutional goals for information technology is to encourage and support faculty and students to use information technology in teaching and learning.

Stevens (1996) noted, that fifteen participants per independent factor represents a reasonable sample size that would yield a large effect size of .80, therefore a minimum of seventy-five participants is necessary to satisfy five independent variables. On the other hand Abrams (1999) suggested that 20 participants per independent variable is an appropriate for a sample size. Therefore a minimum of 100 participants would be required for five independent variables. In this study, 212 faculty members responded to the survey.

Data Description and Collection

Authorization to conduct this study was obtained from Auburn University Institutional Review Board. The sampling process for this study was conducted in the following phases:

Phase I: Seven colleges and schools were selected ensuring applied science, social science, and exact science. This list was obtained from the organization's website. The deans of every department (n=7) were contacted by mail with a request for permission to conduct this study with their teaching faculty members. In addition, a description of the proposed study and a copy of the actual survey that would be administered to faculty members were also included with this correspondence (See Appendix A). The introductory letter sought permission from the individual deans to have their faculty members participate in the study. Also, deans were asked to return a signed approval or disapproval of the study to be conducted (See Appendix B); a self addressed stamped envelope was included for ease of response.

Phase II: one hundred percent of the deans of the colleges and schools approached agreed to participate in the study (n=7) available email addresses for some faculty members in each area was obtained from the institution's website. A database was developed and utilized to aide in disseminating surveys to individual faculty members.

Phase III: teaching faculty members at each college and school (n=514) were sent emails inviting them to participate in the study (See Appendix C) along with a link to the survey. The invitation letter specified that participation in the study was completely voluntary and if they chose to participate they could click on the link provided in the email. After clicking the link in the emailed participants were routed to an information letter which gave further details about the study and they were further instructed to click on the link in the letter which then took them to the survey (see Appendix C). The information letter explained that if they wished to participate they could click on the link that took them to the survey or they could simply close their browser if they did not wish to participate. Furthermore, participants were assured that no identifiable information such as names or Internet Protocol (IP) addresses were recorded in order to protect participants' anonymity and privacy.

Some deans allowed the researcher to send them a copy of the information and the link to the survey and they distributed the surveys to the faculty members. Other deans guided the researcher to their departments' website where the information was readily accessible. The survey was designed using Kwik Surveys which is an online tool that aids in building surveys and analyzing the data and also host and code the survey data. As participants completed and submitted their online survey, their responses summary data were immediately available for reviewed. Data was then downloaded from Kwik Surveys and further used for statistical analysis using Statistical Package for the Social Sciences (SPSS).

Response Rates

Within five days of distributing the survey to faculty members there were 212 faculty members' responded to the survey this number adequately satisfied the desired sample size requirement. As a result, there was not a need to send follow-up communication reminding faculty to complete and submit their survey responses. The main strategies I employed to increase response rate included (1) allowing participants to realize the extrinsic reward they will experience by assisting educators and university leaders in developing resources to help faculty members integrate technology into their curriculum, (ii) seeking the support of individual deans of each college and school to encourage faculty to participate in the study, (iii) assuring participants that there were no risks associated with participating in this study as the survey was administered anonymously and no identifying information was collected or used. Furthermore, participants were assured that in order to ensure that their data remained anonymous data would only be reported in groups of 10 or more, and (iv) promising to provide a summary report of the study's findings to participants.

Instrumentation

In order to determine a suitable instrument for this study, several attitude and technology survey instruments were examined. After extensive analysis the Faculty Attitudes Toward Information Technology (FAIT) was adapted from Dr. Gerald Knezek, with his approval (See Appendix E). This instrument deals extensively with faculty's attitude towards utilizing technology in their classroom instructions. The FAIT was derived from a seven criterion structure of the Teacher Attitudes survey which was developed by Christenson and Knezek (1998). The survey instrument adopted for this study asked thirty questions which were divided into four sections, *Demographic Information*; Use of *Technology in Classroom Instruction*; *Faculty Attitude towards Technology Integration into Classroom Instruction*; and *Faculty Perception of their Organization's Role in Providing Professional* Development *to meet their Technology Need.*

Questions in the *Demographic Information* category sought to gain information about the participants' ages, gender, training, current use of technology, and the number years in faculty position. *Use of Technology in Classroom Instruction*; *Faculty Attitude towards Technology Integration into Classroom Instruction*; and *Faculty Perception of their Organization's Role in Providing Professional Development to meet their Technology Need* were scored on a Likert-type scale, where participants were asked to respond to items using a five point scale as follows: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and, 5 = strongly agree.

Pilot Testing

Pilot testing is a worthwhile process in survey instrumentation, as there are necessary improvements that can be made through each stage of the process (Andrews, Nonnecke, & Preece, 2003). Pilot testing will allow for the opportunity to assess how effective the survey instrument is designed as a means of collecting the information that it intended to receive. This way, the researcher can determine what changes need to be made to the overall format and structure of the survey instrument.

The research study adopted a four stage pilot test design, as proposed by Andrews, Nonnecke, & Preece (2003). First, stage 1 where sample survey questions were drafted and then reviewed by colleagues and members of the research committee. Questions were then checked for ambiguity or redundancy. Feedback was then given to the researcher and questions were changed or restructured based on input given. Four rounds of drafts and edits were conducted with the survey questions then a prototype was developed. A prototype was then developed after the completion of the four rounds of drafts and edits. This method was used in an effort to use the most appropriate language in designing the survey. According to Nielson (2000), it is more ideal to use short sentences when constructing online surveys, as it allows individuals to easily scan the questions, in search of keywords and phrases.

Next, stage 2 was the cognitive test where a group of professionals versed in technology (n=6) were asked to complete a usability test. These people included two university professors and three technology specialists, and one university vice president. This stage helped to establish content validity of the survey instrument. This test included their critique of the draft email and the survey questions that would be sent to survey participants. These six people then completed the survey, after which they provided feedback on the survey language and on ways in which the language can be simplified. In addition, participants provided information on any concerns they might have about the survey. After concerns were submitted further edits were made to the existing survey instrument.

Stage 3 was the live test (pilot test) which was conducted after a survey was constructed with items that explored faculty's technology practices in their classroom instructions as well as the availability of professional development opportunities and appropriate training to aide in technology integration.

Piloting provides important information in terms of the volume of response to invitations and follow-ups. The pilot study using the instrument was conducted with college faculty (n=17) who met the sampling selection criteria (teaching faculty at a college or university) to complete. The response rate for the pilot study was 100% (n=17). At this stage, the researcher determined which questions needed to be thrown out based on the responses that were given.

The reliability scales (Cronbach's Alpha values) for the twelve factors that relate to faculty attitude toward technology integration ranged from .89 to .90 (Table 3) which was similar to Christenson and Knezek's reliability scale of .93 for every factor in their 1998 study. Based on the responses given by the participants the researcher made the determination that teaching faculty would be a great sample to participate in an online survey.

Table 3

Reliability Coefficients for Attitude (Pilot Study)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
attitude_1	40.89	59.075	.441	.891
attitude_2	40.42	58.955	.613	.882
attitude_3	40.65	58.055	.622	.881
attitude_4	40.92	54.989	.729	.875
attitude_5	41.05	56.347	.705	.876
attitude_6	40.87	55.465	.760	.873
attitude_7	41.25	57.037	.617	.881
attitude_8	40.86	57.659	.636	.880
attitude_9	41.11	57.308	.649	.879
attitude_10	40.99	56.325	.664	.878
attitude_11	40.84	58.439	.506	.887
attitude_12	40.65	61.741	.302	.898

Finally, Stage 4, also known as Cleanup Stage, where the final touches on grammar and format were completed. After completing the stages of pilot testing, the final survey instrument was constructed. This instrument contained descriptive items which dealt with the characteristics of the research participants including age, gender, rank, and technology use and experience. The survey was then distributed among the research participants. This entire process took seven weeks to complete. One month for pilot testing and three weeks for survey data collection.

Data Analysis

Data analysis was based on the responses of all teaching faculty and staff respondents in order to answer the research questions for this study. The responses were coded and analyzed using SPSS Version 17.0 for cross tabulation to illustrate the demographics, descriptive statistics for technology incorporation with means and standard deviations in all four categories. Descriptive statistics (frequency, percentages, mean, and standard deviation) were used to test. Simple regression, Chi-square analyses, and Spearman correlation were used to investigate the possible differences and/or relationships between the variables of the respondents' characteristics and their integration of technology into their classroom instruction. To be more specific, descriptive statistics (frequency, percentage, means, and standard deviation etc.) were used to test Hypotheses 1 and 2.

For research question 1, the simple regressions procedures were conducted to assess the relationships of the independent factor faculty perception of professional development needs and the dependent factor faculty use of technology in assessment in teaching and learning.

For research question 2, the simple regressions procedures were also conducted to assess the relationship between the independent factor faculty perception of professional development needs and the dependent factor faculty attitude towards technology integration in teaching and learning.

For research question 3 chi-square analysis was used to determine whether independent factors such as age, gender, technology expertise, and academic rank has an effect on the dependent factor faculty communication. In addition, Spearman correlation statistics was ran in SPSS to determine the strength and nature of the relationship between the independent and dependent factors.

In order to gain a better understanding of the basic features of the data in this study, descriptive statistics were obtained using SPSS to analyze from the survey responses received. Descriptive statistics use mainly used to describe the primary features of the data in a study.

Frequency tables (see table 4) were run on SPSS in order to summarize the provide information about the sample and provide a summary of the various responses offered by the survey participants.

Measures of central tendency provides a measure the dispersion or spread of the data were also used to analyze the survey results relating to faculty experience in higher education, faculty experience with computer use, and faculty individual characteristics (table 2).

Table 4
Faculty Individual Characteristics

	N	%
Years teaching in higher education		
Less than 2 years	23	11.1
2-10 years	95	46.1
11-20 years	43	20.9
21-30 years	29	14.1
Over 30 years	16	7.8
Age		
29 or under	18	8.7
30-39	50	24.3
40-49	41	19.9
50-59	61	29.6
60 and over	36	17.5
Gender		
Male	112	54.4
Female	94	45.6
Experience with computers		
None	5	2.4
Very Limited	18	8.7
Some	9	4.4
Quite a lot	80	38.8
Extensive	50	24.3
Employment Part or Full Time		
Adjunct	33	16.0
Associate	59	28.6
Assistant	46	23.3
Full	62	30.1
Instructor	3	1.5

An alpha of .05 was set for all statistical procedures. Inferential statistics procedures were conducted to assess faculty level of technology adaption for further data analysis. "Statistical inference involves drawing conclusions that go beyond the data and having empirical evidence for those conclusions. These conclusions have a degree of certainty, whether or not quantified, accounting for the variability that is unavoidable when generalising beyond the immediate data to a population or a process" (Bakker, Kent, Derry, Noss, & Hoyles, 2008, p. 130).

Regression Analysis

A regression is a statistical analysis that assesses the relationship between two variables. A Simple Linear Regression details the amount of variance that is accounted for by one variable in predicting another variable, therefore there is only one independent variable in a simple regression (Tabachnick & Fidell, 1989).

Assumptions

There are four main assumptions that are used as justification for the use of linear regression models for the purpose of making predictions.

(i) Linearity of the relationship between dependent and independent variables

(ii) Independence of the errors (no serial correlation)

(iii) Homoscedasticity (constant variance) of the errors

(iv) Normality of the error distribution.

If there is any violation of these assumptions then the regression model may be deemed inefficient or seriously biased or even misleading (Aron, Aron, & Coups, 2005). There was no violation of assumptions in this study.

Chi-Square Analysis

Chi-square is a statistical test commonly used to compare data that is observed data with data that one expects to obtain according to a specific hypothesis. The chi-square test is constantly testing the null hypothesis, which simply states that there is no significant difference between the expected result and the observed result.

Assumptions

(i) There is random sampling of the data

(ii) There is a large enough sample size

(iii) The expected count in each cell is greater than or equal to 5

(iv) Observations are independent of each other (Yates, Moore, & McCabe, 1999).

Concerns for Internal/External Validity

Internal and external validity have a tremendous effect on the treatment of outcomes which can affect a study's credibility and quality (Simmerman, & Swanson, 2001). According to Parker (1990) "*internal validity* refers to the extent to which error variance is experimentally controlled" (pp. 613-614), in addition Wortman (1994) stated that "*internal validity* entails the determination of whether certain threats systematically bias the results" (p. 108). It is therefore important for a study to have high internal validity, as this would help to alleviate the risk of an increase in explanation of results. Therefore, an important goal of any study is to account for and remove as many threats to validity as possible. When studies have high external validity their results can be easily generalized to other populations and situations (Simmerman & Swanson, 2001).

This study was limited by the relatively small sample size from the total population of teaching faculty members at Auburn University. Increasing the sample would most likely improve the external validity of this study. Finally, participants were asked to respond to a survey about their institutions, and as stakeholders, they might be hesitant to rate their institution negatively, thereby skewing the data. In order to protect against these problems the researcher adopted prescribed guidelines by the pilot group for writing questions and organizing the survey. In addition, the researcher took into consideration the norms and values of the research participants in constructing survey questions.

Concerns for Reliability and Generalizability of Results

There are two very important elements that determine whether or not a survey instrument is useful, these are validity and reliability. Reliability is a necessary condition for validity (Kreiner, 2007). Score Reliability and Generalizability is an important measure of the quality of a test is how reliable the test scores are. Reliability is important because it indicates the replicability of the test scores when either a test could be given twice or more to the same group of people, or two tests constructed in the same manner could be given to the same group of people. In essence, “the concern of reliability is to quantify the precision of test scores and other measurements” (Haertel, 2006, p. 65).

This research study was conducted at one location; there may be bias towards the school, its leaders, and the overall attitude of the effectiveness of the school. This in effect will negatively affect the researcher’s ability to generalize research findings to other schools. Moreover, as the researcher is utilizing an online survey some participants who might not have engaged in this type of survey method before, might find it somewhat intimidating. This insecurity might cause them not to get involved in the research study.

The size of the population was a main concern, as the survey was conducted with only seven departments at Auburn University. In addition, if there are factors that contribute to an extremely low survey response rate will negatively impact reliability and generalizability of results.

Limitations of the Methodology

The main limitation of the survey methodology is that data collection is solely reliant on self-reporting. As a result, this can negatively affect the outcome of the study as participants can intentionally deceive or misinterpret the questions posed and provide responses that can contribute to inaccuracies in the data (Pispa & Heiskanen, 2005). In addition, because this method is of a descriptive nature, and no explanations for responses are offered, it would be difficult to gain proper insights into cause-and-effect relationships (Mertler, 2002). These limitations were taken into account as the researcher interpreted the survey results. The timing of the survey can clearly have an effect on the return rate. The survey was administered during the summer months when some faculty members were away from school for various reasons. This in effect might have had an effect on the survey return rate as well as the level of participation.

Summary

This study involved faculty members from seven colleges and schools at Auburn University in an attempt to determine faculty attitudes and perceptions of technology professional development needs and the faculty use of technology into their classroom instructions. The main purpose of this study was to determine faculty overall attitude towards technology integration also, Auburn University's vision highlights the use of technology in strengthening access through research and outreach programs.

Data collected from the faculty surveys were analyzed using simple regressions and chi square analysis.

CHAPTER FOUR

Results

The purpose of this study was to examine issues that relate to the availability of technological resources, faculty support, program readiness, and faculty behavior towards incorporating technology into their classroom instructions. Three research questions provided the focus for the study:

1. Do professional development opportunities affect college faculty efficacy and practice of incorporating technology into their instruction?
2. What are the characteristics of faculty members that are incorporating technology into their instruction (i.e. age, gender, technology expertise, and academic rank)?
3. Do professional development opportunities affect college faculty attitude towards incorporating technology into their instruction?

The survey used for this study was designed to assess college faculty members' knowledge, attitude, and practice of incorporating technology into teaching and learning. In addition, the study also sought to investigate the factors that contributed to faculty's use of technology and identify the factors that influenced their attitudes, knowledge, and practice in integrating technology into their curriculum. The researcher hypothesized that:

1. The majority of the faculty members are integrating some form of technology into their teaching practice.
2. The majority of the faculty members are willing to learn more about strategies to incorporate technology into their instruction. There is a relationship between faculty's

demographics (age, gender, academic rank, tenure status) and their level of technology integration.

3. There is a relationship between faculty's members' beliefs and attitudes towards the effectiveness of technology integration and the level at which they have incorporated.
4. There is a relationship between faculty's efficacy and behavior toward technology and their level of technology integration.
5. The availability of technology, technical training, and support through professional development opportunities has a direct impact on faculty's adoption of technology integration.

This chapter presents the findings of the study which is divided into four main sections: (i) descriptive information about faculty participants' demographic data, (ii) simple regression findings related to research questions 1 and 2, (iii) chi-square analysis related to research question 3, and (iv) other findings.

Demographic Information of Participants

The participants for this study were 212 faculty members from seven colleges and schools at Auburn University: the College of Agriculture, the College of Business, the College of Education, the Samuel Ginn College of Engineering, the College of Liberal Arts, the Harrison School of Pharmacy, and the College of Sciences and Mathematics. Five hundred and fourteen (514) faculty members were emailed letters of request along with a link to the survey inviting them to participate in the study. Of the 514 survey invitations sent, 212 surveys were completed yielding a 40% response rate.

Table 5 presents a summary of faculty individual characteristics. Of the 212 faculty member participants, 52.9% (n=112) were male and 44.3% (n=94) were females and 6 did not report their sex (2.8%). The median age of survey participants was between 40 and 49 years. Nineteen percent (19%) of the 212 participants who reported their ages were within the age range of 40-49 years (n = 41).

The age level of faculty respondents yielded few as 8.7 %, (n=18) faculty members under the age of 29 years old. There were 24.3% for faculty members within the 30-39 (n=50) while there were 19.9% (n=41) of faculty members within the ages of 40-49. The highest number of faculty respondents 29.5% (n=61) were within the 50-59 age range while there were 17.5% (n=36) of the respondents who were 60 years and over. Respondents gender was closely distributed with 54.4% of the respondents being male and 45.6% of the respondents being females (see table 5).

Participants were asked to report the number of years they have been teaching as a faculty member. Eleven percent (n=23) reported that they have been teaching for less than 2 years while there were 46% (n=95), who formed the largest grouping, who have been teaching between 2-10 years. Twenty-one percent (n=43) reported that they have been teaching for 11–20 years, and 14% (n=29) reported that they have been teaching for 21-30 years. Finally, 8% (n=16) of the faculty participants reported that they had over 30 years experience. Faculty distribution by teaching experience revealed that most of the respondents had relatively low teaching experience.

The survey results presented a faculty sample of very experienced technology users. Table 5 illustrates this experience with the highest number of respondents (38.8%, n=80) noted that they had quite a lot of experience and an additional 24.3% (n=50) revealed that they had extensive computer experience. In addition, 42.72% (n=88) of faculty respondents reported that they use some form of technology related instruction in their curriculum at least once per week.

Based on the descriptive statistics, it can be concluded that a large portion of faculty members have some self-efficacy toward technology integration and a large portion displays the necessary behavior towards integrating technology into their curriculum (see table 5).

Table 5
Summary of Descriptive Statistics about Faculty Individual Characteristics

	N	%
Years teaching in higher education		
Less than 2 years	23	11.1
2-10 years	95	46.1
11-20 years	43	20.9
21-30 years	29	14.1
Over 30 years	16	7.8
Age		
29 or under	18	8.7
30-39	50	24.3
40-49	41	19.9
50-59	61	29.6
60 and over	36	17.5
Gender		
Male	112	54.4
Female	94	45.6
Experience with computers		
None	5	2.4
Very Limited	18	8.7
Some	9	4.4
Quite a lot	80	38.8
Extensive	50	24.3
Computer-based assessment		
Never	33	16.0
Rarely	44	21.4
Sometimes	63	30.6
Very Often	47	22.8
Always	19	9.2
Technology-based instructions		
Never	18	8.7
At least once every other month	28	13.6
At least once per month	42	20.4
At least once every other week	30	14.6
At least once per week	88	42.7
Employment Part or Full Time		
Adjunct	33	16.0
Associate	59	28.6

Table 5

Summary of Descriptive Statistics about Faculty Individual Characteristics

	N	%
Assistant	46	23.3
Full	62	30.1
Instructor	3	1.5

Training Experience

Of the sample 81.55% has participated in some form of computer training while 18.45% of the population received or participated in no computer training. The computer training received by survey participants were as the result of many sources (see table 6). Most of the training participants received were either at a college or university at 29.13 (n=60) which is an indication that colleges and universities are offering some form of professional development or technology training within individual disciplines. Faculty respondents noted that they received some technology related training were also received via other sources at 3.88% (N=8), while computer store training was an option practiced by 3.88% of the population (n=8). Some faculty members reported that they were self trained at 19.90% (n=41).

Table 6

Summary of Descriptive Statistics of Faculty's Computer Training

	Yes		No	
	N	%	N	%
Computer Trained	168	81.6	38	18.5
Self Trained	41	19.9	165	80.1
College or university trained	60	29.1	146	70.9
Computer Store	9	4.4	197	95.6
Other	8	3.9	198	96.1

Faculty Knowledge of Computer Applications

Table 7 presents data on faculty knowledge of technology for instructional purposes. Faculty participants were asked to check each item indicating whether or not they have used individual software to aid in classroom instruction. If faculty members did not check a particular item, it signified that they had did not use that particular software for instructional purposes.

Mean scores represent faculty knowledge of instructional technology. The mean scores are on a scale from 1 to 5, 1 represents little to no knowledge of instructional technology while a 5 represents very high knowledge of instructional technology. Three of the eight mean scores were 3.3 or above which signified that more faculty members knew how to use word, spreadsheet, and presentation software to aid in their classroom instructions. However, there were much lower mean score in databases, statistics software, and publishing software usage as the mean scores were much lower than 3.3. Overall, the results on faculty knowledge of instructional technology indicate that faculty members have some knowledge of the use of technology in teaching and learning and have been instrumental in utilizing the technology to aid in their classroom instructions.

The mean responses for survey questions regarding faculty use of email to communicate with their students was 3.84 (standard deviation 1.08), which shows that faculty members are using email to a very large extent to communicate with their students. In addition, the survey question on faculty use of technology to help them design their lessons yielded a 3.71 (standard deviation 1.35) mean score which indicates that overall faculty respondents are generally using technology in their classroom instruction.

Table 7

Mean Representation of Faculty Knowledge of Instructional Technology

	N	Mean	Std. Deviation
Word	212	4.93	.59
Spreadsheet	212	3.33	2.37
Databases	212	1.08	2.07
Presentation	212	3.70	2.20
Statistics	212	1.53	2.31
Publishing	212	1.25	2.17
Email	210	3.84	1.08
Lesson	210	3.71	1.35

Faculty Use of Computer Applications

Research questions one and three looked at faculty members' technology adoption, self efficacy, and use in their instructional practices. The extent to which faculty respondents are knowledgeable about using specific technology in their instructions is derived from their responses on the degree to which they use specific applications. If faculty members indicated that they have experience using a specific software program in their classroom instructions this signified some knowledge base with regard to that particular technology. Table 8 reveals faculty participants responses to questions about their software application experience.

In responding to their use of word processing programs in their instructions 80.1% of the faculty members surveyed revealed that they used word procession applications to aid in their classroom instructions, and 19.9% of the respondents claimed that they had no experience using word processing programs for classroom purposes. Moreover, 63.1% of the faculty members claimed that they use spreadsheet programs in their classroom instructions while a mere 18.0% of the faculty revealed that they have some experience using databases to aid in their classroom instructions. There was 79.1% use of presentation programs to help guide classroom instructions while only 25.2% of the faculty members claimed to have some experience with statistical packages for classroom instruction purposes, and 26.2% explained that they had experience with using desktop publishing programs for classroom purposes.

With low faculty experience in databases, statistics packages, and desktop publishing, there is evidence that there is a definite need for more technology tools in the classrooms to use as teaching tools. This low reporting of these software packages for instructional purposes could be as a result of a lack of training opportunities, lack of available resources, lack of motivation to use these tools or programs, or the need for awareness of the effectiveness of using these technologies in aiding teaching and learning.

Table 8

Summary of Descriptive Statistics of Faculty Software Application Experience

	N	% with experience	N	% without experience
Word Processing Programs	165	80.1	41	19.9
Spreadsheet Programs	130	63.1	76	36.9
Databases	38	18.0	169	82.0
Presentation Programs	163	79.1	43	20.9
Statistics Packages	52	25.2	154	74.8
Desktop Publishing	54	26.2	152	73.8

In the next two sections of this chapter, the results based on the analysis of data that were collected from the faculty survey (See Appendix A) are presented.

Regression analyses were used to assess the association of one independent variable, professional development, with two separate dependent variables, assessment and attitude. Chi-square analyses were used to assess the association of several independent variables (age, gender, rank, and training) with the dependent variables instruction specifically in word, excel, data analysis, presentation programs, statistical software programs, desktop publishing, and lesson incorporation.

Descriptive Statistics for Faculty Attitude

The descriptive statistics for faculty attitude towards technology integration consisted of the mean scores of each item. Likert scale was used for these items (1= Strongly Disagree, 2=Disagree, 3=undecided, 4=Agree, 5=Strongly Agree). The 12 questions about faculty attitude towards integrating technology were asked in Part B of the survey (See Appendix A). Table 9 displays the descriptive statistics for questions relating to faculty attitude toward integrating technology into their classroom instructions. Attitudes towards technology incorporation average scores range from 3.41 to 4.10, indicating a moderately high attitudinal score. The question regarding the need for teaching education programs including instructional applications of technology yielded a mean score of 4.10, which was the highest average score for all 12 attitude related questions, indicating that faculty members agreed that teachers should be trained to effectively incorporate technology into their classroom instructions.

Table 9

Faculty Attitude towards Integrating Technology

	N	Mean	Std. Deviation
I would like to learn about technology use	211	3.69	1.08
Teacher Training should include technology application	212	4.10	.92
Faculty should know how to use technology	209	3.95	.95
Instructional Technology would improve students' education	207	3.71	1.06
Technology integration would encourage students to work with each other	207	3.62	1.00
Instructional technology integration would help organization and productivity	206	3.74	1.00
Instructional technology aids students involvement	207	3.41	1.06
Courses should use email and the internet to disseminate course information	205	3.73	.97
Instructional technology encourages interaction among students	207	3.51	.98
I believe the Internet allow for interaction with instructor and students	208	3.60	1.05

Table 9

Faculty Attitude towards Integrating Technology

I prefer email to disseminate information	208	3.78	1.05
My students are required to use computers to complete assignments	209	3.92	1.07

Faculty Perceptions about Professional Development Opportunities

The review of literature (Chapter 2) discussed administration's role in providing the necessary tools through the form of professional development sessions in order to help faculty members be more acclimated to new ideas and innovations (Furco & Billig, 2002; Hall & Hord, 1987). Therefore in order to successfully infuse technology into the curriculum there is a definite need for organizational leadership to provide training, education, and technical support to faculty members to help them effectively integrate technology into their curriculum. The review of literature also revealed that there are various factors that affect faculty's knowledge of and attitudes towards, and overall use of technology in teaching and learning.

Table 10 provides descriptive statistics about faculty's perception of their organization's role in providing the necessary professional development that would enable them to effectively integrate technology into their classroom instructions. The mean scores for faculty perception on technology related professional development offered by their organization ranged from 3.0 to 4.03. This range indicates a moderately strong perception that in fact their organization is providing the necessary training through the form of professional development sessions to enable them to incorporate technology into their classroom instructions.

The question regarding faculty perception on organization's role in providing technology related professional development yielded a 4.03 mean score, which indicated that in fact faculty members believe that their organization has a duty to provide the necessary training and education that would help them to effectively use technology in their teaching and learning. Likewise, faculty responses also indicate that they generally attend professional development sessions offered by their organization that are geared at enabling them to incorporate technology into their classroom instructions.

Table 10

Descriptive Factors for Faculty Perception of Technology Integration

	N	Mean	Std. Deviation
I have immediate need for training in technology integration	208	3.13	1.25
Organization needs to provide ongoing training in technology integration	211	4.03	.75
My organization provides technology training opportunities	212	3.46	1.07
I have attended technology training provided by my organization	205	3.37	1.15
I would not be using technology to the same degree if I had not attended training provided by my organization	211	3.00	1.22

Research Question 1

Hypothesis Testing

A simple regression was conducted to test the following hypotheses:

(a) H_{O1}: R = 0, i.e. linear combination of independent factors does not significantly relate to faculty integration of technology into their teaching practice.

H_{A1}: R ≠ 0, i.e. linear combination of independent factors significantly relate to faculty integration of technology into their teaching practice.

(b) H_{O1}: R = 0, i.e. the availability of technology, technical training, and support through professional development opportunities does not relate to faculty's adoption of technology integration.

H_{A1}: $R \neq 0$, i.e. the availability of technology, technical training, and support through professional development opportunities relate to faculty's adoption of technology integration.

Research Question 1 sought to evaluate the relationship between professional development opportunities and faculty practice of incorporating technology into their instructions. A simple linear regression analysis was conducted as there was only one predictor variable (professional development) which is a continuous variable with only one response or dependent variable (assessment) which is also continuous.

The simple linear regression model summary table (Table 11) indicated that the test was statistically significant ($F(1, 194) = 40.112$, $p=<0.001$); $R^2=0.414$. Therefore 41% of variance in assessment can be explained by professional development sessions. For every 1 point increase in Professional Development, there is a 0.341 point increase in technology in assessment. Therefore more Professional Development leads to more technology use. As the simple linear regression test is statistically significant we reject the null hypothesis that faculty level of assessment utilizing technology does not significantly relate to them receiving technology related professional development.

Table 11

Regression Coefficients Linear Regression Model

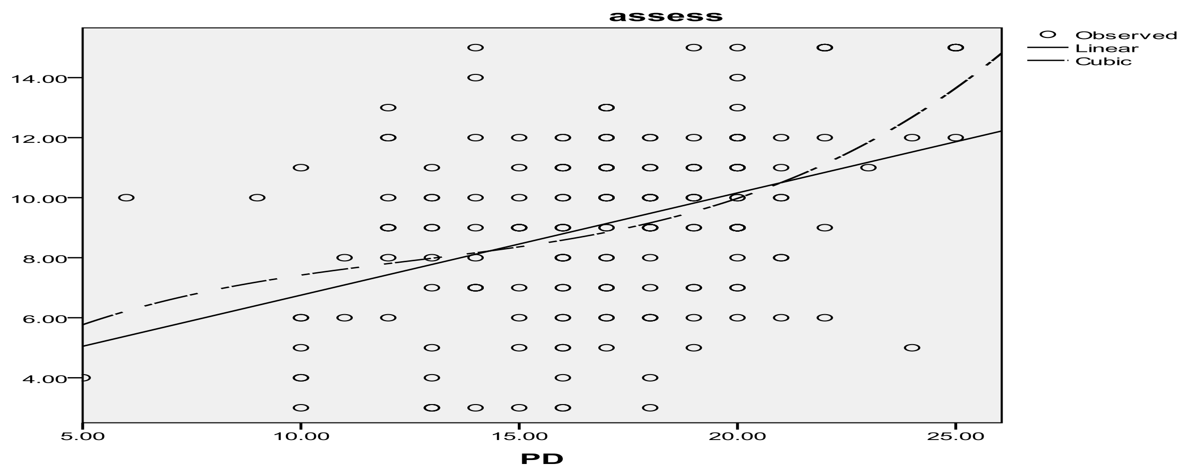
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.346	.937		3.571	.000
	PD	.341	.054	.414	6.333	.000

Dependent Variable: Faculty use of technology in assessment

Furthermore, a scatterplot of the predicted outcome variables with the regression line plotted was also created. Figure 4 shows a positive relationship between the amount of professional development faculty received and the level at which they incorporate technology in their overall classroom assessments.

Figure 4

Scatter Plot of Regression Standard of Professional Development and Faculty Assessments



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Research Question 2

Chi-square analyses were performed in order to determine the level of significance of the relationship between the characteristics of faculty members that are incorporating technology into their instruction (i.e. age, gender, technology expertise, and academic rank). The following hypotheses were observed:

Faculty Age

(a) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty age and their level of technology adaptation in using word processing programs.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty age and their level of technology adoption in using word processing programs.

(b) H_{O1}: R = 0, i.e. there is no relationship between faculty age and their level of technology adoption in Spreadsheet usage.

H_{A1}: R ≠ 0, i.e. there is a relationship between faculty age and their level of technology adoption in Spreadsheet usage.

(c) H_{O1}: R = 0, i.e. there is no relationship between faculty age and their level of technology adoption in using Databases.

H_{A1}: R ≠ 0, i.e. there is a relationship between faculty age and their level of technology adoption in using Databases.

(d) H_{O1}: R = 0, i.e. there is no relationship between faculty age and their level of technology adoption in using Presentations software.

H_{A1}: R ≠ 0, i.e. there is a relationship between faculty age and their level of technology adoption in using Presentations software.

(e) H_{O1}: R = 0, i.e. there is no relationship between faculty age and their level of technology adoption in using Statistical software.

H_{A1}: R ≠ 0, i.e. there is a relationship between faculty age and their level of technology adoption in using Statistical software.

(f) H_{O1}: R = 0, i.e. there is no relationship between faculty age and their level of technology adoption in using Desktop publishing software.

H_{A1}: R ≠ 0, i.e. there is a relationship between faculty age and their level of technology adoption in using Desktop publishing software.

(g) H_{O1}: R = 0, i.e. there is no relationship between faculty age and their level of technology adoption in using E-mail.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty age and their level of technology adoption in using E-mail.

(h) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty age and their level of technology adoption in designing technology related lessons.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty age and their level of technology adoption in designing technology related lessons.

Table 12 displays the chi-square test results to test the hypothesis stated above. The results table shows that age has no effect on using the following applications in their classroom instructions: word processing software application (x^2-df = 3.42, p=0.491), use of spreadsheet software (x^2-df = 2.099, p=0.718), use of database (x^2-df = 5.79, p=0.224), presentation programs (x^2-df = 3.616, p=0.460), statistical software (x^2-df = 3.620, p=0.460), desktop publishing software (x^2-df = 4.312, p=0.365), email (x^2-df = 17.706, p=0.341), and using data to plan lessons (x^2-df = 19.216, p=0.258). As a result we accept the null in these areas.

However in looking at age having an effect on whether or not faculty member planned lessons and designed instruments that incorporated some form of technology resulted in a significant relationship (x^2-df = 26.015, p=0.054) and (x^2-df = 35.184, p=0.004) respectively. Therefore, we determine that age has an effect on whether or not faculty would design instruments and lessons that incorporated some form of technology, thus we reject the null hypotheses in these two instances.

Table 12
Age and Software Use Cross-tabulations

	Word		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.415[a]	4	.491
N of Valid Cases	210		

Table 12
Age and Software Use Cross-tabulations

	Value	df	Asymp. Sig. (2-sided)
Spreadsheet			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.099[a]	4	.718
N of Valid Cases	210		
Databases			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.679[a]	4	.224
N of Valid Cases	210		
Presentation			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.616[a]	4	.460
N of Valid Cases	210		
Statistics			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.620[a]	4	.460
N of Valid Cases	210		
Publishing			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.312[a]	4	.365
N of Valid Cases	210		
Email			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.706[a]	16	.341
N of Valid Cases	208		
Lesson			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.015[a]	16	.054
N of Valid Cases	208		
Data			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.216[a]	16	.258
N of Valid Cases	206		
Instrument			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.184[a]	16	.004
N of Valid Cases	210		

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Faculty Gender Hypotheses

(a) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty gender and their level of technology adoption in Microsoft word.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty gender and their level of technology adoption in Microsoft word.

(b) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty gender and their level of technology adoption in Spreadsheet usage.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty gender and their level of technology adoption in Spreadsheet usage.

(c) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty gender and their level of technology adoption in using Databases.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty gender and their level of technology adoption in using Databases.

(d) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty gender and their level of technology adoption in using PowerPoint Presentations.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty gender and their level of technology adoption in using PowerPoint Presentations.

(e) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty gender and their level of technology adoption in using Statistical software.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty gender and their level of technology adoption in using Statistical software.

(f) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty gender and their level of technology adoption in using Desktop publishing software.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty gender and their level of technology adoption in using Desktop publishing software.

(g) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty gender and their level of technology adoption in using E-mail.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty gender and their level of technology adoption in using E-mail.

(h) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty gender and their level of technology adoption in designing technology related lessons.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty gender and their level of technology adoption in designing technology related lessons.

Table 13 displays the chi-square test results to test the hypotheses stated above. The results table shows that gender has no effect on using the following applications in their classroom instructions: word processing software application (x^2-df = 2.54, p=0.111), use of spreadsheet software (x^2-df = 0.934, p=0.334), use of database (x^2-df = 1.057, p=0.304), presentation programs (x^2-df = 0.387, p=0.534), statistical software (x^2-df = 0.528, p=0.467), desktop publishing software (x^2-df = 0.185, p=0.667), email (x^2-df = 5.338, p=0.254), using data to plan lessons (x^2-df = 4.163, p=0.384), lessons incorporating technology (x^2-df = 0.367, p=0.985), and designed instruments that incorporated technology (x^2-df = 5.595, p=0.232). As a result we accept the null in these areas.

Table 13

Gender and Software Use Cross-tabulations

	Word		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.540[a]	1	.111
N of Valid Cases	211		
	Spreadsheet		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.934[a]	1	.334
N of Valid Cases	211		
	Databases		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.057[a]	1	.304
N of Valid Cases	211		
	Presentation		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.387[a]	1	.534
N of Valid Cases	211		
	Statistics		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.528[a]	1	.467
N of Valid Cases	211		
	Publishing		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.185[a]	1	.667
N of Valid Cases	211		
	Email		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.338[a]	4	.254
N of Valid Cases	209		
	Lesson		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.367[a]	4	.985
N of Valid Cases	209		
	Data		

Table 13

Gender and Software Use Cross-tabulations

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.163[a]	4	.384
N of Valid Cases	207		
Instrument			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.595[a]	4	.232
N of Valid Cases	211		

Faculty Technology Expertise Hypotheses

(a) H_{O1}: R = 0, i.e. there not a relationship between faculty technology expertise and their level of technology adoption in Microsoft word.

H_{A1}: R ≠ 0, i.e. there is a relationship between faculty technology expertise and their level of technology adoption in Microsoft word.

(b) H_{O1}: R = 0, i.e. there is no relationship between faculty technology expertise and their level of technology adoption in Spreadsheet usage.

H_{A1}: R ≠ 0, i.e. there is a relationship between faculty technology expertise and their level of technology adoption in Spreadsheet usage.

(c) H_{O1}: R = 0, i.e. there is no relationship between faculty technology expertise and their level of technology adoption in using Databases.

H_{A1}: R ≠ 0, i.e. there is a relationship between faculty technology expertise and their level of technology adoption in using Databases.

(d) H_{O1}: R = 0, i.e. there is no relationship between faculty technology expertise and their level of technology adoption in using PowerPoint Presentations.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty technology expertise and their level of technology adoption in using PowerPoint Presentations.

(e) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty technology expertise and their level of technology adoption in using Statistical software.

H_{A1}: $\underline{R} \neq 0$, i.e. there is no relationship between faculty technology expertise and their level of technology adoption in using Statistical software.

(f) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty technology expertise and their level of technology adoption in using Desktop publishing software.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty technology expertise and their level of technology adoption in using Desktop publishing software.

(g) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty technology expertise and their level of technology adoption in using E-mail.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty technology expertise and their level of technology adoption in using E-mail.

(h) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty technology expertise and their level of technology adoption in designing technology related lessons.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty technology expertise and their level of technology adoption in designing technology related lessons.

Table 14 displays the chi-square results to test the hypotheses stated above. The results table shows that technology expertise has no effect on faculty using the following applications in their classroom instructions: word processing software application (x^2-df = 4.52, p=0.501), use of database (x^2-df = 3.682, p=0.055), and statistical software (x^2-df = 2.315, p=0.128). As a result we accept the null hypotheses in these areas.

However in looking at the effect of technology expertise on whether or not faculty member used spreadsheet software (x^2-df = 16.879, p=0.000), presentation programs (x^2-df = 12.902, p=0.000), desktop publishing software (x^2-df = 7.635, p=0.06), email (x^2-df = 41.442, p=0.000), planned lessons paying attention to existing student data in the subject area and designed instruments that incorporated some form of technology resulted in a significant relationship (x^2-df = 25.014, p=0.000) and (x^2-df = 32.571, p=0.000) respectively. Therefore, we determine that technology expertise has an effect on whether or not faculty would design instruments and lessons that incorporated spreadsheets, presentation software, desktop publishing, included technology into their lessons, or design instruments that included some form of technology, thus we reject the null hypotheses in these instances.

Table 14
Training Chi-Square Tests

	Word		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.452[a]	1	.501
N of Valid Cases	212		
	Spreadsheet		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.879[a]	1	.000
N of Valid Cases	212		
	Databases		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.682[a]	1	.055
N of Valid Cases	212		
	Presentation		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.902[a]	1	.000

Table 14
Training Chi-Square Tests

N of Valid Cases	212		
Statistics			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.315[a]	1	.128
N of Valid Cases	212		
Publishing			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.635[a]	1	.006
N of Valid Cases	212		
Email			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	41.442[a]	4	.000
N of Valid Cases	210		
Lesson			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.327[a]	4	.000
N of Valid Cases	210		
Data			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.014[a]	4	.000
N of Valid Cases	208		
Instrument			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.571[a]	4	.000
N of Valid Cases	212		

Faculty Academic Rank Hypotheses

(a) H_{O1}: R = 0, i.e. there is no relationship between faculty academic rank and their level of technology adoption in Microsoft word.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty academic rank and their level of technology adoption in Microsoft word.

(b) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty academic rank and their level of technology adoption in Spreadsheet usage.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty academic rank and their level of technology adoption in Spreadsheet usage.

(c) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty academic rank and their level of technology adoption in using Databases.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty academic rank and their level of technology adoption in using Databases.

(d) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty academic rank and their level of technology adoption in using PowerPoint Presentations.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty academic rank and their level of technology adoption in using PowerPoint Presentations.

(e) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty academic rank and their level of technology adoption in using Statistical software.

H_{A1}: $\underline{R} \neq 0$, i.e. there is no relationship between faculty academic rank and their level of technology adoption in using Statistical software.

(f) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty academic rank and their level of technology adoption in using Desktop publishing software.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty academic rank and their level of technology adoption in using Desktop publishing software.

(g) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty academic rank and their level of technology adoption in using E-mail.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty academic rank and their level of technology adoption in using E-mail.

(h) H_{O1}: $\underline{R} = 0$, i.e. there is no relationship between faculty academic rank and their level of technology adoption in designing technology related lessons.

H_{A1}: $\underline{R} \neq 0$, i.e. there is a relationship between faculty academic rank and their level of technology adoption in designing technology related lessons.

Table 15 displays the chi-square results to test the hypotheses stated above. The results table shows that academic ranking has no effect on faculty participants using the following applications in their classroom instructions: word processing software application (x^2-df = 7.149, p=0.128), use of spreadsheet software (x^2-df = 4.486, p=0.344), statistical software (x^2-df = 2.766, p=0.598), desktop publishing software (x^2-df = 2.446, p=0.654), email (x^2-df = 17.388, p=0.361), using data to plan lessons (x^2-df = 21.683, p=0.154), using existing data to plan lessons (x^2-df = 19.271, p=0.255), and designing instruments that incorporated some form of technology (x^2-df = 22.039, p=0.142). As a result we accept the null hypotheses in these areas.

However in looking faculty academic rank and use of database (x^2-df = 10.893, p=0.028) as well as the use of presentation programs (x^2-df = 9.458, p=0.051) resulted in a significant relationship. Therefore, it was determined that academic rank has an effect on whether or not faculty would use database software and presentation programs in designing their lessons, thus the null hypotheses are rejected in these two instances.

Table 15
Rank Chi-Square Tests

	Word		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.149[a]	4	.128
N of Valid Cases	211		
	Spreadsheet		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.486[a]	4	.344
N of Valid Cases	211		
	Databases		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.893[a]	4	.028
N of Valid Cases	211		
	Presentation		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.458[a]	4	.051
N of Valid Cases	211		
	Statistics		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.766[a]	4	.598
N of Valid Cases	211		
	Publishing		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.446[a]	4	.654
N of Valid Cases	211		
	Email		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.388[a]	16	.361
N of Valid Cases	209		
	Lesson		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.683[a]	16	.154
N of Valid Cases	209		
	Data		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.271[a]	16	.255
N of Valid Cases	207		
	Instrument		

Table 15
Rank Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22.039[a]	16	.142
N of Valid Cases	211		

Research Question 3

Hypothesis Testing

A simple regression was conducted the following hypotheses:

(a) H_{O1}: R = 0, i.e. faculty receiving technology related professional development does not significantly relate to faculty attitude towards learning strategies to incorporate integrating of technology into their teaching classroom.

H_{A1}: R ≠ 0, i.e. faculty receiving technology related professional development does significantly relate to faculty attitude towards learning strategies to incorporate integrating of technology into their teaching classroom.

H_{O1}: R = 0, i.e. faculty's members' beliefs and attitudes towards the effectiveness of technology integration does not relate to the level at which they have incorporated technology.

H_{A1}: R ≠ 0, i.e. faculty's members' beliefs and attitudes towards the effectiveness of technology integration does relate to the level at which they have incorporated technology.

To further understand if age affected faculty members' decision to incorporate technology, a crosstab was performed (See Table 16) to see the relationship between faculty's age and their level of technology incorporation. From the crosstab tables for word we see that all faculty members who do not use word in their classroom instructions are 50 years or older, however, faculty members who use word in their classroom instructions are represented in all age groups. In addition, for all faculty members who do not use spreadsheet programs in their classroom instructions were distributed across all age groups, but the largest percent were within the ages 50-59. Likewise, the faculty members who use spreadsheet programs in their classroom instructions were within the age group 50-59 years old. The same is true for faculty use of database programs for classroom instructions. Those faculty members within the age group 50-59 yielded the highest percentage who claims not to use database programs during classroom instructions and also the largest group of respondents who use database programs in their classroom instructions. The same is true for the use of presentation programs, statistics programs, and databases during classroom instructions. However, these findings could be as a result of more survey participants (29.6%) were within the ages of 50-59.

Table 16

Effect on Age and the Decision to Integrate Technology

			Age					Total
			29 or under	30-39	40-49	50-59	60 and over	
word	No	Count	0	0	0	2	1	3
		% within word	.0%	.0%	.0%	66.7%	33.3 %	100.0%
	Yes	Count	19	50	42	63	33	207
		% within word	9.2%	24.2%	20.3%	30.4%	15.9 %	100.0%
Total		Count	19	50	42	65	34	210
		% within word	9.0%	23.8%	20.0%	31.0%	16.2 %	100.0%
spreadsheet	No	Count	7	13	14	25	11	70
		% within spreadsheet	10.0%	18.6%	20.0%	35.7%	15.7%	100.0%
	Yes	Count	12	37	28	40	23	140
		% within spreadsheet	8.6%	26.4%	20.0%	28.6%	16.4%	100.0%
Total		Count	19	50	42	65	34	210
		% within spreadsheet	9.0%	23.8%	20.0%	31.0%	16.2%	100.0%
databases	No	Count	11	40	33	51	29	164
		% within databases	6.7%	24.4%	20.1%	31.1%	17.7%	100.0%
	Yes	Count	8	10	9	14	5	46
		% within databases	17.4%	21.7%	19.6%	30.4%	10.9%	100.0%
Total		Count	19	50	42	65	34	210
		% within databases	9.0%	23.8%	20.0%	31.0%	16.2%	100.0%
presentation	No	Count	6	11	7	20	10	54
		% within presentation	11.1%	20.4%	13.0%	37.0%	18.5%	100.0%
	Yes	Count	13	39	35	45	24	156
		% within presentation	8.3%	25.0%	22.4%	28.8%	15.4%	100.0%
Total		Count	19	50	42	65	34	210

Table 16

Effect on Age and the Decision to Integrate Technology

			Age					Total
			29 or under	30-39	40-49	50-59	60 and over	
		% within presentation	9.0%	23.8%	20.0%	31.0%	16.2%	100.0%
statistics	No	Count	10	38	29	44	24	145
		% within statistics	6.9%	26.2%	20.0%	30.3%	16.6%	100.0%
	Yes	Count	9	12	13	21	10	65
		% within statistics	13.8%	18.5%	20.0%	32.3%	15.4%	100.0%
Total		Count	19	50	42	65	34	210
		% within statistics	9.0%	23.8%	20.0%	31.0%	16.2%	100.0%
publishing	0	Count	12	38	29	50	29	158
		% within publishing	7.6%	24.1%	18.4%	31.6%	18.4%	100.0%
	1	Count	7	12	13	15	5	52
		% within publishing	13.5%	23.1%	25.0%	28.8%	9.6%	100.0%
Total		Count	19	50	42	65	34	210
		% within publishing	9.0%	23.8%	20.0%	31.0%	16.2%	100.0%

Research Question 3 sought to evaluate the relationship between faculty attitude towards incorporating technology and professional development opportunities they received. A simple linear regression analysis was conducted as there was only one predictor variable (professional development) which is a continuous variable with only one response or dependent variable (attitude) which is also continuous.

The simple linear regression model summary table (Tables 17) indicated that the test was statistically significant ($F(1, 164) = 48.379$, $p=<0.001$); $R^2=0.477$. Therefore 48% of variance in faculty attitude towards integrating technology can be explained by professional development sessions. Also, for every 1 point increase in Professional Development, there is a 1.066 point increase in attitude. As the simple linear regression test is statistically significant we reject the null hypothesis that faculty attitude towards integrating technology into teaching and learning does not significantly relate to them receiving technology related professional development.

Table 17

Regression Coefficients Linear Regression Model

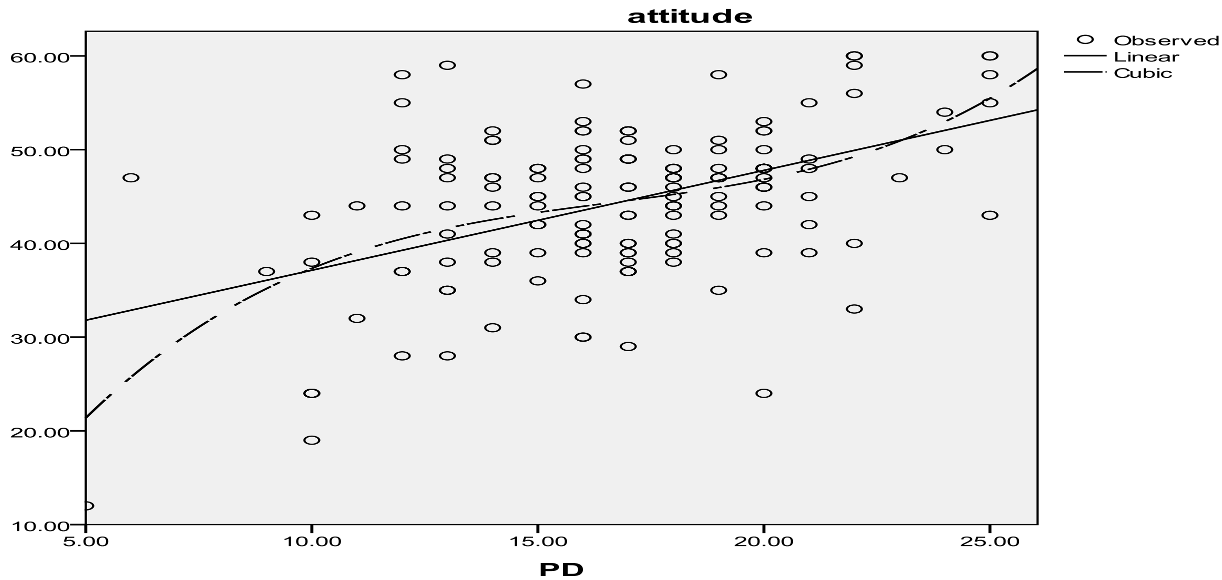
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	26.472	2.658		9.959	.000
	PD	1.066	.153	.477	6.956	.000

a. Dependent Variable: attitude

In addition, a scatterplot of the predicted and outcome variables with the regression line plotted was also created. Figure 5 shows a positive relationship between the amount of professional development faculty received and their attitude towards incorporating technology in their overall classroom teaching and learning.

Figure 5

Scatter Plot of Regression Standard of Professional Development on Faculty Attitude



Relationships between Technology Practices

Word Processing Software, Spreadsheet Programs, and Database Programs

In this section, bivariate correlation coefficient matrixes will be presented to display the faculty attitude, knowledge, and practice of using technology in their classroom instructions. The analysis of the correlation matrix indicates that some of the observed relationships were very strong. Table 18 displays the correlation matrix for faculty use of word processing software, spreadsheet programs, and database programs with other technology types. The strongest relationships was between the use of statistics software and databases (r=.320) which indicates that if a faculty member uses statistics software he or she would also be highly likely to use database software programs to enhance classroom instructions.

There were also very strong relationships between the use of databases and spreadsheet programs (r = .180), spreadsheet programs and presentation programs (r = .287), the use of word processing software programs and presentation programs (r = .202), the use of databases and the use of technology in classroom lesson (r= .304), and database and desktop publishing programs (r =.255). The use of word processing programs were also positively correlated with spreadsheet programs (r = .169). The use of word processing programs was also positively correlated to the use of databases (r = .063), the use of email (0.079), the use of technology in classroom lesson (r= .093), and incorporating in lesson instructions (r = .079) although the relationships were not very strong. These relationships indicate that faculty members who used spreadsheet programs in their classroom instructions are more likely to use word processing programs, database programs, presentation programs, statistical software programs, and incorporate technology into their lesson instructions.

On the other hand the use of spreadsheet software programs was negatively correlated with desktop publishing (r =- . 052) and professional development (r = -.020). Therefore, faculty members who used spreadsheet programs tend to use less desktop publishing software and attend less professional development sessions.

The use of databases in classroom instructions also yielded some very strong positive relationships with the use of statistical software (r = .320), incorporating technology into lesson instructions (r = .304), and the use of desktop publishing software programs (r = .225). In addition, there were weaker positive relationships with using email (r = .099) in classroom instructions. These relationships indicate that faculty members who used database programs in their classroom instructions are more likely to use word processing programs, spreadsheet programs, statistical desktop publishing programs, statistical software programs, and incorporate technology into their lesson instructions.

There was one negative correlation between the use of databases and the use of presentation programs (r =- .054). This indicates that faculty members who used database programs tend to use less presentation programs in their classroom instructions.

Table 18

Correlations Matrix for Word Processing, Spreadsheet, and Databases

Spearman's rho Correlations

		Word	Spreadsheet	Databases
Word	Correlation Coefficient	1.000	.169*	.063
	Sig. (2-tailed)	.	.014	.361
	N	212	212	212
Spreadsheet	Correlation Coefficient	.169*	1.000	.180**
	Sig. (2-tailed)	.014	.	.009
	N	212	212	212
Databases	Correlation Coefficient	.063	.180**	1.000
	Sig. (2-tailed)	.361	.009	.
	N	212	212	212
Presentation	Correlation Coefficient	.202**	.287**	-.054
	Sig. (2-tailed)	.003	.000	.435
	N	212	212	212
Statistics	Correlation Coefficient	.080	.255**	.320**
	Sig. (2-tailed)	.248	.000	.000
	N	212	212	212
Publishing	Correlation Coefficient	.069	-.052	.225**
	Sig. (2-tailed)	.316	.452	.001
	N	212	212	212
Lesson	Correlation Coefficient	.093	.255**	.304**
	Sig. (2-tailed)	.180	.000	.000
	N	210	210	210
E-mail	Correlation Coefficient	.079	.238**	.099
	Sig. (2-tailed)	.253	.001	.152
	N	210	210	210

PD	Correlation Coefficient	.095	-.020	.102
	Sig. (2-tailed)	.180	.774	.151
	N	200	200	200

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Presentation, Statistics, and Desktop Publishing Programs

The analysis of the correlation matrix indicates that some of the observed relationships were very strong. Table 19 displays the correlation matrix for faculty use of presentation software, statistics programs, and desktop publishing programs. There were strong relationships between the use of presentation programs and word processing programs, spreadsheet application, desktop publishing programs, and the use of email and in classroom instructions. The strongest relationships was between the use of presentation programs and incorporating technology into classroom lesson (r=.340) which indicates that if a faculty member uses presentation programs he or she is more likely to incorporate technology into their classroom instructions.

There were also very strong relationships between the use of presentation programs and desktop publishing programs (r = .168), the use of presentation programs and email (r= .260), and professional development programs (r =.236). These relationships indicate that faculty members who used presentation programs in their classroom instructions are more likely to use more word processing programs, spreadsheet programs, desktop publishing programs, and emails as a means of incorporating technology into their classroom instructions.

The use of presentation programs was also negatively correlated with the use of databases (r = -.054) and the use of statistical software (r = -.097). Therefore, faculty members who used presentation programs tend to use less databases and less statistical software.

The use of statistical software in classroom instructions also yielded a very strong positive relationships with incorporating technology into lesson instructions (r = .163). In addition, there were weaker positive relationships with using word processing programs (r =.080) and desktop publishing software (r = .018), and attending professional development session (r = .008). These relationships indicate that faculty members who used presentation programs in their classroom instructions are more likely to use less word processing programs software, desktop publishing software, and emails to enhance technology in their classroom instructions.

There was one negative correlation between the use of statistical software and the use of presentation programs (r =- .097). This indicates that faculty members who used statistical software programs tend to use less presentation programs in their classroom instructions.

Furthermore the use of desktop publishing software also yielded some very strong positive relationships with the use the use of presentation programs (r = .168), incorporating technology into classroom lesson (r = .295), the use of email to enhance classroom instructions (r = .253), and faculty attending professional development sessions (r = .200). In addition, there were weaker positive relationships with using word processing programs (r =.069) These relationships indicate that faculty members who used desktop publishing programs in their classroom instructions are more likely to use more word database programs, presentation programs, incorporate technology into their classroom lessons, email programs, use word processing programs software, use statistical software programs, and attend professional development sessions.

There was one negative correlation between the use of desktop the use of statistical software and the use of spreadsheet programs (r =- .052). This indicates that faculty members who used statistical software programs tend to use less desktop publishing programs in their classroom instructions.

Table 19

Correlations Matrix for Presentation, Statistics, and Desktop Publishing Programs

		Presentation	Statistics	Publishing
Word	Correlation Coefficient	.202**	.080	.069
	Sig. (2-tailed)	.003	.248	.316
	N	212	212	212
Spreadsheet	Correlation Coefficient	.287**	.255**	-.052
	Sig. (2-tailed)	.000	.000	.452
	N	212	212	212
Databases	Correlation Coefficient	-.054	.320**	.225**
	Sig. (2-tailed)	.435	.000	.001
	N	212	212	212
Presentation	Correlation Coefficient	1.000	-.097	.168*
	Sig. (2-tailed)	.	.161	.014
	N	212	212	212
Statistics	Correlation Coefficient	-.097	1.000	.018
	Sig. (2-tailed)	.161	.	.798
	N	212	212	212
Publishing	Correlation Coefficient	.168*	.018	1.000
	Sig. (2-tailed)	.014	.798	.
	N	212	212	212
Lesson	Correlation Coefficient	.340**	.163*	.295**
	Sig. (2-tailed)	.000	.018	.000
	N	210	210	210
E-mail	Correlation Coefficient	.260**	.099	.253**
	Sig. (2-tailed)	.000	.154	.000
	N	210	210	210
PD	Correlation Coefficient	.236**	.008	.200**
	Sig. (2-tailed)	.001	.913	.004
	N	200	200	200

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Technology Lessons, E-mail, and Professional Development

The analysis of the correlation matrix indicates that some of the observed relationships were very strong. Table 20 displays the correlation matrix for faculty use of technology related lessons, emails, and attending technology related professional development. There were very strong relationships between the use of technology related lessons and the use of spreadsheet programs (r = .255), database programs (r = .304), presentation programs (r = .340), with the highest strongest correlation with the use of emails (r = .502). However, word processing applications (r = .093) yielded a positive correlation with the use of technology related lessons, but the relationship was not very strong. These relationships indicate that faculty members that used incorporated technology into their lessons tend to use more word processing programs, spreadsheet programs, database programs, statistical software programs, desktop publishing programs, emails, and attended professional development sessions.

The use of emails to aid in classroom instructions also yielded some very strong positive relationships with the use of spreadsheet programs (r = .238), presentation programs (r = .260), desktop publishing programs (r = .253), and a strong positive correlation with professional development (r = .150). However, the highest positive correlation with using emails was incorporating technology into classroom lessons (r = .502). There were no negative correlations among factors.

In addition, the professional development also yielded some very strong positive correlations with the use of presentation programs (r = .236), desktop publishing software (r = .200), and strong correlation with the use of emails (r = 1.50). There were also positive by not very strong correlations with word processing applications (r = .095), databases (r = .102), and utilizing technology in lesson instructions (r = .096). these relationships indicate that faculty members who attended professional development sessions are more likely to use word processing programs, database programs, presentation programs, statistical software, desktop publishing programs, use emails, attend technology related professional development sessions, and use more technology related lessons in their classroom instructions.

There was one negative correlation between the use of professional development and the use of spreadsheet programs (r =- .020). This indicates that faculty members who attended professional development sessions were less likely to use spreadsheet programs in their classroom instructions.

Table 20

Correlations Matrix for Technology Lessons, E-mail, and Professional Development

		Lesson	E-mail	PD
Word	Correlation Coefficient	.093	.079	.095
	Sig. (2-tailed)	.180	.253	.180
	N	210	210	200
Spreadsheet	Correlation Coefficient	.255**	.238**	-.020
	Sig. (2-tailed)	.000	.001	.774
	N	210	210	200
Databases	Correlation Coefficient	.304**	.099	.102
	Sig. (2-tailed)	.000	.152	.151
	N	210	210	200
Presentation	Correlation Coefficient	.340**	.260**	.236**
	Sig. (2-tailed)	.000	.000	.001
	N	210	210	200
Statistics	Correlation Coefficient	.163*	.099	.008
	Sig. (2-tailed)	.018	.154	.913
	N	210	210	200
Publishing	Correlation Coefficient	.295**	.253**	.200**
	Sig. (2-tailed)	.000	.000	.004
	N	210	210	200
Lesson	Correlation Coefficient	1.000	.502**	.096
	Sig. (2-tailed)	.	.000	.176
	N	210	208	199
E-mail	Correlation Coefficient	.502**	1.000	.150*
	Sig. (2-tailed)	.000	.	.035
	N	208	210	198
PD	Correlation Coefficient	.096	.150*	1.000

Table 20

Correlations Matrix for Technology Lessons, E-mail, and Professional Development

	Sig. (2-tailed)	.176	.035	.
	N	199	198	200

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The demographic data from this study showed that that the survey participants varied according to sex, age, experience, and rank are generally exposed to and utilize various forms of technology. Some respondents can be viewed as laggards when it comes to integrating technology, while other fall within the late and early majority in adopting technology into their curriculum. However, it is evident that some respondents can be viewed as early adopters and innovators in technology integration (Moore 1991). The implication for this finding is that organizational leaders should target those inventive faculty members who have readily embraced technology integration to help bridge the chasm between faculty attitude towards technology integration and faculty technology integration (Furco & Billig, 2002).

The university's vision includes broad access to the university through the innovative use of information technology. This signifies that the organization's leaders have a strong desire to have technology adopted into their faculty members teaching and learning, and this is evident with the technology-related technology development opportunities they make readily available to faculty members. However, some faculty respondents' failure to utilize these professional development opportunities will help to perpetuate the gap between innovative change and faculty attitude towards integrating technology into their teaching and learning.

Therefore the role of leadership is very important in establishing motivation incentives to help faculty members realize the value of technology integration. These motivators can be in the form of rewards and recognition, peer mentoring, professional development, and budgetary changes that support technology initiatives within the organization.

CHAPTER FIVE

DISCUSSION OF RESULTS

Purpose of the study

Many individuals have requested some form of justification for the colossal investment in technological resources (Oppenheimer, 1997, 2003), as well as the impact of technology incorporation on students' achievement (Sandholtz, Ringstaff, & Dwyer, 1997). Coincidentally, one cannot presume that if technology is readily available at an educational institution that faculty members will embrace and incorporate it into their classroom instructions. On the other hand, to successfully implement these technological tools goes beyond making the technology available in every classroom (Keengwe, 2007). This therefore creates a challenge to researchers to provide evidence that in fact integrating technology into the curriculum actually enhances students' overall learning (Oppenheimer, 2003; Roblyer & Knezek, 2003; & Strudley, 2003).

There has been a marked change in the global economy which is felt by most employers who demand a skilled workforce to improve their business productivity (Martin, 1997). This change in the global economy has also been acknowledged by government officials who see the need for an educated society in order to bring about economic growth. This therefore solidifies the need for educational institutions, especially institutions of higher learning to prepare their students to meet the demands of the changing society (Knapp & Glenn, 1996). This would require change to the traditional means of educating to a more modern approach through technology integration that will more adequately satisfy the changing needs of the workplace (Morrison (2003). However, reports show that faculty members are not using innovative ways to integrate technology into their curriculum as a means of making a significant difference in their students' education (Cuban, 2001).

The world has changed into an information saturated arena therefore in order to have competitive advantage over other countries the products of the institutions of learning must produce self-disciplined, educated individuals with excellent technical skills that reflects success (Drucker, 1989). An individual's approach to technology depends solely on his or her values, attitudes, and overall abilities. Therefore, if an individual feels confident about the changing face of society which is fueled by the influx of technology then he or she would tend to embrace technology more readily (Roblyer & Knezek, 2003).

This study investigated the faculty members' attitude towards technology integration into their curriculum as well as their perceptions of professional development needs to aid in technology integration, and how these factors influence their decisions to use technology in their educational practices. Three research questions provided the focus for the study:

1. Do professional development opportunities affect college faculty efficacy and practice of incorporating technology into their instruction?
2. What are the characteristics of faculty members that are incorporating technology into their instruction (i.e. age, gender, technology expertise, and academic rank)?
3. Do professional development opportunities affect college faculty attitude towards incorporating technology into their instruction?

The survey used for this study was designed to investigate college faculty members' knowledge, attitude, and practice of incorporating technology into teaching and learning. In addition, the survey also sought to investigate the factors that contributed to faculty's use of technology and identify the factors that influenced their attitudes, knowledge, and practice in integrating technology into their curriculum. The researcher hypothesized that:

1. The majority of the faculty members are integrating some form of technology into their teaching practice.
2. The majority of the faculty members are willing to learn more about strategies to incorporate technology into their instruction.
3. There is a relationship between faculty's demographics (age, gender, academic rank, tenure status) and their level of technology integration.
4. There is a relationship between faculty's members' beliefs and attitudes towards the effectiveness of technology integration and the level at which they have incorporated.
5. There is a relationship between faculty's efficacy and behavior toward technology and their level of technology integration.
6. The availability of technology, technical training, and support through professional development opportunities has a direct impact on faculty's adoption of technology integration.

The faculty and teaching staff from seven schools and departments at Auburn University: the College of Agriculture, the College of Business, the College of Education, the Samuel Ginn College of Engineering, the College of Liberal Arts, the Harrison School of Pharmacy, and the College of Sciences and Mathematics participated in this study.

Summary of Study Design

This section will discuss the overall significance of the research results and its place in literature in relation to other studies which examined faculty beliefs and attitude towards integrating technology into their curriculum. The discussion of the findings can be summarized with the following points: (1) technology-related professional development is important to creating a technology rich educational environment, (2) faculty self-efficacy and positive attitudes are prerequisites for integrating technology into the curriculum, and (3) faculty have shifted their teacher-centered traditional practices into more student-centered practices as they are integrating technology more frequently into their curriculum.

Rogers (1995) Diffusion of Innovation (DoI) model, Hall and Hord (1987) Concerns Based Adoption Model (CBAM), and Abrahamson & Rosenkopf's Network Theory (1990) were used as theoretical frameworks used to investigate the extent to which teaching faculty attitudes relate to the overall use of technology in their curriculum. The focus of the study was based on faculty use of technology in classroom instruction, their attitude towards technology integration into classroom instructions, and their perception of their organization's role in providing professional development to meet their technological needs.

The data for the study were collected from the faculty and teaching staff of the seven colleges and departments at Auburn University. In light of the limited population there were some concerns about the response rates, therefore a pilot study was conducted to help the researcher assess whether or not a poor response rate would be an issue. The pilot survey yielded a very good response rate (100%, n=17). Five hundred and fourteen (514) surveys were distributed, 212 were returned, representing a 41% response rate.

The survey instrument was adopted and modified from Dr. Gerald Knezek's Faculty Attitudes Toward Information Technology (FAIT) which deals with faculty attitude towards technology integration. The modification took the form of re-wording survey statements, combining questions under categories, and eliminating questions that did not address the target sample's unique qualities.

The survey consisted of three sections (Appendix A: Part A – Part C). Part A consisted of faculty participants' demographic information, the dependent factors used in the chi-square analyses. Part B consisted of faculty attitude towards technology integration into classroom instruction, the dependent factors for the regression analysis. Part B was based on Rogers' (1995) Diffusion of Innovation (DoI) model. Part C consisted of faculty perception of their organization's role in providing professional development to meet their technology needs, the independent factor for the regression analyses. Survey statements were coded negatively and positively throughout the survey to avoid acquiescence bias.

In addition, surveys were administered electronically and there was no identifiable information collected which ensured faculty respondents' anonymity. As participants completed and submitted their online survey, their response summary data was recorded on Kwik Surveys' database. Once the expected survey responses were received, the data was then downloaded from Kwik Survey's database and further used for statistical analysis using Statistical Package for the Social Sciences (SPSS).

There were a number of statistical analyses performed on the survey data collected. Among those analyses was the Cronbach's Alpha reliability coefficient which looked at consistency of the various parts of the survey instrument. (i) The Cronbach's Alpha was conducted for the pilot study as well as for the actual survey instrument that was used by all survey participants. The reliability scales (Cronbach's Alpha values) for the twelve factors that relate to faculty attitude toward technology integration ranged from .89 to .90 (Table 3). (ii) Correlation coefficients were computed to assess the relationships among independent and dependent variables. (iii) Simple regressions were also conducted to answer research questions 1 and 3. The various assumptions for linear regression were checked to ensure there were no violations of the required conditions (iv) Chi-square analyses were conducted to answer research question 2.

Findings

The following section discusses the findings of the study as it relates to the research questions that were posed. There were three research questions that were identified at the beginning of the study:

Research Question1

Do professional development opportunities affect college faculty efficacy and practice of incorporating technology into their instruction?

Regression analysis was done to answer this research question. Based on the regression analysis, professional development accounted for 41% of the variance in faculty practice of incorporating technology into their classroom instructions. The effect size of $R^2 = .41$ was judged to be large (Sun, Pan, & Wang, 2010).

Research Question 2

What are the characteristics of faculty members that are incorporating technology into their instruction (i.e. age, gender, technology expertise, and academic rank)?

Chi-square analyses were performed in order to determine the level of significance of the relationship between the characteristics of faculty members that are incorporating technology into their instruction (i.e. age, gender, technology expertise, and academic rank).

Age

It was found that age has no effect on whether or not faculty members word processing software applications, spreadsheet software, databases, presentation programs, statistical software, desktop publishing software, email, and existing data to plan lessons. However, it was found that age did have an effect on whether or not faculty member planned lessons and designed instruments that incorporated some form of technology.

Gender

Chi-square analysis was done to determine whether or not gender has an effect on faculty use of various software applications. It was found that gender has no effect on whether or not faculty members would use word processing software application, spreadsheet software, databases, presentation programs, statistical software, desktop publishing software, emails, data to plan lessons, designed lessons that incorporated technology, and designed instruments that incorporated technology.

Technology Expertise

In looking at the results for the chi-square analysis for technology expertise and their use of various software applications in their classroom instructions, it was found that faculty technology expertise has no effect on faculty using the word processing software application databases, and statistical software.

However in looking at the effect of technology expertise on whether or not faculty member used spreadsheet software, presentation programs, desktop publishing software, email, planned lessons paying attention to existing student data in the subject area and designed instruments that incorporated some form of technology resulted in a significant relationship) respectively. Therefore, it was determine that technology expertise has an effect on whether or not faculty would design instruments and lessons that incorporated spreadsheets, presentation software, desktop publishing, included technology into their lessons, or design instruments that included some form of technology.

Academic Ranking

Chi-square analysis was done to test the effect of faculty academic ranking and their use of application software in their classroom instructions. Results showed that faculty academic ranking had no effect on their use of word processing software application, spreadsheet software, statistical software, and desktop publishing software, email, using existing data to plan lessons, and designing instruments that incorporated some form of technology.

However it was found that faculty academic rank had an effect of their use of databases as well as the use of presentation programs. Therefore, it was determined that academic rank has an effect on whether or not faculty would use database software and presentation programs in designing their lessons.

Research Question 3

Do professional development opportunities affect college faculty attitude towards incorporating technology into their instruction?

A simple linear regression analysis was conducted to answer this research question. Based on the regression analysis, 48% of variance in faculty's attitude towards integrating technology can be explained by professional development sessions.

Concerns Based Adoption Model (CBAM) Stages of Adoption

In order to determine faculty members' stages of technology adoption and use of instructional technology, according to the CBAM stages of concerns, survey responses were analyzed.

The findings revealed that 8.7% (non-adopters) of the participants never use any type of technology in their instructions, while 13.69% (low level adopters) claim to incorporate technology at least once every other month, 20.39% (moderate level adopters) incorporate technology at least once per month, 14.56% (high level adopters) incorporate technology at least once every other week, and 42.72% (very high level adopters) of the faculty participants incorporate technology into their classroom instructions at least once per week. These results indicate that there are faculty members operating under every spectrum of the CBAM stages of adoption model. There are non-adopters, low-level adopters, moderate-level adopters, and high level adopters, and very high level adopters. Interestingly, there are more faculty members who are very high level adopters than another category of users.

Based on the Concerns Based Adoption Model (CBAM) stages of adoption, the results of this survey suggest that:

(i) Faculty participants are a very diverse group of people, who have differing views and needs about technology integration.

(ii) The majority of faculty members are using technology in their classroom instructions on a very regular basis.

(iii) More that 77% of faculty participants expressed an interest in learning about technology integration (Agree = 54.85%; Strongly Agree = 22.32%).

Perception of Organization's Role in Providing Professional Development

The survey instrument asked faculty's perception of their organization's role in providing technology-related professional development opportunities for them. Results indicate:

(i) Faculty member on average have a moderately strong perception that their organization is providing the necessary technology-related professional development they need in order for them to effectively incorporate technology into their curriculum.

(ii) Faculty members believe that their organization has a duty to provide the necessary training and education that would enable them to effectively incorporate technology into their classroom instructions.

(iii) Faculty members generally attend technology-related professional development sessions offered by their organizations.

Knowledge of Computer Applications

Faculty respondents indicated that they use some commonly used software applications in their classroom instructions. They claim the most commonly used software application in classroom instructions are word processing programs with 80.10% of the faculty respondents admit to using these applications on a regular basis. Second, 79.12% of the faculty participants responded to having use presentation programs in the regular class instructions, and fewer 63.10% to using spreadsheet programs in their regular classroom instructions. A much smaller percentage of faculty member stated that they used statistic packages (25.24%) and databases (18.45%) on a regular basis.

This information coupled with the 81.55% of the faculty participants claiming they received some form of computer training might account for the high percentage of regular technology application use in classroom instructions. The responses varied when asked the source of the computer training, as some respondents were self trained (19.90%), college or university trained (29.13%), trained in a computer store (4.37%), or received some other source of training (3.88%). There was a large percentage of non-formal computer training as a large number of faculty participants responded that they did not receive training at a college or university (10.87%) which can be the result of the varying number of participants who did not utilize commonly used software applications in their classroom instructions.

Discussion of Major Findings

The characteristics that generated a definition for faculty participants' knowledge of, attitude towards, and practice of incorporating technology into teaching and learning yielded varying results. The findings are presented in the subsequent pages.

Research Question 1 sought to evaluate the relationship between professional development opportunities and faculty practice of incorporating technology into their instructions. A simple linear regression analysis was conducted and showed that faculty level of utilizing technology related assessments significantly related ($F(1, 194) = 40.112$, $p<0.001$); $R^2=0.414$) to them receiving some form of technology related professional development.

Chi-square analyses were performed in order to answer research question 2 in determining the level of significance of the relationship between the characteristics of faculty members that are incorporating technology into their instruction (i.e. age, gender, technology expertise, and academic rank).

Age

It was found that age has no effect on faculty use of word processing software application (p=0.491), use of spreadsheet software (p=0.718), use of database (p=0.224), presentation programs (p=0.460), statistical software (p=0.460), desktop publishing software (p=0.365), email (p=0.341), and using data to plan lessons (p=0.258) in their classroom instructions. However age had a significant effect on whether or not faculty would design instruments (p=0.054) and lessons (p=0.004) that incorporated some form of technology.

Gender

It was found that that gender has no effect on faculty member using word processing software application (p=0.111), spreadsheet software (p=0.334), databases (p=0.304), presentation programs (p=0.534), statistical software (p=0.467), desktop publishing software (p=0.667), email (p=0.254), use of data to plan lessons (p=0.384), lessons incorporating technology (p=0.985), or designing instruments that incorporated technology (p=0.232).

Technology Expertise

Findings suggest that technology expertise has no effect on faculty respondents using word processing software application (p=0.501), databases (p=0.055), and statistical software (p=0.128) in their classroom instructions. However there was a significant relationship between the effect of technology expertise on whether or not faculty member used spreadsheet software (p=0.000), presentation programs (p=0.000), desktop publishing software (p=0.06), emails (p=0.000), planned lessons paying attention to existing student data in the subject area (p=0.000), and designed instruments that incorporated some form of technology (p=0.000).

Academic Rank

Results showed that academic ranking has no effect on faculty participants use of word processing software application (p=0.128), use of spreadsheet software (p=0.344), statistical software (p=0.598), desktop publishing software (p=0.654), email (p=0.361), data to plan lessons (p=0.154), existing data to plan lessons (p=0.255), and designing instruments that incorporated some form of technology (p=0.142). However faculty academic rank yielded a significant relationship with faculty use of database (p=0.028) and the use of presentation programs (p=0.051).

Research Question 3 sought to evaluate the relationship between faculty attitude towards incorporating technology and professional development opportunities they received. A simple linear regression analysis was conducted. The simple linear regression model summary table (Tables 12 and 13) indicated that the test was statistically significant F (1, 164) = 48.379,

$p<0.001$; $R^2=0.477$. Therefore 48% of variance in faculty's attitude towards integrating technology can be explained by professional development sessions.

Faculty Attitudes towards Professional Development

Faculty participants in this study generally support the use of technology in the curriculum. However, over 50% of the faculty members surveys noted that they either "strongly agreed" (15.53%) or "agreed" (35.92) that they were in need of immediate training in order for them to effectively integrate technology into the classroom instructions. According to Means (1994), it is imperative for educators to be given adequate training and support so that they would be accustomed to the various hardware and software that are to be utilized in technology integration. There is a definite indication that faculty survey participants (n = 106) would attend professional development aimed at assisting them to incorporate technology into their curriculum.

Five questions dealt specifically on faculty's perception and attitude towards the institution led professional development training they have attended and their overall feeling about the quality of support they have received in integrating technology from their individual organizations. Generally faculty members believe that is it their organization's duty to provide them with technology related professional development and support and that their organization is indeed providing the training they need in order for them to integrate technology into their classroom instructions.

Even though a large majority of survey participants "agree" (56.31%) and "strongly agree" (11.17%) that they attended the professional development sessions offered by their organization, a significant number of respondents "disagree" (10.19%) and "strongly disagree" (21.36%) have not taken advantage of this opportunity. Also, there was over 25% of the faculty respondents who "strongly disagree" (11.65%) or "disagree" (24.27%) that the professional development they received from their organization was instrumental in their decision to incorporate technology into their curriculum. Furthermore, 15.05% of the faculty participants were undecided in determining the impact of their organization's professional development in their decision to integrate technology into their curriculum. This could be as a result of faculty members not viewing these professional development opportunities as worthwhile which in turn can impact their decision to integrate technology into their classroom instructions (Cravner, 1998).

Practice of Using Technology during Instructions

Faculty members indicated that they are using technology for teaching and learning. There were 84% of the faculty members who reported that they use technology with their classroom assessments with 91% using technology to aid in classroom instructions. Bandura (1997) asserted that individuals with high self-efficacy are usually not apprehensive about participating in tasks and dedicating time to mastering related skills regardless of the degree of difficulty. In addition, an individual's self-efficacy can be demolished through negative evaluation than it is to strengthen it through positive encouragement (Bandura, 1993). Therefore, how an individual views his or her ability to perform a particular task determines to a large extent what that individual does with knowledge and skills gained in that particular area. Thus, faculty perception of their understanding or mastery of technology will have a direct impact on their behavior and attitude towards integrating technology into their curriculum.

Other Findings

Use of Software Applications

When the use of software applications were analyzed to determine the existence of a relationship, it was found that faculty members who used statistical software tend to also use database software (r=.320) to enhance their classroom instructions. In addition, it was determined faculty members who used spreadsheet programs in their classroom instructions are more likely to use word processing programs, database programs, presentation programs, statistical software programs, and incorporate technology into their lesson instructions.

It was found that faculty members who reported that they used spreadsheet programs in their classroom instructions were more likely to use word processing programs, database programs, presentation programs, statistical software programs, and incorporate technology into their lesson instructions. In addition, faculty members who used databases in classroom instructions were more likely to use word processing programs, spreadsheet programs, statistical desktop publishing programs, statistical software programs, and incorporate technology into teaching and learning activities.

On the other hand, faculty members who used spreadsheet software programs in their classroom instructions were less likely to use desktop publishing software and attend professional development sessions. Moreover, faculty members who the used databases in their classroom instructions tended to use less presentation programs in their classroom instructions.

Implications

The main purpose of this study was to investigate issues that relate to the availability of technological resources, faculty support, program readiness, and faculty behavior towards incorporating technology into their classroom instructions. It was found that faculty's attitude towards integrating technology into their curriculum were generally positive with mean scores ranging from 3.41 to 4.10. Moreover, when assessing faculty's attitude towards the need for teacher education programs to include some form of technology related instructional applications it yielded a very high mean score of 4.10, which was the highest average score for all 12 attitude related questions, which suggests that that faculty members believe that teachers should be trained to effectively incorporate technology into their classroom instructions. Faculty attitudes and belief are important factors that must be considered in determining whether or not they will integrate technology into their classroom instructions (Palak, 2004).

Likewise, in assessing faculty's perception of their organization's role in providing technology-related professional development the mean scores ranged from 3.0 to 4.03, indicating a moderately strong perception that their organization is providing the necessary training through the form of professional development sessions to enable them to incorporate technology into their classroom instructions. However, the question regarding faculty perception on organization's role in providing technology related professional development yielded a 4.03 mean score, which indicated that in fact faculty members believe that their organization has a duty to provide the necessary training and education that would help them to effectively use technology in their teaching and learning.

In addition, faculty responses indicate that they generally attended professional development sessions offered by their organization that are geared at enabling them to incorporate technology into their classroom instructions.

Recommendations for future Research and Practice

Recommendations for future Research

This study investigated issues that relate to the availability of technological resources, faculty support, program readiness, and faculty behavior towards incorporating technology into their classroom instructions. Therefore, the findings of this study are generalizable to faculty members at Auburn University in particular and to similar institutions in the Southeastern United States.

It is recommended that organizational leaders assess the effect of technology-related professional development sessions offered to faculty members to determine to degree to which faculty members are utilizing the available technology and the reasons for their. In addition, faculty efficacy and attitude towards technology integration and ongoing professional development should be research to determine their effect on technology integration. Also, research should be conducted to assess the use of technology in teaching and learning and students' overall academic achievement.

Recommendations for future Practice

Organizational leaders should develop policy that include ongoing professional development and provide support initiatives such as support for peer mentoring and faculty institutes in order to integrate technology into the institution's overall culture. Ongoing professional development sessions should be specific to individual faculty's curriculum with ongoing technical support in order to get faculty more acclimated to using technology into their curriculum. This would be much more effective with utilizing peer mentors to assist in alleviating faculty fear of technology and increase their overall self-efficacy.

Based on the survey results faculty members have varying levels of technology experience therefore there is need for varying degrees of technical support for individual faculty members based on their level of experience. In order to effectively transform faculty beliefs about traditional methods of teaching to a more technology rich delivery would also require research based methods of training faculty members that would not degrade or threaten their abilities as educators. Moreover, organizational leaders should capitalize on faculty general support of technology integration and employ supportive measures to fund technology programs which aim at updating existing technology with faculty members as part of the committee to aid in the planning and implementation processes.

Limitations of the Study

A major limitation to the study is the use of a non-randomized sample. The study is limited to a selected number of college departments at a university, as only faculty from one university participated in this study.

Another limitation is the sample size as only seven colleges and departments from one university were used in this study. Likewise, population samples were only taken from one university in Alabama. In addition, the study focused only on faculty attitudes towards technology integration instead of the reasons for faculty's decision to adopt technology for teaching and learning.

Finally, the study is limited to the information acquired from a review of literature and survey questions. However, survey questions probed into faculty behavior towards professional development opportunities and their overall experience and efficacy in utilizing technology, thus providing an understanding of the relationship between faculty attitude and their overall practice in integrating technology into their teaching and learning.

References

Abrahamson, E. & Rosenkopf, L. (1990), When do bandwagon diffusions roll?" How far do they go? And when do they roll backwards?: A computer simulation. *Academy of Management Best Papers Proceedings*, 50, 155-159.

Abrahamson, E. & Rosenkopf, L. (1993a), Institutional and competitive bandwagons. *Academy of Management Review*, 18, 487-517.

Abrams, D. R. (1999). *Introduction to regression.* Princeton University Data and Statistical Services. Retrieved from http://dss.princeton.edu/online_help/analysis/regression_intro.htm

Al-Bataineh, A., & Brooks, L. (2003). Challenges, advantages, and disadvantages of instructional technology in the community college classroom. *Community College Journal of Research & Practice*, 27(6), 473. Retrieved from EBSCOhost.

Alessi, E., & Martin, J. (2010). Conducting an internet-based survey: Benefits, pitfalls, and lessons learned. *Social Work Research*, *34*(2), 122-128. Retrieved from Education Research Complete database.

Allen, D. (1999). Desire to finish college: An Empirical link between motivation and persistence. *Research in Higher Education*, *40*(4), 461-485. Retrieved June 24, 2009, from Academic Search Premier database.

Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic survey methodology: A case study in reaching hard-to-involve internet users. *International Journal of Human-Computer Interaction*, *16*(2), 185.

Aron, A., Aron, E. N., & Coups, E. J. (2005). Statistics *for the behavioral and social sciences: A brief course* (3rd ed.). Upper Saddle River, NJ: Pearson Education.

Aschemann-Witzel, J., & Hamm, U. (2011). Measuring consumers' information acquisition and decision behavior with the computer-based information-display-matrix. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, 7(1), 1-10. doi:10.1027/1614-2241/a000018

Bain, J., & McNaught, C. (2006). How academics use technology in teaching and learning: understanding the relationship between beliefs and practice. *Journal of Computer Assisted Learning, 22*(2), 99-113. doi:10.1111/j.1365-2729.2006.00163.x.

Bajwa, D. S., Lewis, L., Pervan, G., Lai, V. S., Munkvold, B. E., & Schwabe, G. (2008). Factors in the global assimilation of collaborative information technologies: An exploratory investigation in five regions. *Journal of Management Information Systems*, 25(1), 131-165. Retrieved from EBSCO*host*.

Bakker, A., Kent, P., Derry, J., Noss, R., & Hoyles, C. (2008). Statistical Inference at Work: Statistical Process Control as an Example. *Statistics Education Research Journal*, 7(2), 130-145. Retrieved from EBSCOhost.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, 28, 117-148.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: W H. Freeman.

Bass, B. M. (1985). Leadership and performance beyond expectations. New York: Free Press.

Becker, H. J. (2001). How are teachers using computers in instructions? Paper presented at the 2001 meeting of the American Educational Research Association. Retrieved from http://www.crito.uci.edu/tlc/FINDINGS/special3/

Billig, S. H., Sherry, L., & Havelock, B. (2005). Challenge 98: sustaining the work of a regional technology integration initiative. *British Journal of Educational Technology*, 36(6), 987-1003. doi:10.1111/j.1467-8535.2005.00569.x

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. Educational Researcher, 33(8), 3-15.

Botturi, L. (2009). Handbook on information technologies for education and training (2nd ed.). *Distance Education*, 30(2), 285-287. doi:10.1080/01587910903023256

Bracey, G. (2005). Cheating update. *Phi Delta Kappan*, *86*(8), 637.

Brown, A. (2006). Learning from a distance. *Journal of Property Management*, *71*(4), 42-45. Retrieved from Business Source Premier database.

Bryant, A. L. (2000). Investment in education and technology: the key to preparing for the digital age. In Technos: *Quarterly for Education and Technology.* Retrieved from http://findarticles.com/p/articles/mi_m0HKV/is_4_9/ai_68951437/

Carrell, L. J., & Menzel, K. E. (2001). Variations in learning, motivation, and perceived immediacy between live and distance education classrooms. Communication Education, 50, 230–240.

Castle, S. R., & McGuire, C. J. (2010). An Analysis of Student Self-Assessment of Online, Blended, and Face-to-Face Learning Environments: Implications for Sustainable Education Delivery. *International Education Studies*, 3(3), 36-40. Retrieved from EBSCOhost.

Chemers, M., Hu, L., & Garcia, B. (2001). Academic self-efficacy and first-year college student performance and adjustment. *Journal of Educational Psychology*, *93*(1), 55. Retrieved June 24, 2009, from Academic Search Premier database.

Chen, T., & Chen, T. (2006). Exploring learner perception of e-learning effectiveness in the workplace learning context based on diffusion of innovations (doi) model. *Online Submission*, Retrieved from EBSCO*host*.

Chickering, A. & Gamson, F. (1987). Seven practices for good practice in undergraduate education. Washington, DC: American Association for Higher Education. (ERIC Document Reproduction Service No. ED 282–491).

Chitiyo, R., & Harmon, S. (2009). An analysis of the integration of instructional technology in pre-service teacher education in Zimbabwe. *Educational Technology Research and Development*, *57*(6), 807-830. doi:10.1007/s11423-009-9136-7.

Christensen, R.,Griffin,D.,&Knezek,G. (2001).Measures of teacher stages of technology integration and their correlates with student achievement. Paper presented at the Annual Meeting of the American Association of Colleges for Teacher Education, Dallas, TX.

Cochran-Smith, M., & Fries, M. K. (2001). Sticks, stones, and ideology: The discourse of reform in teacher education. *Educational Researcher*, 30(8), 3-15.

Conrad, A., & Munro, D. (2008). Relationships between computer self-efficacy, technology, attitudes and anxiety: Development of the computer technology use scale (CTUS). *Journal of Educational Computing Research*, *39*(1), 51-73. Retrieved from Education Research Complete database.

Cuban L. (2001). Oversold and underused: Computers in the classroom. Cambridge, MA: Harvard University Press.

Daft, R. L., & Lengel, R. H. (1984). Information richness: A new approach to managerial behavior and organizational design. In L. L. Cummings & B. M. Staw (Eds.), Research in organizational behavior, 6, 191–233. Greenwich, CT: JAI Press.

Daniel, J. (1999). Mega-Universities and knowledge media: Technology strategies for higher education. London: Kogan Page Ltd.

Devlin, M., & Gray, K. (2007). In their own words: a qualitative study of the reasons Australian university students plagiarize. *Higher Education Research & Development*, *26*(2), 181-198. doi:10.1080/07294360701310805

Doering, A., Hughes, J., & Huffman, D. (2003). Preservice teachers: Are we thinking with technology?. *Journal of Research on Technology in Education*, *35*(3), 342.

Doutrich, D., Hoeksel, R., Wykoff, L., & Thiele, J. (2005). Teaching teachers to teach with technology. *Journal of Continuing Education in Nursing*, *36*(1), 25-31. Retrieved from CINAHL database.

Drucker, P. F. (1989). *The new realities*. New York: Perennial Library.

Dwyer, D. C., Ringstaff, C., & Sandboltz, J. H. (1991). Changes in Teachers' beliefs and practices in technology-rich classrooms. *Educational Leadership*, 48(8), 45-52.

Edwards, M., Cangemi, J., & Kowalski, C. (1990). The college dropout and institutional responsibility. *Education*, *111*(1), 107. Retrieved from Academic Search Premier database.

Ekholm, M. & Trier, U. P. (1987). The concept of institutionalization: Some remarks. In M. Miles, M. Ekholm & R. Vandenberghe (Eds), Lasting school improvement: exploring the process of institutionalization (pp. 13–21). Leuven-Amersfoort, Belgium: ACCO.

Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development*, 47(4), 47–61.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration. *Educational Technology Research and Development*, 53(4), 25–39.

Fashola, O., & Slavin, R. (1998, April). Effective dropout prevention and college attendance programs for students placed at risk. *Journal of Education for Students Placed at Risk, 3*(2), 159. Retrieved from Academic Search Premier database.

Flanagin, A. J. (1999). Theoretical and pedagogical issues in computer-mediated interaction and instruction: Lessons from the use of a collaborative instructional technology. *Electronic Journal of Communication*, 9(1). Retrieved from www.cios.org/EJCPUBLIC/009/1/00916.HTML

Fullan, M. (2001). The new meaning of educational change. New York: Teachers College Press.

Furco, A., & Billig, S. H. (2002). Service-Learning: The Essence of the Pedagogy. *Advances in Service-Learning Research*. Retrieved from EBSCO*host*.

Gallimore, R., & Stigler, J. (2003). Closing the teaching gap: Assisting teachers to adapt to change. In C. Richardson (Ed.), Closing the teaching gap: Assisting teachers adapt to changing standards and assessments (pp. 25-36). London, England: Qualifications Curriculum Authority.

Graham, C., Tripp, T., & Wentworth, N. (2009). Assessing and improving technology integration skills for pre-service teachers using the teacher work sample. *Journal of Educational Computing Research*, *41*(1), 39-62. doi:10.2190/EC.41.1.b.

Granovetter, M., & Soong, R. (1986). Threshold models of interpersonal effects in consumer demand. *Journal of Economic Behavior and Organization*, 7, 83-99.

Granovetter, M., & Soong, R. (1988). Threshold models of diversity: Chinese restaurants, residential segregation, and the spiral of silence. In C. C. Clogg (Ed,). *Sociological Methodology.* Vol. 18, Washington, DC: American Sociological Association.

Graves, L. (2008). A second life for higher ed.: A virtual world offers new opportunities for teaching. *U.S. News & World Report, 2008.* Retrieved from http://www.usnews.com/education/online-education/articles/2008/01/10/a-second-life-for-higher-ed

Griffith, T. L. (1999). Technology features as triggers for sensemaking. *Academy of Management Review* (24:3), 472-488.

Hall, G. E. & Hord, S. M. (1987). Change in schools: *Facilitating the process*. Albany, NY: State University of New York Press.

Hall, L. (2006). Modeling technology integration for preservice teachers: A PT3 case study. *Contemporary Issues in Technology and Teacher Education, 6*(4), 436-455.

Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education*, *41*(4), 393.

Heath, R. (1993). Responsibility Center Budgeting: A Review and Commentary on the Concept and the Process. *Journal of the Association for Communication Administration*, (1), 1-10. Retrieved from Communication & Mass Media Complete database.

Honey, M., Culp, K., & Spielvogel, R. (1999). Critical issue: Using technology to improve student achievement. Retrieved from http://www.ncrel.org/sdrs/areas/issues/methods/technlgy/te800.htm

Hsieh, P., Sullivan, J., & Guerra, N. (2007, Spring2007). A closer look at college students: Self-efficacy and goal orientation. *Journal of Advanced Academics*, *18*(3), 454-476. Retrieved from Academic Search Premier database.

Information Technology at Auburn University (2010). Retrieved from www.auburn.edu/oit/it_goals.php

Jacobs, H. H. (Ed.). (1989). Interdisciplinary curriculum: Design and implementation Virginia: ASCD. (ED 316506).

Katz, M. L. and Shapiro, C. (1985). Network externalities, competition, and compatibility. *American Economic Review*, 75,424-440.

Keengwwe, J. (2007). Faculty integration of technology into instruction and students' perceptions of computer technology to improve student learning. Journal of Information Technology Education 6, 169-179. Retrieved from EBSCOhost.

Keller, J., & Bichelmeyer, B. (2004). What happens when accountability meets technology integration. *TechTrends: Linking Research & Practice to Improve Learning*, *48*(3), 17-24.

Knapp, L. R. & Glenn, A. D. (1996). *Restructuring schools with.* MA: Allyn & Bacon.

Koehler, M. J., & Mishra, P. (2008). Introducing TPCK. In AACTE Committee on Innovation and Technology (Ed.), *Handbook of technological pedagogical content knowledge (TPCK) for educators* (pp. 3-29). New York: Routledge.

Kreiner, S. (2007). Validity and objectivity: Reflections on the role and nature of Rasch models. *Nordic Psychology, 59*(3), 268-298. doi:10.1027/1901-2276.59.3.268.

Lane, D. R., & Shelton, M. W. (2001). The centrality of communication education in classroom computer-mediated-communication: Toward a practical and evaluative pedagogy. *Communication Education*, 50, 241–255.

Lang, R., Alfonzo, M., & Dawkins, C. (2009). American demographics -- Circa 2109. *Planning*, *75*(5), 10. Retrieved from MasterFILE Premier database.

Levy, E., & Rakovski, C. (2006). Academic dishonesty: A zero tolerance professor and student registration choices. *Research in Higher Education*, *47*(6), 735-754. doi:10.1007/s11162-006-9013-8.

Lim, W., Lee, Y., & Hung, D. (2008). A prophet never accepted by their own town: A teacher's learning trajectory when using technology. *Asia-Pacific Journal of Teacher Education*, 36(3), 215-227. Retrieved from Ebsco*host*.

Lin, C., & Lu, M. (2010). The study of teachers' task values and self-efficacy on their commitment and effectiveness for technology-instruction integration. *Online Submission*, Retrieved from ERIC database.

Livingston, K., & Condie, R. (2006). The impact of an online learning program on teaching and learning strategies. *Theory Into Practice*, *45*(2), 150-158. doi:10.1207/s15430421tip4502_7

Ma, H., Wan, G., & Lu, E. (2008). Digital cheating and plagiarism in schools. *Theory Into Practice*, *47*(3), 197-203. doi:10.1080/00405840802153809

Martin, C. P. (1997). *The digital estate strategies for competing, surviving, and thriving in an internetworked world.* New York: McGraw Hill.

Means, B. (1994). *Technology education reform.* San Francisco CA: Jossey-Bass Inc.

Mehlinger, H. D. (1996). School reform in the information age. *Phi Delta Kappan*, 400-407.

Meier, E. B. (2005). Situating technology professional development in urban schools. *Journal of Educational Computing Research*, 32(4), 395-407. Retrieved from EBSCO*host*.

Meier, E., & Budin, H. (2001). Enhancing teacher learning with technology: The role of curriculum design in a situated training model. Paper presented at the American Educational Research Association, Seattle.

Meier, E., & Horton, D. (2005). The role of content knowledge in the integration of technology. Paper presented at the American Educational Research Association Annual Meeting, Chicago, IL.

Meier, E., Jennings, S., Swan, K., & Rubenfeld, L. (2001). Professional development strategy for integrating technology: The role of the university facilitator. Paper presented at the American Educational Research Association, Seattle.

Meier, E., Swan, K., Jennings, S., & Rubenfeld, L. (2003). Building professional knowledge through technology integration. Paper presented at the American Educational Research Association Annual Meeting, Chicago, IL.

Mertler, C. (2002). Demonstrating the potential for web-based survey methodology with a case study. *American Secondary Education, 30*(2), 49. Retrieved from MasterFILE Premier database.

Meyer, J, and B. Rowan (1977), Institutionalized Organizations: Formal Structure as Myth and Ceremony. *American Journal of Sociology*, 83, 340-363.

Mills, S. C., & Tincher, R. C. (2003). Be the technology: A developmental model for evaluating technology integration. *Journal of Research on Technology in Education*, 35(3), 382. Retrieved from EBSCO*host*.

Moody, J., & Kindel, T. (2004). Technology in the Citadel school of business administration: Successes, failures and future steps. *TechTrends: Linking Research & Practice to Improve Learning*, *48*(5), 44-49.

Moore, G. A. (1991). Crossing the chasm. New York: Harper Business.

Morales, C., Knezek, G., & Christensen, R. (2008). Self-efficacy ratings of technology proficiency among teachers in Mexico and Texas. *Computers in the Schools*, *25*(1/2), 126-144. doi:10.1080/07380560802158004

Morling, B., McAuliffe, M., Cohen, L., & DiLorenzo, T. (2008). Efficacy of personal response systems ("clickers") in large, introductory psychology classes. *Teaching of Psychology*, *35*(1), 45-50. doi:10.1080/00986280701818516

Morrison, J. (2002). US higher education in transition. *On The Horizon*, *11*(1), 6-10. Retrieved from British Library Document Supply Centre Inside Serials & Conference Proceedings database.

Morrison, J. (2003). US higher education in transition. *On The Horizon*, *11*(1), 6-10. Retrieved from British Library Document Supply Centre Inside Serials & Conference Proceedings database.

Muller, E., Buteau, C., Klincsik, M., Perjesi-Hamori, I., & Sarvari, C. (2009). Systemic integration of evolving technologies in undergraduate mathematics education and its impact on student retention. *International Journal of Mathematical Education in Science & Technology*, *40*(1), 139-155. doi:10.1080/00207390802551602.

Nagasawa, R., & Wong, P. (1999). A Theory of Minority Students' Survival in College. *Sociological Inquiry*, *69*(1), 76-90. Retrieved from Academic Search Premier database.

Nasser, Jac. (2000). "Connecting with society: The changing role of the corporation." *Executive Speeches* 15, no. 2: 26.

National Center for Educational Statistics. (2001b). Projections of education statistics to 2011. Chapter 2: Enrollment in degree-granting institutions. Retrieved from http://nces.ed.gov/pubs2001/proj01/chapter2.asp

Nielsen, J. (2000). Designing web usability. Indianapolis, IN: New Riders.

Oppenheimer, T. (1997). The computer delusion. *The Atlantic Monthly*, 280(1), 45-62.

Oppenheimer, T. (2003). *The flickering mind: The false promise of technology in the classroom and how learning can be saved*. New York: Random House.

Owen, P., & Demb, A. (2004). Change dynamics and leadership in technology implementation. *Journal of Higher Education*, *75*(6), 636-666. Retrieved from Education Research Complete database.

Palak, D. (2004). Teachers' beliefs in relation to their instructional technology practices. Doctoral dissertation, West Virginia University, Morgantown. Retrieved from http://wvuscholar.wvu.edu:8881//exlibris/dtl/d3_1/apache_media/L2V4bGlicmlzL2R0bC9kM18xL2FwYWNoZV9tZWRpYS83MTAy.pdf

Park, C. C. (2003). In other (people's) words: Plagiarism by students—literature and lessons. *Assessment & Evaluation in Higher Education*, 28(5), pp. 471–488.

Park, J. J. (2009). When race and religion hit campus: An ethnographic examination of a campus religious organization. *Unpublished Dissertation*, University of California, Los Angeles.

Parker, R. M. (1990). Power, control, and *validity* in research. *Journal of Learning Disabilities*, 23, 613-620.

Patry, M. (2009). Clickers in large classes: From student perceptions towards an understanding of best practices. *International Journal for the Scholarship of Teaching & Learning*, *3*(2), 1-11.

Piispa, M., & Heiskanen, M. (2005). Violence against women survey in Finland; methodology and experiences. *Statistical Journal of the UN Economic Commission for Europe*, *22*(3/4), 255-263. Retrieved from Academic Search Premier database.

Plair, S. (2008). Revamping professional development for technology integration and fluency. *Clearing House*, *82*(2), 70.

Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, 29(1), 4-15.

Raley, Y. (2007). Why We Quit. *Scientific American Mind*, *18*(4), 74-79. Retrieved MasterFILE Premier database.

Roblyer, M. D., & Knezek, G. A. (2003). New millennium research for educational technology: A call for a national research agenda. *Journal of Research on Technology in Education,* 36(1), 60-71.

Robyler, M. D. & Edwards, J. (2000). Integrating educational technology into teaching and learning (2nd ed.). Upper Saddle River, NJ: Prentice-Hall.

Rogers, E. M. (1995). Diffusion of innovations (4th ed.). New York: The Free Press.

Sandholtz, J. H., Ringstaff, C., & Dwyer, D. C. (1997). Teaching technology: *Creating student-centered classroom.* New York: Teachers College Press.

Sandholtz, J. H., Ringstaff, C., & Dwyer, D. C. (2000). The evolution of instruction in technology-rich classrooms. In R. D. Pea (Ed.), *Technology and learning*. San Francisco, CA: Jossey-Bass.

Schlueter, E., & Schmidt, P. (2010). Special issue: Survey experiments. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, *6*(3), 93-95. doi:10.1027/1614-2241/a000010.

Senge, P. (1990). *The fifth discipline.* New York: Doubleday.

Seo, K., Templeton, R., & Pellegrino, D. (2008). Creating a ripple effect: Incorporating multimedia-assisted project-based learning in teacher education. *Theory Into Practice*, *47*(3), 259-265. doi:10.1080/00405840802154062.

Simmerman, S., & Swanson, H. (2001). Treatment outcomes for students with learning disabilities: How important are internal and external variability?. *Journal of Learning Disabilities, 34*(3), 221. Retrieved from Education Research Complete database.

Sitzmann T, KraigerK, Stewart D,Wisher R. (2006). The comparative effectiveness of web-based and classroom instruction: A meta-analysis. *Personnel Psychology, 59*,623–664.

Sitzmann, T., Bell, B., Kraiger, K., & Kanar, A. (2009). A multilevel analysis of the effect of prompting self-regulation in technology-delivered instruction. *Personnel Psychology*, *62*(4), 697-734. doi:10.1111/j.1744-6570.2009.01155.x.

Sitzmann, T., Bell, B., Kraiger, K., & Kanar, A. (2009). A multilevel analysis of the effect of prompting self-regulation in technology-delivered instruction. *Personnel Psychology,* *62*(4), 697-734. doi:10.1111/j.1744-6570.2009.01155.x.

Smith, B. L., & Hunter, R. (1988). Learning communities: A paradigm for educational revitalization. *Community College Review, 15(4).*

Snyder, D. P., Edwards, G., & Folsom, C. (2002). The strategic context of education in America 2000 To 2020: Part One. *On the Horizon*, 10 (2), 6-12.

Spotts, T. H., & Bowman, M. A. (1995). Faculty use of instructional technologies in higher education. *Educational Technology*, 56-64.

Stella, A., & Gnanam, A. (2004). Quality assurance in distance education: The challenges to be addressed. *Higher Education*, *47*(2), 143-160.

Stephens, J., Young, M., & Calabrese, T. (2007). Does moral judgment go offline when students are online? A comparative analysis of undergraduates' beliefs and behaviors related to conventional and digital cheating. *Ethics & Behavior*, *17*(3), 233-254. doi: 10.1080/10508420701519197

Stevens, J. (1996). *Applied multivariate statistics for the social sciences* (3rd ed.). hillside, NJ: Erlbaum.

Stuenkel, L. (n.d.). Gilroy, Calif., school is a model for technology integration. *Dispatch, The (Gilroy, CA).*

Sumner, M., & Hostetler, D. (1999). Factors influencing the adoption of technology in teaching. *Journal of Computer Information Systems*, 40, 81–87.

Sun, S., Pan, W., & Wang, L. (2010). A comprehensive review of effect size reporting and interpreting practices in academic journals in education and psychology. *Journal of Educational Psychology*, 102(4), 989-1004. doi:10.1037/a0019507

Sung Youl, P. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Journal of Educational Technology & Society*, *12*(3), 150-162. Retrieved from Academic Search Premier database.

Tabachnick & Fidell (1989). *Using multivariate statistics*. (2nd edition). New York: HarperCollins.

Taylor, H., Bremer, J., Overmeyer, C., Siegel, J., & Terhanian, G. (2001). Using internet polling to forecast the 2000 elections. *Marketing Research, 13*(1), 26-30. Retrieved from Business Source Premier database.

Turman, P. D., & Schrodt, P. (2005). The influence of instructional technology use on students' affect: Do course designs and biological sex make a difference? *Communication Studies*, 56, 109–129.

Ugar, W., Martindale, T., & Crawley, F. (2007). One professor's face-to-face teaching strategies while becoming an online instructor. *Quarterly Review of Distance Education*, *8*(4), 365-385.

US Bureau of Labor Statistics. (2002). Projections. Retrieved from http://www.bls.gov/home.htm

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478. Retrieved from EBSCO*host*.

Wade. J. (1995), Dynamics of organizational communities and technological bandwagons: an empirical investigation of community evolution in the microprocessor market. *Strategic Management Journal*, 16, 111-133.

Wang, Y.-M. (2002). When technology meets beliefs: Preservice teachers' perception of the teacher's role in the classroom with computers. *Journal of Research on Technology in Education*, 35(1), 150-161.

Weick, K. E. (1990). Technology as equivoque: Sensemaking in new technologies, in *Technology and Organizations*, P. S. Goodman and L. S. Sproull (Eds.), Jossey-Bass, San Francisco, 1-44.

Welbourne, T. M. (2007). Employee engagement: Beyond the fad and into the executive suite. *Leader to Leader*, 45-51

Wellman, J. (2003). The credit hour and public budgeting. *New Directions for Higher Education*, (122), 83.

White, B., & Fredericksen, J. (2000). Technological tools and instructional approaches for making scientific inquiry accessible to all. In M. Jacobson, & R. Kozma (Eds.), *Science and mathematics education: Advanced designs for technologies of learning* (pp. 321–360).

Wilson, B., Sherry, L., Dobrovolny, J., Batty, M., & Ryder, M., (2001). Adoption of learning technologies in schools and universities. In H.H. Adelsberger, B. Collis, & J. M. Pawlowski (Eds.), *Handbook on information technologies of education & training*. New York: Springer-Verlag, Rerieved from http://carbon.cudenver.edu/~lsherry/pubs/newadopt.htm.

Witmer, D. F. (1998). Introduction to computer-mediated communication: A master syllabus for teaching communication technology. *Communication Education*, 47, 162–173.

Witt, P. L. (2003). Enhancing classroom courses with Internet technology: Are course Web sites worth the trouble? *Community College Journal of Research and Practice*, 27, 429–438.

Witt, P., & Schrodt, P. (2006). The influence of instructional technology use and teacher immediacy on student affect for teacher and course. *Communication Reports*, *19*(1), 1-15. doi:10.1080/08934210500309843.

Woodall, M. (n.d.). CEO Forum on Education, Technology Releases Its Final Report. *Philadelphia Inquirer, The (PA).*

Wortman, P. M. (1994). Judging research quality. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 97-109). New York: Russell Sage Foundation.

Yates, D., Moore, Moore, D., McCabe, G. (1999). *The practice of statistics* (1st Ed.). New York: W.H. Freeman.

Yi, M., & Hwang, Y. (2003). Predicting the use of web-based information systems: Self-efficacy, enjoyment, learning goal orientation, and the technology acceptance model. *International Journal of Human-Computer Studies, 59*, 431–449.

Yu-Feng, L., & Hien, N. (2007). Get your degree from an educational ATM: An Empirical study in online education. *International Journal on E-Learning*, *6*(1), 31-40. Retrieved from Education Research Complete database.

Zeidenberg, M. (2008). Community colleges under stress. *Issues in Science & Technology, 24*(6), 53. Retrieved from MAS Ultra - School Edition database.

Appendix A

Survey Instrument

Faculty Attitude Towards Incorporating Technology

****All responses to this survey are kept confidential****

Instructions: Please read each statement then click on the circle next to the option that corresponds with your views about technology incorporation or type your response in the indicated box response as appropriate. PLEASE DO NOT PROVIDE A RESPONSE TO ANY QUESTION YOU DO NOT FEEL COMFORTABLE ANSWERING.

Part A: Demographic Information

1. Gender:

○ Male

○ Female

2. Age:

○ 29 or under

○ 30-39

○ 40-49

○ 50-59

○ 60 and over

3. How long have you been teaching at the University level?

○ Less than 2 years

○ 2-10 years

○ 11-20 years

○ 21-30 years

○ Over 30 years

4. Rank:

○ Adjunct

○ Associate

○ Assistant

○ Full

○ Other (Specify):

Part B: Use of Technology in Classroom Instruction

5. Have you ever received any type of computer training?

○ Yes

○ No

6. Where did you receive your training? (check all that apply):

Self-taught	Computer store	College or University	Never Received Training
☐	☐	☐	☐

Other (Please Specify):

7. What is your level of experience using computers?

- None
- Very limited
- Some experience
- Quite a lot
- Extensive

8. How often do you use computer-based assessment to measure students' abilities?

- Always
- Very Often
- Sometimes
- Rarely
- Never

9. Please indicate which software you have used to aid in classroom instruction (Please check all that apply):

- Word Processing Programs (Microsoft Word, Pages, Word Perfect, etc.)
- Spreadsheet Programs (Microsoft Excel, Lotus 123, Numbers etc.)
- Databases (Oracle, MS Access, MS-SQL Server, DB2, Informix etc.)

☐ Presentation Programs (Microsoft Power Point, Freelance Graphics, Keynote etc.)

☐ Statistics Packages (SPSS, Stata etc.)

☐ Desktop Publishing (Adobe FrameMaker, Adobe InDesign, Adobe PageMaker and QuarkXPress etc.)

Other (Please Specify):

[ ]

10. How often do you use email to communicate with students?

○ Always

○ Very Often

○ Sometimes

○ Rarely

○ Never

11. I design lessons that include the use of technology:

○ At least once per week

○ At least once every other week

○ At least once per month

○ At least once every other month

○ Never

12. I use technology to collect and/or analyze data in order to make decisions regarding changes I may want to make in my instructional strategies.

- Always
- Very Often
- Sometimes
- Rarely
- Never

13. I use technology to create various assessment instruments (checklists, rubrics etc.) to evaluate my students' work.

- Always
- Very Often
- Sometimes
- Rarely
- Never

Part B: Faculty Attitude towards Technology Integration into Classroom Instruction

14. If given the opportunity, I would like to learn about and use technology.

- Strongly Disagree
- Disagree

- Undecided
- Agree
- Strongly Agree

15. Teacher training should include instructional applications of technology.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

16. I believe all faculty members should know how to use instructional technology.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

17. I believe using instructional technology would significantly improve the overall quality of my students’ education.

- Strongly Disagree

- Disagree
- Undecided
- Agree
- Strongly Agree

18. I believe computer technology integration would help students work with one another.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

19. I believe integrating instructional technology would help me organize my work and increase my productivity.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

20. I believe that using instructional technology makes the student feel more involved in the lesson.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

21. More courses should use e-mail or the internet to disseminate class information and assignments.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

22. Using the instructional technology allows for more interaction between students enrolled in the course.

- Strongly Disagree
- Disagree

- Undecided
- Agree
- Strongly Agree

23. Using the internet allows for more interaction between students and instructors.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

24. I prefer e-mail to traditional paper handouts as an information disseminator.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

25. My students are required to use computers in order to complete their course assignments.

- Strongly Disagree

Disagree

Undecided

Agree

Strongly Agree

Part C: Faculty Perception of their Organization's Role in Providing Professional Development to meet their Technology Needs

26. I have an immediate need for training on integrating technology into my curriculum.

Strongly Disagree

Disagree

Undecided

Agree

Strongly Agree

27. Organizations should provide ongoing training on the use of technology in the classroom.

Strongly Disagree

Disagree

Undecided

Agree

Strongly Agree

28. My organization provides technology training opportunities for me.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

29. I have attended technology training provided by my organization on using the computer in my curriculum.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

30. I would not be using technology to the same degree if I had not attended the training my organization provided.

- Strongly Disagree
- Disagree
- Undecided

- Agree
- Strongly Agree

Appendix B

Permission Letter

Auburn University
College of Education
Educational Foundations, Leadership and Technology
4036 Haley Center
Auburn, AL 36849-5221

Dear Educator:

My name is Donna V. Palmore I am a doctoral candidate in the Department of Educational Foundations, Leadership and Technology at Auburn University. I am currently working on my dissertation entitled **"University Faculty Attitude towards Integrating Technology into Their Classroom *Curriculum*."** I am hereby seeking your permission to survey your teaching faculty members (after IRB approval) to determine the factors that affect their decisions to integrate technology into their regular teaching instructions. If your faculty members decide to participate in this research study, they will be asked to complete a 30 question online survey about their attitude towards technology integration. Their total time commitment will be approximately 15 minutes.

There are no risks associated with participating in this study as the survey will be administered anonymously and no identifying information such as IP addresses will be collected or used. In addition, I will provide you with an aggregate report of your faculty members' responses.
If you have questions about this study, please contact Donna V. Palmore at (334)558-7508 or Dr. Ivan Watts at (334) 844-3556.

Enclosed is a copy of the Electronic information letter that would be sent to your faculty members (upon receiving IRB's approval) to conduct this study and a self-addressed stamped envelope for you to return your site authorization letter if this study meets with your approval. Your favorable response will be greatly appreciated.

Sincerely,

Donna Palmore
Doctoral Candidate
Educational Foundations, Leadership and Technology
Auburn University
Enclosure

Appendix C

Electronic Information Letter

Auburn University
College of Education
Educational Foundations, Leadership and Technology
4036 Haley Center
Auburn, AL 36849-5221

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

INFORMATION LETTER
for a Research Study entitled
"*Faculty Attitude Towards Technology Use in Teaching and Learning.*"

You are invited to participate in a research study to determine how professional development opportunities affect your decision to integrate technology into your regular teaching instructions. The study is being conducted by Donna V. Palmore, Doctoral Candidate under the direction of Dr. Ivan Watts, Faculty Advisor and Associate Profession in the Auburn University Department of Educational Foundations, Leadership and Technology. You were selected as a possible participant because you are a teaching faculty member) and are age 19 years or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to complete a 30 question survey about your attitude towards technology integration. Your total time commitment will be approximately 15 minutes.

Are there any risks or discomforts? There are no risks associated with participating in this study as the survey will be administered anonymously and no identifying information will be collected or used. To ensure that your data remains anonymous, data will only be reported in groups of 10 or more.

Are there any benefits to yourself or others? If you participate in this study, you can experience the extrinsic reward of assisting educators and university leaders develop resources to help faculty members integrate technology into their curriculum.

If you change your mind about participating, you can withdraw at any time by closing your browser window. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Once you've submitted anonymous data, it cannot be withdrawn since it will be unidentifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Education or the Department of Educational Foundations, Leadership and Technology.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by not recoding any identifiable information such name or your IP address. Information collected through your participation may be used to fulfill an educational requirement, published in a professional journal, and/or presented at a professional meeting.

If you have questions about this study, please contact Donna V. Palmore at (334)558-7508 or Dr. Ivan Watts at (334) 844-3556.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334) 844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

Donna Palmore 05/11/2011

The Auburn University Institutional Review Board has approved this document for use from May 11, 2011 to May 10, 2012 Protocol #11-151 EX 1105.

LINK TO SURVEY

Appendix D

IRB Protocol Approval Notice

Protocol 11-151 EX 1105# , approved

Human Subjects [hsubjec@auburn.edu]

To: Donna Richardson

Cc: Sheri Downer; Ivan Watts

Attachments: (2) Download all attachments
Investigators Responsibil~1.docx (16 KB) [Open in Browser]; map to Ramsay offices.pdf (408 KB) [Open in Browser]

Dear Ms. Richardson,

Your revisions to your protocol entitled "Faculty Attitude Towards Technology Use In Teaching and Learning" have been reviewed. Your protocol has now received final approval as "Exempt" under 45 CFR 46.101(b)(2).

This e-mail serves as official notice that your protocol has been approved. A formal approval letter will not be sent unless you notify us that you need one. By accepting this approval, you also accept your responsibilities associated with this approval. Details of your responsibilities are attached. Please print and retain.

You may begin your study using the information letter to which you have added the IRB approval information.

Your protocol will expire on May 10, 2012. Put that date on your calendar now. About three weeks before that time you will need to submit a final report or renewal request. (You might send yourself a delayed e-mail reminder for next April)

If you have any questions, please let us know.

Best wishes for success with your research!
Susan

Susan Anderson, IRB Administrator
IRB / Office of Research Compliance
115 Ramsay Hall (basement) **See map attached***
Auburn University, AL 36849
(334) 844-5966
hsubjec@auburn.edu

Appendix E

IRB Approval Agreement

READ, PRINT AND RETAIN THIS DOCUMENT

The Auburn University Institutional Review Board
Office of Research Compliance – Human Subjects
307 Samford Hall
334-844-5966, fax 334-844-4391, hsubjec@auburn.edu

Investigators: By accepting this IRB approval for this protocol, you agree to the following:

1. No participants may be recruited or involved in any study procedure prior to the IRB approval date or after the expiration date. (PIs and sponsors are responsible for initiating Continuing Review proceedings via a renewal request or submission of a final report.)

2. ***All protocol modifications*** will be approved in advance by submitting a modification request to the IRB unless they are intended to reduce immediate risk. Modifications that must be approved include adding/changing sites for data collection, adding key personnel, and altering any method of participant recruitment or data collection. Any change in your research purpose or research objectives should also be approved and noted in your IRB file. The use of any unauthorized procedures may result in notification to your sponsoring agency, suspension of your study, and/or destruction of data.

3. ***Adverse events or unexpected problems*** involving participants will be *reported within 5 days* to the IRB.

4. A ***renewal*** request, if needed, will be submitted three to four weeks before your protocol expires.

5. A ***final report*** will be submitted when you complete your study, and before expiration. Failure to submit your final report may result in delays in review and approval of subsequent protocols.

6. ***Expiration*** – If the protocol expires without contacting the IRB, the protocol will be administratively closed. The project will be *suspended* and you will need to submit a new protocol to resume your research.

7. ***Only the stamped, IRB-approved consent document or information letter will be used*** when consenting participants. Signed consent forms will be retained at least three years after completion of the study. Copies of consents without participant signatures and information letters will be kept to submit with the final report.

8. You will not receive a formal approval letter unless you request one. ***The e-mailed notification of approval to which this is attached serves as official notice.***

All forms can be found at http://www.auburn.edu/research/vpr/ohs/protocol.htm

Appendix F

Permission to use Survey Instrument

RE: Permission to use FAIT and/or TAT instruments in dissertation

Gerald Knezek [gknezek@gmail.com]

To: Christensen, Rhonda [Rhonda.Christensen@unt.edu]; Donna Richardson

Cc: gknezek@gmail.com; rhonda.christensen@gmail.com

- You replied on 1/20/2011 6:02 AM.

Hi Donna, You have permission to use the FAIT and TAT in your dissertation research. Please cite the proper source when you distribute them and let us know the results of your study!

Regards,
Gerald Knezek

Regents Professor of Learning Technologies, University of North Texas

At 3:13 PM -0600 1/19/11, Christensen, Rhonda wrote:
>Hi Donna
>I am cc'ing this to Dr. Gerald Knezek the first author of the TAT.
>Dr. Knezek is also the first author of the book in which the FAIT is
>located.
>Best of luck and thank you for your well-written message.
>Rhonda Christensen
>
>******************************
>Rhonda W. Christensen, Ph.D.
>Research Scientist
>FIPSE simMentoring Project Director
>NSF m-SOS-w Project Coordinator
>Institute for the Integration of Technology into Teaching and Learning (IITTL)
>University of North Texas
>Email: rhonda.christensen@gmail.com
>Web: courseweb.unt.edu/rhondac
>Project Web: www.iittl.unt.edu
>
>
>"The purpose of life is a life of purpose."
>Unknown