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Faculty and teacher candidate computer self - efficacy and the relationship of faculty computer self -efficacy, technology professional development, and technology use

Rebecca A. Callaway

FACULTY AND TEACHER CANDIDATE COMPUTER SELF-EFFICACY AND THE RELATIONSHIP OF FACULTY COMPUTER SELF-EFFICACY, TECHNOLOGY PROFESSIONAL DEVELOPMENT, AND TECHNOLOGY USE

by

Rebecca A. Callaway, B.S., M.Ed.

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We hereby recommend that the dissertation prepared under our supervision by Rebecca Ann Callaway entitled Faculty and Teacher Candidate Computer Self-Efficacy and the Relationship Of Faculty Computer Self-Efficacy, Technology Professional Development, and Technology Use be accepted in partial fulfillment of the requirements for the Degree of Doctor of Education.

Supervisor of Dissertation

Head of Department

Curriculum, Instruction, & Leadership
Department

Recommendation concurred in:

Advisory Committee

Approved:

Director of Graduate Studies

Dean of the College

Approved:

Dean of the Graduate School

ABSTRACT

The purpose of this study was to examine the possible relationship among faculty computer self-efficacy, technology professional development, and the extent of technology use in Louisiana's college and university classrooms. Additionally, faculty computer self-efficacy and teacher candidate computer self-efficacy were compared.

Participation was voluntary, involving higher education faculty and teacher candidates from the nineteen teacher preparation institutions within Louisiana. Faculty completed online surveys. A 30-item Likert-type scale was used to measure computer self-efficacy. Faculty also reported their involvement in technology training over the last five years and their technology use in the classroom. Teacher candidates completed either an online or print copy of the computer self-efficacy survey.

Data analysis involved a factor analysis of the computer self-efficacy scale, the identification of five computer self-efficacy constructs, a 4 x 3 ANOVA, and contingency coefficients to determine the correlation of nonparametric items.

Results of this study indicate a significant relationship between faculty computer self-efficacy and the extent of technology use. A significant relationship between technology professional development and technology use was also detected. Analysis of the data failed to confirm an interactive effect between faculty computer self-efficacy and technology professional development related to technology use. Results suggest an inverse relationship between tenure and computer self-efficacy, with observed tenured

faculty members' computer self-efficacy scores lower than expected scores. The results of this study also found no difference in faculty members' computer self-efficacy and teacher candidates' computer self-efficacy.

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DEDICATION

This dissertation is dedicated to my parents, who instilled in me a love of learning and an inquisitive nature. Thanks for all of the love and support through the years. I always knew that anything was possible because you believed in me.

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CHAPTER I

INTRODUCTION

While the introduction of computers into the classroom provides a variety of possible activities, teachers have long struggled with technology's functional role and influence in the classroom. Although technology cannot change bad teaching to good teaching, it can enhance good teaching (Sandholtz, Ringstaff, & Dwyer, 1997).

Technology's greatest impact on education may not be directly measured by test scores and improved content retention, but may lie, as Kerr (2004) suggests, in fundamental changes in the ways and means by which students learn, think, and interact with each other and the world. These changes involve students building upon their prior knowledge to construct their own understanding of the world around them. Students are no longer limited to a textbook author's perception of the subject but are able to use technology as one of many tools in gathering data and developing an understanding of the subject (Kerr). With a seemingly endless source of resources available students are challenged to filter, sort, and absorb the information they need.

The Information Literacy Competency Standards for Higher Education (Association of College and Research Libraries, 2000) indicate that students need numerous and repeated opportunities to research and manipulate data from multiple sources. The use of technology greatly facilitates these activities by means not possible without technology. Use of a problem-based approach affords students the opportunity to delve deeper into course content, while allowing them to develop a better understanding of the material than is typically afforded in the traditional classroom with a lecture and textbook approach (Association of College and Research Libraries).

Technology allows students to learn in their own way, at their own pace, and in ways not available without technology. Smith (1997) states "Technology adds the tools that facilitate access to the people, content, strategies, activities, guidance, and opportunities to apply new information that makes learning a personal process" (p. 38). Furthermore, Smith states that technology allows students to chose "how, when, and where they participate in the learning process" (p. 38).

Although universities have made enormous investments in technology during the last forty years, teaching methods in higher education have essentially stayed the same, with lecture remaining the most dominant mode of instruction for the majority of faculty members in some departments (Cuban, 2002). Yet Cuban, in examining technology use by faculty members (n = 750) at a prestigious research university, found that higher education faculty members tend not to be fearful of technology, readily embracing technology tools for research and course preparation both at the office and at home. This widespread acceptance and adoption of technology for research by faculty members does not extend into the classroom, however. As Mehlinger and Powers (2002) suggest, faculty members who are content to be labeled “old fashioned” for not integrating technology into their teaching would find the same label regarding their research practices distasteful.

Extensive research into school change and school reform has occurred during the last forty years. Yet, little of this research involves higher education (Mehlinger & Powers, 2002). Although university presidents and boards of trustees indicated their reasons for investing in technology was to "revolutionize teaching and learning" (Cuban, 2002), few faculty members integrate technology into teaching, choosing instead to cling to traditional teaching methods (Cuban,; Kagima, 1998; Mehlinger & Powers,; Moursund & Bielefeldt, 1999).

Research by Hannan, English, and Silver (1999) into the nature of change and innovations in teaching and learning in higher education showed that changes in teaching and instructional methods largely reflected faculty members' desire to improve student learning and meet the needs of the students. Many of these innovators felt trapped between their traditional teaching methods and new and different student needs, with no other option but to change (Hannan et al.). Yet, change is not easy. Knowing what to change and how to change in order to integrate technology is a challenge. Proper integration of technology involves identifying the characteristics of the student, understanding the course content, and utilizing the appropriate learning process while applying the appropriate technology (West & Daigle, 1993). The Boyer Commission on Educating Undergraduates in the Research University (Kenny, 1998) suggested that higher education faculty members should be redesigning courses using technology to enhance teaching rather than using technology to replace teaching. In 1999 the National Survey of Information Technology in Higher Education indicated that assisting faculty efforts to integrate technology into their classes was the top-ranked information technology issue for colleges and universities (Green, 1999).

Traditionally, faculty development has been an individualized activity with faculty members typically involved with research, conferences, or travel with little or no formal or institution-sponsored faculty development activities. The presence of technology on college campuses necessitated the creation of technology professional development programs as groups of faculty members had similar needs regarding faculty development (Mehlinger & Powers, 2002). Schools and colleges of education across the nation received $75 million in federal funding during fiscal year 1999 for technology professional development activities (Mehlinger & Powers). Although the need for technology integration was apparent and funding was available, widespread technology integration did not occur. Participants at the second National Technology Leadership Retreat (NTLR), comprised of leaders from thirteen national education associations, concluded that, while accreditation standards require technology integration into the teaching curriculum, technology integration is viewed as an “add on” which routinely occurs in separate stand alone courses and is not integrated into method courses (Bell, 2001).

Changes in pedagogy toward a more constructivist approach coupled with the inclusion of technology takes time, typically involving years, not weeks or months (Gillingham & Topper, 1999; Sandholtz et al., 1997). Changes in teaching methods and the integration of innovations are not easy, not even for the experts in the field of education. In a nation-wide survey commissioned by the Milken Exchange on Education Technology and the International Society for Technology in Education and involving 416 teacher training institutions, Moursund and Bielefeldt (1999) ascertained that faculty technology skills were comparable to the skills of their students with 67% of the institutions' faculty members modeling technology in half or fewer of their preservice teacher program courses.

Various forms of technology professional development have been available to interested Louisiana college and university faculty members. The state of Louisiana was awarded a three-year $1.6 million catalyst grant, Technology in Higher Education | Quality Education for Students and Teachers (T.H.E. | QUEST), from the United States Department of Education through the Preparing Tomorrow's Teachers Today (PT3) program in 1999 (Louisiana Systemic Initiatives Program, 2002). T.H.E. | QUEST provided technology professional development opportunities for faculty members across Louisiana involved in teacher preparation. T.H.E. | QUEST professional development facilities were available at two universities, one located in the north central area of the state and the other in the southern part of the state. While specifically targeting language arts, social studies, mathematics, science, and education faculty members, T.H.E.| QUEST technology professional development sessions were open to all higher education faculty members within the state of Louisiana (Louisiana Systemic Initiatives Program). Additional technology professional development on Professional Accountability Support System Portfolio (PASS-PORT), an electronic portfolio development software, has also been offered on a statewide level. All state colleges and universities use BlackBoard, a web-based course management system, and offer numerous faculty development workshops on BlackBoard. Additionally, BlackBoard is a common topic for presentations at the Teaching in Higher Education Forum (T.H.E. Forum), a statewide conference held each spring since 1998 by Louisiana State University. While some faculty members have taken advantage of these opportunities, other faculty members opt to integrate technology on their own with little or no faculty development. Still other faculty members choose not to integrate technology.

Purpose of the Study

The purpose of this study was to examine the possible relationship among faculty computer self-efficacy, technology professional development, and the extent of technology use in Louisiana's college and university classrooms. Additionally, faculty computer self-efficacy and teacher candidate computer self-efficacy were compared.

Significance of the Problem

Technology affects all aspects of modern life. College students arrive on campus with an ever-increasing level of computer sophistication, many with a personal computer in hand. These students are accustomed to videocassette recorders, digital videodiscs, satellite dishes, and computers. The technological prowess of college students makes it difficult for faculty members to retain traditional teaching methods and avoid technology integration (Zhao & Cziko, 2001) as students' demands for technology in the classrooms increase. Yet, for the preservice teacher, the need for technology integration in the university classroom goes beyond course content.

Teacher candidates observe teaching methods being modeled daily in each of their classes, regardless of the subject matter. Additionally, teacher candidates observe technology use, misuse, or non-use in their university classes. Technology modeling allows teacher candidates to observe the routine use of technology within the teaching environment. The quality, appropriateness, and usefulness of the technology used in these classrooms can influence teacher candidates' computer self-efficacy as vicarious experiences, such as these, strongly influence the individuals' beliefs in succeeding with technology (Bandura, 1997). Faculty who are trained, not only to be technology proficient but able to integrate technology into their teaching, play an integral part in the development of technology proficient teacher candidates who are comfortable integrating technology into their teaching (Vannatta & Beyerbach, 2000). The importance of modeling is therefore not limited to classes in the colleges of education, but entails all areas of the university. While the teacher education unit is ultimately accountable for the development of quality teachers, the responsibility and influence of faculty members from other disciplines within the university cannot be overlooked.

Research Questions

This study addresses the following research questions:

1. Is there a relationship between the specific constructs of the Computer Use Self-Efficacy Scale (CUSE) and faculty members' technology professional development?
2. Is there an interaction effect between faculty self-efficacy and professional development related to technology use?
3. Is there a relationship between faculty members' computer self-efficacy and the extent of their technology use?
4. Is the level of technology use influenced by the extent of faculty members' technology professional development?
5. Is the level of faculty computer self-efficacy related to specific demographic variables?
6. Is there a difference between faculty computer self-efficacy and teacher candidate computer self-efficacy?

Null Hypotheses

Null hypothesis 1 states: There is no relationship between the specific constructs of the Computer Use Self-Efficacy Scale (CUSE) and technology professional development.

Null hypothesis 2 states: There is no interaction effect between self-efficacy and technology professional development as related to the extent of faculty members' technology use.

Null hypothesis 3 states: There is no relationship between faculty members' computer self-efficacy and the extent of faculty members' technology use.

Null hypothesis 4 states: There is no relationship between faculty members' technology professional development and the extent of faculty members' technology use.

Null hypothesis 5 states: There is no relationship between specific characteristics of faculty members and their level of computer self-efficacy.

a. There is no relationship between department affiliation and faculty computer self-efficacy.

b. There is no relationship between tenure status and faculty computer self-efficacy.

c. There is no relationship between gender and faculty computer self-efficacy.

Null hypothesis 6 states: There is no difference in the mean computer self-efficacy between faculty members and teacher candidates.

Definitions

Clinical Practice

The National Council for Accreditation of Teacher Education (NCATE) refers to the preservice internship or student teaching activities of teacher candidates as clinical practice (National Council for Accreditation of Teacher Education, 2004). This study used the definition of clinical practice provided by NCATE.

Complexity

Rogers (2003) defined complexity as "the degree to which an innovation is perceived as relatively difficult to understand and use." This study used the definition of complexity provided by Rogers.

Computer Self-Efficacy (CSE)

This study employed Cassidy and Eachus' (2002) definition of computer self-efficacy as the belief in one's ability to perform a given task within the computer domain.

Diffusion of Innovations

This study used the Rogers' (2003) definition of the diffusion of innovations as a four-step process whereby individuals within a system adopt an innovation. Diffusion of an innovation involves (1) the innovation, (2) communication, (3) time, and (4) a social system.

Faculty Member

Faculty member was defined as teaching faculty employed on a full-time basis. Graduate Assistants and Teaching Assistants were specifically excluded from this study.

Instructional Technology

Instructional technology was defined as technology used by instructors and/or learners in the educational environment to aid in the learning or assessment process.

PASS-PORT

Professional Accountability Support System-Port (PASS-PORT) is an interactive software database designed to serve as an online portfolio system for Louisiana's preservice teachers. University faculty members, administrative staff, and students use PASS-PORT in gathering and documenting data for inclusion in the electronic portfolio during preservice years and the first three years of a new teacher's career.

Self-Efficacy

This study utilized Bandura's (1997) definition of self-efficacy as the self-confidence to complete a given task. Individual's beliefs regarding competency to complete a given task is situationally dependent and domain-based. Strong self-efficacy in one domain does not guarantee strong self-efficacy in another domain.

Teacher Candidate

Various terms are frequently used to describe undergraduate students in the field of education. NCATE currently refers to students enrolled in teacher preparation programs as "teacher candidates." (National Council for Accreditation of Teacher Education, 2004) Some references cited within this study refer to teacher candidates as "preservice teachers."

Technology Professional Development

For the purpose of this study, technology professional development was defined as specific technology-related organized learning activities for faculty members.

Technology Use

For the purposes of this study, technology use is limited to faculty member and student use of technology in the classroom and/or online for course-related activities. Faculty members' and teacher candidates' personal technology use and research activities are specifically excluded from this study.

T.H.E |QUEST Program

Technology in Higher Education Quality Education for Students and Teachers (T.H.E.|QUEST) was a faculty development program funded through the United States Department of Education's Preparing Tomorrows Teachers Today (PT3) program from 1999-2003. T.H.E.|QUEST faculty development sessions focused on assisting higher education faculty members in learning to integrate technology into their teaching. The program was originally designed for education, arts, and science faculty members from the nineteen universities and colleges across Louisiana that offer teacher preparation programs.

Limitations of the Study

Generalizability Limitations

The results of this study reflect voluntary participation by faculty members and teacher candidates from universities and colleges within Louisiana. Due to the methods employed in obtaining faculty email addresses and the variety of means used to distribute the survey, not all faculty members were contacted for participation in the study. As such, the generalizability of the findings is limited.

Self-Report Survey Limitations

The study was limited to two variations of one self-report survey instrument. Both faculty and teacher candidates completed the computer self-efficacy scale and a demographic section. Additionally, faculty reported their technology professional development experiences during the last five years and their use of technology in the classroom and online for class activities. The results of the study are therefore limited to the accuracy of the participants' responses.

Online Survey Limitations

Faculty participation in this study was limited to an online self-report survey. The results of the study are therefore limited to those faculty participants who use email and the Internet. A small portion of the teacher candidate survey was gathered online. Therefore, the results of the study are also limited by the online availability and accuracy of some teacher candidates' email addresses.

Significance of the Study

Numerous studies have tied computer self-efficacy to computer use. Other studies have focused on technology professional development and computer use. A review of literature indicates little research on the inter-relationship of computer self-efficacy, technology professional development, and the integration of technology in higher education courses. If a relationship between computer self-efficacy and technology integration does exist, this may provide insight into faculty members' willingness or reluctance to integrate technology into their classes. Additionally, the relationships among computer self-efficacy, technology professional development, and technology integration may indicate the extent of needed technology professional development and possible directions for future professional development activities for Louisiana's higher education faculty members. If computer self-efficacy is a factor in technology adoption and successful use requires computer self-efficacy, then technology professional development may need to include activities to boost self-efficacy (Compeau & Higgins, 1999).

Faculty who are technology proficient and able to integrate technology into their teaching and model technology use in the classroom play an integral part in the development of technically sophisticated teacher candidates who are comfortable integrating technology into their teaching (Vannatta & Beyerbach, 2000). The importance of modeling is, therefore, not limited to the colleges of education, but pervades all areas of the university. While the teacher education unit is ultimately accountable for the development of quality teachers, the responsibility and influence of faculty members from other disciplines within the university cannot be overlooked.

CHAPTER II

REVIEW OF LITERATURE

The review of literature related to technology use is grounded in the theoretical framework that computer self-efficacy and technology professional development contribute significantly to the use and integration of technology in the classroom and the diffusion rate of innovations within higher education.

Diffusion of Innovations

Change denotes a development process during which experience leads to skill development and successful use of the innovation (Dooley, 1999). Individuals adopt innovations at different rates depending on their perception of these ideas. Rogers (2003), categorizing individuals according to their rate of adoption of an innovation as they relate to others, identified five categories: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%). Thus, the diffusion of an innovation follows a normal distribution and is represented with a bell-shaped curve divided into the five adoption categories (Chart 1).

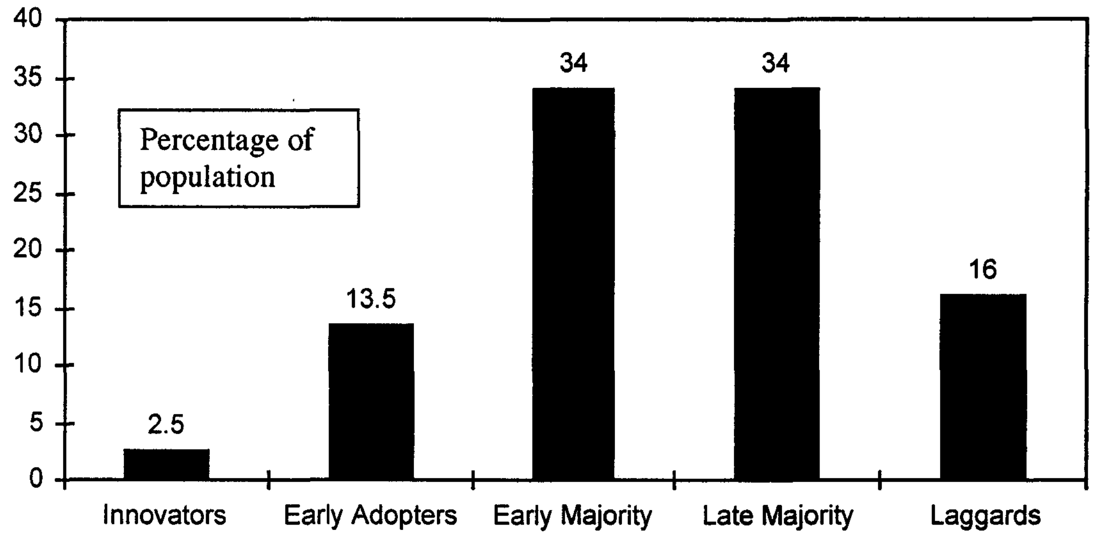

Chart 1. Roger's Diffusion of Innovation Adoption Categories

Based on Rogers (2003) Diffusion of Innovation Theory, this categorization of diffusion adopters is the generally accepted method for separating adopters in diffusion research. Rogers further explained that each of these categories plays an important role in the diffusion of an innovation within an organization.

The innovator's role in the diffusion process involves importing and experimenting with new and different ideas and innovations not found within the local system (Rogers, 2003). Innovators are intrigued with the novelty and uniqueness of new ideas and inventions while enjoying a playful enthusiasm for new designs separate and apart from their usefulness or practicality. As a result, the innovator is a gambler, as not all innovations prove to be successful. Organizations may look to innovators for new ideas but typically do not adopt innovations based on their recommendations.

Early adopters are respected by their peers and are sought after for their opinion and advice on innovations. Early adopters purposefully choose to adopt an innovation after carefully evaluating its usefulness. Rogers (2003) theorized that early adopters have more influence in the systemic adoption process than any other group.

Early majority members adopt an innovation before the average member of a system. Composed of one-third of the system's membership, the early majority's position between early adopters and late adopters provides a critical line of continuity in the diffusion process (Rogers, 2003). The early majority, carefully weighing the advantages and disadvantages of an innovation before adopting, are deliberate in their actions.

The late majority, composing an additional third of the system population, is generally characterized as cautious, as late majority members do not adopt until after half of the system's members have adopted. These conservative skeptics must be convinced of the usefulness of the innovation, typically pressured by their peers into adoption (Rogers, 2003).

Finally, Rogers (2003) stated that laggards are the last group within a system to adopt an innovation. While laggards tend to reference the past and traditional practices in their decision to adopt, the laggard's slow rate of adoption may reflect limited economic resources and not a reluctance to adopt.

Bennett and Bennett (2003) employed survey instruments before and after faculty development in examining factors that influenced faculty members' adoption of the BlackBoard Course Management System at a small liberal arts college. Twenty volunteer faculty members participated in the 30-week study. Faculty development activities included demonstrations and modeling of BlackBoard use by faculty members already using the system in their classes, guided practice and course development, and group discussions. After developing their own course in BlackBoard, participants were given the opportunity to share their course design and implementation plans with other participants. The survey instruments were comprised of four sections dealing with attitudes toward computers, computer self-efficacy, beliefs on technology enhancing the learning experience, and the usefulness of computers as an instructional tool. All four composites showed significant increases in pretest/posttest comparisons (Bennett & Bennett). Additionally, 90% of participants indicated that they would incorporate BlackBoard into the classroom-based courses for the upcoming academic year.

Results of a survey of faculty members (n = 557) at a Canadian research university showed that while the use of technology for research and professional communication is a common occurrence for most mainstream faculty members, the amount of technology integrated into the classroom by these faculty members is minimal (Anderson, Varnhagen, & Campbell, 1998). Based on the faculty members' technology use, each survey responder was categorized into one of Rogers' five adopter types. Anderson et al. postulated the existence of a chasm with innovators, early adopters, and technologists on one side and the majority of mainstream faculty members on the other side. Results of the study indicated the existence of a significant difference between early adopters and the mainstream faculty in the type of support needed to integrate technology. While most early adopters are self-taught, primarily needing only to have hardware and software made available to them and time for implementation; mainstream faculty members additionally need exposure to new technologies and new ideas, workshops, mentoring, interaction with instructional technologists, as well as collaboration with other faculty members (Anderson et al.). Qualitative data reflected many mainstream faculty members' strong opposition to technology integration into the classroom. Anderson et al. recommended that universities develop adoption strategies that focus not on the early adopters, but on mainstream faculty members. Concerns of the mainstream faculty members cannot be overlooked. As Linnell (1994) noted, faculty members' concerns change over time and can slow down or even stop the diffusion process.

If adoption of an innovation would benefit the system as a whole, why is the adoption process slow? Rogers (2003) concluded that individuals act in what they perceive as their own best interest, even if this is contrary to the best interest of the system. Yet, Rogers contended that, as the number of individuals adopting an innovation increases, a tipping point or critical mass is reached at which point the rate of adoption accelerates and becomes self-sustaining. If the rate of system-wide adoption of an innovation is dependent upon the individual's perceived best interest, then what controls the individual's adoption of an innovation?

Self-Efficacy

An individual's perceived self-efficacy focuses not on the skills he/she has available, but what he/she can do with those skills in different settings (Bandura, 1997). Bandura asserted that there are four main sources of information upon which self-efficacy is built: enactive mastery experiences, vicarious experiences with others, social persuasion, and various physiological states— the strongest influence being exerted by enactive mastery experiences.

Direct participation allows the individual hands-on experience and thereby provides authentic feedback and self-evidence as to the individual's ability. Self-perceived success in these experiences build self-efficacy while self-evaluated failures or shortcomings erode self-efficacy (Bandura, 1997). Observing the successes and failures of other individuals also affects a person's self-efficacy. Bandura contended that as a person compares and evaluates his/her skills to that of another individual's skills, self-efficacy is either elevated because of a positive comparison or lowered following a negative assessment. Social persuasion and the opinions of others have strong affects on self-efficacy. Although praise and positive reinforcement tend to raise self-efficacy, Bandura indicated that negative criticism and negative reinforcement exert an even stronger influence on self-efficacy. Bandura concluded that the influence of others is not limited to verbal persuasion, as the mere presence of a highly skilled individual may temporarily affect one's self-efficacy. Further, physiological states affecting self-efficacy include pain, illness, alertness, and familiarity with the task.

Computer Self-Efficacy

While Rogers (2003) defined complexity as "the degree to which an innovation is perceived as relatively difficult to understand and use," Bandura (1997) suggested this perceived level of complexity reflects the connection between the skills necessary to complete the task and the individual's capability to perform those skills. Following Bandura's theory, technology activities that are perceived as complex would become daunting tasks for individuals with low computer self-efficacy. Rogers further indicated that for any innovation the complexity and rate of adoption are negatively related. Therefore, more complex innovations are adopted at a slower rate than less complex innovations. Following Bandura's theory, those individuals who perceive technology integration as a complex process in which they lack confidence will be slow to adopt and embrace technology.

The inclusion of computer self-efficacy is a critical component for technology integration because individuals must possess not only the necessary skills but the confidence to use those skills successfully (Compeau & Higgins, 1999). While computer self-efficacy is viewed as a prerequisite to technology use, computer self-efficacy is also affected by technology use. Therefore, measurements of computer self-efficacy function as both cause and effect, in some instances exerting a positive or negative spiraling effect (Compeau & Higgins). Bandura (1997) stated that low self-efficacy may result in failure to apply what is learned. If self-efficacy is low enough, an individual may not attempt simple skills involving minimal steps even though the concept is well understood.

Ferguson (2001), in a study analyzing the relationship of computer self-efficacy, computer experiences, and computer knowledge of college students ($n = 153$), found that computer experiences affect computer self-efficacy, with computer self-efficacy being a reliable predictor of computer skills. Cassidy and Eachus (2002), indicated that participation in technology training significantly increased computer self-efficacy. Additionally, results of their study indicated a significant difference in computer self-efficacy between the genders, with males having higher computer self-efficacy scores than females. Further, technology training did not affect the role gender played in computer self-efficacy scores with males consistently having higher computer self-efficacy scores than females before and after technology training (Cassidy & Eachus).

Findings from two separate studies (Compeau & Higgins, 1999; Decker, 1998) indicate that low computer self-efficacy is not a time-limited event and that computer self-efficacy is a reliable predictor of technology use even over a lengthy period of time.

Attitudes toward computers affect an individual's computer self-efficacy (Zhang & Espinoza, 1998). In examining computer self-efficacy, attitudes toward computers, and the desire to learn computing skills, Zhang and Espinoza surveyed undergraduate students at a regional state university in the southwest. Results of a multiple regression analysis of their survey data indicated that computer comfort/anxiety is a significant predictor of computer self-efficacy. Further results implied that attitudes toward computer and computer self-efficacy are significant predictors of desirability of learning computer skills.

Torkzadeh, Pfulghoeft, and Hall (1999), in surveying undergraduate business majors, ($n = 414$) detected a positive correlation between training and computer self-efficacy. While individuals with positive attitudes towards computers showed a high correlation between training and computer self-efficacy, individuals with "negative" attitudes toward computers showed no significant change in computer self-efficacy following training. Torkzadeh et al. postulated that lack of interest in formal training might be indicative of the individual's belief that the training is unnecessary or inappropriate for his or her needs. Although negative attitudes toward computers develop at different times, Torkzadeh et al. suggested that for some individuals a negative attitude is a result of not staying current and feeling that their computer skills have slipped hopelessly into obsolescence with no possibility of improvement. Computer experience works to increase computer self-efficacy, with computer self-efficacy being the best predictor of computer skills and knowledge (Johnson et al., 2001).

Delcourt and Kinzie (1993) surveyed undergraduate and graduate students ($n = 328$) enrolled in education programs from six universities across the nation to measure computer attitudes and computer self-efficacy. The results of this study showed attitudes toward computers to be a significant predictor of computer self-efficacy for word processing, email, and CD-ROM databases. Delcourt and Kinzie suggested that enhancing users' computer experience could result in positive computer attitudes, increased computer self-efficacy, and technology adoption.

Data from the National Center for Education Statistics (NCES) indicated that in 2000-2001 over half of all two-year and four-year postsecondary institutions in the United States used the Internet for online courses with over 80% of those indicating plans to increase their use of online courses (National Center for Education Statistics, 2004). With vast numbers of students involved with online learning, it is important to examine the role computer self-efficacy plays in predicting online student satisfaction.

Lim (2001), in studying computer self-efficacy and academic self-concept among adult online learners (n = 235), found a significant relationship between computer self-efficacy and online student satisfaction of web-based courses. In examining the variables of age, gender, number of years of computer use, frequency of computer use, computer training and computer self-efficacy, Lim found computer self-efficacy to be the only predictor of online course satisfaction. While no significant relationship was indicated between the variables and web-based course satisfaction, Lim's multiple regression analysis showed that the combination of variables produced a predictive model for adult learners' intent to enroll in additional online courses. In measuring computer self-efficacy, Lim chose Eachus and Cassidy's Computer User Self-Efficacy Scale.

If self-efficacy is a factor in technology adoption and the successful use of technology requires self-efficacy, then technology professional development may need to include activities to boost self-efficacy (Compeau & Higgins, 1999). Individuals with a high computer self-efficacy are more willing to apply themselves in learning more difficult skills (Murphy, Coover, & Owen, 1988). Yet, efficacy beliefs affect computer performance regardless of level of education or prior computer experience (Bandura, 1997).

Hill, Smith, and Mann (1987), in examining the role of computer self-efficacy in predicting technology use, described two separate studies. In the first study, 304 undergraduate students were surveyed. The researchers concluded that computer self-efficacy influences an individual's decision to use technology separate from the individual's perceived value of using technology. In the second study on computer self-efficacy and predicted technology use, Hill et al. surveyed 133 undergraduate female students enrolled in a private midwestern university. Results of this study indicated that individuals who do not believe that they can exert control over computers are less likely to use computers or learn more about computers. Hill et al. indicate that computer self-efficacy beliefs can be of such a general nature as to affect and predict an individual's adoption decision regarding a wide variety of technology products. Thus, the use of technology-specific computer self-efficacy scales may be useful in determining general computer self-efficacy and predicting computer usage.

Faculty Development

Traditional faculty development involves self-motivated, self-guided professional scholars pursuing knowledge through research and readings without outside direction or input. The rapid evolution of technology makes this form of traditional faculty development obsolete, as faculty members find keeping up with changes on their own an impossibility (Camblin & Stegier, 2000). Technology integration involves not just using technology but changing teaching and learning (Coughlin & Lemke, 1999) while finding new and innovative ways to utilize technology in the classroom. Coughlin and Lemke concluded that for technology integration to occur faculty members must change their philosophy concerning how students learn and what is involved in professional development. Hagenson and Castle (2003), in investigating the integration of technology by college of education faculty members, found that faculty members learn about technology by collaborating with technologists, by collaborating with someone who is viewed as a teacher leader, or by gaining personal experience.

Faculty Computer Self-Efficacy

Faculty computer self-efficacy is crucial not only to diffuse technology in higher education but also to maximize the effects of technology integration within the classroom (Faseyitan, Libii, & Hirschbuhl, 1996). Faculty members may perceive the integration of technology into the teaching environment as complex (Bennett & Bennett, 2003), with those faculty members who lack confidence and self-efficacy in computer use choosing not to integrate technology into their teaching, regardless of the availability of hardware (Faseyitan et al., 1996). Rapid technological advances force faculty members to develop and refine technology skills continually or risk not having the skills or expertise to utilize technology effectively in their workplace (Hagenson & Castle, 2003). The technology learning curve for many faculty members is steep. Faculty members who are accustomed to being the source of knowledge and the expert suddenly find themselves in the role of novice technology student with little or no background knowledge. This shift in perspective is intimidating and frightening for faculty members (Rogers, 2000). Findings from a survey of university faculty members (n = 600) in Canada indicated a major concern of faculty members regarding technology integration was the possibility of experiencing technical difficulties while teaching (Larose et al., 1999).

Although research suggests computer self-efficacy affects computer use, is there a link between computer self-efficacy and technology integration by higher education faculty members? Faseyitan, Libii, and Hirschbuhl (1996) examined this question by surveying faculty members (n = 280) at a Midwest research university. Two surveys were utilized in the in-service program study, a pre-program survey, and a post-program survey. The pre-program survey provided baseline data on the computer self-efficacy of faculty members and the relationship of computer self-efficacy and technology adoption. The post-program survey measured computer self-efficacy and solicited participants' evaluation on the contribution of specific program activities in facilitating technology use in instruction. Survey respondents were classified as either adopters (59%) if they had used computers in their classroom or required students to use technology or as non-adopters (41%) if they did not to use technology in their classroom. Results of a t-test of computer self-efficacy scores showed a significant difference ($p < 0.0001$) between adopters and non-adopters (Faseyitan et al.). Additionally, adopters and non-adopters were found to be significantly different by years of service, with the probability of adoption decreasing as the number of years of service increases. Faseyitan et al. discerned that gender and discipline were not related to technology integration. While results of their study showed staff development activities increased computer self-efficacy, no significant relationship was found between staff development and technology integration.

Inman and Mayes (1998), in surveying community college faculty members (n = 861) on technology use and need, noted that rank, age, and teaching experience were not predictors of technology use. While Inman and Mayes observed that faculty members using one type of technology were more prone to request various additional types of technology, they also suggest that without research to determine faculty members' current technology use and technology needs, the results of technology professional development are minimal. Inman and Mayes further suggested that, while basic technology faculty development sessions fulfill the needs of many, additional technology professional development programs should be tailor-made to address specific individual or small group needs.

Faculty members' limited technology use may be indicative of their lack of confidence in using technology. In a study of faculty members' computer self-efficacy and technology integration, participants who used only email and word processing also had a low computer self-efficacy (Kagima & Hausafus, 2000). This cross-sectional survey involved teaching faculty members (n = 176) from the colleges of agriculture, education, and family and consumer sciences at Iowa State University of Science and Technology. Each of the three colleges selected for study offered distance education courses through the Iowa Communications Network and the Internet. An analysis of various technology integration surveys revealed no instrument measuring electronic communication skills. The survey scale developed by Kagima and Hausafus measured faculty members' use of various technologies in terms of hours per week, ranging from 1 (0 hours per week) to 3 (≥ 3 hours per week). Analysis of data using ANOVAs and t-tests showed significant difference in faculty members' computer self-efficacy with regard to years of teaching, age, tenure, gender, and college. Results of Kagima and Hausafus' study indicated low computer self-efficacy in each of the following groups: tenured faculty, faculty members over 60 years of age, and faculty with more than 10 years teaching experience. Gender was also a predictor of low computer self-efficacy, with females scoring lower than males. Kagima and Hausafus suggested that lower computer self-efficacy scores among females was limited to new technology, with no significant difference between genders on older technology, such as email. Results also indicated that faculty members in the College of Family and Consumer Sciences ranked lower in computer self-efficacy than their counterparts in agriculture and education. Scheffe post hoc comparisons indicated that faculty members 60 years of age or older, faculty members with 10 or more years experience, and faculty members from the College of Family and Consumer Sciences were less likely to integrate electronic communication technology into their teaching.

The adoption rate of technology teaching tools may not be consistent in all disciplines. Larose et al., (1999), in a study on the integration of information and communication technology, surveyed faculty members (n = 269) from fifty departments. In employing a convenience sample, Larose et al., ascertained that social science faculty members lag significantly behind faculty members of applied sciences in the adoption of technology teaching tools. Technology adoption by faculty members in the applied sciences was high, as was their technology skills self-rating. While results of the study indicated nearly half of law faculty members rated themselves "expert" users, law faculty members, along with theology, ethics, and philosophy faculty members integrated technology the least. Faculty members in education had a significantly lower attitude regarding the pedagogical value of technology than other faculty members. Additionally, education faculty members had a significantly higher level of computer anxiety.

Technology Professional Development and Computer Self-Efficacy

According to Rogers (2003), the willingness to adopt technology is affected by the individual's perception of one or more of the following characteristics of the innovation: (1) relative advantage, (2) trialability, (3) observability, (4) complexity, and (5) compatibility. A variety of faculty development venues may afford faculty members the opportunity to experience these characteristics of new technology. As an example, Bennett and Bennett (2003) suggested that faculty development sessions which focus on specific pedagogical advantages of the technology helped faculty members to become aware of the relative advantage of integrating technology into their classes. Assisting faculty members as they develop and implement the skills and teaching methods necessary for technology integration is a key issue not only in faculty development but in program development as well (Inman & Mayes, 1998).

In developing and validating a computer self-efficacy instrument, Compeau and Higgins (1995) surveyed over 1,000 business professionals. Results of this study indicated that encouragement of others indirectly influences behavior through its affect on self-efficacy. Based on these findings, colleges and universities need to be aware of the concept of computer self-efficacy and develop strategies for building computer self-efficacy within the institution. While just-in-time technical support may be the hope of many faculty, the interaction between faculty and support personnel may be critical as support personnel may actually negatively impact a faculty members' computer self-efficacy by failing to explain technical problems properly, leaving the individual feeling less in control and less competent in solving future technology problems. Individuals are more likely to increase their computer self-efficacy as a result of participating in training sessions in which they observe modeling of the use of technology, they are able to interact successfully with the technology, and they are reassured that they are capable of mastering the skills presented (Compeau & Higgins). Training sessions designed in such a manner entail three of the four principal sources of information that define an individuals' self-efficacy for a given task: vicarious experiences such as technology modeling, enactive mastery experiences such as hands-on activities, and verbal persuasion including positive affirmations regarding ability (Bandura, 1997).

In a follow-up study, Compeau and Higgins (1999) confirmed many of the findings of their earlier research. Computer self-efficacy remains to be a strong predictor of computer use and computer anxiety, even a year later. If low computer self-efficacy does not diminish with time, then intervention with training targeted at raising computer self-efficacy may be necessary to assure continued computer use (Compeau & Higgins). Additionally, Compeau and Higgins predicted that computer self-efficacy would remain a factor in an individual's decision to adopt technology, the amount of technology used by an individual, and a person's persistence in overcoming technical problems.

Delcourt and Kinzie (1993) determined that positive experiences in technology professional development increase computer self-efficacy and may influence faculty members' technology adoption and integration. Yet, technology adoption and changes in teaching activities and methods takes time. Batson and Williamson (1999) indicated that faculty members needed at least two years to begin the transition from traditional teaching methods in a teacher-centered classroom to a more technologically integrated student-centered classroom using constructivist methods and activities.

Technology Use

Various instruments have been employed in researching and evaluating technology integration at all levels of education. Technology integration research instruments can be grouped into seven categories based on the type of information the instrument was designed to gather: attitudes, needs, beliefs, knowledge, skills, behaviors, and levels of proficiency (Knezek, Christensen, Miyashita, & Ropp, 2000).

The adoption of instructional technology impacts not only the culture and practice but the very structure of today's universities (Anderson et al., 1998). Faculty members can be both knowledgeable in their subject area and possess technology skills yet fail to integrate technology successfully into their teaching. The use of technology by faculty members for professional activities and productivity is not necessarily an indication of technology integration in their teaching (Mills & Tincher, 2003). While teaching with technology is not about technology itself, it does involve using technology in new and different ways of teaching and learning (Coughlin & Lemke, 1999). Technology is a powerful tool with the potential to stimulate change and transform the classroom or preserve and perpetuate traditional teaching methods (Mehlinger & Powers, 2002).

Faculty members must find a personal comfort level in using technology. The impact of technology on higher education will not be manifested until faculty members are comfortable with technology and confident in its use. Yet, a faculty member's comfort level in technology skills does not automatically lead to a comfort level in teaching with that technology (Faseyitan et al., 1996). Faculty members who are proficient in using email may be overwhelmed by the thought of students emailing assignments as attachments, the sheer volume of email involved, or the time necessary to answer a multitude of students' questions via email. Successful integration of technology into the curriculum requires more than mere technology skill; it requires a philosophical shift toward a more constructivist student-centered learning environment for faculty members entrenched in a traditional teacher-centered classroom. If technology use is to enhance learning, then technology forces not the integration of technology into the traditional classroom but the renovation and redesign of the curriculum (U.S. Congress Office of Technology Assessment, 1995).

Faculty members must perceive a usefulness for the technology and must possess computer self-efficacy in order to effectively model technology integration for teacher candidates (Delcourt & Kinzie, 1993). Although the technology may be viewed as relatively easy to learn, faculty members may perceive the integration of the technology into the teaching environment as complex (Bennett & Bennett, 2003) and may not fully conceptualize how technology could aid them in their instruction nor comprehend the importance of their modeling technology for their students (Gillingham & Topper, 1999). Wesley and Franks (1996) theorized that technology adoption is not a linear progression but a multi-faceted process interrelated to faculty development, organizational change, organizational culture, skill development, and the complexity of the innovation. Therefore, technology adoption is a continuously evolving process both for individuals and organizations (Wesley & Franks).

Technology Use and the Teacher Candidate

The Boyer Commission on Educating Undergraduates in the Research University (Kenny, 1998) suggested that higher education faculty should be redesigning courses using technology to enhance teaching rather than to replace teaching. Teacher education candidates should use technology throughout their undergraduate and graduate courses and need to experience the integration of technology in their teaching method courses (Goldfield, 2001).

Based on results of Chiero's (1997) study of P-12 teachers (n = 36), faculty computer self-efficacy may play a vital role in the education of preservice teachers, as instructors who are comfortable with technology are better able to model technology integration. White (1999), in a study of 415 preservice teachers, found that participants valued technology integration and wanted more modeling of constructivism in their preservice classes.

Faculty development in higher education is critical in the development of technology proficient preservice teachers (Vannatta & Beyerbach, 2000). It is difficult for many preservice teachers to make the connection between what transpires in their university classrooms and their expectations of the K-12 classroom (Jones, 2002). Therefore, faculty who are trained not only to be technology proficient but able to integrate technology into their teaching and model technology use in the classroom play an integral part in the development of technically sophisticated teacher candidates who are comfortable integrating technology into their teaching (Beyerbach, Walsh, & Vannatta, 2001; Vannatta & Beyerbach).

Mastery modeling involves three steps: (1) effective modeling to establish rules and patterns that learners are able to generalize and apply in a variety of situations, (2) guided practice to help perfect skills, and (3) supervised successful application of the skills in a work environment (Bandura, 1997). Applying this concept to preservice teachers necessitates that effective technology modeling be extended to all courses— not limited to courses within the college of education.

Change in faculty members' technology use in the classroom and the effect of these changes on preservice teachers is a slow process. Changes in pedagogy toward a more constructivist approach coupled with the inclusion of technology takes time, typically involving years, not weeks or months (Gillingham & Topper, 1999; Sandholtz et al., 1997). Proper integration of technology involves identifying the characteristics of the student, understanding the course content, and utilizing the appropriate learning process while applying the appropriate technology (West & Daigle, 1993). For college of education faculty, the challenge of technology integration doubles as they must address technology integration in P-12 classrooms as well as in their own university classrooms (Stetson & Bagwell, 1999).

Conclusions from the Literature Review

The use of technology for research and professional communication is a common occurrence for most mainstream faculty members, yet the amount of technology integrated into the classroom by these faculty members is minimal (Anderson et al., 1998). While most early adopters of technology are self-taught, mainstream faculty members need professional development workshops, technology support, and collaboration with other faculty members (Anderson et al.).

Self-efficacy is built upon enactive mastery experiences, vicarious experiences with others, social persuasion, and various physiological states— the strongest influence being exerted by enactive mastery experiences (Bandura, 1997). Numerous studies have linked computer self-efficacy and technology use. While computer self-efficacy is viewed as a prerequisite to technology use, computer self-efficacy is also affected by technology use. Therefore, computer self-efficacy may exert a positive or negative effect on technology use (Compeau & Higgins, 1999).

While a clear connection between computer self-efficacy and computer use exists, research into the possible links between faculty computer self-efficacy, technology professional development, and technology use in the classroom has been limited and inconclusive. Participation in technology professional development significantly increases computer self-efficacy (Cassidy & Eachus, 2002; Torkzadeh et al., 1999). Yet faculty members who lack computer self-efficacy choose not to integrate technology into their teaching, regardless of the availability of hardware (Faseyitan et al., 1996). Individuals with a high computer self-efficacy are more willing to apply themselves in learning more difficult skills (Murphy et al., 1988). Yet, efficacy beliefs affect computer performance regardless of level of education or prior computer experience (Bandura, 1997).

While results of some studies found that gender and academic discipline not related to technology use in the classroom (Faseyitan et al., 1996), other research results indicated that rank, age, and teaching experience were not related to technology use (Inman & Mayes, 1998).

Low computer self-efficacy was linked to tenure, teaching experience, and faculty members over the age of 60. Additionally, previous studies have indicated that gender was related to computer self-efficacy with females scoring lower than males (Kagima & Hausafus, 2000).

While Faseyitan el al. found technology professional development to increase computer self-efficacy, they observed no relationship between computer self-efficacy and technology use in the classroom. Compeau and Higgins (1999) determined that computer self-efficacy was a strong indicator of technology use. Larose et al., (1999) found social science faculty members to lag significantly behind faculty of applied sciences in adopting technology for classroom use. Thus, the relationship between computer self-efficacy, technology professional development, and technology use in the classroom remains unanswered.

Technology integration can provide effective modeling for teacher candidates. While some studies link faculty development and faculty computer self-efficacy to effective modeling of technology (Chiero, 1997), a connection between faculty computer self-efficacy and teacher candidates' computer self-efficacy has yet to be established.

CHAPTER III

RESEARCH METHODOLOGY

This study examined the possible relationship among faculty computer self-efficacy, technology professional development, and the extent of technology use in Louisiana's colleges and university classrooms. Additionally, faculty computer self-efficacy and teacher candidate computer self-efficacy were compared. A review of literature discovered limited research connecting faculty members' computer self-efficacy, technology professional development, and the use of technology in the classroom.

Technology use in classrooms and online course components were examined. This study excluded all non-course related faculty members' use of technology such as advising, committee work, correspondence, research, or other personal use.

Population

The target populations for this study were teacher candidates and faculty members from the 21 colleges and universities within Louisiana that have teacher preparation programs. Two universities had recently implemented teacher preparation programs with no completers and no teacher candidates in clinical experience. Therefore, the pool of possible teacher candidate participants was limited to 19 colleges and universities. Participation was voluntary for both teacher candidates and faculty members. Approval was secured from the researcher's university human subjects committee with strict adherence to committee and university guidelines.

Higher education faculty members at the 21 colleges and universities that have teacher education programs were solicited via email for participation in the study. Faculty email addresses were obtained through university websites and university listservs. Additional faculty contacts were made by requesting network administrators, deans, department heads, and Technology Committee for Teacher Education (TCTE) committee members to distribute the email request for participation to all faculty members on their respective campuses.

The total number of online surveys submitted by higher education faculty was 737. Careful examination of the faculty data detected 190 surveys with missing data, leaving 547 responses with usable data. Included at the end of the survey was an acknowledgement of appreciation for participating in the survey and an offer to receive results of the study by emailing the researcher. Although no data were included in the survey to identify specific university involvement, faculty emails requesting results of the study indicated responses from 19 of the 21 colleges and universities with teacher education programs. The exact number of faculty members contacted is unknown. Faculty member responses are therefore a sampling of convenience.

Directors of clinical practice and field experiences were contacted for possible teacher candidate participation. Directors suggested that having teacher candidates complete the surveys during their regular candidate meetings on campus would result in a faster and higher response rate than other methods. Therefore, printed surveys were sent to directors for the teacher candidates to complete at their next meeting. At the specific request of one director, the teacher candidate survey was placed online. A small group of teacher candidates was contacted via email and completed the survey online. Although most directors expressed a willingness to have teacher candidates participate in the study, several did not meet with teacher candidates during the time of the study. Teacher candidate responses are, therefore, a sampling of convenience. The total number of teacher candidates in clinical experience during the research period was 878. The total number of teacher candidate responses was 274. Examination of the data found 22 surveys with missing data, leaving 252 teacher candidate responses with usable data.

Although documentation and approval for the study of human subjects had been obtained through the researcher's university, three universities prevented student and/or faculty participation until the local Institutional Research Board reviewed and approved the study. Approval by one university's Institutional Research Board extended beyond the timeframe of the study. As a result, teacher candidates from that institution, as well as some faculty, were excluded from the study. Some of this university's faculty members had previously been contacted and asked to participate in the study. Based on the emails received requesting results of the study, some of this university's faculty had responded to the survey. Since response was anonymous, there was no way to determine which responses had come from that university. Therefore, some faculty responses from this university were included in the study.

An email virus temporarily disabled one university's email system, destroying many emails, including the email requesting faculty members' participation in the survey. These unforeseen delays further limited the number of teacher candidate and faculty respondents.

Procedures

The study consisted of a one-time online survey of faculty members teaching at the colleges and universities within Louisiana with teacher preparation programs. Faculty members were contacted through email and requested to participate voluntarily in the study. The email included the necessary link to the webpage containing the online survey. The online survey was hosted on a secure university server and available online for a period of two weeks. After the two-week period, the webpage was made unavailable. A database was automatically populated as the online survey data were submitted. The online survey and database design helped to reduce the possibility of user input error by the faculty participants and the researcher.

Directors of clinical practice at each of the universities throughout the state were contacted and asked to have their students participate in the study. Teacher candidates completed the survey during regular university scheduled meetings using print copies of the survey. Teacher candidates at one university completed the survey online. Results of the teacher candidate survey were keyed into the database by the researcher for analysis.

Instrumentation

An anonymous online survey was used to solicit responses from higher education teaching faculty members regarding their computer self-efficacy, technology professional development, and technology use. The survey consisted of three parts: (1) demographics and technology professional development, (2) computer self-efficacy, and (3) technology use.

Part one of the survey consisted of professional and personal demographic information of the faculty members including institutional type, university department, years of experience in higher education, tenure status, employment status, gender, and Internet access. Part one also addressed the amount of time faculty were involved in technology professional development. Participation in T.H.E.|QUEST and PASS-PORT training were specifically targeted.

Part two consisted of Cassidy and Eachus' (2002) 30-item Computer User Self-Efficacy (CUSE) Scale measuring faculty's self-efficacy regarding computer use. The scale consists of items dealing with computer self-efficacy with responses set on a six-point Likert scale ranging from strongly disagree to strongly agree.

Part three consisted of a researcher-developed technology use survey measuring faculty member's technology use for instructional purposes. The survey included both online activities and technology used in face-to-face classes. The frequency scale devised for this section of the survey was deemed faulty after the data collection phase of the study had begun. As a result, data from part three of the faculty survey were reduced to a dichotomy of technology use or non-use.

The teacher candidates' survey was comprised of two parts: a demographic section and a computer self-efficacy scale. The same computer self-efficacy scale administered to faculty members was used with the teacher candidates. While the faculty survey was online, the teacher candidate survey was a paper instrument with the exception of teacher candidates at one university who completed the survey online at the request of the director of clinical practice.

This study combined sections of two survey instruments: (1) Computer User Self-Efficacy (CUSE) Scale (Cassidy & Eachus, 2002) and (2) a researcher-designed technology integration survey based on the Technology Use Survey (Kagima &

Hausafus, 2000). Cassidy and Eachus, in developing their 30-item computer self-efficacy scale, surveyed two random samplings ($n = 101$, $n = 184$) of university students. In phase one of the study, 101 undergraduate students were surveyed using the original 47-item scale. Cronbach's alpha indicated a high degree on internal consistency with an alpha of 0.94. The detection of significant positive correlations between computer self-efficacy and both familiarity with software packages and computer experience which were similar to findings in previous research led to the establishment of construct validity. Factor analysis found the original 47-item scale was one-dimensional. Therefore, the number of items was reduced to 30 without adversely affecting the reliability or validity of the scale. In phase two of Cassidy and Eachus' study the 30-item scale was administered to 184 undergraduate students.

Although validity and reliability had been previously established for the CUSE scale, specific data were unreported. Because of the unreported reliability and validity data, this researcher conducted a Cronbach Alpha reliability test and a factor analysis on the CUSE scale. These data were used to analyze variances in identified constructs.

Demographic data were included in part one of the instrument. Although many of the items on the Kagima and Hausafus (2000) survey correlated with functions available in various online course management systems, the survey did not include technology used in the classroom, an important part of the current study. Supplemental items were needed to address technology omitted in the Kagima and Hausafus instrument. Although Kagima and Hausafus measured time on task, the revised instrument for the current study was limited to use or non-use for each technology item. Questions eliciting the number of hours faculty members participated in technology professional development during the last five years were included in the survey. Three open-ended questions elicited qualitative data with participants expressing their views on the benefits and limitations of technology use. Additionally, participants were asked what they have had to change in order to integrate technology into their teaching. To establish validity of the researcher-generated items, three educational technologists reviewed the revised instrument, with the panel members' suggestions for improvements of the survey implemented.

Theoretical Basis for the Instrument

The online and classroom technology activities used to determine the level of technology use were based on common themes that emerged in the review of literature. Research to determine faculty use of technology is a necessary first step in higher education faculty properly integrating technology (Inman & Mayes, 1998). Based on computer-self efficacy survey results, programs can be developed to address participants with low computer self-efficacy (Cassidy & Eachus, 2002), thereby better preparing individuals to use computers.

Data Analysis

Initial data coding of faculty responses was performed automatically as the surveys were submitted online. Following the survey period, the researcher examined data and additional coding was added as needed. Based on the research hypotheses, statistical tests were performed that included a factor analysis, a bivariate correlation, a 4 X 3 ANOVA, contingency correlations, and a one-way ANOVA.

Hypothesis 1

Hypothesis 1 states that there is no relationship between the specific constructs of the Computer Use Self-Efficacy Scale (CUSE) and technology professional development.

A factor analysis and a bivariate correlation on the constructs of the computer self-efficacy scale and the hours of technology professional development were employed to determine the relationship of the identified constructs of computer self-efficacy and technology professional development.

Hypotheses 2, 3, and 4

Hypothesis 2 states that there is no interaction effect between self-efficacy and technology professional development as related to the extent of faculty members' technology use. Hypothesis 3 states that there is no relationship between faculty members' computer self-efficacy and the extent of faculty members' technology use. Hypothesis 4 states that there is no relationship between faculty members' technology professional development and the extent of faculty members' technology use.

A 4 X 3 ANOVA was utilized to determine if there was an interaction effect between computer self-efficacy and technology professional development related to technology use. The 4 X 3 ANOVA also yielded findings on the relationship between computer self-efficacy and technology use as well as the relationship between technology professional development and technology use. The 4 x 3 ANOVA, therefore, resolved hypothesis 2, 3, and 4.

Upon establishment of the mean computer self-efficacy score of all participants, computer self-efficacy scores were divided into quartiles. Level 1 (low) computer self-efficacy included the lowest quarter of the range of scores. Level 2 (below average) computer self-efficacy included scores in the 26-50% range. Level 3 (above average) computer self-efficacy included scores in the 51-75% range. Level 4 (high) computer self-efficacy included scores above the 75% range.

Based on the returned surveys, a mean number of technology professional development hours was established. The number of technology professional development hours was divided into three levels: low-range, mid-range, and high-range based on the distribution of the scores. Level 1 (low range) included the lower third range of scores. Level 3 (high range) included the top third range of all scores. Level 2 (medium range) included the middle third range of all scores. Since the number of hours was unknown, the levels were not established before examination of survey results. The intersection of each row and column yielded the mean level of technology use for each of the twelve groups. As an example, the first cell in the first column (Chart 2) represented the mean level of technology use for faculty members with low computer self-efficacy and who participated in the fewest hours of technology professional development. This design allowed for the interactive effect of computer self-efficacy and technology professional development on technology use.

Technology Professional Development	Levels of Computer Self-Efficacy Scores			
	1 (low)	2 (below average)	3 (above average)	4 (high)
1 (low-range)	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$
2 (mid-range)	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$
3 (high-range)	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$

Chart 2. ANOVA for Computer Self-Efficacy and Technology Professional Development

Hypothesis 5

Hypothesis 5 states that there is no relationship between the level of computer self-efficacy and specific characteristics of faculty members. Three sub-hypotheses were defined as part of hypothesis 5: (a) there is no relationship between department affiliation and faculty computer self-efficacy, (b) there is no relationship between tenure status and faculty computer self-efficacy, and (c) there is no relationship between gender and faculty computer self-efficacy.

A bivariate correlation and correlation contingency was employed to determine which, if any, faculty characteristics contributed to the variance in computer self-efficacy. Individual raw scores for computer self-efficacy were used in this analysis. Contingency coefficients range from 0 (random relationship) to 1 (perfect linear relationship). The contingency coefficient is a nominal approximation of the Pearson correlation r (Garson, 2004).

Hypothesis 6

Hypothesis 6 states that there is no difference in the mean computer self-efficacy between faculty and teacher candidates. Hypothesis 6 was resolved by using a one-way ANOVA to determine if a significant difference existed between faculty computer self-efficacy and teacher candidate computer self-efficacy.

CHAPTER IV

DATA RESULTS AND ANALYSIS

The purpose of this chapter is to present an analysis of data with respect to the interactive effect of faculty computer self-efficacy and technology professional development with technology use and the relationship between faculty computer self-efficacy and teacher candidate self-efficacy. The data are presented as they pertain to the six null hypotheses as restated below:

Null hypothesis 1: There is no relationship between the specific constructs of the Computer Use Self-Efficacy Scale (CUSE) and technology professional development.

Null hypothesis 2: There is no interaction effect between self-efficacy and technology professional development as related to the extent of faculty members' technology use.

Null hypothesis 3: There is no relationship between faculty members' computer self-efficacy and the extent of faculty members' technology use.

Null hypothesis 4: There is no relationship between faculty members' technology professional development and the extent of faculty members' technology use.

Null hypothesis 5: There is no relationship between the level of computer self-efficacy and specific characteristics of faculty members.

Null hypothesis 6: There is no difference in the mean computer self-efficacy between faculty and teacher candidates.

Computer Self-Efficacy Scale Reliability

Part II of the survey, the Computer Self-Efficacy Scale (CUSE), was developed by Cassidy and Eachus (2002) and used with permission of the authors. A reliability analysis was performed by the researcher on the 30-item scale using the 547 faculty responses. Table 1 presents the reliability coefficient for the scale. As shown in Table 1, the Cronbach's alpha level for internal reliability of the 30-item scale was .950.

Table 1. Reliability Statistics for Computer Self-Efficacy Scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.950	.952	30

Table 2 shows the item means, mean item variances, and the range of item means. As indicated in the table, the mean of the 30-item means was 4.887 on a 6-point Likert Scale that ranged from 1-6. The lowest item mean was 3.441, with the highest item mean 5.735. This denotes that the responses, overall, were relatively high across the sample and across all items. The variance in item means was .197, indicating little variance among item means.

Table 2. Reliability Summary Item Statistics for Computer Self-Efficacy Scale

Item	Mean	Minimum	Maximum	Range	Max /Min	Variance
Item Means	4.887	3.441	5.735	2.294	1.667	.197

Note. The covariance matrix is calculated and used in the analysis. N= 30 for all scales.

After verifying the reliability of the 30-item computer self-efficacy scale, a factor analysis was performed to determine common constructs. Any cases in which respondents failed to answer all 30 items on the scale were excluded in the analysis. Tabachnick and Fidell (2001) recommend a minimum of ten cases per item when factor analyzing an instrument. The factor analysis included over ten cases per item, as 547 cases were analyzed.

The principal components extraction method and an Eigenvalue of 1 were used to extract the components and their variants. The solution was then rotated using varimax rotation to maximize the loadings into the five identified constructs. Table 3 shows the mean, standard deviation, and number of cases analyzed for each of the 30 items on the computer self-efficacy section of the survey.

Table 3. Means and Standard Deviations for Computer Self-Efficacy Survey Items

Question	Mean	Std. Deviation
Q1	4.77	1.202
Q2	4.83	1.165
Q3	5.11	1.273
Q4	5.09	1.163
Q5	5.62	.944
Q6	5.15	1.146
Q7	5.12	1.211
Q8	4.51	1.445
Q9	5.17	1.099

Table 3. (Continued)

Question	Mean	Std. Deviation
Q10	4.44	1.408
Q11	4.40	1.172
Q12	4.93	1.217
Q13	4.90	1.155
Q14	4.42	1.461
Q15	5.73	.810
Q16	4.60	1.234
Q17	4.75	1.305
Q18	4.72	1.260
Q19	5.15	1.099
Q20	4.90	1.151
Q21	4.34	1.495
Q22	5.32	1.096
Q23	5.11	1.366
Q24	5.08	1.041
Q25	3.44	1.508
Q26	4.89	1.287
Q27	5.03	1.104
Q28	5.01	1.154

Table 3. (Continued)

Question	Mean	Std. Deviation
Q29	4.58	1.370
Q30	5.48	1.093

Note. N= 547 for all questions.

Table 4 shows the results of principal component extraction. As seen in Table 4, five components, with Eigenvalues greater than 1, were extracted from the 30-item computer self-efficacy survey and explained 64.271% of the cumulative variance across all 30 items.

Table 4. Total Variance Explained for Computer Self-Efficacy Scale

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.899	42.998	42.998	12.899	42.998	42.998	5.311	17.702	17.702
2	2.815	9.382	52.380	2.815	9.382	52.380	4.245	14.151	31.853
3	1.394	4.648	57.028	1.394	4.648	57.028	4.062	13.540	45.393
4	1.129	3.765	60.793	1.129	3.765	60.793	3.638	12.125	57.518
5	1.044	3.478	64.271	1.044	3.478	64.271	2.026	6.753	64.271
6	.788	2.628	66.899						
7	.759	2.529	69.428						
8	.704	2.348	71.777						
9	.635	2.116	73.893						
10	.619	2.062	75.954						
11	.568	1.893	77.848						

Table 4. (Continued)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
12	.558	1.862	79.709						
13	.512	1.706	81.415						
14	.480	1.599	83.014						
15	.468	1.560	84.574						
16	.445	1.485	86.059						
17	.437	1.455	87.514						
18	.387	1.289	88.803						
19	.374	1.247	90.051						
20	.365	1.217	91.267						
21	.355	1.184	92.451						
22	.323	1.077	93.528						

Table 4. (Continued)

Component	Initial Eigenvalues			Extraction Sums Of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
23	.303	1.011	94.539						
24	.302	1.006	95.545						
25	.272	.908	96.453						
26	.259	.865	97.318						
27	.240	.802	98.120						
28	.217	.724	98.844						
29	.186	.620	99.463						
30	.161	.537	100.000						

Extraction Method: Principal Component Analysis.

The principal component solution was rotated using varimax rotation with Kaiser normalization. The resulting component matrix is presented in Table 5. Item loadings for the rotated components are presented in Table 5. Loadings for each item were examined to determine the highest loading for each item across the five factors. Item 16 loaded within .001 variance in two components, component 1 and component 5. Examination of all items in both components revealed that item 16 was more related to other items in component 5 than to items in component 1. Therefore, item 16 was removed from component 1 and placed in component 5.

Table 5. Rotated Component Matrix for Computer Self-Efficacy Scale

Question	Component				
	1	2	3	4	5
Q1	.653	.184	.391	.043	.307
Q2	.701	.221	.352	.141	.284
Q3	.612	.070	.212	.415	.072
Q4	.343	.084	.343	.529	.234
Q5	.661	.125	-.012	.493	-.083
Q6	.552	.547	.107	.208	.112
Q7	-.058	.548	.115	.461	-.010
Q8	.067	.196	-.017	.096	.778
Q9	.296	.686	-.064	.188	.243
Q10	.263	.023	.592	.333	.301
Q11	.333	.198	.304	.169	.581
Q12	.733	.236	.312	.156	.308

Table 5. (Continued)

Question	Component				
	1	2	3	4	5
Q13	.327	.128	.506	.465	.269
Q14	.287	.091	.632	.267	.126
Q15	.231	.339	.050	.622	.011
Q16	.497	.124	.389	.165	.496[(a)]
Q17	.156	.237	.513	.493	.207
Q18	.104	.850	.206	.059	.009
Q19	.330	.160	.421	.571	.198
Q20	.188	.785	.123	.055	.148
Q21	.445	.121	.600	.140	-.004
Q22	.378	.151	.332	.502	-.024
Q23	.129	.267	.062	.584	.158
Q24	.027	.842	.063	.183	.058
Q25	.171	.073	.770	-.008	-.053
Q26	.549	.106	.417	.287	.030
Q27	.170	.649	.091	.270	.187
Q28	.309	.232	.475	.515	.199
Q29	.700	.199	.461	.076	.188
Q30	.612	.080	.235	.328	.055

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 13 iterations, [(a)] Item loaded in component 1, but placed in component 5 due to relevance.

The factor analysis of the Computer Self-Efficacy Scale revealed five principal constructs in the survey: confidence in abilities for general computer use, attitudes about using computers for learning, confidence in understanding basic computer concepts, attitudes on satisfaction and enjoyment in working with computers, and confidence in abilities to use software packages. Table 6 presents the names of the constructs based on the items that loaded highest on that construct. Construct 1 was named "Confidence in abilities for general computer use" because most of the items with their highest loading on that factor are descriptive of an individual's confidence in that area. Construct 2, named "Attitudes about using computers for learning," reflected items dealing with the value of computer use in learning. Construct 3 concerned the individual's confidence in understanding computer concepts and was therefore named "Confidence in understanding basic computer concepts." Construct 4 represented satisfaction and enjoyment levels in working with computers and was named "Attitudes on satisfaction and enjoyment in working with computers." Construct 5 centered on the abilities necessary to use software packages and was thus named "Confidence in abilities to use software packages." Table 6 presents the five constructs, the individual items that loaded into each construct, and the factor loading for each item within the construct.

Table 6. Constructs from Factor Analysis of Computer Self-Efficacy Scale

Construct	Factor Loading	Item #	Question
Construct 1: Confidence in abilities for general computer use	.653	1.	Most difficulties I encounter when using computers, I can usually deal with.
	.701	2.	I find working with computers very easy.
	.612	3.	I am very unsure of my abilities to use computers.
	.661	5.	Computers frighten me.
	.552	6.	I enjoy working with computers.
	.733	12.	I am very confident in my abilities to make use of computers.
	.549	26.	As far as computers go, I don't consider myself to be very competent.
	.700	29.	I consider myself to be a skilled computer user.
	.612	30.	When using computers I worry that I might press the wrong button and damage it.

Table 6. (Continued)

Construct	Factor loading	Item	Question
Construct 2: Attitudes about using computers for learning	.548	7.	I find that computers get in the way of learning.
	.686	9.	Computers make me much more productive.
	.850	18.	Using computers makes learning more interesting.
	.785	20.	Some computer packages definitely make learning easier.
	.842	24.	Computers are good aids to learning.
	.649	27.	Computers help me to save a lot of time.
Construct 3: Confidence in understanding basic computer concepts	.592	10.	I often have difficulties when trying to learn how to use a new computer package.
	.506	13.	I find it difficult to get computers to do what I want them to do.
	.632	14.	At times I find working with computers very confusing.
	.513	17.	I seem to waste a lot of time struggling with computers.
	.600	21.	Computer jargon baffles me.
	.770	25.	Sometimes, when using a computer, things seem to happen and I don't know why.

Table 6. (Continued)

Construct	Factor Loading	Item	Question
Construct 4: Attitudes on satisfaction and enjoyment in working on computers	.529	4.	I seem to have difficulties with most of the packages I have tried to use.
	.622	15.	I would rather that we did not have to learn how to use computers.
	.571	19.	I always seem to have problems when trying to use computers.
	.502	22.	Computers are far too complicated for me.
	.584	23.	Using computers is something I rarely enjoy.
	.515	28.	I find working with computers very frustrating.
Construct 5: Confidence in abilities to use software packages	.778	8.	Windows-based computer packages don't cause many problems for me.
	.581	11.	Most of the computer packages I have had experience with have been easy to use.
	.496	16.	I usually find it easy to learn how to use a new software package.

Technology Professional Development and Constructs of Computer Self-Efficacy Scale

Null hypothesis 1 states: *There is no relationship between the specific constructs of the Computer Use Self-Efficacy Scale (CUSE) and technology professional development*. Prior to calculating the bivariate correlations between hours of technology professional development and construct scores on the computer self-efficacy scales, the researcher reviewed descriptive statistics which indicated that the distribution for the number of hours of technology professional development deviated from normality (skewness = 3.589, kurtosis = 15.303). Raw scores for hours of technology professional development were converted to z-scores, and cases resulting in a z-score greater that 3.29 or less than – 3.29 were omitted. Tabachnick and Fidell (2001) suggested that any cases with z-scores greater than 3.29 or less than –3.29 should be considered as outliers and as such, be excluded from analyses. Based on Tabachnick and Fidell's criteria, thirteen cases were deemed outliers and excluded from analysis. After correcting for outliers, the distribution of scores on technology professional development approached a more normal distribution with skewness of 2.623 and a kurtosis of 7.704.

Bivariant correlations were calculated between the scores of each of the five construct scores and hours of technology professional development. Table 7 presents the results of this analysis. Construct 1, "Confidence in abilities for general computer use," and technology professional development had a correlation of .159, significant at the 0.01 level of confidence. Therefore, there is a relationship between faculty members' confidence in general computer use and the number of hours of technology professional development. Construct 2, "Attitudes about using computers for learning," was also related to technology professional development, with a correlation value of .141 and significant at the 0.01 probability level. Examination of technology professional development and Construct 3, "Confidence in understanding basic computer concepts," yielded the highest correlation value of .166, significant at the 0.001 probability level. Technology professional development and Construct 4," Attitudes on satisfaction and enjoyment in working on computers," were also related. This pairing resulted in a .134 correlation value, significant at the 0.01 probability level. The final pairing, technology professional development and Construct 5,"Confidence in abilities to use software packages," showed the lowest correlation level of .121, yet was significant at the 0.01 probability level. Thus, all five constructs were related to technology professional development and all were significant at the 0.01 probability level.

Although each of the constructs was significantly related to hours of technology professional development, it is questionable whether or not these relationships are substantive. The largest correlation coefficient ($r = .166$) was between technology professional development and Construct 3," Confidence in understanding basic computer concepts." Thus, the largest relationship estimate explained less than 3% of the variance in any one of the five constructs ($R^2 = .02755$). A significant relationship was shown between technology faculty development and computer self-efficacy. Therefore, hypothesis 1 was rejected. However, because of the large sample size ($N = 533$), these statistically significant findings may be of no practical value.

Table 7. Bivariate Correlation of Identified Computer Self-Efficacy Constructs

		Hours of Training	Construct 1	Construct 2	Construct 3	Construct 4	Construct 5
Hours of Training	Pearson Correlation	1	.159(**)	.141(**)	.166(**)	.134(**)	.121(**)
	Sig. (2-tailed)	.	.000	.001	.000	.002	.005
Construct 1	Pearson Correlation	.159(**)	1	.492(**)	.770(**)	.758(**)	.642(**)
	Sig. (2-tailed)	.000	.	.000	.000	.000	.000
Construct 2	Pearson Correlation	.141(**)	.492(**)	1	.400(**)	.549(**)	.439(**)
	Sig. (2-tailed)	.001	.000	.	.000	.000	.000
Construct 3	Pearson Correlation	.166(**)	.770(**)	.400(**)	1	.763(**)	.585(**)
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000
Construct 4	Pearson Correlation	.134(**)	.758(**)	.549(**)	.763(**)	1	.573(**)
	Sig. (2-tailed)	.002	.000	.000	.000	.	.000
Construct 5	Pearson Correlation	.121(**)	.642(**)	.439(**)	.585(**)	.573(**)	1
	Sig. (2-tailed)	.005	.000	.000	.000	.000	.

** Correlation is significant at the 0.01 level (2-tailed).
Note. N = 533

Computer Self-Efficacy and Technology Professional Development

Related to Technology Use

Null hypothesis 2 states: *There is no interaction effect between computer self-efficacy and technology professional development as related to faculty members' technology use.* Null hypothesis 3 states: *There is no relationship between faculty members' computer self-efficacy and the extent of faculty members' technology use.* Null hypothesis 4 states: *There is no relationship between faculty members' technology professional development and the extent of faculty members' technology use.* A 4 x 3 ANOVA was used to test these three hypotheses.

Faculty computer self-efficacy levels were divided into four groups based on the range of scores. The lowest level of scores (below 133) were labeled "low," the second level of scores (134-151) were labeled "below average," the third level of scores (152-163) were labeled "above average" and the fourth level of scores (164-180) were labeled "high."

Technology professional development hours were calculated by totaling the number of hours faculty members were involved in technology professional development over the last five years. Faculty members were then grouped based on the range of training scores. Three groups were defined: "Technology Professional Development Level 1" (less than 2 hours), "Technology Professional Development Level 2" (2-14 hours), and "Technology Professional Development Level 3" (more than 14 hours).

Faculty indicated use or non-use of nine specific technologies for the classroom and had the option of writing in two additional technologies. Faculty also indicated use or non-use of 16 online resources and had the option of writing in one additional resource.

Therefore, faculty members indicated a variety of technology use that ranged from 0-28. The mean technology use score was 11.33 with a median of 11.

Table 8 presents the results of the 4 x 3 ANOVA analysis. As shown in Table 8, although both faculty computer self-efficacy and technology professional development were significantly related to technology use, the interaction effect between faculty computer self-efficacy and technology professional development related to technology use was not significant (p = .737).

Table 8. Interactive Effect of Computer Self-Efficacy and Technology Professional Development Related to Technology Use

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3487.583(b)	11	317.053	13.025	.000	.211
Intercept	68151.378	1	68151.378	2799.698	.000	.840
TPD	1853.267	2	926.634	38.067	.000	.125
CSE Groups	1128.045	3	376.015	15.447	.000	.080
TPD + CSE Groups	86.433	6	14.406	.592	.737	.007
Error	13023.185	535	24.342			
Total	86717.000	547				
Corrected Total	16510.768	546				

Note. (a) Computed using alpha = .05,
(b) R2 = .211 (Adjusted R^2 = .195)
TPD = Technology Professional Development
CSE= Computer Self-Efficacy
Dependent Variable: Technology Use

Table 9 shows the mean technology use score for the technology professional development and computer self-efficacy interaction. As the means for the levels generated according to the amount of technology professional development increases, the means for the levels generated according to computer self-efficacy also increases with the exception of faculty members in level 3, "above average" computer self-efficacy with 2-14 hours of technology professional development. Since there is no interaction effect between self-efficacy and professional development on technology use, null hypothesis 2 was accepted.

Table 9. Mean Scores for Interactive Effect of Computer Self-Efficacy and Technology Professional Development Related to Technology Use

TPD Level	Computer Self-Efficacy Levels	Mean	Std. Deviation	N
1 (< 2 hrs)	Low	6.75	4.804	51
	Below Average	8.90	4.314	51
	Above Average	9.46	5.257	50
	High	10.86	5.761	44
	Total	8.92	5.207	196
2 (2-14 hrs)	Low	10.19	4.503	52
	Below Average	11.27	5.041	52
	Above Average	11.02	4.120	41
	High	14.15	3.948	34
	Total	11.45	4.658	179
3 (> 14 hrs)	Low	10.82	6.412	28
	Below Average	13.74	3.985	39
	Above Average	14.09	6.088	46
	High	15.46	4.647	59
	Total	13.95	5.431	172

Table 9. (Continued)

TPD Level	Computer Self-Efficacy Groups	Mean	Std. Deviation	N
Total	Low	8.98	5.352	131
	Below Average	11.10	4.875	142
	Above Average	11.48	5.574	137
	High	13.66	5.242	137
	Total	11.33	5.499	547

Note. TPD = Technology Professional Development.
Dependent Variable: Technology Use

The lack of an interaction effect between computer self-efficacy and technology professional development on technology use led to the exploration of hypothesis 3. Null hypothesis 3 states: *There is no relationship between faculty members' computer self-efficacy and the extent of faculty members' technology use.* Results of the 4 x 3 ANOVA, as shown in Table 8, indicate that computer self-efficacy is statistically related to technology use ($p < .05$).

Table 10 presents the mean scores on technology use across the computer self-efficacy levels. As indicated in Table 10, the mean technology use score increased as the level of computer self-efficacy increased. Table 10 shows that the mean technology use score for the "low" computer self-efficacy level was 8.98 while the mean score for faculty in the "below average" computer self-efficacy level was 11.10 on technology use. Compared to he mean score of 8.98 for the "low" computer self-efficacy level the mean score for the "above average" computer self-efficacy level 11.48. As indicated in Table 10, the "low" computer self-efficacy levels' mean score on technology use was 8.98

while the "high" computer self-efficacy levels' mean score was 13.66. The mean technology use score for the "below average" level was 11.10 and 11.48 for the "above average" computer self-efficacy level. The "above average" level mean score for technology use was 11.48. The mean score for technology use for the "high" computer self-efficacy level was 13.66.

Table 10. Computer Self-Efficacy and Technology Use

CSE Group	Mean	N	Std. Deviation
Low	8.98	131	5.352
Below Average	11.10	142	4.875
Above Average	11.48	137	5.574
High	13.66	137	5.242

Note. CSE = Computer Self-Efficacy
Dependent Variable: Technology Use

A Scheffe Post Hoc analysis was performed to determine if the mean scores on technology use among the four computer self-efficacy levels differed statistically (see Table 11). As indicated in Table 11, the difference between the "below average" and the "low" level means (2.11) was significant ($p < .05$). The difference between the " above average" and the "low" group means (2.50) was significant ($p < .05$). The difference between the "high" and "low" level means (4.67) was significant ($p < .05$). Table 11 indicates a difference between the "above average" and the "below average" level means of .38. These means were not significantly different. The difference between the "high" and the "above average" means (2.18) was significant ($p < .05$). Comparison of the "high" group (13.66) to the "below average" level (11.10) resulted in a significant difference ($p < .05$) of 2.56.

Table 11. Scheffe Post Hoc Analysis of Computer Self-Efficacy Groups Related to Technology Use

(I) Computer Self-Efficacy Groups	(J) Computer Self-Efficacy Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Lower Bound
Low	Below Average	-2.11(*)	.598	.006	-3.79	-.44
	Above Average	-2.50(*)	.603	.001	-4.19	-.81
	High	-4.67(*)	.603	.000	-6.36	-2.98
Below Average	Low	2.11(*)	.598	.006	.44	3.79
	Above Average	-.38	.591	.936	-2.04	1.27
	High	-2.56(*)	.591	.000	-4.22	-.90
Above Average	Low	2.50(*)	.596	.001	.81	4.19
	Below Average	.38	.603	.936	-1.27	2.04
	High	-2.18(*)	.591	.004	-3.85	-.50
High	Low	4.67(*)	.603	.000	2.98	6.36
	Below average	2.56(*)	.591	.000	.90	4.22
	Above average	2.18(*)	.596	.004	.50	3.85

Note. Based on observed means.
Dependent Variable: Technology Use
* The mean difference is significant at the .05 level.

A significant difference was found between all groups with the exception of the "below average" and "above average" group comparison. A significant relationship between computer self-efficacy and technology use is evident. Therefore, hypothesis 3 was rejected. There is a significant relationship between faculty members' computer self-efficacy and the extent of faculty members' technology use.

Null hypothesis 4 states: *There is no relationship between faculty members' technology professional development and the extent of faculty members' technology use.* The 4 x 3 ANOVA results (see Table 8) showed that the main effect of technology professional development on technology use was significant.

Table 12 shows the mean technology use scores and standard deviations across the levels. Data in Table 12 suggest that technology use increases as the number of hours of technology professional development increases. Table 12 shows that the mean technology use score for Technology Professional Development Level 1 (< 2 hrs) was 8.92 while the mean for faculty in Technology Professional Development Level 2 with 3-14 hours of training was 11.45 on technology use. The mean technology use score for Technology Professional Development Level 1 (< 2 hrs) was 8.92 while the mean for Technology Professional Development Level 3 (> 14 hrs) was 13.95. The mean technology use score for Technology Professional Development Level 2 (2-14 hrs) was 11.45, Technology Professional Development Level 3's (> 14 hrs) technology use score was 13.95.

Table 12. Technology Professional Development and Technology Use

TPD Level	Mean	N	Std. Deviation
1 (< 2 hrs)	8.92	196	5.207
2 (2-14 hrs)	11.45	179	4.658
3 (>14 hrs)	13.95	172	5.431

Note. TPD= Technology Professional Development
Dependent Variable: Technology Use

A Scheffe Post Hoc analysis was performed to determine if the means of the three levels differed. Results of the Scheffe Post Hoc analysis (presented in Table 13) indicated significant differences between levels. Table 13 shows that the difference (2.52) in the means of Level 1 and Level 2 was significant ($p < .05$). As indicated in Table 12, the difference in Level 1 and Level 3 means (5.02) is significant ($p < .05$). The difference between the Level 2 and Level 3 means (2.50) was significant ($p < .05$). A significant relationship was noted between technology professional development and technology use. Therefore, hypothesis 4 was rejected.

Table 13. Scheffe Post Hoc Analysis of the Effects of Professional Development on Technology Use

(I) Training Level	(J) Training Level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	2	-2.52(*)	.510	.000	-3.78	-1.27
	3	-5.02(*)	.515	.000	-6.29	-3.76
2	1	2.52(*)	.510	.000	1.27	3.78
	3	-2.50(*)	.527	.000	-3.79	-1.21
3	1	5.02(*)	.515	.000	3.76	6.29
	2	2.50(*)	.527	.000	1.21	3.79

Note. Based on observed means.
Dependent Variable: Technology Use
* The mean difference is significant at the .05 level.

Computer Self-Efficacy and Specific Faculty Characteristics

Null hypothesis 5 states: *There is no relationship between the level of computer self-efficacy and specific characteristics of faculty members.* The specific faculty characteristics analyzed were: (a) department affiliation, (b) tenure status, and (c) gender. Coding departments proved to be a challenging task. Since not all colleges and universities group the same departments under the same colleges, the decision was made to allow the respondents to key-in their respective departments and then to group the departments prior to analyzing the data. Ultimately 10 departmental groups emerged from the data: education, science, liberal arts, mathematics, languages and literature, psychology, business, engineering, medical related, and others. Engineering and medical related were regrouped with the "other" category, leaving eight groups.

As part of the demographic information, faculty members were asked to indicate their number of years of teaching experience in higher education. Teaching experience ranged from less than one year to more than 45 years. The mean number of years teaching in higher education was 14.14. Tenure status was coded as (1) tenured, (2) non-tenured, or (3) not on tenure track. Gender was coded as (1) male or (2) female. Faculty members were placed in four levels based on their computer self-efficacy scores. Faculty members with computer self-efficacy scores below 133 were grouped into the "low" computer self-efficacy level. Faculty members with computer self-efficacy scores that ranged between 134-151 were classified as "below average" in computer self-efficacy. Faculty members with computer self-efficacy scores that ranged between 152-163 were classified as "above average." Faculty members scoring above 164 were classified as "high."

Null hypothesis 5 (a) states: *There is no relationship between department affiliation and faculty computer self-efficacy.* A contingency coefficient was calculated to measure the relationship between the two nominal variables, department affiliation and computer self-efficacy. The contingency table showing the expected and observed frequency counts for each department by computer self-efficacy group is in Table 14. As shown in Table 14, the number of education faculty members observed (35) in the "high" computer self-efficacy group was greater than expected (26.9), while the number of education faculty members' scores occurring (21) in the "low" computer self-efficacy group was less than expected (25.9). As shown in Table 14, the number of liberal arts faculty members observed (29) in the "low" computer self-efficacy group was greater than expected (17.5), while the number of liberal arts faculty members' scores occurring (12) in the "high" computer self-efficacy group was less than expected (18.2). Liberal arts faculty members had lower than expected computer self-efficacy scores with over 67% of liberal arts faculty members' computer self-efficacy scores appearing below the mean. However, the calculated χ^2 for the contingency table was not significant ($\chi^2 = 26.481$, $p > .05$). Likewise, the contingency coefficient ($C = .218$) was not significant at $p = .05$.

Table 14. Contingency Table for Department Affiliation Related to Computer Self-Efficacy Levels

		Computer Self-Efficacy Levels			
Department Affiliation	Observed/ Expected	Low	Below Average	Above Average	High
Education	Observed	21.0	28.0	24.0	35.0
	Expected	25.9	28.4	26.7	26.9
Science	Observed	17.0	25.0	24.0	15.0
	Expected	19.5	21.3	20.1	20.2
Liberal Arts	Observed	29.0	20.0	12.0	12.0
	Expected	17.5	19.2	18.1	18.2
Mathematics	Observed	10.0	14.0	16.0	16.0
	Expected	13.4	14.7	13.9	14.0
Language and Literature	Observed	11.0	13.0	15.0	12.0
	Expected	12.2	13.4	12.6	12.7
Psychology	Observed	13.0	12.0	13.0	7.0
	Expected	10.8	11.8	11.1	11.2
Business	Observed	10.0	6.0	8.0	12.0
	Expected	8.6	9.5	8.9	9.0
Other	Observed	17.0	22.0	20.0	24.0
	Expected	19.9	21.8	20.6	20.7
Total	Observed	128.0	140.0	132.0	133.0

Null hypothesis 5 (b) states: *There is no relationship between tenure status and faculty computer self-efficacy.* A contingency coefficient was calculated to measure the relationship between the two nominal variables, tenure status and computer self-efficacy level. The contingency table showing the expected and observed frequency counts for each tenure status category by computer self-efficacy group is shown in Table 15. As shown in Table 15, the observed number (68.0) of tenured faculty members in the "low" computer self-efficacy level was greater than the expected number (57.9) for that level. The number of tenured faculty members observed (71.0) in the "below average" level was also greater than the expected number (63.3) of occurrences for the group. The observed number (36.0) of non-tenured faculty members scoring in the "low" computer self-efficacy level was less than the expected number (47.9) for that group. The number (64.0) of non-tenured faculty members scoring in the "high" computer self-efficacy level was greater than the expected (49.8) count for that group. The numbers of faculty members who were not on tenure track and who were identified in the "above average" (24) or "high" (26) computer self-efficacy level were greater than expected (23 and 23.2).

The observed computer self-efficacy of tenured faculty members was lower than expected while the observed computer self-efficacy of non-tenured faculty members was higher than expected. The calculated χ^2 for the contingency table was significant ($\chi^2 = 16.457$, $p < .05$). Likewise, the contingency coefficient of .173 was significant at $p < .05$. The results indicate that there is an inverse relationship between tenure status and faculty computer self-efficacy, with tenured faculty showing lower computer self-efficacy than non-tenured faculty or those not on tenure track.

Table 15. Contingency Table for Tenure Status Related to Computer Self-Efficacy Levels

		Computer Self-Efficacy Levels			
Tenure status	Observed/ Expected	Low	Below Average	Above Average	High
Tenured	Observed	68.0	71.0	59.0	43.0
	Expected	57.9	63.3	59.7	60.1
Non-Tenured	Observed	36.0	50.0	49.0	64.0
	Expected	47.8	52.3	49.3	49.7
Not on Tenure Track	Observed	24.0	19.0	24.0	26.0
	Expected	22.3	24.4	23.0	23.2
Total	Observed	128.0	140.0	132	133.0

Null hypothesis 5 (c) states: *There is no relationship between gender and faculty computer self-efficacy.* A contingency coefficient was calculated to measure the relationship between the two nominal variables, gender and computer self-efficacy level. The contingency table showing the expected and observed frequency counts for male and female by computer self-efficacy level is shown in Table 16.

As indicated in Table 16, the observed number (57.0) of male faculty members scoring in the "low" computer self-efficacy level was less than the expected number (61.7) for that level. Additionally, the observed number (53.0) of male faculty members appearing in the "high" computer self-efficacy level was less than expected (64.1) for that level. Therefore, the middle two computer self-efficacy levels, "below average" and "above average," had higher observed counts of male faculty members than expected.

While the observed number (71.0) of female faculty members scoring in the "low" computer self-efficacy level was greater than the expected number (66.3) for that level, the number (80.0) of female faculty members scoring in the "high" computer self-efficacy level was greater than the expected (68.9) count for that level. The middle two computer self-efficacy levels, "below average" and "above average," showed fewer observed female faculty members than expected. The two extreme levels, "low" and "high," showed greater than expected numbers of female faculty members.

The calculated χ^2 for the contingency table was significant ($\chi^2 = 8.288$, $p < .05$). Likewise, the contingency coefficient of .124 was significant at $p < .05$. The results indicate that there is a relationship between gender and faculty computer self-efficacy, with female scores occurring more than expected in both the “high” and “low” computer self-efficacy levels. Fewer males scored in the “high” and “low” computer self-efficacy levels than expected.

Table 16. Contingency Table for Gender Related to Computer Self-Efficacy Levels

		Computer Self-Efficacy Levels			
Gender	Observed/ Expected	Low	Below Average	Above Average	High
Male	Observed	57.0	74.0	73.0	53.0
	Expected	61.7	67.5	63.6	64.1
Female	Observed	71.0	66.0	59.0	80.0
	Expected	66.3	72.5	68.4	68.9
Total	Observed	128.0	140.0	132.0	133.0

In summary of hypothesis 5, no significant relationship was identified between department affiliation and computer self-efficacy. Tenure was found inversely related to computer self-efficacy. Gender was also related to computer self-efficacy. The numbers of females scoring in the extreme levels were higher than expected while the numbers of males in the two extreme levels were lower than expected. Therefore, hypothesis 5 was rejected. There was a relationship between specific demographic variables of faculty members and computer self-efficacy.

Faculty Computer Self-Efficacy and Teacher Candidate Computer Self-Efficacy

Hypothesis 6 states: *There is no difference in the mean computer self-efficacy between faculty and teacher candidates.* As indicated in Table 17, computer self-efficacy scores for faculty members ranged from a low of 39 to a high of 180. Teacher candidates' computer self-efficacy scores ranged from a low of 57 to a high of 180. The mean computer self-efficacy scores were 146.60 for faculty members and 145.56 for teacher candidates. As indicated in Table 17, the mean computer self-efficacy scores for the two groups differed by 1.04, with the difference between standard deviations less than 0.03.

Table 17. Faculty and Teacher Candidates Computer Self-Efficacy Mean Scores

	N	Mean	Standard Deviation	95% Confidence Interval for Mean Lower Bound	Upper Bound	Minimum	Maximum
Faculty	547	146.60	23.512	144.62	148.57	39	180
Teacher Candidates	252	145.56	23.490	142.64	148.47	57	180
Total	799	146.27	23.495	144.64	147.90	39	180

A one-way ANOVA was used to examine the relationship of computer self-efficacy scores between faculty members and teacher candidates. As shown in Table 18, there is no difference in the mean computer self-efficacy between faculty members and teacher candidates, $F = .338$, $p > .05$. Therefore, hypothesis 6 was accepted; there is no significant difference in faculty members computer self-efficacy and teacher candidates computer self-efficacy.

Table 18. Faculty and Teacher Candidates Computer Self-Efficacy Comparison

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	186.750(a)	1	186.750	.338	.561	.000
Intercept	14725072.1	1	14725072.06	26652.233	.000	.971
Ed level	186.750	1	186.750	.338	.561	.001
Error	440333.933	797	552.489			
Total	17534550.0	799				
Corrected Total	440520.683	798				

Note. Computed using alpha = .05
Dependent Variable: Computer Self-Efficacy Score
(a) $R^2 = .000$ (Adjusted $R^2 = .001$)

Other Findings

Although no hypothesis was posed investigating departments and technology use, a significant finding was discovered. Department affiliation was significantly related to technology use ($p < .05$). A Duncan Post Hoc analysis indicated a significant difference ($p < .05$) between education and five other areas: science, liberal arts, business, psychology, and mathematics. This indicates that faculty members within education departments use a greater variety of technology than faculty members do in these other five disciplines. There was no significant difference between departments of language and literature and education regarding technology use.

A factor analysis revealed three levels of technology use in online courses. The three constructs of online technology were defined as "postings," "interactive," and "advanced." The first construct, "postings," is associated with activities typical of entry-level use of a course management system such as BlackBoard. Announcements, syllabus postings, grades, and placing course materials online are indicative of this construct. Postings were commonly used by faculty in all departments with no significant difference found between departments. The second construct, "interactive," indicated an online interaction with students involving discussion boards, chats, group work, and virtual classrooms. The third construct, "advanced," involved external online components such as streaming video.

A Scheffe Post Hoc analysis of the effect of departments on these factors indicated a significant difference ($p < .05$) in the type of technology used. While there was no significant difference between departments for the constructs "postings" or "advanced," a significant difference was indicated in the "interactive" construct between education and three other departments, science, liberal arts, and mathematics. These results indicate that faculty in the college of education tend to use interactive online components while faculty in other departments rely mainly on static postings.

Summary of Data Analysis

Hypothesis 1: There is no relationship between the specific constructs of the Computer Use Self-Efficacy Scale (CUSE) and technology professional development. A significant relationship between the specific constructs of the computer self-efficacy scale and technology professional development does exist. Hypothesis 1 was rejected.

Hypothesis 2: There is no interaction effect between self-efficacy and professional development on technology use. Analysis of the data failed to confirm an interaction effect between computer self-efficacy and professional development on technology use. Hypothesis 2 was accepted.

Hypothesis 3: There is no relationship between faculty members' computer self-efficacy and their level of technology use. A significant relationship between faculty computer self-efficacy and technology use does exist. Hypothesis 3 was rejected.

Hypothesis 4: There is no relationship between faculty member's technology professional development and the extent of their technology use. Results indicate a significant relationship between technology professional development and technology use. Hypothesis 4 was rejected.

Hypothesis 5: There is no relationship between the level of computer self-efficacy and specific characteristics of faculty members. Hypothesis 5 consisted of three parts: (a) there is no relationship between department affiliation and computer self-efficacy, (b) there is no relationship between tenure and computer self-efficacy, and (c) there is no relationship between gender and computer self-efficacy. Results indicate no relationship between department affiliation and computer self-efficacy. Therefore, null hypothesis 5 (a) was accepted. A significant inverse relationship between tenure status and computer self-efficacy was evident. Therefore null hypothesis 5 (b) was rejected. Additionally, gender was significantly related to computer self-efficacy. Therefore, hypothesis 5 (c) was rejected.

Hypothesis 6: There is no difference between faculty computer self-efficacy and teacher candidate computer self-efficacy. Analysis of the data shows no difference between faculty computer self-efficacy and teacher candidate computer self-efficacy. Hypothesis 6 was accepted.

Additionally, department affiliation was related to technology use, with education faculty members using more technology than faculty members in science, liberal arts, business, psychology, or mathematics.

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This study examined the possible relationship between faculty computer self-efficacy, technology professional development, and the extent of technology use in Louisiana's colleges and university classrooms. Additionally, faculty computer self-efficacy and teacher candidate computer self-efficacy were compared. Technology use in classrooms and online course components were examined. This study excluded all non-course related faculty members' use of technology such as advising, committee work, correspondence, research, or other personal use. The target populations for this study were teacher candidates and faculty members from the 21 colleges and universities within Louisiana with teacher preparation programs.

The Computer Use Self-Efficacy Scale (CUSE) developed by Cassidy and Eachus (2002) was a crucial element of the study. The scale was shown to be internally reliable ($p > .95$) and composed of five constructs: confidence in abilities for general computer use, attitudes about computers for learning, confidence in understanding basic computer concepts, attitudes on satisfaction and enjoyment in working on computers, and confidence in abilities to use software packages. Bandura (1997) suggested that self-efficacy measurements should require judgments of capability at various task levels and in different situations. Examination of the five constructs indicated that the CUSE measured computer self-efficacy at various task levels and in different situations.

Interaction Effect Between Self-Efficacy and Professional Development Related to Technology Use

This study determined that as faculty members' computer self-efficacy increased, technology use increased. Similarly, as the number of hours faculty members were involved in technology professional development increased, technology use increased. Yet, there was no interactive effect between computer self-efficacy and professional development related to faculty members' technology use. If an interaction effect between computer self-efficacy and technology professional development on technology had been present it would have been impossible to determine the independent relationship between each of these variables and technology use.

As the technology use means for the levels of computer self-efficacy increased, the technology use means for the levels of technology professional development also increased. An exception to this was faculty members in level 3, "above average" computer self-efficacy, who were involved in 2-14 hours of technology professional development. The technology use for these faculty members was lower than faculty members in the "below average" computer self-efficacy level with the same level of technology professional development. One possible explanation for this phenomenon may be that the technology professional development sessions offered do not appeal to faculty members with higher computer self-efficacy.

While basic technology faculty development sessions fulfill the needs of many, additional technology professional development programs may be necessary to address specific individual or small group needs (Inman & Mayes, 1998). Lack of interest in training may indicate that the individual believes that the training is unnecessary or inappropriate for his or her needs (Torkzadeh et al., 1999). Individuals with high computer self-efficacy feel confident and competent with their technology skills and may opt to explore new skills on their own without formal training. Therefore, as their computer self-efficacy increases, technology professional development attendance may actually decrease. The level of professional development technology activities offered may not address the more advanced needs of these individuals. Hagenson and Castle (2003), in investigating the integration of technology by college of education faculty members, found that faculty members learn about technology by collaborating with technologists, by collaborating with someone who is viewed as a teacher leader, or by gaining personal experience. Professional development activities that focus extensively on dissemination of basic facts may not nurture the development of computer self-efficacy. Faculty working independently without benefit of technology professional development activities may develop computer self-efficacy at the same rate as faculty involved in organized activities.

Computer Self-Efficacy and Technology Use

This study showed that there is a significant relationship between faculty members' computer self-efficacy and the extent of faculty members' technology use. Faculty members' mean technology use increased as their computer self-efficacy level increased. Faculty members were grouped based on quartiles of computer self-efficacy scores. The four groups were labeled low, below average, above average, and high. A Scheffe Post Hoc analysis indicated a significant difference among the four computer self-efficacy levels with the exception of the "below average" and "above average" comparison. The lack of a significant difference between these two levels may be an artifact of sampling.

Faculty computer self-efficacy scores, while generally high, ranged from a low of 39 to a high of 180. Possible scores on the computer self-efficacy scale range from a low of 30 to a high of 180. The mean computer self-efficacy score for faculty was 146.6. The distribution of scores was negatively skewed, with only 4% of the respondents scoring below 100. The negatively skewed results indicate that most respondents felt comfortable with computers and had a positive attitude toward working with computers.

Faculty members' limited technology use may be indicative of their lack of confidence in using technology in the classroom. In a study of faculty members' computer self-efficacy and technology integration, participants who used only email and word processing also had a low computer self-efficacy (Kagima & Hausafus, 2000). The greater the level of computer self-efficacy, the more variety of technology the faculty members use of technology in the classroom. This would indicate that, as faculty members' confidence level with technology increases, they tend to experiment and venture out into new and different areas of technology for use in their teaching. Therefore, activities that increase faculty computer self-efficacy would affect the variety of technology that faculty members use into their teaching. Faculty members who lack confidence and self-efficacy in computer use choose not to integrate technology into their teaching, regardless of the availability of hardware (Faseyitan et al., 1996).

Technology Professional Development and Technology Use

Results of this study indicated a significant relationship between the number of technology professional development hours faculty members attended during a five-year period and their level of technology use. Furthermore, a significant difference was observed among technology professional development levels across levels of technology use. A significant difference was discovered between technology professional development level 1, with less than 2 hours professional development, and technology professional development level 2, with 2-14 hours of professional development. The largest difference was between technology professional development level 1, with less than 2 hours training and technology professional development level 3, with over 14 hours of training. Findings indicate that the more hours of technology professional development a faculty member engaged in, the greater the variety of technology he or she integrated into their teaching.

Faculty members' involvement in technology professional development during the past five years ranged from no involvement in technology professional development to over 300 hours. Organized activities ranged from workshops to regular college classes.

Faculty members indicated using from 0 to 11 different types of technology in teaching face-to-face classrooms and from 0 to 17 different online components.

Results of this study did not confirm the findings of Faseyitan et al. (1996) who found no relationship between technology professional development and technology use. Technology professional development activities were related to technology use in the classroom. Technology use increased as the number of hours of technology professional development increased. Yet, over one-third of all faculty members surveyed were involved in two hours or less of technology professional development activities during the last five years.

Computer Self-Efficacy and Specific Characteristics of Faculty Members

Several specific demographic characteristics of faculty members were examined to determine if a relationship exists between the characteristic and computer self-efficacy. Faculty characteristics examined included department affiliation, tenure status, and gender. Department affiliation was unrelated to computer self-efficacy. These findings substantiate the findings of Faseyitan et al. who discerned that discipline was not related to technology integration. Although Kagima and Hausafus' (2000) research indicates a significant difference between faculty members from different departments, results of this study do not substantiate their results.

Tenure was inversely related to computer self-efficacy, with non-tenured faculty members having significantly higher computer self-efficacy than expected while tenured faculty members scored lower than expected. These results corroborate Kagima and Hausafus' (2000) conclusions that tenured faculty members have lower computer self-efficacy than non-tenured. Inman and Mayes (1998), in surveying community college faculty members (n = 861) on technology use and need, noted that rank, age, and teaching experience were not predictors of technology use.

This study indicated that there was a relationship between gender and computer self-efficacy, with females scoring higher than expected. Results of this study failed to concur with earlier findings by Kagima and Hausafus (2000) on gender and faculty computer self-efficacy, which found female faculty members to have lower computer self-efficacy than their male colleagues.

Faculty Members' Computer Self-Efficacy and Teacher Candidates' Computer Self-Efficacy

Results of this study found no significant difference between faculty members' computer self-efficacy and teacher candidates' computer self-efficacy. The difference between mean computer self-efficacy scores for faculty members and teacher candidates was less than two points. The mean computer self-efficacy score for faculty members was 146.6. The mean computer self-efficacy score for teacher candidates was 145.56, slightly lower than faculty members. The range of scores and standard deviation for both groups indicate that the two groups are very similar regarding computer self-efficacy.

It is difficult for many teacher candidates to make the connection between what transpires in their university classrooms and their expectations of the K-12 classroom (Jones, 2002). Therefore, faculty who are trained not only to be technology proficient but able to integrate technology into their teaching and model technology use in the classroom play an integral part in the development of technically sophisticated teacher candidates who are comfortable integrating technology into their teaching (Beyerbach et al., 2001; Vannatta & Beyerbach, 2000).

Other Findings

Although no hypothesis was posed investigating departments and technology use, a significant finding was discovered. Technology use was significantly related to department affiliation ($p < .05$). Analysis indicated a significant difference ($p < .05$) between education and five other areas: science, liberal arts, business, psychology, and mathematics. This indicates that faculty members within education departments use a greater variety of technology than faculty members do in these other five disciplines.

There was no significant difference between departments of language and literature and education regarding technology use.

A factor analysis revealed three levels of technology use in online courses. Postings were commonly used by faculty members in all departments with no significant difference found between departments. Analysis of the data indicated a significant difference between education and three other departments, science, liberal arts, and mathematics for interactive online components. These results indicate that faculty in the college of education tend to use interactive online components while faculty in other departments rely mainly on static postings. These interactive online components are indicative of a more constructivist and student-centered learning environment and may be indicative of departmental differences in teaching methods.

Changes in teaching and technology integration take time. Batson and Williamson (1999) indicated that faculty members needed at least two years to begin the transition from traditional teaching methods in a teacher-centered classroom to a more technologically integrated student-centered classroom using constructivist methods and activities. Results of this study also substantiate the findings of Larose et al. (1999), who ascertained that social science faculty members lag significantly behind in the adoption of technology teaching tools and integrated technology the least.

Conclusions

1. There is no interaction effect between computer self-efficacy and technology professional development related to technology use. Yet, as the level of computer self-efficacy increased, the level of technology use increased. In addition, as the level of technology professional development increased, the level of technology

use also increased. Thus, while there is no interaction effect between the two independent variables, but both variables are related to technology use.

2. Computer self-efficacy is significantly related to technology use. Computer self-efficacy is highly related to the variety of technology faculty members choose to use in the classroom. Regardless of the amount of technology professional development, computer self-efficacy is related to technology use.
3. Technology professional development was related to technology use. Regardless of the computer self-efficacy level, technology professional development was related to technology use in the classroom. As little as two hours of technology professional development in a five-year period had a positive impact on the amount of technology used in the classroom.
4. As the number of technology professional development hours increased, the greater variety of technology faculty members used in their teaching.
5. Although department affiliation was unrelated to computer self-efficacy, department affiliation was related to technology use.
6. Tenure was inversely related to computer self-efficacy.
7. Gender was related to faculty computer self-efficacy, with females scoring higher than expected on the computer self-efficacy scale.
8. No difference was found between faculty members' computer self-efficacy and teacher candidates' computer self-efficacy.

Recommendations

Louisiana's colleges and universities have invested large sums of money over the last ten years developing technology infrastructures, providing office computers for faculty members, technology laboratories for students, and multimedia classrooms for instruction. If students are to reap the maximum benefits from these efforts, faculty members must use these technologies in their teaching. While computer self-efficacy is a necessary ingredient of technology use in the classroom, it does not necessarily guarantee its use.

The significant relationship between technology professional development and technology use in the classroom reinforces the need for technology professional development, not to build new technology skills but to explore and develop new ways of using technology in the classroom. With over one in every four faculty members involved in less than two hours of technology professional development during the last five years, clearly professional development activities did not appeal to all faculty members.

While some technology professional development activities may need to target fundamental skills and the development of basic computer self-efficacy, other professional development activities may need to specifically concentrate on technology use in the classroom and computer self-efficacy.

Computer self-efficacy remains a strong predictor of computer use and computer anxiety, with positive or negative computer self-efficacy experiences affecting the individual as much as a year after the event (Compeau & Higgins, 1995). Therefore, it is important that technology professional development activities be both meaningful and positive. If low computer self-efficacy does not diminish with time, then intervention with training targeted at raising computer self-efficacy may be necessary to assure continued computer use (Compeau & Higgins).

Individuals are more likely to increase their computer self-efficacy as a result of participating in training sessions in which they observe modeling of the use of technology, they are able to interact successfully with the technology, and they are reassured that they are capable of mastering the skills presented (Compeau & Higgins, 1995). Training sessions designed in such a manner entail three of the four principal sources of information that define an individuals' self-efficacy for a given task: vicarious experiences such as technology modeling, enactive mastery experiences such as hands-on activities, and verbal persuasion including positive affirmations regarding ability (Bandura, 1997).

Many colleges of education are currently redesigning courses and curriculum, focusing on the need to provide teacher candidates' authentic learning experiences while faculty serve as teaching models. Regardless of the quality of colleges of education faculty members' efforts in modeling technology, the possible impact of technology modeling by other faculty members on teacher candidates cannot be overlooked.

If self-efficacy is a factor in technology adoption and the successful use of technology requires self-efficacy, then technology professional development may need to include activities to boost self-efficacy (Compeau & Higgins, 1999). Additionally, computer self-efficacy is a factor in an individual's decision to adopt technology, the amount of technology used by an individual, and a person's persistence in overcoming technical problems (Compeau and Higgins).

The results of this study led to the following recommendations for implementation:

1. All faculty members should be encouraged to participate in at least one workshop or professional development activity per year, as this research showed that as few

as two hours of technology professional development significantly impacts the use of technology in the classroom.

2. Professional development workshops should be designed not only to develop technology skills, but also to foster computer self-efficacy as a means to increased technology use in the classroom.
3. Faculty members should be encouraged to share technology use activities with other faculty members through formal and informal professional development activities.
4. Special technology professional development activities targeting faculty members who teach general education requirement courses should be developed as a means of increasing technology modeling for teacher candidates in all courses.
5. Special professional development opportunities should be tailored specifically for tenured and experienced faculty members to encourage technology use and foster computer self-efficacy.
6. Since faculty members within the colleges of education use a greater variety of technology and use more interactive technology, collaboration with faculty members from other disciplines might facilitate more technology use and technology modeling in the classroom.
7. The lack of a relationship between faculty computer self-efficacy and teacher candidates' computer self-efficacy may indicate the need for technology modeling across the curriculum.

This study answered several relevant research questions, but additional research is needed. The results of this study led to the following recommendations for additional study:

1. Additional research on the effect of technology modeling in university classes on teacher candidates is needed.
2. Research examining access to technology in the classroom and the relationship between access and technology integration is needed.
3. Further research is needed on the causes of technology resistance among faculty members.
4. Longitudinal studies of teacher candidates' computer self-efficacy should be explored.
5. Additional research is needed investigating the effect of professional development programs specifically targeting computer self-efficacy.
6. A revised computer self-efficacy scale with specific constructs focusing on teaching with technology needs to be developed.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

LOUISIANA TECH
UNIVERSITY

OFFICE OF UNIVERSITY RESEARCH

MEMORANDUM

TO: Rebecca Calloway

FROM: Stephanie Herrmann, University Research SH

SUBJECT: HUMAN USE COMMITTEE REVIEW

DATE: February 14, 2004

In order to facilitate your project, an **EXPEDITED REVIEW** has been done for your proposed study entitled:

"The Relationship of Teacher Candidate Computer Self-efficacy to Faculty Computer Self-efficacy, Technology Faculty Development, and Technology Integration in Louisiana's Colleges and Universities"
Proposal # HUC-0041

The proposed study procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be personal in nature or implication. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Further, the subjects must be informed that their participation is voluntary.

Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

This approval is granted for one year from the date shown above. Projects should be renewed annually. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of University Research.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study.

If you have any questions, please contact Mary Livingston at 257-2292 or Stephanie Herrmann at 257-5075.

Note to Researcher:
No comments at this time.

A MEMBER OF THE UNIVERSITY OF LOUISIANA SYSTEM

P.O. BOX 3092 • RUSTON, LA 71272 • TELEPHONE (318) 257-5075 • FAX (318) 257-5079
AN EQUAL OPPORTUNITY UNIVERSITY

APPENDIX B

PERMISSION TO USE COMPUTER SELF-EFFICACY SCALE

From: P.Eachus@salford.ac.uk
Subject: Re: CUSE key and permission
Date: January 12, 2004 4:18:01 AM CST
To: becky@woodard.latech.edu

Please feel free to use the scale.
The scoring key is attached.

Pete Eachus

On 27 Dec 2003, at 13:54, Becky Callaway wrote:

> Dr. Eachus,
> I am interested in using your Computer User Self-efficacy Scale in research for my dissertation. I am looking at higher education faculty and the relationship between computer self-efficacy, technology faculty development and technology integration.
>
> If this is acceptable to you, would you send me the scoring key as well as written permission to use the scale?
>
> Thank you,
>
> Becky Callaway
> Coordinator of Instructional Technology
> CITDL— 1014 PML
> Louisiana Tech University
> 318 257-2912
> 318 257-2731 (fax)

Dr Peter Eachus
School of Community, Health Sciences, and Social Care
University of Salford

Phone: +44 161 295 2428 Fax: +44 161 295 2427

University of Salford, Salford, M6 6PU, UK.

---- File information -----------
File: Scoring of The Computer Self.doc
Date: 9 Mar 2001, 11:33
Size: 11776 bytes.

Scoring of The Computer Self-Efficacy Scale

"Student Attitude Towards Computers"

Part 1

Experience with computers - this question is scored using a standard Likert format where "none" is scored as 1 and "extensive" is scored as 6.

Number of computer packages used - here the respondent is scored 1 for each package used and these are totalled to give a score for the question, i.e. total number of packages used.

Part 2

Items 1 to 30 are all scored on a six point Likert scale.

Items 1, 2, 6, 8, 9, 11, 12, 16, 18, 20, 24, 27 and 29 are positively worded and the respondent's response is recorded as the actual scale score for these items, e.g. a response of 4 to item 1 will be scored as 4, i.e.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

Items 3, 4, 5, 7, 10, 13, 14, 15, 17, 19, 21, 22, 23, 25, 26, 28 and 30 are negatively worded and are scored in reverse, i.e.

Strongly Agree 1 2 3 4 5 6 Strongly Disagree

A scale score for these items is obtained by subtracting the respondent's response from 7, e.g. a response of 4 to item 3 will be scored as 3.

Summing the scores for all 30 items gives a self-efficacy score and by scoring the scale in such a way, high scale scores indicate greater confidence for computer use.

APPENDIX C

INFORMED CONSENT FORM FOR FACULTY MEMBERS

Technology Survey Information and Participant Consent Agreement

PROJECT DESCRIPTION
TITLE: The relationship of teacher candidate computer self-efficacy to faculty computer self-efficacy, technology professional development, and technology integration in Louisiana's colleges and universities.

PURPOSE OF STUDY: The purpose of this survey is to determine the relationship between teacher candidates' computer self-efficacy and faculty members' computer self-efficacy, technology professional development, and technology integration in Louisiana's colleges and universities. The survey is divided into three parts. In Part I you are asked to provide some basic background information about yourself and your experience with computers. In Part II you are ask to indicate the extent to which you, personally, agree or disagree with the statement provided. In Part III you are asked about your use of technology in your classes.

SUBJECTS: A statewide survey of higher education faculty members and teacher candidates.

PROCEDURE: The faculty member participants will be contacted via Internet to complete an online survey. Questions on attitudes, opinions and demographic information are included in the survey. The responses will be sent back electronically via internet. Teacher candidate participants will complete a printed survey.

INSTRUMENTS AND MEASURES TO INSURE PROTECTION OF CONFIDENTIALITY: A researcher-developed survey will be used to gather the information; the instrument was piloted with five instructional technologists, with modifications made to correct ambiguous and/or nonproductive questions. In order to protect the confidentiality of participants, the data collected will be stored on a server-based password-protected account. Due to the nature of the Internet complete confidentiality cannot be guaranteed.

RISKS: There are no risks associated with this study.

BENEFITS/COMPENSATION: None

SAFEGUARDS OF PHYSICAL AND EMOTIONAL WELL-BEING: This study involves no treatment or physical contact.

If you have any questions or comments regarding this study contact:
PROJECT DIRECTORS:
Rebecca Callaway, Doctoral Student, 318-257-2912, becky@latech.edu ,
Dr. Jo Ann Dauzat, Project Director, 318-257-3712, jdauzat@latech.edu
HUMAN USE COMMTTTEE: Dr. Mary Livingston, maryml@latech.edu

Dr. Terry McConathy, tmm@gschool.latcch.edu

PARTICIPANT CONSENT STATEMENT: I understand that my participation in this study is strictly voluntary. I understand that I may refuse to answer any questions without penalty. I further understand that individual survey results will not be accessible to anyone except the principal investigator, myself, or a legally appointed representative. I have not been requested to waive, nor do I waive any of my rights related to participating in this study.

☐ By selecting this box and pressing the Submit button, I agree to the terms and conditions set forth above.

APPENDIX D

INFORMED CONSENT FORM FOR TEACHER CANDIDATES

Technology Survey Information and Participant Consent Agreement

PROJECT DESCRIPTION
TITLE: The relationship of teacher candidate computer self-efficacy to faculty computer self-efficacy, technology professional development, and technology integration in Louisiana's colleges and universities.
PURPOSE OF STUDY: The purpose of this survey is to determine the relationship between teacher candidates' computer self-efficacy and faculty members' computer self-efficacy, technology professional development, and technology integration in Louisiana's colleges and universities.
SUBJECTS: A statewide survey of higher education faculty members and teacher candidates.
PROCEDURE: The faculty member participants will be contacted via Internet to complete an online survey. Questions on attitudes, opinions and demographic information are included in the survey. The responses will be sent back electronically via internet. Teacher candidate participants will complete a printed or online survey.
INSTRUMENTS AND MEASURES TO INSURE PROTECTION OF CONFIDENTIALITY: A researcher-developed survey will be used to gather the information; the instrument was piloted with five instructional technologists, with modifications made to correct ambiguous and/or nonproductive questions. In order to protect the confidentiality of participants, the data collected will be stored on a server-based password-protected account. Due to the nature of the Internet complete confidentiality cannot be guaranteed.
RISKS: There are no risks associated with this study.
BENEFITS/COMPENSATION: None
SAFEGUARDS OF PHYSICAL AND EMOTIONAL WELL-BEING: This study involves no treatment or physical contact.
If you have any questions or comments regarding this study contact:
PROJECT DIRECTORS:
Rebecca Callaway, Doctoral Student, 318-257-2912, becky@latech.edu ,
Dr. Jo Ann Dauzat, Project Director, 318-257-3712, jdauzat@latech.edu
HUMAN USE COMMTTTEE: Dr. Mary Livingston, maryml@latech.edu
Dr. Terry McConathy, tmm@gschool.latcch.edu

PARTICIPANT CONSENT STATEMENT: I understand that my participation in this study is strictly voluntary. I understand that I may refuse to answer any questions without penalty. I further understand that individual survey results will not be accessible to anyone except the principal investigator, myself, or a legally appointed representative. I have not been requested to waive, nor do I waive any of my rights related to participating in this study.

By selecting this box and pressing the Submit button, I agree to the terms and conditions set forth above.

APPENDIX E

TECHNOLOGY SURVEY FOR FACULTY

Part I
Institution: ☐ 4 year doctoral ☐ 4 year non-doctoral
Department:
Number of years teaching experience in higher education:
Internet Access: ☐ home only ☐ work only ☐ both home and work
Tenure Status: ☐ tenured ☐ non-tenured ☐ not on tenure track
Employment Status: ☐ full-time ☐ part-time
Gender: ☐ male ☐ female
Ethnicity: ☐ African American ☐ Asian ☐ Caucasian ☐ Hispanic ☐ Native American ☐ Other
I attended T.H.E|QUEST faculty development sessions: ☐ yes, at Lafayette ☐ yes, at Ruston ☐ no

I attended Passport faculty development sessions:

☐ yes

☐ no

In addition to the faculty development sessions above, how many hours of technology faculty development or technology-related workshops have you attended in the last 5 years:

	1999	2000	2001	2002	2003
Course Management system (i.e. Blackboard, WebCT, etc.)	hrs.	hrs.	hrs.	hrs.	hrs.
Webpage Design	hrs.	hrs.	hrs.	hrs.	hrs.
T.H.E.QUEST	hrs.	hrs.	hrs.	hrs.	hrs.
PASS-port	hrs.	hrs.	hrs.	hrs.	hrs.
Other:	hrs.	hrs.	hrs.	hrs.	hrs.
Other:	hrs.	hrs.	hrs.	hrs.	hrs.
Other:	hrs.	hrs.	hrs.	hrs.	hrs.
Other:	hrs.	hrs.	hrs.	hrs.	hrs.

Part II

1. Most difficulties I encounter when using computers, I can usually deal with.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
2. I find working with computers very easy.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
3. I am very unsure of my abilities to use computers.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
4. I seem to have difficulties with most of the packages I have tried to use.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
5. Computers frighten me.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
6. I enjoy working with computers.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree

7. I find that computers get in the way of learning.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
8. Windows-based computer packages don't cause many problems for me.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
9. Computers make me much more productive.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
10. I often have difficulties when trying to learn how to use a new computer package.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
11. Most of the computer packages I have had experience with have been easy to use.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
12. I am very confident in my abilities to make use of computers.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
13. I find it difficult to get computers to do what I want them to do.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
14. At times I find working with computers very confusing.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
15. I would rather that we did not have to learn how to use computers.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
16. I usually find it easy to learn how to use a new software package.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
17. I seem to waste a lot of time struggling with computers.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
18. Using computers makes learning more interesting.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
19. I always seem to have problems when trying to use computers.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree
20. Some computer packages definitely make learning easier.	Strongly disagree	☐	1	☐	2	☐	3	☐	4	☐	5	☐	6	Strongly agree

21. Computer jargon baffles me.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
22. Computers are far too complicated for me.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
23. Using computers is something I rarely enjoy.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
24. Computers are good aids to learning.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
25. Sometimes, when using a computer, things seem to happen and I don't know why.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
26. As far as computers go, I don't consider myself to be very competent.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
27. Computers help me to save a lot of time.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
28. I find working with computers very frustrating.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
29. I consider myself to be a skilled computer user.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree
30. When using computers I worry that I might press the wrong button and damage it.	Strongly disagree	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	Strongly agree

Part III

How many courses are you currently teaching?	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4 or more
Of these courses, how many have components available to students online?	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4 or more
Of these courses, how many do you teach online? (no more than two face-to-face meetings)	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4 or more

On average, how many times per week do you use the following technology in your current face-to-face classes: (total of all face-to-face classes)	Never	Less than once	1 - 2	3 - 4	5 or more
Powerpoint	☐	☐	☐	☐	☐

VCR	☐	☐	☐	☐	☐
DVD	☐	☐	☐	☐	☐
Document Camera	☐	☐	☐	☐	☐
Graphing Calculator	☐	☐	☐	☐	☐
Computer Software Demonstration	☐	☐	☐	☐	☐
Internet Sites	☐	☐	☐	☐	☐
Video Camera	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐
On average, how many times per week do you use each of these online resources in your teaching? (total of all courses - both online and face-to-face)	Never	Less than once	1 - 2	3 - 4	5 or more
Course Annoucements	☐	☐	☐	☐	☐
Syllabus	☐	☐	☐	☐	☐
Resources for assignments	☐	☐	☐	☐	☐
Email	☐	☐	☐	☐	☐
Course schedule	☐	☐	☐	☐	☐
Course content	☐	☐	☐	☐	☐
Grades	☐	☐	☐	☐	☐
Digital dropbox	☐	☐	☐	☐	☐
Chat	☐	☐	☐	☐	☐
Discussion board	☐	☐	☐	☐	☐
Groups	☐	☐	☐	☐	☐
Online quiz	☐	☐	☐	☐	☐
Online survey	☐	☐	☐	☐	☐
Virtual Classroom	☐	☐	☐	☐	☐
Interactive tutorial	☐	☐	☐	☐	☐
Streaming video	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐

For the courses you are currently teaching, how are materials posted online? (check all that apply)

- [ ] Course management system (i.e. BlackBoard, WebCT, etc.)
- [ ] Personal webpage for course
- [ ] Textbook publisher hosted website

Other:

How have you changed your teaching in order to integrate technology into your courses?

What are the advantages of having course materials online?

What are the disadvantages of having course materials online?

APPENDIX F

DEPARTMENTAL GROUPINGS

DEPARTMENT GROUPINGS

1 Education

Behavioral Studies and Educational Leadership,
Curriculum, Instruction, and Leadership,
Education,
Education, Curriculum and Instruction,
Educational Foundations and Leadership,
Educational Leadership, Counseling and Foundations,
Educational Leadership and Instructional Technology,
Educational Leadership, Research and Counseling,
Education and Counseling,
Education and Human Development,
Education and Educational Technology,
Educational Leadership, Research and Counseling,
Educational Leadership and Counseling
Educational Technology
Foundations and Leadership,
Instructional Technology,
Teacher Education,
Teaching and Learning,
Health and Exercise Sciences,
Health and Human Performance,
Health and Physical Education,
Health Sciences,
Human Performance and Health Promotion,
Kinesiology,
Kinesiology and Health Sciences,
PK16

2 Science

Applied and Nature Sciences,
Applied, Natural and Social Sciences,
Biological & Environmental Sciences
Chemistry and Physics,
Geology and Geophysics ,
Geosciences ,
Physics,
Science,
Agricultural Economics and Agribusiness ,
Agricultural Sciences ,
Family and Consumer Sciences ,
Forestry ,

Human Resources (Family and Consumer Sciences),
Human Resource Education & Workforce Development,
Human Ecology,
Renewable Natural Resources

3 Arts and Sciences

Architecture
Art,
Arts, English, and Humanities ,
Aviation ,
Aviation Science,
Communication Arts ,
Communicative disorders ,
Communication Studies ,
Creative and Performing Arts,
Creative and Performing Arts (Music),
Music,
Performing Arts – Drama,
Speech Theatre,
Criminal Justice,
Fine Arts,
Fine Arts, Music, Philosophy ,
History and Geography
History and Political Science
History and social sciences
Humanities,
Journalism,
Mass Communication,
Liberal Arts,
Military Science ,
Philosophy ,
Political Science ,
Professional Aviation ,
Religion,
Social Work ,
Sociology,
Sociology/ Pediatrics,
Speech

4 Mathematics, Computer Science, and Statistics

Mathematics
Mathematics, Computer Science, and Statistics
Computer Science

5 Languages and Literature

English,
English, Journalism, and Languages,
Foreign Languages & Literatures,
Languages,
Language and Communication,
Languages and Literature,
Modern Languages,

6 Behavioral Sciences

Behavioral Sciences,
Behavioral and Social Sciences ,
Counseling ,
Counseling Education ,
Psychology & Behavioral Sciences,
Social Sciences,

7 Administration and Business

Accounting,
Business Administration,
Business law,
Computer Information Systems and Analysis,
Economics & Finance,
Entreprenuership,
Management and Marketing,
Marketing,
Professional Accountancy

8 Other

Biomedical Engineering,
Chemical Engineering,
Civil Engineering,
Construction,
Electrical Engineering,
Electrical Engineering Technology,
Mechanical Engineering
Dental Hygiene,
Gerontology,
Health Information Management,
Nursing,
Nursing Radiology,
Occupational Therapy ,

Pharmacy,
Radiologic Technology,
Assessment and Evaluation,
Continuing Education,
Graduate studies,
Higher education,
Learning resource center,
Library,
Louisiana Scholars' College,
Master of Arts in Urban Education,
Student Support Services
Title III