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The Fusion Model of Instructional Design: a proposed model for faculty development programs in technology integration

Lori C. Soule
Louisiana State University and Agricultural and Mechanical College, lori.soule@nicholls.edu

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THE FUSION MODEL OF INSTRUCTIONAL DESIGN:
A PROPOSED MODEL FOR FACULTY DEVELOPMENT PROGRAMS IN
TECHNOLOGY INTEGRATION

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Educational Theory, Policy, and Practice

by

Lori C. Soule
B.S., Nicholls State University, 1980
M.B.A., Nicholls State University, 2002
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DEDICATION

To the memory of my parents,

Odis Eugene and Helena Penisson Cole.

Mom and Dad,

thank you for the inner drive and determination you instilled in me.

I hope that I can influence my own children and future generations

in the way that you have influenced me.

I miss you dearly.

With all of my love,

Lori
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ABSTRACT

University faculty are increasingly challenged to integrate technology into their teaching to meet the needs of technology-savvy students today. The purpose of this dissertation is to introduce and examine an instructional design model, the Fusion Model of Instructional Design, for designing and implementing more effective faculty development programs in technology integration. The model builds on positive aspects of participatory design (Vincini, 2001), rapid prototyping (Tripp & Bichelmeyer, 1990), and Keller’s (1983) ARCS model of motivation. Key characteristics of the Fusion Model are participation of early adopters in the design and implementation of training, recursive training of early adopters first and then the remaining faculty within one department or a small number of related departments, and on-going formative evaluation through brainstorming and discussion.

Two studies were conducted to examine the perceived value, usability, and effectiveness of the Fusion Model in a small southern university. For both studies, the participants were trained on various components of a popular course management system. Study 1 was conducted with two departments for the purpose of piloting of the model. Survey data were collected in Study 1. Study 2 was conducted with two additional departments for further evaluation of the model. Data from Study 2 were collected using both quantitative and qualitative methods. Qualitative data were collected through interviews of faculty participants and the university technology facilitator and the researcher’s observation journal.

Results of these studies indicate that the use of Fusion Model of Instructional Design was perceived favorably and produced positive outcomes. Both the technology facilitator and the faculty participants reported positive attitudes toward the training designed, developed, and implemented using the model. The technology facilitator was pleased with the value, usability, and effectiveness of the model because the model allowed for greater faculty participation,
customization of the training, and modifications of the sessions when needed. The faculty were pleased because using the model allowed them input in their training which resulted in more participation, more targeted training and support with colleagues in the same department. In a follow-up survey, faculty reported a significantly higher level of technology integration in their teaching and student learning.
CHAPTER 1
INTRODUCTION

The classrooms of yesteryears had a different appearance than those of today. The students carried around slide rules in order to perform math operations. Manual typewriters had a bell to warn the typist of the upcoming right margin, and the carriage was moved back manually to the left margin. Back then, students anxiously awaited the handing out of tests; not because they were eager to take the test, they just wanted to smell the purple ink from the ditto machine. If a classroom contained technology, it consisted of a movie projector and possibly a slide projector with carousels of picture slides; both were used to bring audio/video content into the classroom. Another technology tool available in the classroom was the overhead projector. Things appeared to be a lot less complicated back then.

But times have changed; in the last decade education has seen a great many additions in the use of technology in the classroom and on campuses. Walk around any college campus today and one will notice that today’s student has a very different appearance from students from as recent as five years ago. In many instances, located in students’ ears is a pair of earbud headphones with a cord leading from the headphones to their pockets or backpacks. They could be listening to the latest music download, or maybe it’s a history lecture on the fall of the Roman Empire. At the same time, they may be typing on their cell phone, with their thumbs at a rate faster than many people can type on a traditional QWERTY keyboard. They use a computer for composition, get most of their news from computers or TV, and can spent hours at a time playing video games (Gilroy, 1998). These students are part of a “more wired, technologically savvy and connected” generation than any generation in the past (McGriff, 2001, p. 309). With the level of technology these tech-savvy students enjoy, Gilroy poses the question, “…if technology is
central to so many aspects of contemporary life, should it not be central to the learning process?” (p. 6).

In order to educate this new breed of students, educators of today are obligated to incorporate various technologies into their classrooms. Classrooms of today can contain many types of technology including calculators, presentation technologies, online classes, online chat rooms, online tutorials, Internet, Web searches, computer-based multimedia training, E-mail and listserv collaboration, simulations, and as of late, pod-casting. Although there are several different types of instructional technologies available for classroom use, integrating these technologies can present a serious challenge, even for the most progressive instructor.

As seen by the demands of today’s students (Cramer, 2007), integration of technology into classrooms is becoming more of an issue. Through technology integration, classrooms can become more “learner centered” (Anson as cited by Hall & Elliott, 2003, p. 303). Technology can facilitate learning through the presentation of real world problems that engage learners in solving complex problems. Technology tools provide a way for individuals to connect and manipulate both technology resources and their own ideas. Technologies can promote communication both within and outside the classroom thus allowing for easier feedback, reflection, and revision (Driscoll, 2002a). Technology can provide unique learning experiences for students. Through the use of technology, students can open doors that they did not know even existed (Alvarez, 1996), and information is being created and disseminated more and more easily (Massey, 2001). Certain technology integration techniques better facilitate certain learning activities (Doherty & Ayers, 2002). Technology alone does not guarantee learning; it is how the teachers and learners use accessible technology that determines if the transformation of learning occurs (Driscoll, 2002a).
Doherty and Ayers (2002) state specific types of students’ behaviors that were exhibited when technology was integrated into classrooms. These behaviors include the searching for (a) answers on their own, (b) applying their new knowledge to real world questions, (c) working in teams, (d) coming to class more prepared and ready to actively participate in the class, and (e) taking more responsibility for their learning.

Employers want graduates who are problem solvers (McGriff, 2001); graduates who can demonstrate both mastery of the current knowledge in their field and mastery of technology that will enable them to stay abreast of changes in their field (Duderstadt, 1999/2000). Technology has expanded educational opportunities to older and working students. The interest in distance learning is exploding due in large part to the growth of the Internet. It is predicted that 90% of households in the United States will have Internet access by 2010 (Rogers, D. L., 2000). In addition, the higher education market has expanded its opportunities to corporate universities, for-profit institutions, and online providers (Owen & Demb, 2004).

Faculty need to become technologically competent to meet the demands of these diverse students and must be willing to make the necessary changes to accommodate these students (Padgett & Conceição-Runlee, 2000). Faculties have been hesitant to integrate computers and alter their pedagogies (Dusick, 1998). In some cases, integrating technology into the classroom transforms the traditional role of the teacher as the “sage on the stage” to becoming a “guide on the side” (Jacobsen, 1998, p. 3), an area considered to be outside of their “comfort zone.”

Issues have been raised by faculty concerned with technology integration. A favorite criticism from faculty is that the use of technology in the classroom will “dehumanize teaching and learning” (Burke, 1994, p. 4). Another faculty criticism is that technology “will reduce their role in learning” (Burke, p. 4). According to Burke, if technology is used properly, it can (a) personalize the student’s education because it can be tailored to fit the individual needs and
learning style of each person and (b) reduce the amount of time spent on providing information and data thus allowing more time to convey the meanings and relationships that comprise of knowledge and wisdom.

Faculty members are apprehensive when it comes to including technology in their classrooms. The traditional form of teaching has been and remains the lecture, but as the curriculum emphasis is changing from teaching to learning, the lecture can no longer be the primary mode of instruction (Davidson-Shivers, 2002). Faculty roles changing from instructor and lecturer to course developer and facilitator are being suggested to accommodate technology integration (Bennett, 2003; Horgan, 1998; Padgett & Conceição-Runlee, 2000).

In order to integrate technology, some risk taking has to occur, and by nature, college professors are risk averse (Geoghegan as cited by Dusick, 1998). But if successful technology integration occurs, the professor’s confidence and enthusiasm about technology will likely rise (Hirschbuhl & Faseyitan, 1994). Besides fearing risk, other factors that prevent faculty from pursuing technological innovations are: fear of change, fear of time involved, and not knowing where to start, among others (Truman-Davis & Hartman, 1998).

As the call for technology integration into classrooms is made, changes occurring are rare. Change is not easy for most people, especially when technology is involved. People are apprehensive toward technology even if the technology is seen as an improvement, an innovation. Truman-Davis and Hartman (1998) state that the learning of needed technical skills is only part of the change process. Sufficient time must be allotted for using programs and equipment to maintain a level of proficiency after the initial training period. Scaffolding from peers can provide the needed technological information and opportunities of learning in a safe environment (Brown, Benson, & Uhde, 2004).
Everett M. Rogers’ (1993) defined five adoption categories—innovators, early adopters, early majority, late majority, and laggards. Innovators are risky and daring; they are eager to try new ideas. Followed close by in the adoption categories are early adopters; change agents seek out early adopters to spread the word about the innovation. Early majority and late majority tend to take their time adopting an innovation; they need to see a purpose in adopting the innovation. Laggards may never adopt the proposed innovation. In a recent study, Nicolle (2005) reported percentages of faculty use of technology based upon Roger’s adoption categories, as follows: awareness (10.1%), learning the process (25.6%), using and applying the process (36.4%), creative application to new contexts (18.6%), and facilitating the process (9.3%).

Hall and Hord (1987), along with other colleagues, developed their ideas for the Concerns-Based Adoption Model (CBAM) during the early 1970s. CBAM is a systematic change model that allows change facilitators to understand the change process from the viewpoint of the persons affected by the change. The CBAM model contains two diagnostic dimensions, Levels of Use and Stages of Concern, which identify and describe the dynamics of an innovator adopter. Levels of Use describe the diverse ways an innovation could be used by the adopter. Stages of Concern explain the developmental sequence of the user’s knowledge, encountered problems, motivations, and requirements related to the use of the innovation. Seven Stages of Concern are identified as: awareness, informational, personal, management, consequence, collaboration, and refocusing.

Ely (1995) suggests that the underlying pedagogy must change. Teachers can no longer teach the students all the answers. Teachers need to help students learn how to ask the right questions, find the answers, and apply them to the problem.

Nicolle (2005) discussed how faculty members expect and depend on faculty development programs to be available for use; they will attend the programs when the materials
covered are discipline-specific and are relevant to their own needs. Nicolle states, “…faculty members appear to value effective teaching. The ability to determine a direct connection between effective teaching and the use of technology is a critical component in assisting them along the journey of integration” (p. 124).

A key component in managing the integration of technology in classrooms is through faculty development programs (McGriff, 2001). McGriff defines faculty development as a “process of professional training (and retraining) undertaken by instructors in higher education” and that “instructional designers can serve as change agents within faculty development programs” (p. 308).

Gagné, Briggs, and Walter (1992) define instructional design (ID) as a methodical process of planning instructional systems. Instructional design defined by Molenda, Reigeluth, and Nelson (2001) as “that branch of knowledge concerned with theory and practice related to instructional strategies and systematic procedures for developing and implementing those strategies” (p. 2). Instructional design is a construct that describes the rules and procedures used to create instructional content such as materials, lessons, or entire systems in a coherent and dependable manner. The rules and procedures guide designers to work more efficiently while producing instructional content that is more effective and appealing and which can be used in a variety of learning environments (Molenda, et al., 2001).

The literature reflects that some universities have attempted to use instructional design models to create faculty development programs. However, the tried models are of the *homegrown variety* or a modification of a long-standing generic model known as ADDIE. ADDIE is an acronym referring to the major processes that comprise the generic instructional design model: Analysis, Design, Development, Implementation, and Evaluation. It is a
“colloquial term used to describe a systematic approach to instructional development” (Molenda, 2003a, p. 1).

Davidson-Shivers, Salazar, and Hamilton (2005) describe a modified ADDIE model used to instruct faculty members on the use of Microsoft PowerPoint™ for creating classroom presentations. They chose to use an instructional design model for training because through the use of the model and its procedures, they could transcend disciplinary boundaries among faculty members and serve as a framework for other faculty development efforts. Following the model, the workshop developers began with a survey of faculty members to determine their level of computer expertise and the type of computer used. The ADDIE model was modified to allow for concurrent design and development of instructional materials; instructional materials and the order of events were developed at the same time. The evaluation was planned during the concurrent design and development stage; materials were developed, tested, and reviewed. During implementation, team teaching was employed in a relaxed atmosphere which included providing “job aids, hands-on exercises, and personalized feedback” (p. 531).

An example of a homegrown model can be found in Pederson’s (2000) article describing a template that was created to help faculty in their incorporation of a course management system into their classes. The rationale for creating the template was due to the majority of the faculty being overwhelming by the web course development process and the general failure to incorporate instructional design into the development process. Using a rapid prototyping approach as a guide, existing courses were evaluated to determine what web components were used and how they were used. Templates for commonly used items, such as the syllabus, were created incorporating graphic, layout, and organizational principles. Once the templates were developed, faculty members could choose to use the templates to create new WebCT courses.
Another homegrown example is the faculty training model which facilitates faculty in the development and/or conversion of course materials to be delivered online as discussed by McCallie and McKinzie (1999). The model includes an introduction to distance education, orientation to WTOnline (their virtual university), development and communication tools, instructional design issues, promotion of online interaction, visual design, course example analysis, and sample class layout. McCallie and McKinzie suggest by providing faculty with the necessary tools and support, effective instruction will occur in online classrooms.

Even though some universities are implementing instructional design models, whether a modified known model or one designed internally, in their creation of faculty development programs, there are limitations with each model. In the three mentioned examples, the instructional materials were created and then presented to the faculty members; the faculty were not encouraged to participate in the creation of the initial instructional material or any additional material. Pederson (2000) mentions the use of a rapid prototyping approach due to limited time and resources, but he does not mention using the rapid prototyping approach in the creation of new materials; only existing web components were evaluated for use in web development components. Appelman (2005) notes the limitations of ADDIE and similar models. These models do not have an adequate number of components nor the iterative ability to assist in the development of educational media solutions. Consequently, designers are left without the adequate tools to develop effective learning experiences. Other authors note the traditional instructional design models are lacking. Goodrum, Dorsey, and Schewn (1994) state, “Increasingly, people find this approach severely lacking in the face of problems that call for customer/user focus, adaptable technical and social designs, and solutions where training is impractical or unaffordable” (p. 230).
**Statement of Problem**

There is a current push for faculty members to integrate technology into their existing teaching practices in order to meet the learning needs of the changing student population. Efforts have been made to use faculty development programs as the avenue to teach faculty members how to incorporate different technologies into the classroom. Other efforts include using the principles and practices of instructional design in the creation of these needed faculty development programs.

Reigeluth (1996) suggests the possible need of a new paradigm for Instructional Systems Design (ISD). He describes the current model of training and education as one “not designed for learning, it is designed for sorting” (p. 14); students are separated into laborers and managers. Educators should focus on “learning instead of sorting…customization not standardization” should be the basis of ISD (p. 14). The new paradigm should contain a user-designer approach in which the ISD process is a series of decisions, each of which requires a cycle of analysis, synthesis, evaluation, and change. Included in the ISD process should be all of the stakeholder groups. The stakeholders should envision fuzzy images (possible end products) of instruction early in the ISD process. His most important component of this paradigm is that much of the designing should be done by the learners.

Ely (1995) suggests inviting teachers, as “stakeholders,” into the planning process of technology implementation. By becoming part of the process, they will posses “ownership” of the ideas along with those who introduced them. Faculty members would have input into what they want to be trained on and, therefore, would probably be more accepting and motivated by the training. In addition, by incorporating the input from faculty into the designed courseware, pedagogical concerns of faculty can be eliminated and the problem of instructional design being “just a process” is overcome. Truman-Davis and Hartman (1998) suggest providing faculty
development programs that “are collaborative and provide just in time learning environments to prevent problems” (p. 5).

A factor that influenced instructional design during the 1990s was the growth of interest in constructivism. Constructivist principles include (a) solving complex and realistic problems, (b) interacting with others to solve those problems, (c) examining problems from multiple perspectives, (d) encouraging ownership of learning process, and (e) examining their own role in the knowledge construction process (Driscoll, 2000). Willis (1995) describes the characteristics of constructivist-interpretivist instructional design models. These models are recursive, non-linear, reflective, and collaborative, and some are even chaotic. A critical component of this type of model is formative evaluation.

Surry and Land (2000) confer with the importance of formative evaluation. As faculty development programs are being designed and developed, possible problems could be discovered at an early stage, before too much of the program is “set in stone.” Other strategies, such as the implementation of Keller’s ARCS model of motivation design, applied during the implementation of the faculty development programs, can serve as effective frameworks for increasing faculty motivation toward technology integration.

Wilson (1997) reflects on his thoughts about the objectivist/constructivist debate on instructional design. He suggests that the next generation of instructional design theory should be flexible, generic, and able to be used in a wide variety of situations that are encountered in everyday practice.

Davidson-Shivers, Salazar, and Hamilton (2005) found very few instructional design models specifically related to faculty development. These findings indicate a lack of instructional design principles and procedures being utilized in the creation and implementation of faculty development programs.
**Purpose of the Study**

The purpose of this study was to examine the usability and benefits of a proposed Fusion Model of Instructional Design in the development and implementation of faculty development programs that help faculty integrate technology into their teaching practices. The model is developed based on three well-known instructional design models: participatory design, rapid prototyping, and Keller’s ARCS model of motivation. Participatory design originates from software development. It emphasizes participation of target users in the software design and development process. Rapid prototyping originates from manufacturing industry design. It calls for the design of a prototype early in the design and development process, which is in contrast with the traditional systematic but often slow instructional design approach. Keller’s motivation model focuses on motivation design of instruction. It is hoped that by combining these three distinct instructional design models, the Fusion Model will build on the strengths of each of these models, thus making the design and development process of faculty technology programs more participatory and the resulting training programs more appealing, relevant and effective for faculty.

**Research Questions**

The following are two main research questions and seven sub-questions that guided this research:

RQ 1: What is the perceived value and usability of the Fusion Model of Instructional Design in designing and implementing faculty programs in technology integration?

RQ 1A: How has the model’s participative aspect changed the university technology facilitator's design, development, and implementation of faculty development programs in technology integration?
RQ 1B: How has the model’s recursive aspect changed the faculty participation in the design, development, and implementation of faculty development programs in technology integration?

RQ 1C: How has the model’s formative evaluation aspect helped the flow and results of the implementation of the faculty development programs in technology integration designed and developed using the model?

RQ 2: What is the perceived effectiveness of the faculty development programs designed, developed, and implemented using the Fusion Model of Instructional Design?

RQ 2A: What is the faculty attitude toward faculty development programs overall?

RQ 2B: What is the perceived effectiveness of the faculty development programs on faculty attitudes toward ICT?

RQ 2C: What are the perceived changes in the use of ICT as a result of attending the faculty development programs?

**Significance of the Study**

This study is expected to show that by using a carefully planned approach during the creation of faculty development programs designed to guide faculty in their integration of technology, the end result would be more successful faculty training programs, better acceptance of these programs by faculty, and an overall improved attitude toward technology integration rather than the opposition currently being displayed by faculty. Nworie and McGriff (2001) state, “Effective management of the instructional development process and technologies used in instruction, and the preparation of faculty, will likely result in the efficient use of the technologies, and in the improvement of both teaching and student learning processes” (p. 228).
Helping faculty integrate technology into their classrooms is an important challenge that is necessary in order to meet the needs of today’s changing student. As an educator, one must be willing to make changes to the current established teaching practices. The integration of technology into established teaching practices is considered to be a “major professional development challenge for faculty developers and academic institutions” (Sherer, Shea, & Kristensen, 2003, p. 184). This study is expected to show that once faculty are shown relevant reasons for integration and gain confidence in their ability to integrate technology, they will become motivated and willing to make the necessary changes to their teaching practices.

The lack of instructional design principles and procedures currently being utilized in the creation and implementation of faculty development programs was noted (Davidson-Shivers, et al., 2005). If instructional design principles and procedures are implemented during the design and development of instructional materials designed for faculty development programs, the results would be more effective and appealing to faculty. This is conferred by a study conducted by Davidson-Shivers, Salazar, and Hamilton (2005). They report that when instructional design strategies were used in planning and implementing faculty development workshops, a strong satisfied rating of the workshop was produced. It is expected that this study will expand on the findings of their 2005 study.

Implications of this study include the possibility of replicating the study in a K-12 setting. Theoretical contributions of this model to instructional design include the distinctiveness of the model; this model was designed for the express purpose of design, development, and implementation of faculty development programs in technology integration. Universal models do not have all the necessary components to meet the needs of this specialized situation—faculty development programs in technology integration. Using this model, faculty have the ability to suggest or choose topics of interest to them. They can decide what type of training will better
meet their needs in terms of group size and, they can decide on the frequency of training. In addition, because they have some say in the training, most faculty will leave the training sessions having developed the confidence that they will be able to integrate technology into their teaching preparation and classes, and they will be satisfied with what they have learned in the sessions.

**Limitations of the Study**

A mixed methods embedded case study design was the chosen method of research for this study. The first limitation of this study was the small number of participants. In the study, the number of participants was limited to faculty participating in four different faculty development programs over two semesters. Each faculty development program was designed for a specific department. Therefore, because of the size of the scope of this study, the ability to test the generalizability of the model is limited. However, by applying the model with four programs in four different departments, it is hoped that the applicability of the model was tested to a reasonable extent.

Another limitation is the ability to carry out the model to its fullest potential due to the length of the semester. Some of the faculty participating in the study were not available for follow-up interviews.

**Definitions of Terms**

**Change agent** – an individual or group who promotes and institutes change

**Comfort zone** – the term used to denote a type of mental conditioning resulting in artificially created mental boundaries, within which an individual derives a sense of security

**Diffusion** – the spread of linguistic or cultural practices or innovations within a community or from one community to another

**Innovation** – an idea, practice, or object that is perceived as new by the individual
**Motivation** – is the driving force behind all actions of individual; an internal state that activates behavior and gives it direction

**Pedagogy** – the art or science of teaching

**Stakeholder** – an individual or group with an interest in the success of a group or an organization in delivering intended results and maintaining the viability of the group or organization’s product and/or service; stakeholders influence programs, products, and services

**Technology** – the combination of both hardware and software

**Technology integration** – the effective use of technology in education as an integral tool for the purpose of enhancing student achievement

**Training session** – equivalent substitution for faculty development program
CHAPTER 2
LITERATURE REVIEW

Introduction

Technology integration in classrooms is a current topic of much discussion among faculty, administration, and students. Computer labs, some with 24-hour access, are found in many locations around campuses. Classrooms contain various types of technological equipment including computers, projection systems, whiteboards, and audio systems, just to mention a few. Through the use of the Internet, students are no longer restricted to a certain times they must attend class or the distances they live from campus; they can access their coursework at any time of the day and from practically anywhere on Earth. Advances in technology are some of the greatest forces affecting the future of colleges and universities, and “it is the promise and anticipation of what technology can do in the future that is now affecting attitudes and ideas about how we can teach and learn” (Massey, 2001, p. 78). With all the technology that is available for classroom use, one might ask if the technology is being put to use, being integrated into teaching and learning, or sitting in a corner collecting dust.

As technology has become more affordable and plentiful, the call for use in classrooms is at its highest level. Curricula and pedagogy are undergoing changes to meet the needs of incoming students and employers of graduates. A body of literature has been published related to technology integration in the classroom. This review of relevant literature will focus upon several interrelated topics, including theoretical foundations, faculty development programs in technology integration, best practices for professional development workshops, and instructional design models, providing the framework and background for this study. The combining of these topics, as a whole, work to inform how both historical and current research guided this study.
Relevant topics discussed are the technology integration on today’s campuses along with faculty apprehension toward technology. The use of faculty development programs designed to encourage faculty to incorporate technology into their current teaching practices are examined. A discussion of different types of instructional design models is given. This chapter concludes with a discussion on this study’s proposed instructional design model which is to be used during the development and implementation of faculty development programs on technology integration. Additional rational for this study was provided by gaps in the literature, as related to this investigation. These gaps are discussed and interspersed throughout this chapter.

**Theoretical Foundations**

As the call for technology integration into classrooms is made, changes will have to occur in response to the call. Change is not easy for most people, especially when technology is involved. People are apprehensive toward technology even if the technology is seen as an improvement, an innovation. In order to study those innovations and people’s interactions and reactions to the innovations, a variety of social and educational theories were reviewed. Each theory will be presented using past and current research. When viewed together, the theories will present a framework that will describe how adults adopt technology into their existing teaching methods using an educational setting designed specifically for this purpose.

**Diffusion of Innovations**

Early diffusion studies date back to the 1920s and 1930s with the most analyzed study conducted by Ryan and Gross (1943). Their investigation of the diffusion of hybrid-seed corn influenced the methodology, theoretical framework, and interpretations of rural sociological traditions by students in years to come. Some of the other areas of diffusion study include (a) education, where the diffusion of kindergartens, bus driver training, and modern math were studied; (b) public health and medical sociology, where the diffusion of new drugs or new
medical ideas, family-planning methods, or heath innovations were studied; and (c) marketing, where the diffusion of products in the marketplace were studied (Rogers, 1983).

For this study, Everett M. Rogers’ Theory of Diffusion of Innovations (1983) was used as a foundation. Rogers’ defined five adoption categories—innovators, early adopters, early majority, late majority, and laggards. Innovators are risky and daring; they are eager to try new ideas. Followed close by in the adoption categories are early adopters. Prospective adopters seek out early adopters for their opinions and information about the innovation. Change agents seek out early adopters to spread the word about the innovation. Early majority and late majority tend to take their time adopting an innovation; they need to see a purpose in adopting the innovation. Laggards may never adopt the proposed innovation; they tend to be suspicious of innovations and change agents.

![Figure 2.1 Adoption Categorization on the Basis of Innovativeness (Rogers, 1983, p. 247)](image)

The five adopter categories are represented on a bell-shaped curve, portrayed in Figure 2.1, with each category not mutually exclusive of another. Relevant to the study is the necessity for the innovation to move through the categories to at least the midpoint of the curve. Faculty development activities must attract and enlist the greater part of the faculty; the innovation must move past the early adopters into the mainstream of the faculty. The early adopters are
instrumental in the adoption of the innovation and must be retained as part of the mainstream effort (Doherty & Ayers, 2002).

Rogers’ interest in diffusion studies grew out of his dissertation research where he gathered data on the use of chemical innovations by Iowa farmers. This research motivated him to write his first book on diffusion research, *Diffusion of Innovations* (Rogers, 1962), to “point out the lack of diffusion of diffusion research, and to argue for greater awareness among the diffusion research traditions” (Rogers, 1983, p. 39).

**Concerns-Based Adoption Model**

Hall and Hord (1987), along with other colleagues, developed their ideas for the Concerns-Based Adoption Model (CBAM) during the early 1970s. During this time, the value of innovations being introduced into the schools was being questioned. The innovations were reported to cause “no significant differences.” The problem was not with the innovations—the problem was with the process of implementation of the innovations. As a result, the experiences of the faculty implementing the innovations were evaluated.

Certain assumptions are parameters that direct the concerns-based approach. These assumptions are the foundation for the concepts, tools, and procedures needed in using CBAM. The assumptions include (a) it is critical to understand the viewpoint of the participants in the change process; (b) change is not an event, it is a process; (c) it is possible to predict much of what will occur during the change process; (d) innovations come in all shapes and sizes; (e) two sides of the change process coin are innovation and implementation; (f) to change something, someone has to change first; and (g) everyone can be a change facilitator (Hall & Hord, 1987).

CBAM is a systematic change model that allows change facilitators to understand the change process from the viewpoint of the persons affected by the change. The CBAM model contains two diagnostic dimensions, Levels of Use and Stages of Concern, which identify and
describe the dynamics of an innovator adopter. Levels of Use describe the diverse ways an innovation could be used by the adopter. Stages of Concern explain the developmental sequence of the user’s knowledge, encountered problems, motivations, and requirements related to the use of the innovation. Seven Stages of Concern are identified and described as: Stage 0, Awareness; Stage 1, Informational; Stage 2, Personal; Stage 3, Management; Stage 4, Consequence; Stage 5, Collaboration; and Stage 6, Refocusing. In the Stages of Concern, the users of the innovation are concerned initially about their own interaction with the innovation and over time, shift toward task and impact concerns. As initial concerns were reduced through increased use of the innovation, the intensities of task and impact concerns increased (Hall & Hord, 1987).

An important key to the CBAM model is the change facilitator. Change facilitators can be anyone involved in the change process who has developed “the competence and confidence needed to use a particular innovation” (Hall & Hord, 1987, p. 11). The term “facilitator” is used in place of “agent” because this person or group facilitates or assist others in their concerns so they become more effective and skilled in using the proposed innovation (Hall & Hord, 1987).

Learning Theories

Andragogy, developed by Malcolm Knowles (1984), is a learning theory specifically directed toward adult learners. Andragogy makes the following assumptions about the design of learning: (a) adults need to be involved in the planning and evaluation of their instruction; (b) experience, including mistakes, provides the basis for learning activities; (c) adults learn best when the topic is of immediate value; and (d) adults prefer problem-centered learning. In adult learning programs, certain fundamental aspects must be in place in order for learning to be effective. Adult learners want to know why they need to learn something before they will invest time and effort into learning. Adults are task-oriented in their learning process. As adults come into a learning situation, their backgrounds are wide and varied and their lifetime of experiences
defines the person; utilization of a person’s experiences is a key to self-actualization. Adults are self-directed and expect to take responsibility for their decisions. A starting point for adult learners is the problems that the learners have on their minds. In addition, interaction with other learners during the learning process enhances learning. Being self-directed, adults will “learn more things, and learn better” (Knowles, 1975, p. 14).

Adult learning theory is consistent with constructivism. In the constructivism approach to learning, the learner actively imposes organization and meaning on his or her environment and in the process constructs knowledge. Certain learning conditions and instructional strategies are essential in knowledge construction. These include authentic learning activities, opportunities for collaboration, learner goal-setting, and reflection (Driscoll, 2002b). Constructivism focuses on “high-level, complex learning goals” (Driscoll, 2002b, p. 66). In constructivism, knowledge is dynamic and resides in the mind; thinking and perception are inseparable, and problem solving is necessary to acquire knowledge (Wilson, Teslow, & Osman-Jouchoux, 1995).

**Implications for the Current Study**

By pulling together the different theoretical foundations, one can surmise that in order to get adults to accept change, their concerns about change and at what stage they are in the change process must be addressed. If change is to take place in the level of technology used in a classroom, the presence of a change agent is a necessary component. Classroom changes, such as revised materials, teaching strategies, and pedagogical ideas, will have to occur. A more effective method of getting faculty to accept and implement these classroom changes is to involve them in instructional planning and content creation and to give them a chance to collaborate with peers on these changes.

Until recently, higher education has been protected from the forces that spur change. However, now change in higher education is inevitable (Nworie & McGriff, 2001). Duderstadt
(1999/2000) states, “The real question is not whether higher education will be transformed but rather how and by whom” (p. 41). Higher education institutions should plan “to make the best use of emerging technologies to enhance existing methods of learning and create new ways to fulfill their core teaching and learning missions” (McAuthur, 2002, p. 77). In order for institutions to get stakeholders to “buy-in” to the technology integration process, more institutions are linking their institutional missions and goals to technology (Owen & Demb, 2004).

A first step in technology integration is for faculty in a discipline or program to identify what technology can do for their students (Doherty & Ayers, 2002). Recommendations have been made for technology integration in the classroom. These recommendations include: (a) incorporate successful models that use the Internet and other technologies, (b) demonstrate how the new technologies are a vital part in the curriculum, (c) offer practice opportunities for faculty, (d) incorporate online resources in instructional programs, and (e) make technology resources available for in-class use (Ouzts & Palombo, 2004).

**Faculty Professional Development for Technology Integration**

The purpose of faculty professional development is for the improvement of teaching and learning at the undergraduate and graduate levels. Since the 1980s, numerous efforts have been made at colleges and universities to improve teaching and learning. These efforts are necessary in order to meet the needs of the stakeholders, the students who attend institutions of higher education for the purpose of learning. As a result, teaching practices have changed and students are more involved in their learning through collaborative and cooperative learning, technology-based learning, and learning communities (McGriff, 2001). Part of the change in teaching practices centers around the integration of technology into classrooms. McGriff suggests faculty seek professional development to get a better grasp of how technology can be integrated into

D. L. Rogers (2000) reports the “weak link” between the adoption of technology and faculty is training. If today’s students are to be prepared for the technology-driven future, teachers should have more than limited or inadequate training in technology (Poole & Moran, 1998). Poole asks, “If staff development is really the key to integration, then why are computers collecting dust when many teachers have already been sent to technology workshops?” (p. 60). Ineffective faculty development is attributed to one-shot workshops, lack of continued support, unawareness of teacher needs, and lack of knowledge and support from leadership (Poole & Moran).

To address these obstacles of technology integration, an organized, methodical approach must be applied. Faculty development professionals suggest the key to building a successful faculty development programs is to find out what the faculty want to learn and what type of assistance the faculty feel they will need to reach their goal (Quick & Davies, 1999). Faculty must be dedicated from beginning and/or continuing their development of technology proficiencies through professional development (Nelson, Snider, & Gershner, 2002). Through the use of a systematic approach to faculty design, faculty can create a critical mass of transformation and thorough assessment of outcomes for continuous improvement insures cost-benefit gains (Truman-Davis & Hartman, 1998).

In order to effectively increase the use of technology in the classroom, faculty must increase their level of competency (Dusick & Yildirim, 2000). Dooley (1999) reports that teachers should not only have training on the use of technology but training on how technology can become part of their teaching repertoire. Faculty development is a component in the lifelong learning process for faculty in higher education (McGriff, 2001). These long-term, continuous
development programs are necessary to prevent faculty from becoming obsolete (Camblin & Steger, 2000). Another necessity is an efficient technology infrastructure so that faculty can use available technology effectively (Mitra, Steffensmeier, Lenzmeier, & Massoni, 1999).

The relationship between faculty development efforts and resulting classroom technology integration is multifaceted. A basic set of “enabling factors” (p. 4) is necessary for the successful implementation of technology. The factors are: (a) universal student access to computers, (b) dependable networks, (c) multiple opportunities for training and consulting, and (d) a faculty philosophy that values experimentation and tolerates failure (Doherty & Ayers, 2002).

Ross, Ertmer, and Johnson (2001) report on their study of thirteen teachers participating in a technology integration faculty development program. Various themes about their technology integration beliefs, their technology integration practices, and their self-efficacy beliefs about technology integration emerged from the study. Results include: (a) contributors to learning include more “active types of learning”—peer models, hands-on experiences working with computers, and class discussions; (b) teachers are revising their beliefs toward technology, especially in the role of the students; and (c) increases in confidence levels with regard to technology use are due to increases in knowledge, hands-on experience, peer support, and a sense of accomplishment.

Several additional suggestions have been made for successful faculty development programs. Quinlan and Akerlind (2000) propose having development activities that occur within departments or disciplines. Having activities customized to their own department or discipline, individual professors are more likely to see relevance in the material presented and would probably incorporate the material into their own teaching situation. Guskey and Sparks (1991) recommend using pre- and post-tests, exit interviews, and questionnaires to evaluate changes in participants’ knowledge base. Johnson (2001) advocates the teaching of technology skills in a
setting that is immersed in connections among technology skill, learning, and teaching.

Suggestions of formative evaluation during professional development are given (North Central Regional Educational Laboratory, 1997). Richardson, Eddlesfield, and Lewis (2008) suggest programs that are “demand-led, built around learner needs” (p. 21).

Additional success in using professional development programs for technology integration can be achieved by the use of adult-learning theories and research. Andragogy, a theory regarding the teaching of adults, is a necessary component for successful adult instruction (Cravener, 1998; Davidson-Shivers, 2002; North Central Regional Educational Laboratory, 1999; Rogers, D. L., 2000). Diverse understanding of adult-learning theories, along with technical issues and pedagogy, are necessary to ensure the success of faculty development programs for technology integration with higher education faculty.

Studies have shown that a key factor in successful faculty development for technology integration is the intrinsic and extrinsic motivation of the individual faculty member (Surry & Land, 2000). Motivational strategies can contribute to an effective framework for developing strategies to encourage higher education faculty to use technology. Surry and Land developed a set of strategies for increasing faculty motivation of technology use based upon John Keller’s (1999) ARCS model of motivational design’s four categories. The four categories used to design the strategies are attention, relevance, confidence, and satisfaction.

Literature regarding professional development is quite extensive. Most of this body of literature is qualitative in nature and contains a mix of case studies, evaluations, surveys, book chapters, papers, and articles; little empirical research has been conducted (Garet, Porter, Desimone, Birman, & Yoon, 2001). Other areas of limited research in professional development concerns include (a) the overuse of volunteer participants, thus limiting the findings from individuals who may need the professional development opportunities the most; and (b) the lack
of knowledge about the connection between professional development activities and what students learn (Bobrowsky, Marx, & Fishman, 2001).

In summary, faculty are concerned about the changes in their pedagogy that would have to occur in order to incorporate technology in their classrooms. Part of their concerns is due to their lack of knowledge about technology. Through the use of effective faculty development programs that incorporate andragogy learning theory and include faculty participation in the development of the programs, faculty can increase their knowledge of technology and become motivated to incorporate technology into their classrooms.

**Best Practices for Professional Development Workshops**

Higher education institutions put forth a great deal of resources and creativity when helping faculty learn to integrate technology into their teaching preparation and classes. Several universities have developed programs using best practices to help their faculty in this pursuit of technology integration. A common list of steps is found within these institutions promoting best practices for professional development workshops. The list consists of (a) needs assessment, (b) project planning, (c) instructional design and development, (d) formative evaluation and testing, and (e) materials development. The most important suggestion given by these best practice institutions is to “focus on the teaching and learning issues and not on the technology” (Bates, 2001, p. 144).

The University of Central Florida’s programs are designed to meet the needs of individual faculty members. There are individualized face-to-face consultations and classes available. The training can be self-paced or just-in-time. The University realizes that faculty use of technology begins with the early adopters, and the institution must be ready to expand in both the amount and extent of support. Formative assessment is used to make continuous improvements to their programs (Hartman & Truman-Davis, 2001).
At Collège Boréal, Ontario, lifelong learning is defined as a process whereby “learners engage in activities with experts, their peers, and a given subject matter” (Pollock, et al., 2001, p. 63). Learners at Collège Boréal are faculty learning about new technologies. Their process of faculty support in technology integration includes (a) the definitions of the institution’s vision, objectives, and expectations; (b) the communication of these definitions to the faculty; (c) the use of open discussion and negotiation allows for faculty adoption and buy-in; and (d) the use of tracking and formative assessment to learn and evolve from past lessons to future lessons (Pollock, et al., 2001).

Virginia Tech University generally schedules two-day, three-day, and four-day workshops during the summer for their faculty (Moore, 2001). The success rate of the summer workshops is extremely high. During the first four-year cycle of workshops, “96% of Virginia Tech’s faculty had attended the institute’s workshops and seminars” (p. 83). The workshops consist of mixed technical ability to allow faculty to become mentors. As the workshops begin, the information is practical, and the participants are not overloaded with topics. The level of technology knowledge and teaching of the participants is respected, and the participants are helped to build upon what they know. The emphasis in the workshops is practical issues of teaching and learning and not on technology. Building rapport, trust, and credibility between the workshop leaders and the faculty is stressed. New technologies that people cannot use or access are not introduced in the workshops.

At Bellevue Community College, suggestions for other colleges attempting to teach faculty about new technologies are given (Hutchinson, 2001). Innovators and early adopters are valuable in the process. For training workshops, trainers should realize that having one level of training will not work. Other suggestions include (a) provide various training opportunities including repeat sessions and downtown between sessions to work with the material presented;
(b) put training materials online so faculty can assess once the training is over; and (c) realize that faculty will need time with the new technologies, whether it is time to learn the technology, incorporate the technology, or fully exploit the possible uses of the technology.

**Instructional Design Models**

**A Brief History**

Since the first half of the 1990s, instructional design has influenced the development of training programs and materials. From the military to business, industry, and education, various instructional design models have been created and implemented, with each newly developed model possibly being an improvement of existing models. This historical summary will present an overview on the origins and development of various models.

The origins of instructional design can be traced to the early 1940s. During this time of war, a large number of educators and psychologists conducted research and developed training materials for the military services. After the end of World War II, many psychologists, involved in the training programs for the military, continued their efforts working on solving instructional problems (Reiser, 2001).

The 1950s are characterized by a movement away from standardized application of instructional technology to the formulation of theoretical models of learning (Leigh, 2004). B. F. Skinner’s *The Science of Learning and the Art of Teaching*, published in 1954, began a minor revolution in the field of education through his development of the basic behaviorist principles of stimulus-response, feedback, and reinforcement. Benjamin Bloom’s *Taxonomy of Educational Objectives*, published in 1956, gave another boost to behaviorist objectives (Reiser, 2001). Bloom’s *Taxonomy* stated learning objectives should be classified according to the type of learning behaviors and he presented a hierarchical relationship among the various types of outcomes (Reiser, 2002).
Since the 1960s, instructional design has been influenced by the principles of cognitive science and cognitive psychology (Molenda, et al., 2001). In the early 1960s, Robert Gagné’s *The Conditions of Learning* described five domains of learning outcomes, each of which required different conditions to promote learning. He also described nine events of instruction that he considered necessary for attaining any type of learning outcome (Reiser, 2001). Significant impact on the field of instructional design came from Gagné’s work in the area of learning hierarchies and hierarchical analysis, which describe how the knowledge of certain subordinate skills were necessary in order to learn a superordinate skill (Reiser, 2002). It was during this time that Robert Glaser introduced the concept of “instructional design” (¶ 7) in a model he developed that linked learner analysis to the design and development of instruction (Leigh, 2004).

The original systems approach model, designed by Dick and Carey, was first introduced at Florida State University in 1968 (Dick & Carey, 1985). Many students studying to become instructional designers first learned the process of designing instruction by studying one of the four editions of Dick and Carey’s *The Systematic Design of Instruction* (Dick, 1996). Using a systems approach, all parts of the model are working together toward a defined goal (Dick & Carey, 1985). Limitations of the Dick and Carey model include (a) the model is not a complete Instructional Systems Design model; (b) practitioners do not follow the steps in sequence and sometimes skip some of the steps; and (c) the model is viewed as a fixed, linear approach to designing instruction (Dick, 1996).

During the first half of the 1970s, faculty development centers were created on college campuses with the intent of helping faculty integrate media into their classrooms and instructional design procedures in their teaching. In response to this growing interest in the instructional design process, many schools were developing graduate programs in instructional
technology. Seeing the value of using instructional design techniques to improve the quality of training, many businesses and industry began adopting this approach (Reiser, 2002).

It was during the mid 1970s that several branches of the military adopted an instructional design model intended to guide the development of training material for the different branches (Reiser, 2001). This model is thought to be the ADDIE model (Molenda, 2003b).

Interest in instructional design continued to grow in the 1980s. Business, industry, the military, and the international arena applied instructional design principles to the development of internal training programs. In contrast, instructional design had a minimal impact on areas of instruction in public schools and higher education during this same period (Reiser, 2001). In the public school sector, some curriculum development efforts, including the writing of instructional design textbooks for teachers, were developed using instructional design processes. Of the instructional improvement centers created in higher education during the 1970s, more than one quarter of them had been disbanded by the mid 1980s and budget cuts resulted in downsizing in the remaining centers. One area that did see growth in education during the 1980s was the use of microcomputers in the classroom. Many professionals in the field of instructional design turned their efforts toward developing new models to accommodate this new technology (Reiser, 2002).

The 1990s brought a variety of developments that had significant influence on instructional design. Through the performance technology movement, many instructional designers began conducting more vigilant analysis of performance problems noting that oftentimes poor training or lack of training was not the cause. Instructional designers prescribed non-instructional solutions such as changes in incentive programs or changes in work environments to solve such problems (Reiser, 2001).

Another factor that influenced instructional design during the 1990s was the growth of interest in constructivism. Constructivist principles include (a) solving complex and realistic
problems, (b) interacting with others to solve those problems, (c) examining problems from multiple perspectives, (d) encouraging ownership of learning process, and (e) examining their own role in the knowledge construction process (Driscoll, 2000). Willis (1995) describes the characteristics of constructivist-interpretivist instructional design models. These models are recursive, non-linear, reflective, collaborative, and some are even chaotic. A critical component of this type of model is formative evaluation.

Besides the growth of the constructivism movement during the 1990s, the advent of new media, such as the Internet and hypermedia, has brought about new ways of approaching learning and instruction. Since 1995, the Internet has been used to deliver learning at a distance. Other areas of interest that have seen growth include electronic performance support systems, rapid prototyping, and knowledge management (Reiser, 2001). In recent years, additional instructional design models have been created. These models use a different approach from the commonly known ADDIE model.

**Participatory Design**

Participatory design is an approach that focuses on collaborating with intended users throughout the design and development process instead of designing a product for the users. The idea of participatory design has been borrowed from Scandinavian software design traditions where stakeholders were involved in making contributions and reflecting on product design (Vincini, 2001). Research on participatory design began in the 1970s as a reaction to computer-based systems and the way these systems were effecting workers through dislocations and deskilling. Management began working with unions and workers to formulate the adoption of laws and agreements concerning worker rights in relation to the introduction of computer-based systems (Kensing & Blomberg, 1998). Successful applications of participatory design, including designing of a virtual space conference, designing of a web site for older users, and developing
of educational software, have been described in the literature (Anderson, Ashraf, Douther, & Jack, 2001; Ellis & Kurniawan, 2000; Williams & Traynor, 1994).

A six-step process to implement the values and principles of participatory design is described by Ellis and Kurniawan (2000). The six-steps are: “(a) build bridges, (b) develop user model, (c) map possibilities, (d) develop prototype(s), (e) elicit and integrate feedback, and (f) continue iteration” (p. 265). Williams and Traynor (1994) suggest using participatory design in designing technology for classroom use. If computer technology in the classroom is to move in a successful direction, teachers “must have a real voice in the design of technology and in its incorporation into the curriculum” (p. 339).

**Rapid Prototyping**

Rapid prototyping is the building of a model of the system used in designing, installing, testing, and implementing the system. Originally developed for use in the manufacturing industry, a vital part of the process is the involvement of the potential users in the design. During utilization of the design, the designer observes and learns from the future users the strengths and weaknesses of the design. The discovery of new/potential problems results in the modification of the prototype or possible creation of a new prototype (Tripp & Bichelmeyer, 1990).

In hardware engineering, rapid prototyping has a long and successful history as a way of testing ideas (Tripp & Bichelmeyer, 1990). Dreyfuss (1955) suggested the use of mock-ups and user-testing as crucial components in the design process. In Asimow’s (1962) *Introduction to Design*, he mentions specifically the use of prototyping as an experimental methodology. In addition, prototyping was described as a design methodology by Wilson and Wilson (1965). Rapid prototyping has also been used in software engineering where many similarities exist.
between software design and instructional design; it resolves efficiency problems associated with conventional software design procedures while increasing effectiveness.

In today’s literature, successful applications of rapid prototyping include (a) the development of an ergonomically correct handheld video game, (b) the development of a campus-wide information system, (c) the development of next-generation communications systems, and (d) the redesign of courses and instructional methods at a university (Collis & de Boer, 1998; Jones & Cavallo, 2003; Lopez & Wright, 2002; Shurville & Williams, 2005).

**ARCS Model of Motivation**

Motivation, as Keller (1983) writes, “refers to the choices people make as to what experiences or goals they will approach or avoid, and the degree of effort they will exert in that respect” (p.389). However, he states that motivation is often neglected when understanding how to design instruction. Historically, instructional science gained for the work of behavioral psychology and cognitive psychology which partially described how a person learned but did not explain why a person learned. Keller’s (1979) theory of motivation, performance, and instructional influence demonstrates how his motivational theory can be integrated with both behavioral psychology and cognitive psychology. His theory illustrates how to better understand what persuades a person to approach or avoid a task. In addition, his theory illustrates how to make a task more interesting and appealing.

The ARCS model of motivational design is based upon four dimensions of motivation. These dimensions are attention (A), relevance (R), confidence (C), and satisfaction (S). Attention gaining strategies are designed to gain the attention of the learners and sustain it throughout the instruction. Relevance strategies are designed to make a connection between the learners’ desires, interests, and motives. Confidence building strategies are designed to help learners obtain the necessary skills to master the objectives of the instruction. Satisfaction
strategies are designed to give the learners a sense of accomplishment and fulfillment from the learning experience. The model (a) incorporates a needs based analysis of potential learners and existing instructional material, (b) supports the creation of motivational objectives and measures based upon the results of the needs based analysis of the potential learners, (c) provides direction for creating and selecting motivational strategies, and (d) follows a method that incorporates instructional design and development (Keller, 1999). Successful applications of Keller’s ARCS model of motivational design, including incorporating motivational tactics into computer-based, computer-assisted, and distance learning environments, have been described in the literature (Keller 1999; Song & Keller, 1999).

The body of literature on instructional design is quite large. However, suggestions have been made for the creation of additional models, specifically in the area of faculty development. Davidson-Shivers, et al. (2005) found that the ineffectiveness faculty development programs may be due to not employing instructional design procedures. Davidson-Shivers and Rasmussen (1994) found very few instructional design models created for use with faculty development (as cited by Davidson-Shivers, et al., 2005). These findings indicate a lack of instructional design principles and procedures being utilized in the creation and implementation of faculty development programs in higher education.

**Summary of Literature Review**

Reviewing the diverse array of literature has provided an overview of the research foci in the areas of diffusion of innovation categories, concerns based upon adoption of innovations, how adults learn best, and constructivist learning. These areas of study formed an interrelated framework for investigating the use of a proposed instructional design model in the creation of faculty development programs for technology integration.
Students of today are engaged in technology. Higher education faculty realize that there is a need for change, and they are being pressured from both within and outside the university to make changes. If colleges and universities are to meet the needs of the students, who in turn are their customers, they must be willing to make changes to accommodate those students’ needs, and technology integration in the classroom is one of the main changes.

Faculty represent a wide variety of levels in the adoption diffusion process with a majority of the members being classified at a low to medium level of the proposed E. M. Rogers (1993) adoption categories. Recalling the different stages of the CBAM model (Hall & Hord, 1987), faculty have differing levels of concern in the adoption of technology. Some are quite comfortable using technology and are refocusing their efforts to help others use technology while others are just learning about the different technologies and how these technologies can affect their teaching. Various reasons for faculty apprehension toward technology integration include fear of failure, fear about time involved to incorporate technology, and lack of administrative support. In addition, with the implementation of technology, changes must take place.

While some faculty may be reluctant to change, others take advantage willingly of opportunities for faculty development. Before faculty will be accepting of technology integration, they must become comfortable using technology, and faculty development programs are an excellent means of getting faculty to the necessary level of comfort. Faculty development is a component in the lifelong learning process of higher education faculty and “a key component of managing the transformational changes taking place in higher education over the next decade” (McGriff, 2001, p. 312). Faculty development programs can serve as the change agent in the implementation of technology integration. However, these faculty development efforts must be effective and focused on improving their knowledge and skills based on their needs. Because no one-size-fits-all technique is available for faculty to become comfortable with technology
integration into their teaching practices, individual faculty must be allowed to observe and interact with the early adopters of technology on staff (Belvin & Baines, 2000). Faculty development programs are most successful when faculty are grouped together for training based upon their skill levels, interests, and goals. In addition, customized sessions that are very efficient in time, location, and materials covered are accepted widely by faculty (Chambers & Holbeach, 2003).

Institutions are using best practices when creating workshops in technology integration for faculty. Several suggestions are given by universities using best practices, including a need to focus on teaching and learning, and not on the technology issues. A common list of steps used in creating the workshops was found in all the institutions using best practices.

Instructional design models have been used for many years to design courseware content for military, business, industry, and education settings. However, a minimal number of models exist for use in designing faculty development programs. Of the models that do exist, findings suggest that the instructional design approach to planning and implementing faculty development programs have been successful and may have ultimately improved faculty teaching and instructional use of technology (Davidson-Shivers, et al., 2005).

By applying instructional design procedures, planning of faculty development programs would be reflective and collaborative. Faculty would have input into what they want to be trained on and therefore would probably be more accepting and motivated by the training. In addition, by incorporating the input from faculty into the designed courseware, pedagogical concerns of faculty can be eliminated, and the problem of instructional design being “just a process” is overcome. Another instructional design procedure is the importance of formative evaluation. As faculty development programs are being designed and developed, possible problems could be discovered at an early stage, before too much of the program is “set in stone.”
Other strategies, such as the implementation of Keller’s ARCS, applied during the implementation of the faculty development programs can serve as effective frameworks for increasing faculty motivation toward technology integration (Surry & Land, 2000). Regardless of what the topic of training is, it is of utmost importance that faculty development be designed properly to motivate faculty to integrate technology into their classrooms tomorrow, next week, next year, and thereafter.

Taking into account the need for technology integration into the classroom, the use of faculty development programs serving as change agents and the application of instructional design policies and procedures in development of faculty development programs, the time has come for the development of a new instructional design model that incorporates positive aspects of existing models.
CHAPTER 3
A PROPOSED MODEL: THE FUSION MODEL OF INSTRUCTIONAL DESIGN

Description of the Model

The Fusion Model of Instructional Design is developed based upon participatory design (Vincini, 2001), rapid prototyping (Tripp & Bichelmeyer, 1990), and Keller’s (1983) ARCS model of motivation. It incorporates the positive aspects of the three models. As illustrated in Figure 3.1, the model has eight components:

1. Identification of problem/project
2. Selection and sequence of problems/project to focus on
3. Development of samples of training materials and strategies
4. Training of early adopters; include Keller’s ARCS as part of presentation of content
5. Improvement of training materials and strategies
6. Training of mainstream users/learners with involvement of early adopters; include Keller’s ARCS as part of presentation of content
7. Evaluation of problem/project solution
8. Brainstorming/Discussion

The Fusion Model of Instructional Design is created as a special instructional design model for use in designing, developing, and implementing faculty workshops in technology integration. The learners, especially the early adopters, are encouraged to participate in the design and development of the workshops. Their input is valued because they are aware of the needs of their colleagues. In addition, the early adopters are encouraged to participate in the training of the remaining faculty.

Motivational design is an integral part of the Fusion Model and is especially displayed during the implementation stages by using Keller’s ARCS as the motivational model. The
attention of the learners is gained by the instructor of the workshops through comments about possible changes that could occur through the use of technology. By having the early adopters participate in the design and development of the workshops, the instructional topics covered are relevant to the participants in the workshops. In addition, the relevance of the topics can be emphasized further by citing examples of how their new knowledge could be used. Confidence of the participants’ abilities is achieved by having the participants practice their new skills multiple times during the series of workshops. Satisfaction of the participants is determined through summative evaluation.

Formative evaluation, an important component in the model, occurs through ongoing brainstorming and discussion. Early adopters are encouraged to make suggestions on how to improve the workshops or training materials as the workshops progress.

![Figure 3.1 Fusion Model of Instructional Design](image)

Figure 3.1 Fusion Model of Instructional Design
As one progresses around the design, any step can be repeated, depending upon the need discussed. The solid line arrows show the intended flow of the model. However, steps may be repeated or skipped, if discussion warrants the need to skip. The dashed line arrow indicates that the model may be repeated from the start, if necessary. Most of the steps follow the concept of participatory design by having the users/learners participate in the development of the solution to the problem/project. The following provides a more detailed description of each step.

**Identification of problem/project** determines what needs to be addressed within the problem or project. This is the initial starting point of the model but may be revisited if additional problems occur or if additional solutions are needed while progressing around the design. The ability to revisit this step is denoted by the dashed arrow line in Figure 3.1.

**Selection and sequence of problems/project to focus on** determines how to approach the solution. During the designing of a solution, all stakeholders, including future users, involved in the project are included in the discussions. Having training that is relevant to users/learners’ needs emulate an important component in Keller’s ARCS model. Empowering the future users is an important key because it gives them ownership in the project, and they are more likely to accept the project upon completion due to their involvement. These future users are most probably the innovators and early adopters of technology within the organization. They are adventuresome and are not afraid to try new things. They are collaborating with others and refocusing their efforts in the integration of technology.

**Development of samples of training materials and strategies** allows all stakeholders involved to choose the solution they believe best fits their group. The sample training materials to be agreed upon could be as simple as a handout or as elaborate as a CD containing recorded presentations of the material to be presented. Training strategies include length of training sessions, time of day/day of week for sessions, and frequency of sessions to accommodate the
needs of different departments. This step follows the concept of rapid prototyping presented by Tripp and Bichelmeyer (1990) where components of a problem or project are agreed upon during the early stages therefore sidestepping the possibility of rejection at the end stages.

**Training of early adopters** presents the content to a small, test group of learners to determine what needs additional refining. This target group of learners would most probably be categorized as either early adopters or early majority. Early adopters and early majority are part of Rogers’ (1993) adoption categories. Early adopters are sought by change agents to spread the word about the innovation. Early majority tend to take their time adopting an innovation; they need to see a purpose in adopting the innovation. Both early adopters and early majority are seeing the consequences of using technology. Attempts to motivate this group of learners include pointing out ways of how the training will help them perform tasks or solve problems that might incur.

**Improvement of training materials and strategies** refers to continued refinement of the training materials presented to the learners and instructional strategies used in the training sessions. Participatory design is included in this step when a choice is made from the different samples presented. In addition, the early adopters helping facilitate training sessions with other faculty may see a need to review certain topics at a later date. This step also continues the concept of rapid prototyping by refining the chosen sample content into something that will be actually used at a later date.

**Training of mainstream users/learners with involvement of early adopters** is the implementation with the group for whom the solution was designed. Both training steps include Keller’s ARCS as part of the presentation of content, remembering that not only what content is being presented but how the content being presented is very important to the success of the solution. Remaining early adopters and both early and late majorities would be addressed during
these presentations. Users/learners are learning how technology can help them, personally and in the classroom. In most instances, laggards would probably not attend unless required to do so. The laggards are probably just learning about the different technologies available to them but they do not know how to implement the technology.

**Evaluation of problem/project solution** evaluates the solution content, determining if any re-working needs to occur. People at differing levels of the diffusion process may have different viewpoints on the success of the solution. Therefore, it would be beneficial to try to include a variety of individuals from each of the diffusion categories during this process. This evaluation would be a summative evaluation for the current iteration of the model. However, this evaluation would serve as a formative evaluation if future iterations of the model were to take place.

**Brainstorming/discussion** occurs after each step on an as-needed basis. It is important to try to include as many representative stakeholders as possible during this step; the group of individuals may vary depending upon the location in the model. Brainstorming/discussion can be thought of as “preventive medicine” by identifying potential problems before they occur or while still in an early stage. By brainstorming/discussing the proposed solution on a regular basis, the occurrence of something going astray is minimized. This type of formative evaluation is similar to the formative evaluation found in Morrison, Ross, and Kemp’s model where revision is “an on-going activity” associated with all the nine elements of the model (Gustafson & Branch, 2002, p. 28)

Through the use of this proposed model, faculty members will participate in the program development, formative evaluation of the program will occur at different developmental stages, and motivational tactics will be employed during training sessions to encourage technology integration. By implementing and incorporating the instructional design policies and procedures
of this proposed model, the need for developing a faculty development program to act as a change agent in technology integration can be accomplished.

**Characteristics and Potential Benefits of the Fusion Model of Instructional Design**

The main characteristics of the Fusion Model of Instructional Design are its synergistic use of the three component models: participatory design, rapid prototyping, and motivation design. The resulting Fusion Model of Instructional Design encourages participatory design, is recursive, and is results-driven.

**Participatory Design**

Participatory design is included several times within the iteration of the model. By including participatory design, stakeholders in the project are asked to participate in the design, delivery, and evaluation of training solutions. Their input into the project is valued; thus allowing them to take ownership in the project. In addition, by having the training topic and materials address the specific needs of the faculty, they will see the relevance in attending the training sessions, will be satisfied with their learning, and will be pleased with the outcomes of the training sessions.

**Recursive**

Having the ability to be recursive, a model component may be repeated as many times as necessary to achieve the desired goal. This ability, along with brainstorming and discussion in the center of the model as formative evaluation, can prevent dissatisfaction of faculty and make training more relevant and effective. In addition, the use of two cycles of training, first with early adopters and then involving early adopters in the training with the majority of faculty, helps to make training more effective.
Results-Driven

The model is results-driven. Faculty are encouraged to apply what is learned in the training sessions in the design of their own courses. Early adopters will take part in the design, development, and implementation of the training. Their knowledge of what should be taught to the faculty to meet the faculty needs and sharing of their experiences will provide support and modeling for other faculty.
CHAPTER 4

RESEARCH METHODOLOGY

The study sought to examine the perceived value, usability, and effectiveness of the proposed Fusion Model of Instructional Design which was used to develop faculty development programs designed by colleagues for technology supported teaching and learning. Quantitative and qualitative data in conjunction with multiple-case embedded case studies (Yin, 1994) allowed the researcher to collect data from multiple perspectives. Details of the methodology are described in the following sections: (1) Research Design, (2) University Setting, (3) Study 1, (4) Study 2, and (5) Validity and Credibility.

Research Design

A mixed-method multiple embedded case study design was employed where both quantitative and qualitative data were collected. Yin (1994) notes that case study research allows the researcher to describe “how” and “why” a phenomenon exists. The application of a case study design will allow the researcher to present a “vivid and detailed description of the case and its content” (Johnson & Christensen, 2004, p. 379). Multiple case designs are often more convincing resulting in a more robust study (Yin, 1994). By using an embedded case study design, evaluating “more than one unit of analysis” (Yin, 1994, p. 41) may be possible. “The subunits can often add significant opportunities for extensive analysis, enhancing the insights into the single case” (Yin, 1994, p. 44).

In Study 2, this research also used a time orientation approach where quantitative data were collected prior to and after the training sessions and qualitative data in the form of the researcher’s journal of observations and reflections and interviews of faculty were collected both during and after the training sessions (Johnson & Christensen, 2004).
The participants in the studies included the university technology facilitator and faculty from four departments selected through a purposeful sampling technique. In order to sufficiently address the model under examination, the studies present perspectives from both the university technology facilitator and faculty participating in the study. In addition, observations and reflections of the training sessions were recorded by the researcher in a journal.

The university technology facilitator was responsible for conducting the training sessions for both studies. Depending on the study, the university technology facilitator, researcher, and departmental representatives (early adopters) met to determine the parameters of the training sessions—content, frequency, and length of sessions. The university technology facilitator and researcher frequently discussed the progress of the training sessions for both studies.

Faculty, participating in the studies, were asked to complete surveys as part of the data collection. In addition, some faculty members were chosen to be interviewed by the researcher thus allowing the gathering of additional data for Study 2. Patton (2002) states the researcher can “enter into the other person’s perspective” (p. 341) through the interview process. He suggests that use of the interview process allows researchers to discover what one is thinking since thinking cannot be visibly observed. Study 2 employed informal conversational and interview guide techniques as presented by Patton (2002).

**University Setting**

Both studies were conducted at a small university in the southern United States. The university’s mission statement declares that this university provides a unique blend of excellent academic programs to meet the needs of the state and beyond. The university nurtures dynamic, accountable, engaged citizens in a personalized, culturally rich and vibrant learning environment through quality teaching, research, and service. Located in the heart of Cajun Country, this university has been the sole provider of higher education in the region for over a half century.
The university is dedicated to student success through a comprehensive general education program that prepares students to implement leadership in an international society and develops their abilities to generate a vision for the future (Nicholls State University Website, 2007).

**Previous Workshops in Technology Integration**

Participants in this study took part in previous workshops sponsored by the university. Previous professional development workshops in technology integration consisted of such topics as beginning/intermediate Microsoft Word and Microsoft Excel, e-mail, and Blackboard course management system. Over the last several semesters, the topics changed as the technology available on campus changed. The workshops were held on campus. A calendar of workshop dates and times with pre-determined topics to be covered were developed prior to the beginning of each semester. Faculty were informed of the upcoming workshops via e-mail periodically sent out by the university technology facilitator. Faculty were not required to register for the sessions which allowed for spur-of-the-moment decisions to attend.

**Faculty Use of Blackboard**

Prior to the 2007 fall semester, the use of Blackboard by faculty spanned a variety of levels. Some faculty were not using Blackboard at all, while others had all course documents, exams, assignments, grades, and other material pertaining to their courses available through Blackboard. The average use consisted of posting course syllabi, handouts, and grades. Due to a mandate imposed by the faculty senate in response to student demand and as part of the university’s hurricane preparedness, all faculty were required to post their syllabi and student mid-term and final grades in Blackboard beginning with the 2007 fall semester.
**Study 1**

Study 1 was conducted as a pilot study to examine the effectiveness and flow of the Fusion Model of Instructional Design in designing, developing, implementing, and evaluating faculty technology development programs.

**Participants**

The sampling strategy used for the participants for both studies was purposive sampling (Johnson & Christensen, 2004). In order to evaluate the proposed model adequately, two departments were chosen for each of the studies. Faculty from the Department of Nursing (N = 7) and Department of History and Social Sciences (N = 11) participated in Study 1.

The university technology facilitator worked with the researcher in designing and developing the training sessions. In addition, she led all training sessions for the participants.

**Training Design and Implementation Procedures**

Prior to the beginning of the training sessions, the researcher and the university technology facilitator discussed the possibility of using faculty from different departments in the studies. The university technology facilitator was aware of some departments wanting training and she thought that some may be willing to participate in the study’s training sessions. Possible departments were suggested and contacted to determine their level of interest.

In order to determine which departments would be used in the first study, a short survey, Faculty Needs Assessment Survey (Appendix A), was given to six departments on campus who, in the past, had displayed an interest in having training sessions in technology integration. The two departments displaying the most interest were chosen.

The researcher and university technology facilitator met with departmental representatives from the two chosen departments to determine their preference of training topics and preference of training dates and times.
During the summer of 2007, surveys along with interview protocols were created. In addition, workshop materials were analyzed by the university technology facilitator and more materials were created as needed. During the 2007 fall semester, faculty development workshops for Department of Nursing and Department of History and Social Sciences were held. Faculty were given consent forms to sign prior to the beginning of the training sessions.

Initially, a couple of members of the faculty, who were classified as early adopters, were trained. The early adopters met three to four times with the university technology facilitator. Afterwards, the remaining faculty who wanted to participate in the workshops were trained. These workshops for the remaining faculty were held once a week for about one hour over a two-month period. For the workshops, the faculty were in small groups and topics covered were chosen from the results of the Faculty Needs Assessment Survey (Appendix A). Upon completion of the workshops, a post survey, Faculty Attitude Survey (Appendix B), was administered to the faculty. Due to time conflicts between the Nursing Department workshops and the researcher, no observations of trainings sessions were made.

**Data Collection and Analyses**

**Pre-Study Interview with the University Technology Facilitator**

An informal conversation with the university technology facilitator about the study was held prior to the beginning of Study 1. The conversation could be described as an informal conversational interview in which questions emerged as the conversation progressed. This type of interview increases the significance and importance of the questions (Patton, 2002). Lichtman (2006) describes informal interviews as a style that often arises “when you are in the field conducting a case study” (p. 118). In the interview, the previous training sessions held during the spring and early fall of 2007 were discussed. The researcher was interested in the topics covered, the number of faculty in attendance, and the dates and times of workshops. The
researcher wanted to get good description of previous training sessions in order to make comparisons with future training sessions.

**Pre-Training Faculty Needs Survey**

The Faculty Needs Assessment Survey (Appendix A) was administered to six departments having shown an interest in receiving technology training from the university technology facilitator. The survey contained eight questions—two were yes/no questions, two were multiple-choice, and the remaining four were open-ended. The survey was accessible through a link in Blackboard. Faculty from the six chosen departments were contacted to participate in the survey.

Upon completion by the faculty, the survey data were downloaded from Blackboard to a Microsoft Excel 2007 spreadsheet. In the worksheet, the answers were analyzed to determine each department’s level of interest. The two departments displaying the most interest were chosen to participate in Study 1. The possible training topics gathered from the survey answers were decided upon by the university technology facilitator and the researcher. The chosen topics were later prioritized with the help of departmental representatives.

**Post-Training Faculty Attitude Survey**

Data for Study 1 were collected through the use of convenience sampling where participants were recruited easily due to their participation in the faculty development programs designed using the Fusion Model of Instructional Design. The survey, Faculty Attitude Survey (Appendix B), based upon a 5-point Likert scale, was administered after the completion of the training sessions.

The development of the survey was based upon the research questions for this study, the focus topic areas of attitude toward and levels of technology integration use, relevant literature, and several existing instruments, including those by Knezek, Christensen, Miyashita, and Ropp.
(2000), Christensen (1998), Jacobsen (1998), and Nicolle (2005). Christensen has 199 items measuring teachers’ attitudes toward computers on 16 subscales. Jacobsen includes 195 items on patterns of computer technology use, computer experience, software and tool usage, self-efficacy, demographic information, changes to teaching and learning, incentives to integrate technology into teaching and learning, barriers to integrate technology into teaching and learning, desired method of learning about technology, methods of integrating technology, and evaluating outcomes of using technology in teaching and learning. Nicolle has 108 items that surveyed for general attitudes toward technology, barriers to technology integration, goals for technology integration, technology support resources, teaching design using technology, teaching implementation using technology in the classroom, students’ use of technology in the classroom, results of teaching when using technology, and demographic information.

The surveys were accessible through a link in Blackboard. Once faculty completed the training, they were reminded to participate in the post-training survey. If participation did not occur within a week, an e-mail reminder was sent non-responders.

Upon completion of the study, the data were exported from Blackboard to a Microsoft Excel 2007 spreadsheet. In Excel, the data were screened for extraneous keystrokes, extra columns, and other data that might have presented problems in the future. Once the data were deemed “clean,” the file was imported into SPSS Graduate Pack 13.0 for statistical analysis. From the data gathered from the survey, descriptive statistics were computed for each of the survey items.

**Study 2**

Study 2 was conducted to further examine the value, usability, and effectiveness of the Fusion Model of Instructional Design in the development and implementation of faculty
development programs that help faculty integrate technology into their teaching practices using a more thorough mixed method case study approach.

**Participants**

Participants in Study 2 included faculty from the Department of Allied Health Sciences-Division of Communicative Disorders (N = 5) and University College (N = 13).

The same university technology facilitator from Study 1 conducted the training for Study 2. She worked with the researcher and early adopters in designing and developing the training sessions.

**Training Design and Implementation Procedures**

Upon completion of the first study, a process of determining which two departments would participate in the second study was started. The researcher and university technology facilitator narrowed down their departmental selection to four departments who had inquired possible training for their department. Next, the university technology facilitator evaluated their possible training needs, willingness to participate in the study, and available time for training. Once the evaluations were complete, a final decision was made as to which two departments would be used in Study 2 based upon their responses to the university technology facilitator.

After the departments for the second study were selected, the researcher and university technology facilitator met with departmental representatives to determine what exactly they want training on, the preference of training order, the time and location of training, the size of the training groups (individualized, small group, or large group), and the frequency of the training sessions (single session versus initial session with follow-up).

Before the first training session, the participating faculty were sent a copy of the consent form to sign and were instructed to bring the signed copy to the first training session. In
addition, all faculty participating in the study were instructed to complete the pre-training survey, Faculty ICT Survey—Pre-Training (Appendix C), available through a link in Blackboard.

The early adopters in each respective department were trained first, thus allowing time for possible re-grouping on training details and topics before the remaining departmental members were trained. Once training for the early adopters was completed, the remaining faculty, from the respective departments, were trained. Multiple training sessions were held over a three-month period. Some topics presented were repeated in later training sessions to allow the faculty a chance to better grasp the concepts.

Table 4.1 provides the identification of each of the model components, short description of how each of the model components was implemented, and a range of dates of the implementations.

<table>
<thead>
<tr>
<th>Model Component</th>
<th>Description</th>
<th>Date Range of Implementation (Univ. College)</th>
<th>Date Range of Implementation (Comm. Disorders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of problem/project</td>
<td>Activities used to determine which departments to include in study</td>
<td>November 2007 – January 2008</td>
<td>November 2007 – January 2008</td>
</tr>
<tr>
<td>Selection and sequence of problems/project to focus on</td>
<td>Met with early adopters from each department to determine training interest and objectives</td>
<td>January 28, 2008</td>
<td>January 30, 2008</td>
</tr>
<tr>
<td>Development of several samples of training materials and strategies</td>
<td>Training material used in a prior training session will be used for this study; material presented to early adopters at initial meeting</td>
<td>January 28, 2008</td>
<td>January 30, 2008</td>
</tr>
</tbody>
</table>
Upon completion of the training sessions, faculty were reminded to complete a post-training survey on faculty attitude toward training, Faculty ICT Survey 1—Post-Training (Appendix D), available through a link in Blackboard. A follow-up e-mail was sent to faculty failing to respond to the survey. Interview sessions were held with selected faculty soon after the completion of the training sessions. Approximately three months after the end of the training sessions, follow-up interviews were held with some of the participants from the initial interview sessions. A follow-up survey on faculty attitude toward ICT and use of ICT, Faculty ICT Survey 2—Post-Training (Appendix E), was administered to all participating faculty about one month after the start of the following semester to assess the delayed training impact.
Quantitative Data Collection and Analysis

Pre-Training Faculty Attitude Survey

Quantitative data for Study 2 were collected using a Faculty ICT Survey based upon a 5-point Likert scale. The full survey, Faculty ICT Survey—Pre-Training (Appendix C), was administered before the beginning of the training sessions to determine faculty attitudes and opinions about incorporating technology into their classrooms and their opinions about having some input in the design and development of the faculty development program.

The Faculty ICT Survey was revised based on the survey used in Study 1. The need for a more precise survey became apparent during Study 1 and subsequent survey analysis. The new survey was revised based on suggestions of the committee members and reviewed by two experts in the field of Educational Technology. The final version contained 62 mixed format questions including Likert-scales of agreement and forced choice questions. The main categories of questions included in the survey are: (a) attitude toward training, (b) attitude toward information and communication technology (ICT), and (c) use of ICT in teaching. ICT is defined as using word processing or spreadsheet software, accessing the Internet, using course management systems such as Blackboard, and activities such as sending and receiving e-mail messages.

The survey also included several demographic items pertinent to this study. The potential moderating variables included (a) length of time technology has been integrated into teaching preparation and teaching, (b) technology adoption and integration stage that best describes faculty member within the technology adoption and integration into teaching and learning process, (c) length of time students have been required to use technology for their course assignments, (d) number of workshops/training sessions/seminars on technology integration in the last five years, (e) faculty rank, (f) gender, (g) age, and (h) highest degree earned.
The survey were accessible through a link in Blackboard. Prior to the first training session, all faculty registered for the training sessions were sent an e-mail asking them to participate in the pre-training survey.

**Post-Training Survey of Faculty Attitude toward Training**

A shortened survey, Faculty ICT Survey 1—Post-Training (Appendix D), using the same questions as in Part A of the pre-training full survey, was administered upon completion of the training to determine faculty attitudes and opinions about recently attended training sessions. Upon completion of the training sessions, faculty were reminded to complete the post-training survey which was accessible through a link in Blackboard. Non-responders were sent a reminder e-mail if participation did not occur within a week.

**Follow-Up Survey of Faculty Attitude toward ICT and Use of ICT**

A follow-up survey on faculty attitude toward ICT and use of ICT, Faculty ICT Survey 2—Post-Training (Appendix E), using the same questions as in Parts B and C of the pre-training survey, was administered about one month after the start of the following semester to assess the delayed training impact. Faculty were contacted via e-mail to complete the survey, accessible through a link in Blackboard.

**Survey Data Analyses**

Upon completion of the study, the data were exported from Blackboard to a Microsoft Excel 2007 spreadsheet. In Excel, the data were screened for extraneous keystrokes, extra columns, and other data that might have presented problems in the future. Once the data were deemed “clean,” the file was imported into SPSS Graduate Pack 13.0 for statistical analysis.

Descriptive statistics were used to describe and summarize the following variables: amount of time using technology integration in preparation/classroom, amount of time using technology integration in students’ assignments, number of technology integration workshops
attended, level of technology adoption and integration, faculty rank, gender, age, and highest degree earned. In addition, descriptive statistics were computed separately for faculty of different characteristics on several potential moderating variables such as stage of technology adoption and age for each of the three attitude measures, attitude toward training programs, attitude toward ICT and perceived use of ICT.

Paired sample t-tests were computed for each of the three attitude measures (a) attitude toward ICT, (b) use of ICT, and (c) attitude toward training, using pre-training and post-training values.

**Qualitative Data Collection and Analyses**

**Post-training University Technology Facilitator Interview**

An interview with the university technology facilitator was conducted upon completion of the training sessions. To ensure particular topics were addressed during the interview, a protocol, University Technology Facilitator Interview Protocol (Appendix G), was used to guide the interview.

**Post-Training Faculty Interview**

Faculty participating in the training sessions were interviewed within two weeks after the completion of the sessions. Interviewees were selected using intensity sampling; the labeling of intensity was defined as “early adopters” and “late majority.” Early adopters are usually respected by their peers and are willing to carefully try out new ideas and products while late majority are persons who are generally skeptical and will only use a new idea or product after the majority has adopted the new idea or product. Due to her contact with faculty, knowledge of faculty interest/usage of technology, and extensive teaching experience of computer literacy to adults, the university technology facilitator determined which faculty participating in the training sessions could be labeled as early adopters or late majority. Because of the small number of
participants in the study, no one could be accurately labeled as an early majority—one who tends to take their time adopting an innovation and will need to see a purpose in adopting the innovation. Questions were developed to obtain in-depth information about their attitudes toward technology and their levels of technology use in class preparation and in the classroom prior to and after attending the faculty development training sessions. In addition, questions about whether or not participating in the training sessions developed using the model motivated and/or encouraged their use of technology were included in the interviews. To ensure the interviewees addressed particular topics, a protocol, Faculty Interview Protocol—Post-training (Appendix F), was used to guide the interview. The questions raised in the interviews were related to the survey in order to ensure triangulation of the data.

Approximately three months after the completion of the training sessions, a follow-up interview was held with some of the original interview participants. Not all participants were available for interview due to a change in semester. To ensure particular topics were addressed during the follow-up interview, a protocol, Faculty Interview Protocol—Follow-up (Appendix H), was used to guide the interview.

**Analyses of Interview Data**

All interview data gathered were transcribed and entered into the Atlas.ti software program (Scientific Software Development, 2006). Using a constant-comparative analytical method (Glaser & Strauss, 1967), the qualitative data captured during the first interview were first unitized. These units of information, or themes, served as the basis for defining the categories which was used to form conclusions. Having coded the first interview, all subsequent interviews were analyzed using the same process and any new codes were added, as necessary.


**Researcher Observations and Journal**

The researcher was able to attend most of the training sessions. At which time, notes of observations and reflections were jotted down by the researcher and later transcribed into a Microsoft Word 2007 document. The journal (Appendix I) contained information about each of the training sessions, broken-out by department and session. The information reflected who, in terms of early adopter or late majority, were present at the sessions, what topics were presented initially, what topics, if any, were being reviewed, and observations made during the sessions. For training sessions in which the researcher could not attend, the university technology facilitator reported what was covered in the session and if any problems occurred.

**Validity and Credibility**

Internal validity threats related to the study were minimal. Surveys were administered before the beginning of the first training session and soon after the training sessions were completed so that participants’ opinions and attitudes were reflected more truly thus reducing the possibility of any other event influencing the pre- and post-measurement of the dependent variables. One external validity threat, the ability to generalize the results to the theory of the Fusion Model of Instructional Design is a successful model in the design, development, and implementation of faculty development programs in technology integration, would be considered an issue due to the limited number of participating departments at the chosen university. However, using multiple case studies in four separate settings, i.e. departments, did test the generalizability of the model to some extent.

In order to establish trustworthiness of the data in the qualitative research, triangulation of the data did bring truth and credibility to the research. Johnson and Christensen (2004) describe triangulation as “the term given when the researcher seeks convergence and corroboration of results from different methods studying the same phenomenon” (p. 424). In this
study, the researcher used both survey and interview data to seek common views on presented topics. Purposeful sampling, which is selecting of individuals who possess specified characteristics (Johnson & Christensen, 2004), did lend toward transferability. Another means of establishing trustworthiness was the recording of a reflective journal by the researcher which contained reflections and observations. Yin (1994) states, that “such observations serve as yet another source of evidence in a case study” (p. 86).
CHAPTER 5

RESEARCH RESULTS

Two studies were conducted to examine the perceived value, usability, and effectiveness of Fusion Model of Instructional Design in designing and implementing faculty technology development programs. This chapter presents both quantitative and qualitative results of data analyses conducted for each study. Results of the research are described in the following sections: (1) Study 1, (2) Study 2, and (3) Cross-case Analysis.

Study 1

Demographics of Participants

The University Technology Facilitator

Upon hearing a description of the model and the needed research, the university technology facilitator volunteered to be a participant in the Study 1. She was interested in the model and wanted to see the possible outcomes of the model, when implemented. She has an extensive resume of training experience. Approximately 20 years ago, she began training employees of McDermott International in various capacities. Her training abilities lead her to take a position of training specialist at this university in 1994. In addition, she has been hired on several occasions to lead training sessions at various corporations and organizations. She was promoted to university technology facilitator in 2001.

The university technology facilitator has experience in training personnel in the Microsoft Office components, Blackboard, and other areas of technology. On campus she is the “go-to” person if someone needs training in any area of technology. She holds a Master of Business Administration degree and a Microsoft Office User Certification—Expert Level. In addition, she has taken several education and educational technology courses. Based upon the
background and experience of the university technology facilitator, she may be deemed an expert in her field.

**Participating Faculty Members**

Other participants in Study 1 were faculty members from two selected departments. Faculty from the Department of Nursing (N = 7) and the Department of History and Social Sciences (N = 11) were selected to participate in the study based upon their departmental responses to the needs analysis survey. Most of the participants were 40 years of age or more, had been working in their field for more than 10 years, and were female.

**Initial Interview with the University Technology Facilitator**

Before Study 1, the researcher interviewed the university technology facilitator. The context of the interview indicated that during the dates of January 22 through March 26, 2007, 15 training sessions on Blackboard were held. Topics scheduled to be covered in these sessions included Blackboard basics such as the posting of grades, uploading content, creating discussion forums, and incorporating of graphics and sound into announcements. Of the 15 scheduled spring training sessions, only six sessions were attended by faculty and the remaining sessions were cancelled due to no one being present. For the six sessions that were held, four of the six sessions was attended by the same faculty member.

Twenty-eight additional Blackboard training sessions were held from August 20 through September 26, 2007 at various times during the day. Session topics were very similar to the topics covered during the spring training sessions. Of the 28 fall training sessions, attendance included 11 faculty and one graduate assistant. Of the 12 attendees, 11 were new to Blackboard, and they attended the training sessions on the use of Gradebook on either September 7 or 13. Due to the lack of participation by faculty in the training sessions after the date of September 13, no further sessions were scheduled for the remainder of the semester.
Faculty Needs Analysis Survey

In order to determine the interest level and training topics of different departments, a needs analysis was performed on several departments. Using an online survey via Blackboard, the instrument was administered during the spring 2007 semester. Twenty-seven faculty from the six chosen departments responded to the survey. Some of the survey questions and their corresponding responses were as follows:

• Would you be more likely to attend a training session that has been “personalized” for your departmental needs instead of a generic session?
  ○ 85% would prefer personalized
  ○ 15% would prefer generic

• Would you be more likely to implement what you learn at a training session if you had taken part in the development of the training session?
  ○ 74% would probably implement what was learned
  ○ 26% would probably not implement what was learned

• Please list any other software/hardware for which you would like your department to receive training (i.e. Word, Excel, scanners, video, etc.).
  ○ Assessment feature in Blackboard
  ○ Adding video clips to Microsoft PowerPoint
  ○ Using a scanner
  ○ Advanced Microsoft Excel concepts

• What type and frequency of training session would you prefer to attend?
  ○ 52% would prefer a single training session on a subject
  ○ 48% would prefer an initial session with a follow-up session where creation/development of actual courseware materials would occur
Preferences for Department of History and Social Sciences

A focus group meeting was held on May 2, 2007, with members of the Department of History and Social Sciences. Department-wide training is preferred for this group of faculty. Topics to be covered in preferred workshop order include:

- Blackboard
  - Moving course material from one course to another
  - Adding weights to grades
  - Deploying assignments
  - Pulling statistics from course
- Microsoft PowerPoint
  - Adding video clips to presentation
  - Adding voiceover to presentation
- Scanner
  - Scanning of both images and text
  - Scanning of multiple page documents into a single file
- Paintshop Pro
  - Manipulation of photos prior to insertion in a presentation

Preferences for Department of Nursing

A departmental meeting was held on May 14, 2007. Most of the participants (66%) surveyed expressed a desire to have small group training over individualized or entire group training. Other survey results, presented in desired workshop order included:

- Blackboard
  - Using Assessment tool
  - Using Gradebook
Setting up groups within a class
Using message center
Posting PowerPoint

Microsoft Excel
Computing of grades
Use of formulas

Scanners
Scanning of photos, images, and text for PowerPoint slides
Changing of scanned material

Microsoft PowerPoint
Video streaming within PowerPoint
PowerPoint with music and commercial clips

Survey of Faculty Attitudes

For the post-training survey, all survey items were designed to elicit levels of agreement along a 5-point Likert scale. The scale design was: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree, 5 = Strongly Agree. Table 5.1 presents the results of Study 1’s post-training survey.

All participants in Study 1 seemed to gain their knowledge and strategies of technology integration into their teaching from university-sponsored faculty development programs \((M = 5.00, SD = .00)\). The participants believed technology can benefit their students \((M = 4.67, SD = .50)\), saw technology integration into classes as a welcomed challenged \((M = 4.67, SD = .50)\), received respect from colleagues when integrating technology into their classes \((M = 4.33, SD = .50)\), and were following an inevitable educational trend \((M = 4.00, SD = .87)\). Through the use of technology, they believed they spent more time preparing materials and
resources for instruction ($M = 4.00, SD = .87$), were more prepared for classes ($M = 4.00, SD = .87$), were able to compute semester grades at a quicker pace ($M = 4.89, SD = .33$), and were able to quickly create/revise exams ($M = 4.00, SD = .87$). They also believed that through the use of technology they would be able to create presentations for the classes ($M = 4.33, SD = 1.00$) and present more complex work to the students ($M = 4.44, SD = .88$). In addition, they preferred to attend training sessions customized for their departments ($M = 4.89, SD = .33$).

The participants disagreed with some of the statements presented in the survey. They disagreed that technology integration takes up too much time that could be better spent lecturing ($M = 2.00, SD = .50$) and that using technology to communicate with students took up too much time ($M = 1.33, SD = .50$). They disagreed with having no goals for technology integration in their teaching preparation ($M = 1.11, SD = .33$) and in their classroom ($M = 1.00, SD = .00$). In addition, they disagreed with not being motivated or encouraged to integrate technology into their teaching preparation ($M = 1.89, SD = 1.05$) or into their classroom ($M = 1.67, SD = 1.00$) after attending customized training sessions.

Table 5.1 Mean and Standard Deviation of Study 1 Survey Items (N = 9)

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My knowledge and strategies of technology integration into my teaching are primarily due to institution-sponsored faculty development programs.</td>
<td>5.00</td>
<td>.00</td>
</tr>
<tr>
<td>2. My knowledge and strategies of technology integration in my teaching are primarily the result of informal conversations with peers providing information and support.</td>
<td>3.67</td>
<td>.50</td>
</tr>
<tr>
<td>3. My knowledge and strategies of technology integration in my teaching are primarily self-taught.</td>
<td>2.67</td>
<td>1.00</td>
</tr>
<tr>
<td>4. I do not have enough technology skills to integrate technology into my teaching, including preparation, classroom, and student requirements.</td>
<td>2.33</td>
<td>1.32</td>
</tr>
<tr>
<td>5. While designing my course(s), I feel the inclusion of technology requires too much of my time.</td>
<td>3.33</td>
<td>1.00</td>
</tr>
<tr>
<td>6. Technology integration into my classes requires too much of my class preparation time.</td>
<td>3.00</td>
<td>.87</td>
</tr>
</tbody>
</table>
Table 5.1 continued

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Technology integration in my classroom takes up too much time which could be better spent lecturing.</td>
<td>2.00</td>
</tr>
<tr>
<td>8.</td>
<td>Using technology means (Blackboard, email, chat, etc.) to communicate with my students requires too much of my time.</td>
<td>1.33</td>
</tr>
<tr>
<td>9.</td>
<td>The course I teach does not lend itself to technology integration.</td>
<td>1.33</td>
</tr>
<tr>
<td>10.</td>
<td>I lack essential knowledge of how to effectively integrate technology into my courses to benefit student learning.</td>
<td>3.00</td>
</tr>
<tr>
<td>11.</td>
<td>I have no concerns about using technology in teaching.</td>
<td>3.00</td>
</tr>
<tr>
<td>12.</td>
<td>Technology can benefit my students.</td>
<td>4.67</td>
</tr>
<tr>
<td>13.</td>
<td>I see technology integration in my classes as a welcomed challenge.</td>
<td>4.67</td>
</tr>
<tr>
<td>14.</td>
<td>Technology integration in my classes results in respect from my peers.</td>
<td>4.33</td>
</tr>
<tr>
<td>15.</td>
<td>I follow technology integration advice given by peers.</td>
<td>3.67</td>
</tr>
<tr>
<td>16.</td>
<td>I received student requests to incorporate technology into my classes.</td>
<td>2.33</td>
</tr>
<tr>
<td>17.</td>
<td>I am following an inevitable educational trend.</td>
<td>4.00</td>
</tr>
<tr>
<td>18.</td>
<td>Through the use of technology, I spend more time preparing materials and resources for instruction.</td>
<td>4.00</td>
</tr>
<tr>
<td>19.</td>
<td>Through the use of technology, I am more prepared for my classes.</td>
<td>4.00</td>
</tr>
<tr>
<td>20.</td>
<td>Through the use of technology, I am able to compute semester grades at a quicker pace.</td>
<td>4.89</td>
</tr>
<tr>
<td>21.</td>
<td>Through the use of technology, I am able to quickly create/revise exams.</td>
<td>4.00</td>
</tr>
<tr>
<td>22.</td>
<td>Through the use of technology, I am creating presentations for my students to view.</td>
<td>4.33</td>
</tr>
<tr>
<td>23.</td>
<td>I have no goals for integrating technology into my teaching preparation.</td>
<td>1.11</td>
</tr>
<tr>
<td>24.</td>
<td>Through the use of technology, I am able to present more complex work to my students.</td>
<td>4.44</td>
</tr>
<tr>
<td>25.</td>
<td>Through the use of technology, I am better able to tailor students’ work to their individual needs.</td>
<td>3.44</td>
</tr>
<tr>
<td>26.</td>
<td>Through the use of technology, I spend less time lecturing to my students.</td>
<td>3.00</td>
</tr>
<tr>
<td>27.</td>
<td>Through the use of technology, I have incorporated an online component into my classes.</td>
<td>3.00</td>
</tr>
<tr>
<td>28.</td>
<td>Through the use of technology, my interactions with students have increased.</td>
<td>3.89</td>
</tr>
<tr>
<td>29.</td>
<td>I have no goals of integrating technology into my classroom.</td>
<td>1.00</td>
</tr>
<tr>
<td>30.</td>
<td>Before attending the recent training session(s) on technology integration, I was not motivated and/or encouraged to integrate technology into my class preparation.</td>
<td>3.11</td>
</tr>
<tr>
<td>31.</td>
<td>Before attending the recent training session(s) on technology integration, I was not motivated and/or encouraged to integrate technology into my classroom.</td>
<td>3.56</td>
</tr>
</tbody>
</table>
The results of the survey from Study 1 revealed positive attitudes toward ICT. Faculty appeared to be willing to spend time in designing, developing, and implementing technology integration in their classes. In addition, they seemed to envision how technology could help them in both their teaching preparation and classroom.

Based on the results of Study 1, modifications were made to the data collection procedures thus allowing the researcher to receive a clearer picture of what is happening as a
result of the model implementation. The first change to occur was the modification of the survey. The survey was adapted to include demographic questions. Also presented in the survey were questions that could be classified by three different construct—attitude toward training, attitude toward ICT, and use of ICT. The researcher decided to include both pre- and post-training surveys to gather a more accurate view of participants’ attitudes. In addition, through the addition of interviews and observations, the triangulation of the findings was possible.

**Study 2**

**Demographics of Participants**

**The University Technology Facilitator**

The university technology facilitator volunteered to participate in Study 2. She had enjoyed her participation in Study 1 and looked forward to continuing her involvement. She was interested in seeing a complete implementation of the Fusion Model of Instructional Design including the possible positive outcomes that would result from the study being fully implemented.

**Participating Faculty Members**

A total of 18 faculty members participated in the second study. Five were members of the Department of Allied Health Sciences and the remaining participants were from University College. Most of the respondents (66.7%) were of instructor rank while the remaining respondents (33.3%) were assistant professors. None of the respondents held the rank of professor, associate professor, or lecturer (Table 5.2).

<table>
<thead>
<tr>
<th>Rank</th>
<th>Total n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*Table 5.2 Frequency of University Faculty by Rank (N = 18)*
Table 5.2 continued

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Professor</td>
<td>6</td>
<td>33.3%</td>
</tr>
<tr>
<td>Instructor</td>
<td>12</td>
<td>66.7%</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Over half of the respondents (55.6%) fell in the age range of less than 40 years old. The remaining respondents (44.4%) were over the age of 40 (Table 5.3).

<table>
<thead>
<tr>
<th>Age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>&lt; 40 years old</td>
<td>10</td>
</tr>
<tr>
<td>40 or more years old</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
</tbody>
</table>

There was a difference in the number of workshops the respondents had attended in the past. Most of the respondents (55.6%) had only attended one to two workshops in technology integration in the last five years. Of the remaining respondents, 27.8% attended three to four workshops, 16.7% attended five or more workshops (Table 5.4).

<table>
<thead>
<tr>
<th>Number of Workshops</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>5 or more</td>
<td>3</td>
</tr>
<tr>
<td>3-4</td>
<td>5</td>
</tr>
<tr>
<td>1-2</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
</tbody>
</table>
More than half of the respondents (61.1%) began integrating technology in their teaching preparation and teaching two or fewer years ago. The remaining respondents (38.9%) began integrating technology in their teaching preparation and teaching more than two years ago (Table 5.5).

<table>
<thead>
<tr>
<th>Length of Time</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>2 or fewer years</td>
<td>11</td>
</tr>
<tr>
<td>more than 2 years</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
</tbody>
</table>

Two- thirds (66.7%) of the respondents began requiring their students to use technology in their course assignments two or fewer years ago. The remaining respondents (33.3%) began integrating technology in their teaching preparation and teaching more than two years ago (Table 5.6).

<table>
<thead>
<tr>
<th>Length of Time</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>2 or fewer years</td>
<td>12</td>
</tr>
<tr>
<td>more than 2 years</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
</tbody>
</table>

In the self-selected stages of technology adoption and integration, the half of respondents (50.0%) labeled themselves as basic users while the other half (50.0%) labeled themselves as heavy users (Table 5.7). In the survey, basic users were described as, “I include web resources
in my courses. I post my syllabi and student grades on Blackboard.” Heavy users were described as, “I electronically track student grades via a spreadsheet or Blackboard. In my classes, my students collaborate online through group work and/or discussion.”

Table 5.7 Frequency of University Faculty self-selecting their Stage of Technology Adoption and Integration (N = 18)

<table>
<thead>
<tr>
<th>Stage of technology adoption</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic user</td>
<td>9</td>
<td>50.0%</td>
</tr>
<tr>
<td>Heavy user</td>
<td>9</td>
<td>50.0%</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Analysis of Survey Data

All survey items, except those addressing demographic content, were designed to elicit levels of agreement along a 5-point Likert scale. The scale design was: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree, 5 = Strongly Agree. Means with a value of 3.5 or higher indicate a mid- to high level of agreement on the indicator.

Faculty Attitudes toward Training

Table 5.8 presents the descriptive statistics of faculty responses on the pre- and post-attitudes toward training survey. Eight of the 13 indicators showed more positive attitudes in the post-training survey. On average, the participants were more pleased with the training received in the study (M = 4.39, SD = .79) than with previous training (M = 3.94, SD = 1.11). The training sessions in the study kept their attention better (M = 4.44, SD = .71) than in previous training sessions (M = 4.06, SD = 1.11). The structure and format of the recently attended training sessions was perceived to be better (M = 3.67, SD = 1.28) than those used in previous sessions (M = 3.39, SD = 1.34) for building their confidence in using technology in their teaching preparation. The instructional strategies used in the recent training sessions were perceived to be
better \((M = 4.11, SD = 1.02)\) than the instructional strategies used in previous sessions \((M = 3.72, SD = 1.02)\). More confidence in technology integration was gained by the participants in the recent sessions \((M = 4.17, SD = .99)\) than over the previously attended sessions \((M = 3.89, SD = .68)\). The delivery method improved from previous sessions \((M = 4.00, SD = .69)\) to those sessions occurring as part of the study \((M = 4.22, SD = .81)\). The structure and format of the recently attended training sessions was better \((M = 4.11, SD = .96)\) than those in previous sessions \((M = 3.78, SD = .55)\) for building their confidence in using technology in their classes. The multimedia methods used in the recent training sessions \((M = 4.28, SD = .83)\) were more effective in keeping the participants focused than in previous sessions \((M = 3.83, SD = .62)\).

Table 5.8 Descriptive Statistics of Faculty Attitudes toward Training – Pre- and Post- Training (N=18)

<table>
<thead>
<tr>
<th>Attitude toward Training</th>
<th>Pre-training</th>
<th>Post-training</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The instructor in the last training sessions I attended was successful in relating to my prior technology use.</td>
<td>3.94, 1.11</td>
<td>4.39, .79</td>
</tr>
<tr>
<td>2. The last training sessions I attended kept my attention.</td>
<td>4.06, 1.11</td>
<td>4.44, .71</td>
</tr>
<tr>
<td>3. I was able to accomplish what was taught in the last training sessions I attended.</td>
<td>4.33, .59</td>
<td>4.28, 1.02</td>
</tr>
<tr>
<td>4. The structure and format of the last training sessions I attended helped build my confidence in using technology in my teaching preparation.</td>
<td>3.39, 1.34</td>
<td>3.67, 1.28</td>
</tr>
<tr>
<td>5. The content of the last training sessions I attended was relevant to meet my needs.</td>
<td>4.39, .70</td>
<td>4.44, .62</td>
</tr>
<tr>
<td>6. The instructional strategies used in the last training sessions were effective for me.</td>
<td>3.72, 1.02</td>
<td>4.11, 1.02</td>
</tr>
<tr>
<td>7. I am satisfied with what I learned in the last training sessions.</td>
<td>4.17, .62</td>
<td>4.17, .90</td>
</tr>
<tr>
<td>8. I gained confidence in my abilities of technology integration during the last training sessions I attended.</td>
<td>3.89, .68</td>
<td>4.17, .99</td>
</tr>
<tr>
<td>9. The delivery method of the last training sessions I attended matched the way that I learn.</td>
<td>4.00, .69</td>
<td>4.22, .81</td>
</tr>
</tbody>
</table>
Table 5.8 continued

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>4.39</th>
<th>.61</th>
<th>4.28</th>
<th>.90</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>I am able to apply what I learned from the last training sessions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>* The content covered in the last training sessions I attended did not meet my needs.</td>
<td>3.94</td>
<td>1.00</td>
<td>3.67</td>
<td>1.41</td>
</tr>
<tr>
<td>12.</td>
<td>The structure and format of the last training sessions I attended helped build my confidence in using technology in my classes.</td>
<td>3.78</td>
<td>.55</td>
<td>4.11</td>
<td>.96</td>
</tr>
<tr>
<td>13.</td>
<td>The multimedia methods used in the last training sessions helped me focus.</td>
<td>3.83</td>
<td>.62</td>
<td>4.28</td>
<td>.83</td>
</tr>
</tbody>
</table>

Overall statistics for construct

|   | 3.93 | .50 | 4.15 | .68 |

* These items were reversed.

Faculty Attitudes toward ICT

Table 5.9 presents the descriptive statistics of faculty responses on the pre- and post-attitudes toward ICT survey. Twelve of the 20 indicators for faculty attitudes toward ICT increased from the pre-training to the post-training survey. The participants’ beliefs in technology usage in teaching as being beneficial increased from pre-training (\(M = 4.61, SD = .50\)) to post-training (\(M = 4.72, SD = .46\)). Their frustration levels toward having necessary technology equipment fail during a prepared presentation increased from pre-training (\(M = 4.39, SD = .98\)) to post-training (\(M = 4.61, SD = .61\)). Their beliefs in students expecting their teachers to integrate technology into their courses increased from pre-training (\(M = 4.11, SD = 1.08\)) to post-training (\(M = 4.28, SD = .83\)). The participants’ attitudes of being hampered by the lack of technology resources available in the classrooms where they teach rose from pre-training (\(M = 4.17, SD = .99\)) to post-training (\(M = 4.39, SD = .70\)). Their beliefs in the use of technology being a necessity to adequately prepare for their classes increased from pre-training (\(M = 4.33, SD = .69\)) to post-training (\(M = 4.61, SD = .50\)). Their beliefs in the benefits of Blackboard increased from pre-training (\(M = 4.61, SD = .50\)) to post-training (\(M = 4.78, SD = .43\)). The participants’ beliefs in students requiring the use of technology in their teaching
increased from pre-training ($M = 3.83, SD = .62$) to post-training ($M = 4.06, SD = .64$). Their use of technology as a satisfying experience rose from pre-training ($M = 3.78, SD = .73$) to post-training ($M = 3.94, SD = .73$). Their beliefs that integrating technology enhances learning for their students increased from pre-training ($M = 4.28, SD = .67$) to post-training ($M = 4.44, SD = .62$). The participants’ enjoyment of using technology in their teaching and/or course preparation rose from pre-training ($M = 4.06, SD = .64$) to post-training ($M = 4.22, SD = .43$). Their frustration from the lack of technology resources available in the classrooms where they teach increased from pre-training ($M = 4.50, SD = .71$) to post-training ($M = 4.67, SD = .49$). Their beliefs in the use of web resources in their courses enhances student learning rose from pre-training ($M = 4.17, SD = .62$) to post-training ($M = 4.33, SD = .49$).

<table>
<thead>
<tr>
<th>Table 5.9</th>
<th>Descriptive Statistics of Faculty Attitudes toward ICT – Pre- and Post- Training (N=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitude toward ICT</strong></td>
<td><strong>Pre-training</strong></td>
</tr>
<tr>
<td>1. Technology integration, such as setting up classes in Blackboard, is time well spent.</td>
<td>$M = 4.72$, $SD = .46$</td>
</tr>
<tr>
<td>2. I believe my using technology in teaching is beneficial for students.</td>
<td>$M = 4.61$, $SD = .50$</td>
</tr>
<tr>
<td>3. Having necessary technology equipment fail during a prepared presentation is frustrating.</td>
<td>$M = 4.39$, $SD = .98$</td>
</tr>
<tr>
<td>4. I believe my students benefit from the use of online assessment through Blackboard or some other means.</td>
<td>$M = 4.22$, $SD = .65$</td>
</tr>
<tr>
<td>5. I believe students expect their teachers to integrate technology into their courses.</td>
<td>$M = 4.11$, $SD = 1.08$</td>
</tr>
<tr>
<td>6. I don’t like using technology in my teaching.</td>
<td>$M = 4.00$, $SD = 1.03$</td>
</tr>
<tr>
<td>7. I believe when attempting to use some type of technology in my classes, I should have a “plan B” ready in case of technology failure.</td>
<td>$M = 4.22$, $SD = .73$</td>
</tr>
<tr>
<td>8. My use of technology in my classroom is hampered by the lack of resources available in the classrooms where I teach.</td>
<td>$M = 4.17$, $SD = .99$</td>
</tr>
</tbody>
</table>
Table 5.9 continued

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Mean 1</th>
<th>SD 1</th>
<th>Mean 2</th>
<th>SD 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>I believe the use of technology is sometimes necessary to be adequately prepared for my classes.</td>
<td>4.33</td>
<td>.69</td>
<td>4.61</td>
<td>.50</td>
</tr>
<tr>
<td>10.</td>
<td>Technology integration, such as developing online exams, is time well spent.</td>
<td>3.78</td>
<td>.88</td>
<td>3.67</td>
<td>.91</td>
</tr>
<tr>
<td>11.</td>
<td>I believe using Blackboard to post course documents and resources enhances student learning.</td>
<td>4.61</td>
<td>.50</td>
<td>4.78</td>
<td>.43</td>
</tr>
<tr>
<td>12.</td>
<td>Technology integration, such as finding and providing web resources, is time well spent.</td>
<td>4.28</td>
<td>.75</td>
<td>4.28</td>
<td>.75</td>
</tr>
<tr>
<td>*13.</td>
<td>I don’t like using different types of technology in my courses because of the probability that it might fail.</td>
<td>3.61</td>
<td>1.04</td>
<td>3.50</td>
<td>1.15</td>
</tr>
<tr>
<td>14.</td>
<td>I believe the use of technology in my teaching is required by students.</td>
<td>3.83</td>
<td>.62</td>
<td>4.06</td>
<td>.64</td>
</tr>
<tr>
<td>15.</td>
<td>My use of technology is an overall satisfying experience.</td>
<td>3.78</td>
<td>.73</td>
<td>3.94</td>
<td>.73</td>
</tr>
<tr>
<td>16.</td>
<td>Technology integration, such as developing multimedia, is time well spent.</td>
<td>3.94</td>
<td>.54</td>
<td>3.72</td>
<td>.75</td>
</tr>
<tr>
<td>17.</td>
<td>I believe that integrating technology, such as multimedia presentations, enhances learning for my students.</td>
<td>4.28</td>
<td>.67</td>
<td>4.44</td>
<td>.62</td>
</tr>
<tr>
<td>18.</td>
<td>I enjoy using technology in my teaching and/or course preparation.</td>
<td>4.06</td>
<td>.64</td>
<td>4.22</td>
<td>.43</td>
</tr>
<tr>
<td>19.</td>
<td>I get frustrated from the lack of technology resources available in the classrooms where I teach.</td>
<td>4.50</td>
<td>.71</td>
<td>4.67</td>
<td>.49</td>
</tr>
<tr>
<td>20.</td>
<td>I believe the addition of web resources in my courses enhances student learning.</td>
<td>4.17</td>
<td>.62</td>
<td>4.33</td>
<td>.49</td>
</tr>
<tr>
<td></td>
<td>Overall statistics for construct</td>
<td>4.18</td>
<td>.31</td>
<td>4.24</td>
<td>.30</td>
</tr>
</tbody>
</table>

* These items were reversed.

Faculty Use of ICT

Table 5.10 presents the descriptive statistics of faculty responses on the pre- and post-use of ICT survey. Twelve of the 20 indicators for faculty’s use of ICT increased from the pre-training to the post-training survey. The participants’ use of online student collaboration through group work and/or online discussions increased from pre-training ($M = 2.83, SD = 1.20$) to post-training ($M = 3.11, SD = 1.02$). Their sharing of experiences of new software uses with
colleagues rose from pre-training ($M = 3.61, SD = .70$) to post-training ($M = 3.72, SD = .67$). Their inclusion of web resources in their classes has risen from pre-training ($M = 4.22, SD = .55$) to post-training ($M = 4.50, SD = .51$). The participants’ exploration of new hardware uses in their classes rose from pre-training ($M = 3.39, SD = 1.34$) to post-training ($M = 3.50, SD = 1.25$). Their use of electronic tracking of grades increased from pre-training ($M = 4.72, SD = .75$) to post-training ($M = 4.89, SD = .32$). The participants’ exploration of new software uses in their classes rose from pre-training ($M = 3.67, SD = .97$) to post-training ($M = 3.94, SD = .64$). Having their students’ electronically submit assignments increased from pre-training ($M = 3.50, SD = 1.10$) to post-training ($M = 3.61, SD = 1.04$). Their use of Google to explore topics of interest rose from pre-training ($M = 4.78, SD = .55$) to post-training ($M = 4.94, SD = .24$).

Increasing their word processor usage increased from pre-training ($M = 4.72, SD = .46$) to post-training ($M = 4.94, SD = .24$). The participants’ exploration of new hardware uses in their teaching preparation rose from pre-training ($M = 3.28, SD = 1.02$) to post-training ($M = 3.44, SD = .78$). Their experimentation of new uses of hardware and software for their classes increased from pre-training ($M = 3.39, SD = .92$) to post-training ($M = 3.83, SD = .71$). Their use of multimedia class presentations increased from pre-training ($M = 3.94, SD = .87$) to post-training ($M = 4.17, SD = .71$).

Table 5.10 Descriptive Statistics of Faculty Use of ICT – Pre- and Post- Training (N=18)

<table>
<thead>
<tr>
<th>Use of ICT</th>
<th>Pre-training</th>
<th>Post-training</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In my classes, students collaborate online through group work and/or online discussion.</td>
<td>2.83, 1.20</td>
<td>3.11, 1.02</td>
</tr>
<tr>
<td>2. I share my experiences with new software uses with my colleagues.</td>
<td>3.61, .70</td>
<td>3.72, .67</td>
</tr>
<tr>
<td>3. I include some web resources in my classes.</td>
<td>4.22, .55</td>
<td>4.50, .51</td>
</tr>
<tr>
<td>4. I check my e-mails on a daily basis.</td>
<td>4.89, .32</td>
<td>4.89, .32</td>
</tr>
</tbody>
</table>
Table 5.10 continued

<table>
<thead>
<tr>
<th></th>
<th>I explore new hardware for possible use in my classes.</th>
<th>3.39</th>
<th>1.34</th>
<th>3.50</th>
<th>1.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>* 6.</td>
<td>I don’t use a computer for anything.</td>
<td>4.72</td>
<td>.96</td>
<td>4.83</td>
<td>.51</td>
</tr>
<tr>
<td>7.</td>
<td>I share my experiences with new hardware uses with my colleagues</td>
<td>3.56</td>
<td>.62</td>
<td>3.44</td>
<td>.62</td>
</tr>
<tr>
<td>8.</td>
<td>I use electronic tracking of grades (spreadsheet or Blackboard).</td>
<td>4.72</td>
<td>.75</td>
<td>4.89</td>
<td>.32</td>
</tr>
<tr>
<td>9.</td>
<td>I explore new software for possible use in my class preparation.</td>
<td>3.67</td>
<td>.97</td>
<td>3.94</td>
<td>.64</td>
</tr>
<tr>
<td>10.</td>
<td>My students submit their assignments electronically.</td>
<td>3.50</td>
<td>1.10</td>
<td>3.61</td>
<td>1.04</td>
</tr>
<tr>
<td>11.</td>
<td>I occasionally “google” some topics of interest.</td>
<td>4.78</td>
<td>.55</td>
<td>4.94</td>
<td>.24</td>
</tr>
<tr>
<td>12.</td>
<td>I use a word processor on a regular basis.</td>
<td>4.72</td>
<td>.46</td>
<td>4.94</td>
<td>.24</td>
</tr>
<tr>
<td>13.</td>
<td>I explore new software for possible use in my classes.</td>
<td>3.50</td>
<td>.99</td>
<td>3.39</td>
<td>.98</td>
</tr>
<tr>
<td>14.</td>
<td>I read articles on classroom technology integration.</td>
<td>3.22</td>
<td>.88</td>
<td>3.17</td>
<td>.71</td>
</tr>
<tr>
<td>15.</td>
<td>I post my syllabi and students grades on Blackboard.</td>
<td>4.94</td>
<td>.24</td>
<td>5.00</td>
<td>.00</td>
</tr>
<tr>
<td>16.</td>
<td>I explore new hardware for possible use in my class preparation.</td>
<td>3.28</td>
<td>1.02</td>
<td>3.44</td>
<td>.78</td>
</tr>
<tr>
<td>* 17.</td>
<td>I don’t send e-mails.</td>
<td>4.94</td>
<td>.24</td>
<td>5.00</td>
<td>.00</td>
</tr>
<tr>
<td>18.</td>
<td>I provide electronic feedback on my students’ assignments.</td>
<td>3.72</td>
<td>1.02</td>
<td>3.78</td>
<td>1.06</td>
</tr>
<tr>
<td>19.</td>
<td>I experiment with new uses of hardware and software for my classes.</td>
<td>3.39</td>
<td>.92</td>
<td>3.83</td>
<td>.71</td>
</tr>
<tr>
<td>20.</td>
<td>I use multimedia class presentations (PowerPoint).</td>
<td>3.94</td>
<td>.87</td>
<td>4.17</td>
<td>.71</td>
</tr>
<tr>
<td>Overall statistics for construct</td>
<td>3.98</td>
<td>.40</td>
<td>4.11</td>
<td>.31</td>
<td></td>
</tr>
</tbody>
</table>

* These items were reversed.

Faculty Attitudes and Moderating Variables

Each of the attitude variables along with the moderating variables were used to compute contingency tables. The first attitude variable, attitude toward ICT, consisted of 13 items. The second and third attitude variables, use of ICT and attitude toward ICT, consisted of 20 items each. Table 5.11 presents the results of faculty attitudes toward ICT, training, and use of ICT before and after the training separated by faculty having two or less years experience in using ICT in teaching preparation and teaching and faculty having more than two years experience. Based on the descriptive statistics, faculty having only two or less years experience had the
largest gain in their attitudes toward training, pre-training (M = 3.55, SD = .52) to post-training (M = 3.91, SD = .70), and use of ICT, pre-training (M = 3.91, SD = .39) to post-training (M = 4.05, SD = .24). Faculty with more experience reported the larger gain in attitudes toward ICT from pre-training (M = 4.13, SD = .31) to post-training (M = 4.23, SD = .29).

Table 5.11  Began using ICT in Teaching Preparation and Teaching with Moderating Variables

<table>
<thead>
<tr>
<th>Began using ICT in teaching preparation and teaching</th>
<th>Attitude toward ICT- Pre</th>
<th>Attitude toward ICT- Post</th>
<th>Use of ICT-Pre</th>
<th>Use of ICT-Post</th>
<th>Attitude toward Training- Pre</th>
<th>Attitude toward Training- Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or fewer years (N = 11)</td>
<td>4.21 .33</td>
<td>4.25 .32</td>
<td>3.91 .39</td>
<td>4.05 .24</td>
<td>3.55 .52</td>
<td>3.91 .70</td>
</tr>
<tr>
<td>More than 2 years (N = 7)</td>
<td>4.13 .31</td>
<td>4.23 .29</td>
<td>4.07 .43</td>
<td>4.19 .39</td>
<td>3.71 .49</td>
<td>3.86 .38</td>
</tr>
</tbody>
</table>

Presented in table 5.12 are the results of faculty attitudes toward ICT, training, and use of ICT before and after the training separately for self-reported basic users and heavy users. Based on the descriptive statistics, basic users had the largest gain in their attitudes toward training, pre-training (M = 3.33, SD = .50) to post-training (M = 4.11, SD = .60), use of ICT, pre-training (M = 3.87, SD = .38) to post-training (M = 4.02, SD = .24), and attitudes toward ICT, pre-training (M = 4.10, SD = .28) to post-training (M = 4.19, SD = .31). Heavy users reported positive attitudes and use on all three scales before and after the training; however, their attitudes toward training decreased from pre-training (M = 3.89, SD = .33) to post-training (M = 3.67, SD = .50).

Table 5.12  Stage of ICT Adoption and Integration with Moderating Variables

<table>
<thead>
<tr>
<th>Stage of ICT Adoption and Integration</th>
<th>Attitude toward ICT- Pre</th>
<th>Attitude toward ICT- Post</th>
<th>Use of ICT-Pre</th>
<th>Use of ICT-Post</th>
<th>Attitude toward Training- Pre</th>
<th>Attitude toward Training- Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>Mean SD</td>
</tr>
</tbody>
</table>
Table 5.12 continued

<table>
<thead>
<tr>
<th></th>
<th>Attitude toward ICT</th>
<th>Attitude toward Training</th>
<th>Use of ICT</th>
<th>Use of ICT-Post</th>
<th>Attitude toward ICT</th>
<th>Attitude toward Training-Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Basic User</td>
<td>4.10</td>
<td>.28</td>
<td>4.19</td>
<td>.31</td>
<td>3.87</td>
<td>.38</td>
</tr>
<tr>
<td>(N = 9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy User</td>
<td>4.26</td>
<td>.34</td>
<td>4.29</td>
<td>.30</td>
<td>4.09</td>
<td>.41</td>
</tr>
<tr>
<td>(N = 9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.13 presents the results of faculty attitudes toward ICT, training, and use of ICT before and after the training separated by faculty having two or less years experience in requiring students to use ICT and faculty having more than two years experience. Based on the descriptive statistics, faculty having only two or less years experience had the largest gain in their attitudes toward training, pre-training ($M = 3.58, SD = .51$) to post-training ($M = 3.92, SD = .67$), use of ICT, pre-training ($M = 3.93, SD = .37$) to post-training ($M = 4.06, SD = .23$), and attitudes toward ICT, pre-training ($M = 4.23, SD = .32$) to post-training ($M = 4.28, SD = .31$). Faculty with more experience reported positive attitudes and use on all three scales before and after the training.

Table 5.13 Began requiring Students to use ICT in Assignments with Moderating Variables

<table>
<thead>
<tr>
<th>Began requiring Students to use ICT in Assignments</th>
<th>Attitude toward ICT- Pre</th>
<th>Attitude toward ICT- Post</th>
<th>Use of ICT-Pre</th>
<th>Use of ICT-Post</th>
<th>Attitude toward Training- Pre</th>
<th>Attitude toward Training- Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>2 or fewer years (N = 12)</td>
<td>4.23</td>
<td>.32</td>
<td>4.28</td>
<td>.31</td>
<td>3.93</td>
<td>.37</td>
</tr>
<tr>
<td>More than 2 years (N = 6)</td>
<td>4.08</td>
<td>.31</td>
<td>4.18</td>
<td>.29</td>
<td>4.07</td>
<td>.47</td>
</tr>
</tbody>
</table>

Table 5.14 presents the results of faculty attitudes toward ICT, training, and use of ICT before and after the training separately for faculty having attended one or two technology workshops and faculty having attended three or more technology workshops. Based on the descriptive statistics, faculty having attended one or two workshops had the largest gain in their attitudes toward training, pre-training ($M = 3.30, SD = .48$) to post-training ($M = 4.00, SD = .67$), and use of ICT, pre-training ($M = 3.88, SD = .44$) to post-training ($M = 4.01, SD = .29$). Faculty
having attended three or more workshops reported positive attitudes and use on all three scales before and after the training.

Table 5.14  Number of Technology Workshops Attended with Moderating Variables

<table>
<thead>
<tr>
<th>Number of Technology Workshops Attended</th>
<th>Attitude toward ICT- Pre</th>
<th>Attitude toward ICT- Post</th>
<th>Use of ICT-Pre</th>
<th>Use of ICT-Post</th>
<th>Attitude toward Training- Pre</th>
<th>Attitude toward Training- Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>1-2 (N = 10)</td>
<td>4.13</td>
<td>.33</td>
<td>4.19</td>
<td>.33</td>
<td>3.88</td>
<td>.44</td>
</tr>
<tr>
<td>3 or more (N = 8)</td>
<td>4.25</td>
<td>.30</td>
<td>4.31</td>
<td>.25</td>
<td>4.11</td>
<td>.32</td>
</tr>
</tbody>
</table>

Presented in table 5.15 are the results of faculty attitudes toward ICT, training, and use of ICT before and after the training separately for faculty under the age of 40 and faculty 40 years of age or older. Based on the descriptive statistics, faculty 40 years of age or older had the largest gain in their attitudes toward training, pre-training ($M = 3.50, SD = .53$) to post-training ($M = 4.00, SD = .53$), use of ICT, pre-training ($M = 3.91, SD = .45$) to post-training ($M = 4.11, SD = .33$), and attitudes toward ICT, pre-training ($M = 4.06, SD = .28$) to post-training ($M = 4.18, SD = .28$). Faculty under the age of 40 reported positive attitudes and use on all three scales before and after the training.

Table 5.15  Age with Moderating Variables

<table>
<thead>
<tr>
<th>Age</th>
<th>Attitude toward ICT- Pre</th>
<th>Attitude toward ICT- Post</th>
<th>Use of ICT-Pre</th>
<th>Use of ICT-Post</th>
<th>Attitude toward Training- Pre</th>
<th>Attitude toward Training- Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Under 40 (N = 10)</td>
<td>4.28</td>
<td>.32</td>
<td>4.30</td>
<td>.32</td>
<td>4.03</td>
<td>.37</td>
</tr>
<tr>
<td>40 and over (N = 8)</td>
<td>4.06</td>
<td>.28</td>
<td>4.18</td>
<td>.28</td>
<td>3.91</td>
<td>.45</td>
</tr>
</tbody>
</table>

The data in tables 5.11 to 5.15 appear to show a pattern of considerable improvement of faculty levels of use of ICT and attitudes toward ICT and training prior to and after the study.

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Use of the model appears to result in similar changes in attitudes in persons having (a) two or fewer years experience in using ICT in teaching preparation and teaching, (b) two or fewer years in requiring students to use ICT in assignments, (c) basic computer experience, (d) attended one to two workshops in technology integration, or (e) an age of 40 years of age or older.

**Paired Sample t-Tests**

In Table 5.16, two of the three pairs of constructs were found to be statistically significant at \( \alpha = .05 \) using paired sample \( t \)-tests. However, the researcher chose to use the Bonferroni adjustment (Tabachnick & Fidell, 2007) to avoid making a Type I error. This choice resulted in an adjusted \( \alpha \) equal to .0167. Using the adjusted \( \alpha \), the \( t \)-test results for the construct, use of ICT, were found to be significant \( (t(17) = 2.39, p < .01) \). The results indicated that the mean for the post-training use of ICT \( (M = 4.11, SD = .30) \) was significantly greater than the mean for the pre-training use of ICT \( (M = 3.98, SD = .40) \).

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>( M )</th>
<th>( SD )</th>
<th>Std Error of ( M )</th>
<th>95% CI of Diff.</th>
<th>( t )</th>
<th>( df )</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Att_ICT-pre – Att_ICT-post</td>
<td>.064</td>
<td>.114</td>
<td>.027</td>
<td>.007 – .681</td>
<td>1.06</td>
<td>17</td>
<td>.029</td>
</tr>
<tr>
<td>Use_ICT-pre – Use_ICT-post</td>
<td>.128</td>
<td>.160</td>
<td>.038</td>
<td>.048 – .120</td>
<td>2.39</td>
<td>17</td>
<td>.004</td>
</tr>
<tr>
<td>Att_Trng-pre – Att_Trng-post</td>
<td>.228</td>
<td>.912</td>
<td>.215</td>
<td>-.226 – .681</td>
<td>1.06</td>
<td>17</td>
<td>.304</td>
</tr>
</tbody>
</table>

The standardized effect size, \( d \), was .80, with considerable overlap in the distributions for the 5-point Likert rating of use of ICT pre-training and post-training. The box plots of the pre- and post-training use of ICT results are displayed in figure 5.1.
Qualitative Case Analyses of Interview and Observation Data

Data collected during Study 2 was divided into multiple units of analysis—university technology facilitator and faculty. The faculty was categorized by their classification of being either an early adopter or late majority. Interview data were analyzed from the university technology facilitator and faculty viewpoints. Observations and reflections made by the researcher were woven into the text of the analysis units. In addition, quantitative data about the faculty were included.

The interview with the university technology facilitator occurred upon the completion of the training sessions. The interview took place in her office and lasted about 15 minutes. The University Technology Facilitator Interview Protocol (Appendix G) contained questions similar to those questions found in the Faculty Interview Protocol—Post-training (Appendix F). The questions presented to the facilitator were similar to those presented to faculty members in an attempt to determine if the two groups had similar feelings about the training sessions and interest in technology integration.

Figure 5.1  Box Plots of Use of ICT-pre and Use of ICT-post
Interviews of six members of the faculty were conducted soon after the completion of the training sessions. All participants in Study 2 had agreed to be interviewed as part of the study process prior to the beginning of the study. The three early adopters (two members of the faculty from University College and one from the Department of Allied Health Services-Division of Communicative Disorders) along with the three late majority representatives (one member of the faculty from the Department of Allied Health Services-Division of Communicative Disorders and two from University College faculty) were chosen for the interview sessions. These six members of the faculty were selected based upon their classifications by the university technology facilitator.

The selected participants were contacted via e-mail and asked to schedule a face-to-face interview. In addition, a copy of the Faculty Interview Protocol—Post-Training (Appendix F) was provided as an attachment for their perusal. All the interviews were conducted in the offices of the interviewees; each interview lasted approximately 15 minutes.

Due to the change of semester to summer, not all faculty members who participated in the initial interviews were available for the follow-up interviews. Interviews with one of the early adopters and two of the late majority representative faculty members were conducted approximately 12 weeks after the initial interviews. The Faculty Interview Protocol—Follow-up (Appendix H) was used for the interviews. These interview sessions were held in the office of each of the interviewees and were short in length.

University Technology Facilitator

The first encounter with the Fusion Model of Instructional Design for the university technology facilitator was during Study 1. She enjoyed working with faculty during the implementation of training sessions designed and developed using the model. As a result of her
experiences during Study 1, she openly volunteered to be a part of Study 2. She wanted to see
the model fully implemented and executed.

The university technology facilitator was well organized in her designing and
implementation of the training sessions. For training sessions held previous to the studies, the
technology facilitator would send out e-mails advertising upcoming training sessions. Some of
the topics to be presented seemed outdated, but the university technology facilitator felt that
there was a need to offer those topics. When discussing the needs of the faculty, the researcher
was reassured of the faculty training needs. The university technology facilitator appeared to
have a good grasp on the technology usage and attitude levels of the faculty.

Observations. Having her office located next to the lab where the training sessions are
offered, the researcher could see the number of participants for the different training sessions. In
the past, the researcher thought it was odd that only a small number faculty would take
advantage of the available training. However, the participation levels for this study were much
higher. One change between past training sessions and those held for this study was the location
of the training sessions. Instead of having faculty come to the computer lab located near the
office of the university technology facilitator, the university technology facilitator went to the
departmental lab in each of the participating departments.

Another difference with the training sessions held for this study, the sessions were
customized for the different departments. Having been on both the presenting and receiving
sides of training sessions, the researcher has noticed that participation and attitude levels are
higher when training sessions are customized. As the trainer, examples given can be discipline
specific which helps the trainees relate to what is being presented to them. As the trainee, time is
not being wasted on content that the trainee might not use in the future.
As the training sessions for the faculty were being designed, developed, and implemented, the university technology facilitator was involved in several discussions. Her discussions with the early adopter(s) and researcher for the design and development of the training sessions were thorough. As discussions of possible topics occurred, the university technology facilitator would make suggestions on how the topics would be presented and what she hoped the faculty could accomplish with their newly acquired knowledge.

Besides having customized sessions, the topics presented in the sessions were covered over multiple meetings. A topic was first presented during one of the training sessions held early in the semester. Then at a later date, the topic was reviewed. In some cases, the topic was reviewed a third time in later training session.

Several conversations between the university technology facilitator and the researcher occurred during the time-span of the study. In these informal discussions, topics such as (a) what should be covered in the upcoming session, (b) how in-depth should the training be, (c) should any of the previously presented topics be re-visited, and (d) general progress of the training sessions were discussed.

Seeing the enthusiasm displayed by the technology facilitator about the training sessions and the participation of faculty in the training sessions, the researcher believed the model was working successfully in this setting.

**Interview.** When asked how the content of previous training sessions were decided upon, university technology facilitator described her process of determining what new software was being used on campus, if any, and which faculty members might be in need of training.

Sometimes the possible content was very obvious, like when we changed our e-mail software, upgraded Blackboard, or a new version of Microsoft Office was available. Other times, I tried to offer training on some of the more commonly used software on campus. However, the training sessions were generic, in nature. I had faculty present from different departments.
The university technology facilitator was questioned on the attendance at the training sessions over the years. She described having really good attendance from the faculty when she began offering classes years ago. “I might have had 20-25 people show up at times. I think it was because of people not being familiar or maybe just scared to use the software.” But over time, the attendance level fell. She felt the conflicts in the faculty schedules with the training sessions were the culprit. “Some people could be here on Monday but not on Wednesday; others on Tuesday and Thursday. It was the differences in their schedules that made it difficult to attend.”

When asked to describe previous faculty attitudes at previous training sessions, the university technology facilitator described the faculty as just going through the motions while she felt what she was as saying to them was “…falling on deaf ears. The sessions didn’t match what they wanted to learn. It was almost like talking to a bunch of teenagers. They just didn’t get it.” She thought a lack of interest might have been the problem.

There really was no enthusiasm in the people attending the sessions. I felt like they were just going through the motions, to look good. There was very little interaction between me and them, and with each other. I just didn’t get the questions about using the software like I did in the spring sessions. I felt that the training sessions were something they could put on their evaluation, for faculty development. They were checking off another item on the list.

The university technology facilitator noted a difference in faculty attitudes when comparing sessions held previously to the sessions held for the purpose of this study. She described a definite, positive change in faculty attitudes.

In the spring, I had a captive audience. They made time for the training. They appeared more satisfied and they acted as though they got more out of it. I was actually able to cover more content, successfully. Previously, I felt like they were being forced to be here. They were sacrificing things, like time in their schedule, to be here. They just didn’t seem satisfied.
The university technology facilitator was asked to describe her intentions when designing future training sessions. Liking the results of the training sessions designed for this study, the university technology facilitator stated plans to continue with customized sessions.

I want to continue to try to structure things for the specific departments, or maybe do something for a college. There are departments that do things a certain way and they are the only department that does it that way on campus. Like Comm-D, their training was uniquely different due to the way they need to do things for their accreditation agency. No one else has that setup. I like going in and working with the gurus, followed by the rest of the group. Then, I think, I’ll go to even smaller groups, like maybe one to three persons to help fill in the blanks.

When asked to describe her general feelings about the Fusion Model of Instructional Design, the university technology facilitator appeared to be very pleased with the results she achieved using the model. In the past, she would complain about setting up training sessions and having minimal, if any, participation. Based upon her response to a previous question, she plans to continue using the model in future training sessions.

Overall, I much preferred using the model. It made it easier to go from basic to advance. Before, [the faculty] came in for basic training, missing some training in the middle so they couldn’t do the advanced stuff. They didn’t get all the stepping stones. They’d learn something basic, like creating a document, would skip a session or two. Then they’d want to put an image in the document. They didn’t learn how to work with an image so they’d get all screwed up when trying to get it in the document. The model gives them a better progression. Like I said earlier, they seemed to want to be at the sessions so they were getting all of the material presented. Well, they may not have ‘got it.’ At least, they were there for the presentation.

**Summary of Findings regarding University Technology Facilitator.** In general, the university technology facilitator seemed very pleased using the model for her training sessions; she spoke positively about her experiences in the training sessions. In the past, she decided what was to be presented at the training sessions. These past training sessions were not customized for the different departments while the sessions designed for this study were customized. Her description of previously attendees’ actions and attitudes compared to those attending the sessions designed for this study was distinctly different. She was pleased with the interactions
that occurred between the faculty and herself. She was very thorough in her discussions with the early adopter(s) when planning the training sessions and was open to suggestions made by the researcher. Her future plans for training sessions include the use of customized training for different groups and working with early adopters before moving to the rest of the departmental faculty. The intentions of the university technology facilitator using the model for future sessions are a definite plus for the design of the model.

**Early Adopters**

Participants labeled as early adopter began integrating technology into their teaching preparation and classroom more than two years ago. They all self-selected themselves as heavy users. Their students have been required to use technology for their course assignments for more than two years. Each had a different number of technology integration workshops they had attended in the last five years; the first one had attended one or two, the second had attended three or four, and the third had attended five or more workshops. They all were of the female gender. Two held the rank of assistant professor and one was an instructor. Two of the early adopters were under the age of 40 while the other one was 40 years of age or older. All three had a Master’s degree as their highest earned degree.

**Observations.** As expected, the early adopters were more progressive in their use of technology than their late majority counterparts. They were comfortable in their use of Blackboard and were not apprehensive when considering additional uses of technology. One of the early adopters was more versed in the different Blackboard components than the other two. The researcher believes the two early adopters with a limited Blackboard knowledge are not pushed into using various Blackboard components by their students. These two early adopters have first semester freshmen for students and these freshmen are probably not aware of Blackboard and its capabilities.
When deciding the parameters of the training sessions, the two early adopters from the same department made the decisions for their colleagues. They participated in a meeting with the university technology facilitator and the researcher where the training particulars were decided. Because they were aware of topics that would be of interest to their department, they requested those topics from training. They also decided on the location and time of the training sessions. The third early adopter, from a different department, had held a meeting with her colleagues previously, at which time topics of interest, day, time, and location of training sessions were determined. Upon completion of the departmental meeting, the early adopter met with the university technology facilitator and the researcher to discuss the decisions made by her department.

During the training sessions, the early adopters appeared to want to use more technology in their classes and teaching preparation. They were asking questions to the university technology facilitator about different usage possibilities. Adding course content to Blackboard was the most predicted choice of future technology usage. Toward the end of the training sessions, their questions about the possibilities were becoming more involved. The early adopters appeared to envision possible future uses for themselves. They have a different perspective about technology than the late majority.

The researcher believes the early adopters will be a source of information for their departments. In the training sessions, they appeared to have a good grasp on the topics being presented. There is one early adopter in particular that the researcher thinks will be very productive in increasing her technology integration level. As a result of this, she will be very helpful in answering her colleagues’ questions about technology.

Seeing the early adopters inquire about additional topics during the training sessions, lead the researcher to believe that giving the same setting, they would likely return for additional
training. They seemed to understand what works best for them and their classes, and are looking forward to furthering their technology integration knowledge.

**Interviews.** When asked if they had ever been involved in the decision making training sessions before, all interviewees stated that they had never been involved in the design of faculty development programs in technology integration. Most were aware that workshops on technology integration had been presented in the past. However, they had no idea who was deciding what was to be presented in the workshops. One early adopter said, “I’m not really sure. Maybe it’s [the university technology facilitator] or Continuing Education. We get e-mails all the time about classes being sponsored by Continuing Ed, so it might be them.”

The early adopters stated that their interests in using technology in their class preparation or classrooms had increased recently since attending the training sessions for this study. One early adopter stated, “My interest level has been raised. I want to learn more so I can use more.” Another said, “I can see different possibilities, I just need to have the time to set it all up; if I could put my other responsibilities on hold, I could accomplish a lot.”

The early adopters were asked to describe their technology integration in their teaching preparations and classroom. One stated, “I was using Blackboard for grades and announcements.” Another stated,

> I was using technology a year ago but not to the extent I am now. I decided that I could make technology work for me. So last semester I started putting more stuff on Blackboard. Sometimes I put [the handouts] up after I had given them to the students. But [the handouts] were going to be there for the next time. I want to get all of my handouts, videos, PowerPoints, and whatever on Blackboard so I’ll know where to find it when I need it.

Currently, the early adopters were more engaged in their technology usage while most of the remaining faculty members were still at an entry-level technology usage. One early adopter stated, “I use Blackboard to post assignments, announcements, and websites for student usage.
I also use the Gradebook. I’ve added the viewing of DVDs in some of my classes.” Another early adopter stated:

I use Blackboard for the students to turn in all assignments, the Discussion Board, Group Pages for projects, online assessment, announcements, and the Message Center. I occasionally use other media, such as a laptop and projector, in my classes. I also have [the students] watch YouTube videos that correspond to topics covered in their books.

All early adopters predicted an increase in their levels of technology usage in the future. Some stated they would increase their Blackboard usage while one person was interested in learning other types of technology integration. Comments made by the early adopters include, “I plan more use of the discussion board and video streaming,” “I will have more enhanced PowerPoint presentations and the inclusion of more demonstration videos. I want to learn to create our own demonstration videos to be posted in Blackboard.” One early adopter said,

All assignments will be handled via Blackboard. The early warning system will be used to alert students in danger of missing deadlines as well as tracking my advisees. I think if I ‘dress-up’ my announcements, I might be able to get the students to check Blackboard more frequently. Then while the students are logged into Blackboard, they might decide to venture around in the site.

When asked to give some technology integration advice to their colleagues, the early adopters would encourage their peers to try using technology in their teaching preparation and classrooms and to have a positive attitude toward technology. In addition, they were commendable to the technology support available to faculty. One early adopter said,

Integrating technology is much easier than [the faculty] probably think. Support is readily available and these past training sessions has really helped peaked my interest in adding additional technology in classes. Initial setup is a little time consuming, however the time savings in future semesters is awesome.

Another early adopter stated,

Don’t be intimated by the technology. Once you use it, it is well worth the time spent learning about it. Get into a training session that interest you. We have great tech support for Blackboard so you wouldn’t be on your own.
The prospect of continuing to pursue technology integration was presented to the early adopter. She is planning to add more course documents into Blackboard and will attempt online quizzes in some of her fall classes. “I’m determined to get everything out there. I’m not that organized and to have things in one place will help me tremendously.”

When asked how she had helped her colleagues since the completion of the training sessions, the early adopter available for the follow-up interview described giving minimal help. However, she expects to be busy as the start of the fall semester gets closer.

The department, as a whole, is attempting to put as much of our course content as possible on Blackboard. Putting our course stuff is going to take a couple of semesters for most of us, but I think we will be glad once it is done. There’s one person I can think of, in particular, who will need a lot of help come August. She’s a little slower at getting new concepts. But once she understands it, she doesn’t forget it.

Only the early adopter was contemplating going into other areas of technology, such as creating videos for her classes when asked to describe future technology integration endeavors. “I think I can do the video thing. I heard that Movie Maker is not too hard to use. I guess if I have any questions I can go ask [the university technology facilitator].”

She stated that attending training sessions on technology integration was a definite possibility for her in the future. She was satisfied with the sessions she had attended recently. Previously, she had attended other training sessions and left feeling unsatisfied.

I tried training a few years or semesters ago but it just wasn’t interesting. So I didn’t go back. I like being able to have a chance to say what I want to be trained on. It’s so hard to find extra time so I don’t like wasting it on boring stuff or stuff I don’t want or need to learn. I’m thinking of additional topics for training in the future.

**Summary of Findings regarding Early Adopters.** In general, the early adopters have increased their use of technology integration in teaching preparation and in their classroom over that last year. In addition, they saw themselves increasing their technology integration in teaching preparation and their classrooms in the future. They appeared to not be intimated by
technology and realized that there was excellent technology support, especially through training sessions, available to them on campus. They were very positive in the advice they would give their peers on technology integration.

In the follow-up interview, the early adopter was continuing to integrate technology into her teaching preparation and classes. The early adopter had spent time helping out colleagues and was expecting to give additional help as the fall semester approached. She was considering other technology topics for future learning.

**Late Majority**

Participants labeled as late majority began integrating technology into their teaching preparation and classroom two or less years ago. They all self-selected themselves as basic users. Their students have been required to use technology for their course assignments for the last two years or less. They have attended one or two technology integration workshops in the last five years. They all were of the female gender and held the rank of assistant professor. One of the late majority was under the age of 40 while the other two were 40 years of age or older. Two had a Master’s degree and one a PhD as their highest earned degree.

**Observations.** There was a definite dividing line between the early adopters and late majority when evaluating current technology usage. Most of the late majority were doing the required faculty minimum of posting student grades and syllabi but were not delving into many of the other uses of technology. During the training sessions for the late majority, the pace of the sessions was slower than the sessions held for the early adopters. The university technology facilitator opened the initial session with comments used to get the attention of the participants. As the training sessions progressed, the early adopters helped guide the late majority who were struggling with the presented concepts. Observed in the training sessions were the lack of knowledge of Blackboard by some of the late majority.
There were times when the late majority seemed to be over-whelmed with the amount of material being presented during a session. One late majority in particular, appeared to be in a constant fight trying to grasp the presented topics. The possibilities of the participants’ age or lack of computer experience might have caused their minds to wander toward the end of the training sessions. As a result of this over-load of information, some topics covered in a session were repeated at later sessions to help solidify and clarify the concepts being presented.

Observing the training sessions allowed the researcher to ease-drop on conversations being held between different participants. Participants were making suggestions on how the topics being presented could be used in their respective departments. As the training sessions progressed, faculty were becoming more interested in possible uses of technology.

**Interviews.** When asked about their knowledge of whom and how the training sessions have been designed and developed in the past, the late majority had similar responses to the early adopters. They did not know who determined the content of training sessions offered by the university technology facilitator. A couple of the late majorities knew that the university technology facilitator did host training sessions that were not advertised to the general faculty. They had friends in other departments that had attended some of the personalized sessions. “My friend in Nursing said [the university technology facilitator] was giving them a lesson on how to put videos in Blackboard. I think we could use that here in Comm-D.” The researcher thought the comment about personalized training being held in the Nursing Department was interesting. The researcher believes the late majority was actually describing a training session that occurred during Study 1.

Most of the late majority noted a change in the technology integration level since attending the training sessions designed, developed, and implemented using the Fusion Model of Instructional Design. One late majority stated, “For me, the level increased a lot. I’m trying to
use more aspects of Blackboard. I think it increased for others, too.” The one participant, who stated that she is very interested in technology, blamed time restraints on non-changing technology interest level. “Being department head, there is always a report that is due. I should figure out how to use technology to help me get all of department stuff done.”

When describing their past levels of use of ICT, the interviewees stated they were either not using Blackboard or were minimally using Blackboard a year ago. One member stated using Blackboard “…only minimally. When [the administration] said we’d have to put grades and our syllabi on Blackboard, I almost freaked.” Another member stated, “I was not aware of any technology options available for use.”

The late majorities were not integrating technology to the same level as their early adopter counterpoints. One late majority stated, “Blackboard is still being used to post course information.” Another said, “I’m using Blackboard, but it is still much under used.”

Anticipated levels of future use of technology integration were lower for the late majority than the early adopters. The late majority saw themselves working with more of the Blackboard components. One stated, “I like the idea of the Digital Dropbox. If I can get the hang of doing the grading online, I won’t have to keep all those assignments. Blackboard will do that for me.” Another said,

I see some advancement; due to my busy schedule I don’t devote enough time to learning and practicing. So when I try to do something, I have trouble remembering what to do. Then I get frustrated. But since [my department] went to class together, I can go ask them for help. Using Digital Dropbox sounds intriguing and I’ll like to post some videos to Blackboard. And if I had the time, I’d like to try to make some of the videos. Maybe some of us could do the videos together.

One late majority, who struggled at times with the concepts being presented, was determined to increase her technology integration. She said,

I’ve decided to challenge myself and try to automate my classes on Blackboard. I do know that it will take time, especially up-front. But I figure that the time I spend now
will be time saved later. Since Blackboard can ‘turn things on and off’, I won’t wake up in the middle of the night realizing I hadn’t given the students something they would need for an assignment. Also, it is my understanding that Blackboard can make things ‘go away’. What I mean by that is that the place to turn assignments in will turn off and not be available for students. No more late assignments, just zeros!

The late majorities had similar positive attitudes about technology integration advice for colleagues as did their early adopter counterparts. “Technology integration is very motivating and is now expected by the students,” states one late majority. Another said, “I’d say hey, if I can do it you can do it.” One of the late majorities sums up technology integration advice as “Go for it! It makes life easier.”

When questioned in a later interview about how they had continued to integrate technology into their teaching preparation and classroom, one of the late majority representatives reported a plan to post required reading links to Blackboard and hoped to have most, if not all, handouts posted to Blackboard. The other late majority participant plans to eliminate all hardcopy submissions by students and will use the Digital Dropbox in Blackboard for student submissions.

After being presented with the idea of looking at additional technology possibilities in the future, the late majority were not ready to move on to something new; they were still grappling at learning the different Blackboard components and features. One summed up her feelings as, “If I can get all of Blackboard under my belt that will be an accomplishment. One step at a time.”

Additional training sessions were in the future for the late majority. They were looking forward to future training sessions. They liked being together as a group to learn the material. One reported,

Sure I’ll go to future training sessions, if we can do it as a department like we just did. It helped when go down the hall and ask someone to help me with a step that couldn’t remember or figure out.

The other late majority said,
I know I’m behind the times. I don’t have all the fancy technology stuff, like some of my colleagues have. I have a cell phone and a computer at home that I can get on the Internet with, but that’s it. For me to learn about technology, I need training and then help when I try to use it. I need hand-holding. I think that is part of the reason I don’t have too much technology stuff. I liked the training we just did. It was all about stuff we could use. I mean, it may be a while before I get brave enough, but the some of the others will be doing it shortly.

The two interviewees available for the follow-up interviews have continued to integrate technology into their teaching preparation and classes, and have plans to increase their use of technology. For the summer semester, little changes in technology integration have occurred except for adding more documents to their Blackboard courses. More changes are planned for the fall semester.

Summary of Findings regarding Late Majority. As like their early adopter counterparts, the late majority have increased their use of technology integration in teaching preparation and in their classroom over that last year. In addition, they saw themselves increasing their technology integration in teaching preparation and their classrooms in the future. They are overcoming their intimidation of technology, for the most part, and realized that there was excellent technology support, whether through training sessions or from their colleagues. Considering their stage of technology adoption, the late majority were positive in the advice they would give their colleagues on technology integration.

The late majority available for the follow-up interviews were continuing to integrate technology into their teaching preparation and classes. They were focusing on trying to grasp all of the Blackboard components and features that could be successfully integrated into their teaching preparation and classrooms. They were considering future training on technology integration.
Cross-case Analysis

Common themes between the multiple cases of analysis that support the research questions and supporting sub-questions were determined. Using interview and survey data, along with observations from the researcher, themes emerged that supported the research questions. The emergent themes were the perceived value and usability of the model and the perceived effectiveness of the model. Figure 5.2 displays the two themes of the research questions and the supporting sub-questions.

Figure 5.2 Thematic Analysis

Perceived Value and Usability

The Fusion Model of Instructional Design was perceived to be valuable and an improvement in designing and implementing faculty programs in technology integration. Responses from the university technology facilitator and observations made by the researcher support the value and usability of the model. The university technology facilitator preferred using the model. Her explanation of preferred use includes,
[The model] made it easier to go from basic to advance. Before, [the faculty] came in for basic training, missing some training in the middle so they couldn’t do the advanced stuff…the model gives them a better progression. Like I said earlier, they seemed to want to be at the sessions so they were getting all of the material presented. Well, they may not have ‘got it.’ At least, they were there for the presentation.

The university technology facilitator was pleased with the results of the training sessions design, developed, and implemented using the model. She described her future use of the model as “I want to continue to try to structure things for the specific departments, or maybe do something for a college…I think, I’ll go to even smaller groups, like maybe one to three persons to help fill in the blanks.”

**Participation Aspects of Model**

Through the application of the Fusion Model of Instructional Design, the university technology facilitator made adjustments to her procedures in the design, development, and implementation of faculty development programs in technology integration. Previously, she would decide on program content based upon anticipated needs by the faculty. She stated, “Sometimes the possible content was very obvious, like when we changed our e-mail software, upgraded Blackboard, or a new version of Microsoft Office was available.” Through the use of the model, the early adopter(s) were able to participate in the design and development of the training sessions and this change appeared to be received in a positive manner. One early adopter voiced her opinion of the participatory design nature of the model as, “I like being able to have a chance to say what I want to be trained on.”

**Recursive Aspects of Model**

The model’s ability to be recursive in the presentation and review of topics seemed to work in helping the participants grasp the presented concepts. The researcher noted faculty having difficulty with some of the topics presented. In a discussion with the university technology facilitator, a suggestion was made to repeat certain topics at later sessions. The
university technology facilitator welcomed the suggestion. For one topic in particular, the use of Gradebook, the university technology facilitator worked with some of the participants on this topic during three different sessions.

Other recursive aspects of the model include the early adopters participating in the training sessions with the late majority. During the training sessions held for the late majority, the early adopters were able to participate in the training and were able to act as facilitators for the other participants.

**Formative Evaluation Aspect of Model**

The brainstorming/discussion component of the Fusion Model of Instructional Design appeared to be effective as a formative evaluation tool. The brainstorming/discussion component was thought of as “preventive medicine” by identifying potential problems before they occur or while still in a small stage. During one training session, the researcher noticed the attention of some of the faculty start to wander. The researcher attributed this lack of attention to the length of the training session and the topic being covered. Following the session, the researcher and the university technology facilitator discussed repeating the topic at a later session. By repeating the topic at a later session, thus allowing the participants an additional chance to grasp the information, alleviated the possibility of the participants being un-satisfied with their learning in the sessions. In addition, several informal discussions between the researcher and university technology facilitator occurred where the order and depth of topics were discussed along with other matters about the training sessions.

**Perceived Effectiveness**

Survey and interview data along with researcher observations support the perceived effectiveness of the training sessions designed, developed, and implemented using the Fusion
Model of Instructional Design. Attitudes of faculty toward technology integration appeared to increase as a result of attending the training sessions.

**Faculty Attitudes toward Training Programs**

Faculty participating in the training sessions appeared to be pleased with the manner in which the sessions were held.

**Attention.** Training attendance level was much improved from previous semesters. Participation level was high throughout the training sessions in the current study. Faculty appeared motivated and interested.

Going to training together as a department was very well received. A late majority noted that when she gets the chance to work on technology integration and does not remember how to perform a step she can ask one of her peers; “…when I try to do something, I have trouble remembering what to do. Then I get frustrated. But since [my department] went to class together, I can go ask them for help.”

**Relevance.** The relevance of the training sessions was important to the faculty. The university technology facilitator noted that having customized training sessions was necessary, at times.

There are departments that do things a certain way and they are the only department that does it that way on campus. Like Comm-D, their training was uniquely different due to the way they need to do things for their accreditation agency. No one else has that setup.

An early adopter did not like to waste her time at training sessions that were irrelevant and like to have input into the session content.

I like being able to have a chance to say what I want to be trained on. It’s so hard to find extra time so I don’t like wasting it on boring stuff or stuff I don’t want or need to learn.

**Confidence.** From the survey data, faculty reported an increase in their level of confidence in using technology in their teaching preparation and in their classes. In addition,
their confidence in their abilities of technology integration rose after attending the recent training sessions.

**Satisfaction.** A late majority stated her feelings of satisfaction about the training sessions she had attended recently and future training sessions as,

Sure I’ll go to future training sessions, if we can do it as a department like we just did. It helped when go down the hall and ask someone to help me with a step that couldn’t remember or figure out.

Another late majority said, “I liked the training we just did. It was all about stuff we could use.”

An early adopter stated she was satisfied with the training sessions she had attended recently and suggested, “Get into a training session that interest you.”

The survey data indicated that 8 of the 13 indicators for the construct attitude toward training increased from pre- to post-training. This rise in attitude levels can be interpreted as a result of the training sessions attended by the participants.

**Perceived Changes in Use of ICT**

Overall, the training sessions held for the study appeared to have positive effectives on the faculty. Most of the participants seemed to be increasing their level of technology integration.

One late majority stated, “For me, the level increased a lot. I’m trying to use more aspects of Blackboard. I think it increased for others, too.” One of the early adopters is planning to add more course documents into Blackboard and will attempt online quizzes in some of her fall classes. “I’m determined to get everything out there. I’m not that organized to having things in one place will help me tremendously.” One of the late majority representatives is planning to post required reading links to Blackboard and hopes to have most, if not all, handouts posted to Blackboard. The other late majority participant is planning to eliminate all hardcopy submissions by students and will use the Digital Dropbox in Blackboard for student submissions.
Twelve of the 20 indicators for the use of ICT increased from pre- to post-training. In addition, the paired sample t-tests for the construct, use of ICT, was statistically significant, 
$t(17) = 2.39, p < .01$. Increasing the levels of use of ICT after attending the training sessions indicates that the sessions influenced the participants in their technology integration in a positive manner.

**Faculty Attitudes toward ICT**

Most participants stated that their interests in using technology in their class preparation or classrooms had increased recently. One early adopter stated, “My interest level has been raised. I want to learn more so I can use more.” Another early adopter said, “I can see different possibilities, I just need to have the time to set it all up; if I could put my other responsibilities on hold, I could accomplish a lot.” A late majority stated, “For me, the level increased a lot. I’m trying to use more aspects of Blackboard. I think it increased for others, too.”

Observing the training sessions allowed the researcher to eave-drop on conversations being held between different participants. Participants would make suggestions on how the topics being presented could be used in their respective departments.

After the training sessions, some of the participants were considering future endeavors. An early adopter was contemplating investigating other areas of technology, such as creating videos for her classes. “I think I can do the video thing. I heard that Movie Maker is not too hard to use. I guess if I have any questions I can go ask [the university technology facilitator].”

Twelve of the 20 indicators for the attitude toward ICT increased from pre- to post-training. Increasing the level of attitudes toward ICT after attending the training sessions indicates that the sessions influenced the participants in their technology integration attitudes.
CHAPTER 6

DISCUSSION AND CONCLUSIONS

The primary purpose of this study was to introduce and examine the Fusion Model of Instructional Design in the development and implementation of faculty development programs that help faculty integrate technology into their teaching practices. Faculty attitudes about technology training were examined in this study. In addition, the key characteristics and potential benefits of the model were assessed.

The research within this study employed both quantitative and qualitative methods in an effort to capture a variety of data for triangulation. Because of this effort, the researcher has been able to draw conclusions based upon the findings and provide future researchers with suggestions for further research on this topic.

This chapter will address: (1) Summary of Results, (2) Benefits of the Fusion Model of Instructional Design, (3) Recommendations for Institutions, and (4) Recommendations for Future Research.

Summary of Results

The results of two studies have been presented in this research. Study 1 was conducted to initially pilot the model and the survey. The results of the survey from Study 1 revealed positive attitudes toward ICT. Faculty appeared to be willing to spend time in designing, developing, and implementing technology integration in their classes. In addition, they seemed to envision how technology can help them in both their teaching preparation and classroom.

Based on the results of Study 1, modifications were made to the data collection procedures thus allowing the researcher to receive a clearer picture of what was happening due to model implementation. The first change that occurred was the modification of the survey. The survey was adapted to include demographic questions. Also presented in the survey were
questions that could be classified by three different construct—attitude toward training, attitude toward ICT, and use of ICT. The researcher decided to include both pre- and post-training surveys which gave a more accurate view of participants’ attitudes. In addition, through the addition of interviews and observations, the triangulation of the findings was possible.

Data from three sources, survey, interview, and the researcher’s journal, were gathered during Study 2 to answer the research questions. From the survey, the captured quantitative data provided descriptive characteristics of the sample faculty group. The data indicate that faculty are integrating technology at varying levels depending upon their stage of technology adoption. When comparing pre-training indicators to post-training indicators for the construct attitude toward training, survey data show that in 8 of the 13 indicators, the faculty’s positive attitude levels increased. In addition, 12 of the 20 indicators for the construct, attitude toward ICT, and 12 of the 20 indicators for the construct, use of ICT, increased. Also, one of the three constructs, use of ICT, produced significant paired sample $t$-test results. The faculty appeared pleased with the way the university technology facilitator related to their needs, kept their attention during the training sessions, presented relevant content, used delivery methods matching their learning styles, used multimedia methods effectively to help them focus, and used effective instructional strategies. In addition, the faculty seemed satisfied with the structure and format of the training sessions in helping them build confidence in using technology in both their teaching preparation and classes. Their confidence levels in their abilities to use technology integration increased.

Based upon the increase in the positive ratings of the construct, attitude toward training, and the supporting indicators, the Fusion Model of Instructional Design appears to provide a means of designing and developing workshops in technology integration which are better suited to meet the needs of faculty and help to build the confidence of faculty attending the training
sessions, especially for those who have less technology integration experiences and those who are older.

Interview data from the faculty voiced a level of non-satisfaction with previous training sessions and a level of satisfaction with the training sessions which were designed and developed using the model. The university technology facilitator appeared satisfied with the results of the recent training sessions created using the model.

Data from a mixture of sources provided triangulation of the findings. The interview data captured from the faculty seemed to show a general increase in technology integration interest. The survey data showed an increase in the positive levels of their attitudes toward training, use of ICT, and attitude toward ICT, along with the supporting construct indicators. In addition, the university technology facilitator reported a distinctly different attitude of the faculty attending the training sessions created with the model; their attitudes reflected a positive change.

What appeared to emerge from the Study 2 are the reinforcing concepts of the need to have workshops designed for the prospective audience and the inclusion of audience input into the development of the workshops. The data appear to support the idea that the faculty are motivated and interested in integrating technology into their classes and teaching preparation and their interest.

**Benefits of the Fusion Model of Instructional Design**

The results of the Study 2 supported the use of the Fusion Model on Instructional Design in designing and implementing faculty technology integration training through the three key aspects of the model: (a) participatory design, (b) recursive, and (c) results-driven.
Participatory Design

Participatory design is an integral part of the model. Participation in the design and development of the training sessions included the early adopters, the technology facilitator, and the researcher.

The early adopters from University College discussed with the university technology facilitator the possible topics they were interested in learning about during the training sessions. In the discussion, the list of topics were narrowed and prioritized. The early adopter from the Department of Allied Health Services-Division of Communicative Disorders had discussed with her colleagues possible topics to be covered in the training sessions prior to her initial meeting with the university technology facilitator. At the meeting with the university technology facilitator, the department’s early adopter further discussed and prioritized the possible training topics. These participatory design efforts contributed to the relevance of the training, which in turn motivated the faculty to participate in the training and to apply new skills in their course designs.

As the training sessions progressed, the researcher observed a need for modifications to the training sessions, discussed modifications with the university technology facilitator, and modifications were made. As a result, session content, in the form of quantity and repetitiveness, was modified to meet the needs of the participants. In a non-research setting, the researcher would be replaced by an early adopter. The early adopter would make observations during the training sessions and report back to the university technology facilitator with possible training modifications as done by the researcher in the study.

The use of participatory design is supported in the literature. Ely (1995) noted that by having faculty participate in the planning process, they become stakeholders in the process and thus possess ownership of the ideas produced. In successful professional development programs,
the faculty have a “sense of control, ownership and agency, and … they felt able, even eager, to take risks” (Triggs & John, 2004, p. 431). In the Fusion Model of Instructional Design, the faculty were given the chance to control what they wanted to be trained on and how the training was to occur. As a result of this control, they appeared to take ownership of their learning and projected a sense of future risk-taking in their upcoming technology integration endeavors.

**Recursive**

Recursiveness is built into the model. Three aspects of recursiveness are: (a) multiple brainstorming/discussion sessions, (b) participation by the early adopters from each department at the start of the training and then followed with the training of the majority, and (c) multiple training sessions attended by faculty.

The *improvements of training materials and strategies* component were repeated multiple times as a result of the repetitions of the *brainstorming/discussion* component within the process of the model. These informal discussions are similar to formative feedback in the classic instructional design models (Dick & Carey, 1985) or the more recent constructivist-interpretivist design model that Willis (1995) described as recursive, non-linear, reflective, and collaborative.

The training of the early adopters serves as a model or prototype before the training of the majority of the faculty in a department. Furthermore, by having the early adopters serve as facilitators in the training of the majority of the faculty, they take on the role of peer supporters both during and after the training, which provides a strong support network for the faculty within the department.

There were multiple training sessions held for the majority of the faculty. These multiple sessions with colleagues in the same department allowed faculty time to learn new skills at a deeper level and to apply the new skills in the design of their own courses.
Results-Driven

The National Staff Development Council (2001) suggests training that is results-driven as one of the key elements of good staff development. The training developed and implemented based on the Fusion Model of Instructional Design emphasized seeing actual results of knowledge gained during the training sessions into teaching preparation and delivery. Faculty were encouraged to apply what they were learning into the design of their own courses at most of the sessions. This results-driven approach appears to motivate and encourage faculty member to integrate technology into their classrooms.

In the interviews, most of the faculty spoke of an increased level of interest in integrating technology into their classrooms. They want to learn more about technology so that they can use technology in more innovative ways. The university technology facilitator noted a higher level of interest by the faculty during the training sessions. Faculty attitudes at the sessions held prior to the spring semester showed a lack of interest by the faculty; the faculty would skip training sessions making it difficult for them to grasp some concepts. With the sessions held recently, faculty appeared more satisfied, and the university technology facilitator was able to cover more material in the sessions. Survey data showed an increase in the attitude toward training, use of ICT, and attitude toward ICT data captured prior to and after the training sessions. They were satisfied in what they learned in the recent sessions and felt the content was relevant in meeting their needs.

Motivation and encouragement of faculty to integrate technology into their teaching preparation has emerged from the use of the model. Interview data from the faculty and the university technology facilitator and survey data showed an increased level of interest in integrating technology into teaching preparation. The faculty realized that using technology in their teaching preparation is time-consuming but the rewards of having to do less preparation
during the semester are time well spent. The survey data depicted an increase in the attitude toward the recently attended training sessions over previous sessions. Faculty reported the structure and format of these recent sessions helped build their confidence in integrating technology into their teaching preparation.

The participants’ levels of technology use appear to have changed since participating in a faculty development program in technology integration. The survey data indicated in increase in their level of use of ICT data captured prior to and after the training sessions. In the interview data, all participants reported an increase use or planned increase use of technology. Placing additional course documents in Blackboard, changing student submissions from hardcopy to online through Blackboard, and changing quizzes to online were some of the planned types of technology integration for the fall semester. For the current semester, the addition of additional documents to Blackboard was the most reported change in technology integration.

Overall Model

The model appears to be a viable and workable model that can be applied successfully to the development of faculty development programs in technology integration. The model addresses the inadequacies of ineffective faculty development programs described by Poole and Moran (1998) where one-shot workshops, lack of continued support, and unawareness of teacher needs lead to faculty not implementing the knowledge gained from the workshops attended. In contrast during the use of this model, (a) multiple workshops where held with the topics being presented and reviewed, (b) peer tutoring by the early adopters was available to the rest of the faculty, and (c) the training sessions were designed to specifically address the needs of the departments in attendance. The model follows the suggestions of Wilson (1997) where he proposes the next generation of models should be flexible, generic, and be able to be used in a variety of situations.
The survey data seemed to illustrate a preference in the training sessions designed and developed using the model over previously attended training sessions which were not created using the model. Most of the indicators for the construct, attitude toward training, and the construct itself showed an increase in value from data captured prior to and after the training sessions. The researcher did note that the pre-training attitude toward training results were positive in nature, but not as positive as the post-training.

Interview data from both the faculty and the university technology facilitator were in agreement with the survey data that the model is a viable and workable model. The faculty were not satisfied with the generic training sessions previously held and seemed pleased with the sessions that were designed and developed using the model. The university technology facilitator appeared pleased with the outcome of the recent training sessions created using the model. The improvement can also be seen in the number of much better attended sessions in the study than in previous generic workshops.

The participants’ attitudes toward training seem to change as a result of participating in a faculty development program in technology integration developed using the Fusion Model of Instructional Design. Based upon the data retrieved from the pre-training and post-training surveys and the interviews, there was a change in attitudes toward training. Due to the timing of the change in attitudes, the change can be attributed to faculty participation in the training sessions designed and developed with the model. Most of the supporting indicators for the construct, attitude toward training, and the construct itself had a positive increase in the attitude level.

Most of the faculty reported an attitude change toward technology integration. As the faculty are learning more about integrating technology, they want to learn even more so that they can use the technology more. The university technology facilitator reported a definite, positive
change with participants in the training sessions. They appeared more interested in and more satisfied by what they were learning.

The application of this model appears to be an improvement over previous faculty development programs in technology integration. The university technology facilitator described a definite, positive change that could be seen by the faculty’s participating in recent training sessions. She noticed the faculty making time to attend the training sessions. In the training sessions presented near the beginning of her employment, she described the faculty as being forced to attend the training and, therefore, were not satisfied with the training. She described the faculty as just going through the motions and not really grasping what was being presented to them. In those early sessions, the faculty were working in a mock Blackboard section and had about half of the class time to work hands-on, and the length of the sessions lasted between one to two hours. In the recent sessions designed with the Fusion Model of Instructional Design, she was able to cover more material. She had the participants working in their own class sections, almost the entire class was hands-on, and the sessions were about one to one and one-half hours in length. She felt the training sessions, designed and developed using the model, had a better progression of topics than sessions designed previously.

The Fusion Model of Instructional Design has both similarities and differences when compared to generic instructional design models mentioned in the literature. As for similarities, Davidson-Shivers, Salazar, and Hamilton (2005) describe a modified ADDIE model used to instruct faculty on the use of a popular software package. They chose to use an instructional design model for training because through the use of the model and its procedures, they could transcend disciplinary boundaries among faculty. The Fusion Model of Instructional Design can be used with any discipline as demonstrated in the variety of departments involved in Studies 1 and 2—Nursing, History and Social Sciences, Communications Disorders, and University
College. Pederson (2000) describes a rapid prototyping approach to creating material for training sessions. Rapid prototyping is an integral component in the model in this study; the design of materials to be used in the training sessions is created using rapid prototyping.

The Fusion Model of Instructional Design is different from generic models mentioned in the literature in a couple of ways—the use of rapid prototyping and the ability to repeat model components. Pederson (2000) mentions the use of a rapid prototyping approach due to limited time and resources, but he does not mention using the rapid prototyping approach in the creation of new materials; only existing web components were evaluated for use in web development components. The study model proposed the use of rapid prototyping in the creation of new materials to be used in the training sessions. Appelman (2005) notes the limitations of ADDIE and similar models. These models have neither an adequate number of components and nor the iterative ability to assist in the development of educational media solutions. Consequently, designers are left without the adequate tools to develop effective learning experiences. One of the key aspects of the Fusion Model of Instructional Design is the ability to repeat a component or a series of components as many times as needed to accomplish the set goal.

The model followed best practices developed by several universities in order to help their faculty in the pursuit of technology integration. The design of the model follows the best practices suggestion given by Hartman and Truman-Davis (2001) in the use of formative assessment. They proposed the use of formative assessment to make continuous improvements to faculty programs. Formative assessment of the training session occurred between the university technology facilitator and the researcher on several occasions. Best practices recommended by Moore (2001) can also be found within the model. He suggests having workshops consisting of mixed technological ability to allow faculty to become mentors. Having the early adopters present at the training sessions for the remaining faculty followed Moore’s
suggestion. Hutchinson (2001) suggested providing various training opportunities including repeat sessions and downtime between sessions to work with the material presented. As the training sessions progressed, topics were presented and then reviewed at later trainings sessions.

The model was successful in implementing the four components of Keller’s (1983) ARCS model of motivation. The university technology facilitator would begin the training sessions with comments which appeared to get the attention of the faculty. Faculty reported being pleased with the topics covered in the training sessions being of relevance to them. From the survey data, faculty reported increases in their level of confidence in their abilities of technology integration. Faculty also reported being satisfied with the training sessions they had attended recently.

In summary, the data gathered in this study supports the concept of the model being an acceptable instructional design model for professional development programs in technology integration. Both survey data and interview data seemed to report positive findings toward the use of the model in the design and development of these programs.

**Recommendations for Institutions**

Based upon the results of Study 2, recommendations for institutions can be made. The first recommendation is for institutions of higher education to use the model. Most of the students arriving on campuses are expecting to attend classes immersed in technology. This model can be used to design, develop, and implement faculty development programs in technology integration that can help faculty obtain the necessary knowledge needed to use technology effectively in the classroom.

Another recommendation is to get input from the early adopters in the departments during the design and development of the professional development programs. The early
adopters will probably be familiar with the prospective topics or will have enough technology knowledge that they will be able to understand the proposed topic.

Customizing the training sessions to meet the specific needs of the different departments on campus is the third recommendation. For example, the faculty of math and chemistry departments would have the need to create equations with their word processor where members of other departments, such as fine arts and social sciences, would not have this same need.

A final recommendation is to train persons from one department or two very similar departments, such as chemistry and biology, at the same time. Faculty can go to their peers who attended the same programs for peer tutoring.

**Recommendations for Future Research**

The first recommendation for future research is to use the model to create professional development workshops in technology integration for a K-12 setting. Many anecdotal stories tell of wasted planning periods or staff development days on topics not pertaining to a person’s teaching area. Requiring a high school math teacher to attend a computer training session during his planning period is aggravating. But to have the topic being covered at the training sessions attended by math teachers only pertaining to software used by language arts teachers is unreasonable.

Another recommendation for future research on this model should include a larger sample size. Even though four departments were used in the two studies, the departments were small in size which made it difficult to generalize the results to the theory that the Fusion Model of Instructional Design is a successful model. In addition, by having a larger sample size, a more dispersed sample in terms of rank and gender would likely occur.

A final recommendation for future research would be to look at the cost effectiveness of the training time by the technology facilitator for each department. Having customized training
for different departments may be more appealing to the faculty but will the benefits gained by customized training outweigh the costs.

This study brought to light the need to make changes to the current way of planning and implementing technology integration workshops. In a time when students, for the most part, are more technologically savvy than their professors and are expecting some level of technology present in most of their classes, faculty need to become acquainted and comfortable in their use of technology in the teaching preparation and in their classes.
REFERENCES


APPENDIX A

FACULTY NEEDS ASSESSMENT SURVEY
FACULTY NEEDS ASSESSMENT SURVEY

**Instructions:**

Please complete the following survey. The results of the survey will be used to determine your department’s preference of topics and training sessions.

This 8 item survey should take approximately 5 minutes to complete. Your effort and time spent are sincerely appreciated.

Please check (√) or write the response that most closely represents your opinion, attitude, situation, experience, or knowledge.

1. Would you be more likely to attend a training sessions that has been “personalized” for your departmental needs instead of a generic session?
   
   ___ Yes
   ___ No

2. Would you be more likely to implement what you learned at a training session if you had taken part in the development of the training session?
   
   ___ Yes
   ___ No

3. Please select all that apply…
   
   When attending a training session, you would prefer to receive:
   
   ___ printed handouts
   ___ printouts of PowerPoint slides
   ___ recording of visual demonstrations (ex. Captivate presentation)
   ___ live demonstration

4. Currently in Blackboard, is there any feature(s) for which you would like for your department to receive training? Please list.

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5. Please list any other software/hardware for which you would like your department to receive training (i.e. Microsoft Word, Microsoft Excel, scanners, video, etc.).

6. Is there any type of technology (creating podcasts, etc.) for which you would like your department to receive training?

7. Which would you prefer to attend?
   ____ single session on a topic
   ____ initial session with a follow-up session where the creation/development of actual courseware material would occur

8. Additional comments
APPENDIX B

FACULTY ATTITUDE SURVEY
FACULTY ATTITUDE SURVEY

The Use of Technology in Preparation and Teaching in Higher Education Classrooms

Instructions:

The following statements have been formulated to assist in the evaluation of an instructional design model designed to facilitate the design, development, and implementation of faculty development workshops in technology integration. **Technology integration includes the use of technology in your teaching preparation, the use of technology in your instructional delivery, and the use of technology required of your students by you, both inside and outside the classroom.**

This 57 item survey should take approximately 10 minutes to complete. Your responses are extremely valuable contributions to this dissertation study and your effort and time spent are sincerely appreciated.

Please check (✓) or write the response that most closely represents your opinion, attitude, situation, experience, or knowledge.

Please indicate your level of agreement with each of the following statements using the following scale:

1 = Strongly Disagree, 2 = Disagree, 3 = Neither disagree nor agree, 4 = Agree, 5 = Strongly Agree

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<td>2. My knowledge and strategies of technology integration in my teaching are primarily the result of informal conversations with peers providing information and support.</td>
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<td>3. My knowledge and strategies of technology integration in my teaching are primarily self-taught.</td>
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<td>4. I do not have enough technology skills to integrate technology into my teaching, including preparation, classroom, and student requirements.</td>
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<td>5. While designing my course(s), I feel the inclusion of technology requires too much of my time.</td>
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<td>6. Technology integration into my classes requires too much of my class preparation time.</td>
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<td>7. Technology integration in my classroom takes up too much time which could be better spent lecturing.</td>
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<td>8. Using technology means (Blackboard, email, chat, etc.) to communicate with my students requires too much of my time.</td>
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<td>9. The course I teach does not lend itself to technology integration.</td>
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<td>10. I lack essential knowledge of how to effectively integrate technology into my courses to benefit student learning.</td>
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<td>11.</td>
<td>I have no concerns about using technology in teaching.</td>
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<td>12.</td>
<td>Technology can benefit my students.</td>
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<td>13.</td>
<td>I see technology integration in my classes as a welcomed challenge.</td>
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<td>Technology integration in my classes results in respect from my peers.</td>
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<td>15.</td>
<td>I follow technology integration advice given by peers.</td>
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<td>16.</td>
<td>I received student requests to incorporate technology into my classes.</td>
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<td>17.</td>
<td>I am following an inevitable educational trend.</td>
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<td>18.</td>
<td>Through the use of technology, I spend more time preparing materials and resources for instruction.</td>
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<td>19.</td>
<td>Through the use of technology, I am more prepared for my classes.</td>
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<td>Through the use of technology, I am able to compute semester grades at a quicker pace.</td>
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<td>Through the use of technology, I am able to quickly create/revise exams.</td>
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<td>22.</td>
<td>Through the use of technology, I am creating presentations for my students to view.</td>
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<td>23.</td>
<td>I have no goals for integrating technology into my teaching preparation.</td>
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<td>24.</td>
<td>Through the use of technology, I am able to present more complex work to my students.</td>
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<td>25.</td>
<td>Through the use of technology, I am better able to tailor students’ work to their individual needs.</td>
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<td>26.</td>
<td>Through the use of technology, I spend less time lecturing to my students.</td>
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<td>27.</td>
<td>Through the use of technology, I have incorporated an online component into my classes.</td>
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<td>28.</td>
<td>Through the use of technology, my interactions with students have increased.</td>
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<td>29.</td>
<td>I have no goals of integrating technology into my classroom.</td>
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<td>30.</td>
<td>I was not motivated and/or encouraged to integrate technology into my class preparation.</td>
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<td>31.</td>
<td>I was not motivated and/or encouraged to integrate technology into my classroom.</td>
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<td>32.</td>
<td>Attending generic training sessions on technology did not motivate and/or encourage me to integrate technology into my teaching.</td>
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<td>33.</td>
<td>I believed in order to be motivated and/or encouraged to integrate technology into my teaching, additional incentives should be offered.</td>
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<td>34.</td>
<td>Just the thought of learning about a new technology motivated me to incorporate the technology into my teaching.</td>
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<td>35.</td>
<td>Seeing my peers integrating technology into their teaching motivated me to do the same.</td>
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<td>36.</td>
<td>Even after attending customized technology training, I am not motivated and/or encouraged to integrate technology into my class preparation.</td>
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<td>37.</td>
<td>Even after attending customized technology training, I am not motivated and/or encouraged to integrate technology into my classroom.</td>
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<td>38.</td>
<td>Attending customized training sessions on technology does motivate and/or encourage me to integrate technology into my teaching.</td>
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<td>Question</td>
<td>Response Options</td>
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<td>39. Even after attending customized technology training, I believe in</td>
<td>1 = Strongly Disagree, 2 = Disagree, 3 = Neither disagree nor agree, 4 = Agree,</td>
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<td>order to be motivated and/or encouraged to integrate technology into my</td>
<td>5 = Strongly Agree</td>
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<td>teaching, additional incentives should be offered.</td>
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<td>40. As usual, the time spent in the workshop (training session) would</td>
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<td>have been better spent doing something else.</td>
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<td>41. This professional development workshop (training session) was</td>
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<td>worth the time it took.</td>
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<td>42. Generally speaking, I have learned more in this workshop (training</td>
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<td>session) than in others on technology that I have attended.</td>
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<td>43. I prefer to attend generic, non-departmentalized workshops (training</td>
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<td>sessions).</td>
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<td>44. I prefer to attend workshops (training sessions) customized for my</td>
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Please take time to elaborate on the possible changes that might occur upon the completion of this workshop.

45. I intend on integrating technology into my class preparation in the following ways:

46. I intend on integrating technology into my classroom in the following ways:

47. Since I have attended the workshop (training session), my opinions and thoughts about technology integration in my teaching has changed in the following ways:

Thank you for your participation in completing this survey! You have been a valuable contributor to this research study and your efforts are most appreciated.

Contact information:
Lori C. Soule
Nicholls State University
lori.soule@nicholls.edu
APPENDIX C

FACULTY ICT SURVEY – PRE-TRAINING
FACULTY ICT SURVEY

Faculty Attitudes toward Training and Technology and Their Use of Technology in Preparation and Teaching in Higher Education Classrooms

Instructions:

The following statements have been formulated to assist in the evaluation of an instructional design model designed to facilitate the design, development, and implementation of faculty development workshops in technology integration. Technology integration includes the use of technology in your teaching preparation, the use of technology in your instructional delivery, and the use of technology required of your students by you, both inside and outside the classroom.

This 62 item survey should take approximately 10 minutes to complete. Your responses are extremely valuable contributions to this dissertation study and your effort and time spent are sincerely appreciated.

Please indicate your level of agreement with each of the following statements using the following scale:

1 = Strongly Disagree, 2 = Disagree, 3 = Neither disagree nor agree, 4 = Agree, 5 = Strongly Agree

<table>
<thead>
<tr>
<th>Attitudes toward Training</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>1. The instructor in the last training sessions I attended was successful in relating to my prior technology use.</td>
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<tr>
<td>2. The last training sessions I attended kept my attention.</td>
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<td>3. I was able to accomplish what was taught in the last training sessions I attended.</td>
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<tr>
<td>4. The structure and format of the last training sessions I attended helped build my confidence in using technology in my teaching preparation.</td>
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<td>5. The content of the last training sessions I attended was relevant to meet my needs.</td>
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<td>6. The instructional strategies used in the last training sessions were effective for me.</td>
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<td>7. I am satisfied with what I learned in the last training sessions.</td>
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<td>8. I gained confidence in my abilities of technology integration during the last training sessions I attended.</td>
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<td>9. The delivery method of the last training sessions I attended matched the way that I learn.</td>
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<tr>
<td>10.</td>
<td>I am able to apply what I learned from the last training sessions.</td>
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<tr>
<td>11.</td>
<td>The content covered in the last training sessions I attended did not meet my needs.</td>
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<td>12.</td>
<td>The structure and format of the last training sessions I attended helped build my confidence in using technology in my classes.</td>
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<td>13.</td>
<td>The multimedia methods used in the last training sessions helped me focus.</td>
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<tr>
<td>14.</td>
<td>Technology integration, such as setting up classes in Blackboard, is time well spent.</td>
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<td>15.</td>
<td>I believe my using technology in teaching is beneficial for students.</td>
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<td>16.</td>
<td>Having necessary technology equipment fail during a prepared presentation is frustrating.</td>
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<td>17.</td>
<td>I believe my students benefit from the use of online assessment through Blackboard or some other means.</td>
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<td>18.</td>
<td>I believe students expect their teachers to integrate technology into their courses.</td>
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<td>19.</td>
<td>I don’t like using technology in my teaching.</td>
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<td>20.</td>
<td>I believe when attempting to use some type of technology in my classes, I should have a “plan B” ready in case of technology failure.</td>
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<tr>
<td>21.</td>
<td>My use of technology in my classroom is hampered by the lack of resources available in the classrooms where I teach.</td>
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<td>22.</td>
<td>I believe the use of technology is sometimes necessary to be adequately prepared for my classes.</td>
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<td>23.</td>
<td>Technology integration, such as developing online exams, is time well spent.</td>
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<td>24.</td>
<td>I believe using Blackboard to post course documents and resources enhances student learning.</td>
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<td>25.</td>
<td>Technology integration, such as finding and providing web resources, is time well spent.</td>
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<td>26.</td>
<td>I don’t like using different types of technology in my courses because of the probability that it might fail.</td>
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<td>27.</td>
<td>I believe the use of technology in my teaching is required by students.</td>
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<td>28.</td>
<td>My use of technology is an overall satisfying experience.</td>
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<tr>
<td>29.</td>
<td>Technology integration, such as developing multimedia, is time well spent.</td>
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<td>30.</td>
<td>I believe that integrating technology, such as multimedia presentations, enhances learning for my students.</td>
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<td>1= Strongly Disagree, 2= Disagree, 3=Neither disagree nor agree, 4=Agree, 5=Strongly Agree</td>
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<td>31. I enjoy using technology in my teaching and/or course preparation.</td>
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<tr>
<td>32. I get frustrated from the lack of technology resources available in the classrooms where I teach.</td>
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<tr>
<td>33. I believe the addition of web resources in my courses enhances student learning.</td>
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</table>

**Use of ICT in Teaching**

<table>
<thead>
<tr>
<th>1 2 3 4 5</th>
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<tbody>
<tr>
<td>34. In my classes, students collaborate online through group work and/or online discussion.</td>
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<tr>
<td>35. I share my experiences with new software uses with my colleagues.</td>
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<tr>
<td>36. I include some web resources in my classes.</td>
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<tr>
<td>37. I check my e-mails on a daily basis.</td>
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<tr>
<td>38. I explore new hardware for possible use in my classes.</td>
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<tr>
<td>39. I don’t use a computer for anything.</td>
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<tr>
<td>40. I share my experiences with new hardware uses with my colleagues.</td>
</tr>
<tr>
<td>41. I use electronic tracking of grades (spreadsheet or Blackboard).</td>
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<tr>
<td>42. I explore new software for possible use in my class preparation.</td>
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<tr>
<td>43. My students submit their assignments electronically.</td>
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<tr>
<td>44. I occasionally “google” some topics of interest.</td>
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<tr>
<td>45. I use a word processor on a regular basis.</td>
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<tr>
<td>46. I explore new software for possible use in my classes.</td>
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<tr>
<td>47. I read articles on classroom technology integration.</td>
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<tr>
<td>48. I post my syllabi and students grades on Blackboard.</td>
</tr>
<tr>
<td>49. I explore new hardware for possible use in my class preparation.</td>
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<tr>
<td>50. I don’t send e-mails.</td>
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<tr>
<td>51. I provide electronic feedback on my students’ assignments.</td>
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<tr>
<td>52. I experiment with new uses of hardware and software for my classes.</td>
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<tr>
<td>53. I use multimedia class presentations (PowerPoint).</td>
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</tbody>
</table>

**Demographic Information**

Please choose the correct answer to the following statements.

54. I first began integrating technology in my teaching preparation and teaching:
   _____ 6 months ago
   _____ 1-2 years ago
   _____ 3-4 years ago
   _____ 5+ years ago
   _____ not applicable
55. The stage that best describes where I am within the technology adoption and integration into teaching and learning process is:

_____ Non-user
(I do not use a computer for anything, including creating exams and checking e-mail.)

_____ Minimal user
(I check my e-mail and I use a word processor for creating basic course materials such as course syllabus and exams.)

_____ Basic user
(I include web resources in my courses. I post my syllabi and student grades on Blackboard.)

_____ Heavy user
(I electronically track student grades via a spreadsheet or Blackboard. In my classes, my students collaborate online through group work and/or discussion.)

_____ Super user
(I explore and experiment with new hardware and/or software for possible use in my courses. I share my experiences with technology with my colleagues. I read articles on technology integration.)

56. I first began requiring my students to use technology for their course assignments:

_____ 6 months ago
_____ 1-2 years ago
_____ 3-4 years ago
_____ 5+ years ago
_____ not applicable

57. I have attended approximately this many workshops/training sessions/seminars on technology integration in the last 5 years.

_____ >10
_____ 9-10
_____ 7-8
_____ 5-6
_____ 3-4
_____ 1-2
_____ 0
58. My faculty rank is:
   ______ Professor
   ______ Associate Professor
   ______ Assistant Professor
   ______ Instructor
   ______ Lecturer

59. My gender is:
   ______ Female
   ______ Male

60. My age is:
   ______ < 30
   ______ 30-39
   ______ 40-49
   ______ 50-59
   ______ >59

61. My highest earned degree is:
   ______ Associate
   ______ Bachelors
   ______ Masters
   ______ PhD or professional degree

62. My current e-mail address is: __________________________________________

Thank you for your participation in completing this survey! You have been a valuable contributor to this research study and your efforts are most appreciated.

Contact information:
Lori C. Soule
Nicholls State University
lori.soule@nicholls.edu
APPENDIX D

FACULTY ICT SURVEY 1 – POST-TRAINING
FACULTY ICT SURVEY

Faculty Attitudes toward Training and Technology and Their Use of Technology in Preparation and Teaching in Higher Education Classrooms

Instructions:

The following statements have been formulated to assist in the evaluation of an instructional design model designed to facilitate the design, development, and implementation of faculty development workshops in technology integration. Technology integration includes the use of technology in your teaching preparation, the use of technology in your instructional delivery, and the use of technology required of your students by you, both inside and outside the classroom.

This 13 item survey should take approximately 2-3 minutes to complete. Your responses are extremely valuable contributions to this dissertation study and your effort and time spent are sincerely appreciated.

Please indicate your level of agreement with each of the following statements using the following scale:

1 = Strongly Disagree, 2 = Disagree, 3 = Neither disagree nor agree, 4 = Agree, 5 = Strongly Agree

<table>
<thead>
<tr>
<th>Attitudes toward Training</th>
<th>1</th>
<th>2</th>
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<th>4</th>
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</thead>
<tbody>
<tr>
<td>1. The instructor in the last training sessions I attended was successful in relating to my prior technology use.</td>
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<tr>
<td>2. The last training sessions I attended kept my attention.</td>
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<tr>
<td>3. I was able to accomplish what was taught in the last training sessions I attended.</td>
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<tr>
<td>4. The structure and format of the last training sessions I attended helped build my confidence in using technology in my teaching preparation.</td>
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<tr>
<td>5. The content of the last training sessions I attended was relevant to meet my needs.</td>
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<tr>
<td>6. The instructional strategies used in the last training sessions were effective for me.</td>
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<td>7. I am satisfied with what I learned in the last training sessions.</td>
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<td>8. I gained confidence in my abilities of technology integration during the last training sessions I attended.</td>
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<td>9. The delivery method of the last training sessions I attended matched the way that I learn.</td>
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<tr>
<td>1= Strongly Disagree, 2= Disagree, 3= Neither disagree nor agree, 4= Agree, 5= Strongly Agree</td>
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<tr>
<td>10.</td>
<td>I am able to apply what I learned from the last training sessions.</td>
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<td>11.</td>
<td>The content covered in the last training sessions I attended did not meet my needs.</td>
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<td>12.</td>
<td>The structure and format of the last training sessions I attended helped build my confidence in using technology in my classes.</td>
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<tr>
<td>13.</td>
<td>The multimedia methods used in the last training sessions helped me focus.</td>
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</tbody>
</table>

Thank you for your participation in completing this survey! You have been a valuable contributor to this research study and your efforts are most appreciated.

Contact information:
Lori C. Soule
Nicholls State University
lori.soule@nicholls.edu
APPENDIX E

FACULTY ICT SURVEY 2 – POST-TRAINING
FACULTY ICT SURVEY

Faculty Attitudes toward Training and Technology and Their Use of Technology in Preparation and Teaching in Higher Education Classrooms

*Instructions:* 

The following statements have been formulated to assist in the evaluation of an instructional design model designed to facilitate the design, development, and implementation of faculty development workshops in technology integration. **Technology integration includes the use of technology in your teaching preparation, the use of technology in your instructional delivery, and the use of technology required of your students by you, both inside and outside the classroom.**

This 40 item survey should take approximately 6-8 minutes to complete. Your responses are extremely valuable contributions to this dissertation study and your effort and time spent are sincerely appreciated.

Please indicate your level of agreement with each of the following statements using the following scale:

1 = Strongly Disagree, 2 = Disagree, 3 = Neither disagree nor agree, 4 = Agree, 5 = Strongly Agree

<table>
<thead>
<tr>
<th>Attitude toward Information and Communication Technology (ICT)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Technology integration, such as setting up classes in Blackboard, is time well spent.</td>
<td></td>
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<tr>
<td>2. I believe my using technology in teaching is beneficial for students.</td>
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<td>3. Having necessary technology equipment fail during a prepared presentation is frustrating.</td>
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<td>4. I believe my students benefit from the use of online assessment through Blackboard or some other means.</td>
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<td>5. I believe students expect their teachers to integrate technology into their courses.</td>
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<td>6. I don’t like using technology in my teaching.</td>
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<td>7. I believe when attempting to use some type of technology in my classes, I should have a “plan B” ready in case of technology failure.</td>
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<td>8. My use of technology in my classroom is hampered by the lack of resources available in the classrooms where I teach.</td>
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<td></td>
<td>I believe the use of technology is sometimes necessary to be adequately prepared for my classes.</td>
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<td>-------------------------------------------------------------------------------------------------</td>
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<tr>
<td>10.</td>
<td>Technology integration, such as developing online exams, is time well spent.</td>
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<tr>
<td>11.</td>
<td>I believe using Blackboard to post course documents and resources enhances student learning.</td>
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<tr>
<td>12.</td>
<td>Technology integration, such as finding and providing web resources, is time well spent.</td>
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<tr>
<td>13.</td>
<td>I don’t like using different types of technology in my courses because of the probability that it might fail.</td>
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<tr>
<td>14.</td>
<td>I believe the use of technology in my teaching is required by students.</td>
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<tr>
<td>15.</td>
<td>My use of technology is an overall satisfying experience.</td>
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<tr>
<td>16.</td>
<td>Technology integration, such as developing multimedia, is time well spent.</td>
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<td>17.</td>
<td>I believe that integrating technology, such as multimedia presentations, enhances learning for my students.</td>
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<td>18.</td>
<td>I enjoy using technology in my teaching and/or course preparation.</td>
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<td>19.</td>
<td>I get frustrated from the lack of technology resources available in the classrooms where I teach.</td>
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<tr>
<td>20.</td>
<td>I believe the addition of web resources in my courses enhances student learning.</td>
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</tbody>
</table>

**Use of ICT in Teaching**

<table>
<thead>
<tr>
<th></th>
<th>I believe the use of technology is sometimes necessary to be adequately prepared for my classes.</th>
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</thead>
<tbody>
<tr>
<td>21.</td>
<td>In my classes, students collaborate online through group work and/or online discussion.</td>
</tr>
<tr>
<td>22.</td>
<td>I share my experiences with new software uses with my colleagues.</td>
</tr>
<tr>
<td>23.</td>
<td>I include some web resources in my classes.</td>
</tr>
<tr>
<td>24.</td>
<td>I check my e-mails on a daily basis.</td>
</tr>
<tr>
<td>25.</td>
<td>I explore new hardware for possible use in my classes.</td>
</tr>
<tr>
<td>26.</td>
<td>I don’t use a computer for anything.</td>
</tr>
<tr>
<td>27.</td>
<td>I share my experiences with new hardware uses with my colleagues</td>
</tr>
<tr>
<td>28.</td>
<td>I use electronic tracking of grades (spreadsheet or Blackboard).</td>
</tr>
<tr>
<td>29.</td>
<td>I explore new software for possible use in my class preparation.</td>
</tr>
<tr>
<td>30.</td>
<td>My students submit their assignments electronically.</td>
</tr>
<tr>
<td>31.</td>
<td>I occasionally “google” some topics of interest.</td>
</tr>
<tr>
<td>32.</td>
<td>I use a word processor on a regular basis.</td>
</tr>
<tr>
<td>33.</td>
<td>I explore new software for possible use in my classes.</td>
</tr>
<tr>
<td>34.</td>
<td>I read articles on classroom technology integration.</td>
</tr>
<tr>
<td>35.</td>
<td>I post my syllabi and students grades on Blackboard.</td>
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</tr>
<tr>
<td><strong>1 = Strongly Disagree, 2 = Disagree, 3 = Neither disagree nor agree, 4 = Agree, 5 = Strongly Agree</strong></td>
<td></td>
</tr>
<tr>
<td><strong>36.</strong></td>
<td>I explore new hardware for possible use in my class preparation.</td>
</tr>
<tr>
<td><strong>37.</strong></td>
<td>I don’t send e-mails.</td>
</tr>
<tr>
<td><strong>38.</strong></td>
<td>I provide electronic feedback on my students’ assignments.</td>
</tr>
<tr>
<td><strong>39.</strong></td>
<td>I experiment with new uses of hardware and software for my classes.</td>
</tr>
<tr>
<td><strong>40.</strong></td>
<td>I use multimedia class presentations (PowerPoint).</td>
</tr>
</tbody>
</table>

Thank you for your participation in completing this survey! You have been a valuable contributor to this research study and your efforts are most appreciated.

**Contact information:**

Lori C. Soule  
Nicholls State University  
lori.soule@nicholls.edu
APPENDIX F

FACULTY INTERVIEW PROTOCOL – POST-TRAINING
INTERVIEW PROTOCOL

1. Have you ever been involved in the decision making process about the content of a faculty development workshop before? If so, what are the details?

2. How has your interest level in technology integration in your classes changed since attending the training sessions presented this semester?

3. A year ago, how were you including technology integration in your class preparation and in your teaching?

4. How are you currently including technology integration in your class preparation and in your teaching?

5. Where do you see your level of technology integration six months from now?

6. Where do you see your level of technology integration one year from now?

7. If you had to give a peer some advice on technology integration in the classroom, what would you tell them?
APPENDIX G

UNIVERSITY TECHNOLOGY FACILITATOR INTERVIEW PROTOCOL
INTERVIEW PROTOCOL

1. In the past, how did you determine what topics would be covered in the training sessions?

2. How were the participation levels in past training sessions?

3. What was the attitude of participants in past training sessions?

4. Was there a different level of interest between previous training sessions and the ones held during the spring semester? If so, how?

5. How do you see yourself conducting training sessions in the future?

6. What are your general feelings about the model used in the spring semester?
APPENDIX H

FACULTY INTERVIEW PROTOCOL – FOLLOW-UP
INTERVIEW PROTOCOL

1. Since our last conversation, have you continued to integrate technology into your teaching preparation and classes? If so, how?

2. (For the early adopter) Have you had to help any of your colleagues with some of the topics covered in the spring training sessions? If so, what topic(s)?

3. Are there other things about technology (different software, equipment, etc.) you would like to learn about?

4. Will you seek additional training in technology in the future?
# Researcher’s Journal

<table>
<thead>
<tr>
<th>University College</th>
<th>Department of Allied Health Services-Division of Communicative Disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Meeting</strong></td>
<td>2 early adopters &lt;br&gt;Possible topics to be covered in Blackboard are discussed.</td>
</tr>
<tr>
<td><strong>Initial Observations</strong></td>
<td>Limited knowledge of Blackboard. &lt;br&gt;Not pushed into using by their students because their students are freshmen and are probably not aware of Blackboard.</td>
</tr>
<tr>
<td><strong>Early Adopter Training</strong></td>
<td>3 training sessions &lt;br&gt;Topics include: &lt;br&gt;• add buttons to Blackboard menu &lt;br&gt;• send an e-mail to an individual student &lt;br&gt;• use of message system instead of e-mail &lt;br&gt;• use of Performance Dashboard &lt;br&gt;• the early warning system in Blackboard &lt;br&gt;• weighing grades &lt;br&gt;• keeping a running total in grade book &lt;br&gt;• putting up assignments, retrieving documents, and posting graded assignments</td>
</tr>
<tr>
<td><strong>Training Observations</strong></td>
<td>Use of message system could eliminate boxes of paperwork from previous semesters which are stored in their offices. &lt;br&gt;Performance dashboard will be a real help to department because it will let faculty know when and if students are checking into Blackboard. &lt;br&gt;Review of previously presented material is covered during later sessions. &lt;br&gt;Participants are working within their own Blackboard sections.</td>
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</table>
| Training Session #1 – remaining faculty | 11 participants and 2 early adopters. UTF opened session with a joke about the boxes collecting in UC offices. Participants are working in their own Blackboard sections for all training sessions. Covered in the session:  
- adding menu items  
- adding items to the grade book  
- weighing items  
- use of message system  
- performance dashboard | 4 participants and 1 early adopter. UTF opened the session by asking the faculty if putting audio files of different speech impediments would help students. Participants are working in their own Blackboard sections for all training sessions. Covered in the session:  
- insertion of audio and video files into Blackboard  
- message center  
- grade book (including weighing items, hiding items, and running totals)  
- setting up a thread in the discussion board  
- managing menu items |
| Observations from training session #1 | Toward the last 10 minutes or so of the training session, I noticed the attention of some of the participants was starting to wander. I think, due to their lack of computer expertise and possibly their age, there might have been a little too much information presented in today’s session. I’ll talk with UTF to make sure she does a thorough review of today’s topics at a later session. | CD-EA is helping one of the faculty members who could be described as a late majority. It will be interesting to see how much this lady can get out of the sessions. She seems to constantly be a few mouse clicks behind the rest of the group. |
| Training Session #2 – remaining faculty | In today’s session, the use of the early warning system within the grade book and the posting of an assignment, retrieving the documents to be graded, and post graded assignments were covered. UTF reviewed the use of the message system and weighing items in grade book. UTF asked faculty members to bring an electronic copy of a document to be graded for the next training session. | The assignment feature (how to put up assignment, retrieve documents, and post graded assignments), how to collect and print discussion board items, the message center, and hidden content areas were covered in this session. UTF did review how to setup a thread in Blackboard for the late majority person. The remaining faculty members appear to be grasping the different concepts with ease. |
| Observations from training session #2 | The review of the use of the message system and weighing items in grade book appeared to help the faculty members that were having a “memory overload” in the previous session.  
I think the use of the message system will be beneficial to this group.  
The problem I have with the message system is that it’s another place you have to check for messages. | I’m not sure if UTF plans on covering the electronic grading of a document like she will be doing in UC.  
And as for the late majority person, I really don’t see her doing any more than the required minimal posting of syllabi and grades when these sessions are over.  
She’s trying but there appears to be a constant struggle. |
| Training Session #3 – remaining faculty | UTF met with UC faculty members who wanted additional help/review of adding menu items, adding items to the grade book and weighing the items, the use of the message system, and performance dashboard.  
Time ran out before UTF could go over the process of grading a document electronically and posting the document in Blackboard.  
This will be covered first in the next session. | UTF met with CD faculty members who wanted additional help/review of the inserting of audio and video files into Blackboard, using the message center, using grade book (including weighing items, hiding items, and running totals), setting up a thread in the discussion board, and managing menu items. |
| Observations from training session #3 | They are still struggling, to some degree, with the weighing of grade book items.  
In my opinion, I think it is because they are not sure how they want to do the weighing.  
They kept changing their minds and were getting confused.  
In addition, basic math seems a little foreign to a couple of persons; must be reading/English people. | Sounds like, in some cases, they may record their clients in order to make the audio/video files that will be posted in Blackboard.  
I’m thinking they will need to learn to use some type of software, such as Movie Maker, in order to get the video edited for viewing once this set of training sessions are complete |
| **Training Session #4 – remaining faculty** | UTF met with UC faculty members wanting to use the electronic document they brought to the session for grading and posting purposes. UTF reminded the UC faculty that hardcopy of assignments could be eliminated through the use of electronic grading and posting of assignments. Afterwards, an additional help/review of the use of the early warning system within the grade book and the posting of an assignment was covered. | UTF met with CD faculty members who wanted additional help/review of the assignment feature (how to put up an assignment, retrieve documents, and post graded assignments), how to collect and print discussion board items, the message center, and hidden content areas. The late majority person is really interested in the discussion board. |
| **Observations from training session #4** | I did not attend this session because I was administering an exam to my class that met at the same time as this training session. UTF reported what was covered in the session. | I’m thinking that using the discussion board will be the late majority person’s first attempt of technology integration outside the current required use. |
| **Training Session #5 – remaining faculty** | UTF met with any of the UC faculty members who needed additional clarification/review of any of the topics presented during the training sessions. In addition, as faculty became “comfortable” with the use of Blackboard, they began asking how to do other things like putting up a banner, adding external links, and adding sound and animation to announcements. | UTF met with any of the CD faculty members who needed additional clarification/review of any of the topics presented during the training sessions. In addition, as faculty became “comfortable” with the use of Blackboard, they began asking how to do other things outside of Blackboard like how to setup a form in Word and how to edit videos to be posted in Blackboard. |
| Observations from training session #5 | As of this day, April 4, 2008, the training sessions for UC have been declared over. The faculty members were asked to complete the short post-training survey, available through a link in Blackboard. I saw a couple of the attendees start the survey before we left the room. Faculty members to be interviewed will be chosen shortly. | I’m not surprised about them inquiring about the video editing. It seems like a logical progression since they want to start recording their clients as examples for students to view. Overall, this group appeared to have better grasped the topics presented than the group from UC. I think it is because they were playing around Blackboard before the sessions and most of them did appear to have a fair amount of computer literacy knowledge. As of this day, April 16, 2008, the training sessions for UC have been declared over. Faculty members were asked to complete the short post-training survey, available through a link in Blackboard. Faculty members to be interviewed will be chosen shortly. |
APPENDIX J

SURVEY COVER LETTER
SURVEY COVER LETTER

As technology usage spreads across university campuses, research in the development of instructional design models to facilitate in the design and development of faculty development programs in technology is currently being conducted. As faculty member in higher education, I am interested in contributing to the theoretical knowledge in the educational technology field in general and am hoping to identify ways for better serving faculty in their technology integration efforts at NSU.

Technology integration into teaching includes your technology use in teaching preparation, your technology use in instructional delivery, and technology usage that you require from your students both in class and outside of the classroom. You have been selected to voluntarily contribute to this research through the participation of your department in technology training. Your participation as faculty members who serve as critical contributors to the educational development of university students, a broad array of research areas, on-going scholarship, and service is invaluable.

This 62-item survey should take approximately 10 minutes to complete. Your responses will be handled in a confidential manner and released only as summaries with no personal or organizational identifiers.

The consent page for the survey is found on the next page. The link to the survey is located on the Announcement page of the Blackboard Users Group. The survey is designed to allow for revisiting any questions, if desired.

Please participate in this survey and submit prior to your first training session.

Lori C. Soule  
Instructor, Department of Mathematics and Computer Science  
Nicholls State University  
Ph.D Candidate in Educational Theory, Policy, and Practice; Specialization in Educational Technology  
lori.soule@nicholls.edu
APPENDIX K

RESEARCH STUDY CONSENT FORM
Research Study Consent Form

1. **Study Title:** The Fusion Model of Instructional Design: A Proposed Model for Faculty Development Programs in Technology Integration

2. **Performance Site:** Nicholls State University

3. **Contacts:** Lori C. Soule, available 7:30 to noon at [Redacted] or lori.soule@nicholls.edu

4. **Purpose of the Study:** The purpose of this dissertation study is to evaluate this proposed instructional design model to determine the following:
   - Is the proposed model, Fusion Model of Instructional Design, a viable and workable model that can be successfully applied to the development of faculty development programs in technology integration?
   - Does attendees’ attitudes toward technology integration change as a result of participating in a faculty development program in technology integration developed using the Fusion Model of Instructional Design?
   - In which ways have the attendees’ level of technology use changed/not changed since participating in a faculty development program in technology integration?
   - How is the application of this model an improvement over faculty development programs in technology integration?

5. **Subject Inclusion:** Faculty members at Nicholls State University

6. **Number of Subjects:** 20

7. **Study Procedures:** The subjects will spend approximately 10 minutes completing a survey prior to the beginning of the faculty development sessions. The subjects will attend two or more training sessions. During the training sessions, the researcher will be present to observe interactions occurring within the participants. After all of the training sessions have been completed, the subjects will spend approximately 2-3 minutes completing a survey. In addition, a small number of participants will be interviewed upon the completion of the training sessions.

8. **Benefits:** By participating in the study, it is possible the subjects might have gained confidence in their abilities to integrate technology into their class preparation and classrooms. In addition, the subject may receive satisfaction from their knowledge gained in the training sessions.

9. **Risks:** The study will produce no known risk. The study will not present any physical, psychological, social, or legal risks to the participants other than what is experienced in daily
life. The participants’ identity can be determined by their entry of their campus e-mail address in the survey. However, the participants’ responses will remain confidential.

10. **Right to Refuse:** The subjects may choose not to participate or to withdraw from the study at any time without penalty.

11. **Privacy:** The participants will have the option of entering their e-mail address in survey. The entered e-mail address will be used to determine who has completed the survey and not used to determine how the questions in the survey were answered. Once all survey data have been electronically captured and downloaded, the entered e-mail addresses will be removed prior to the commencement of data analysis. The data will be kept confidential unless release is legally compelled.

12. **Financial Information:** The participants will not receive any type compensation as a result of their participation in the study.

13. **Signatures:** 'The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, LSU Institutional Review Board, (225)578-8692, irb@lsu.edu, www.lsu.edu/irb. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.'

    Subject Signature:____________________________ Date:________________
APPENDIX L

INSTITUTIONAL REVIEW BOARD APPLICATION FORM – LSU
Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/projects using living humans as subjects, or samples or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This form helps the PI determine if a project may be exempted, and if so, to request an exemption.

- Applicant: Please fill out the application in its entirety and include the completed application as well as parts A-E listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at http://appcdocs.lsu.edu/osp/osp.xml/Content/Units/Human+Subjects+Screening+Committee?OpenDocument

- A Complete Application Includes All of the Following:
  (A) Two copies of this completed form and two copies of parts B thru E.
  (B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1 & 2)
  (C) Copies of all instruments to be used.
  (D) If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.
  (B) The consent form that you will use in the study (see part 3 for more information.)
  (E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB.

Training link: http://www.cancer.gov/services&resources/learning/humanparticipants-protects.asp

1) Principal Investigator: ECE
   Dept.: ECE/STK
   Ph: 335-448-4602
   E-mail: j smith@ LSU.edu

2) Co-investigator(s): please include department, rank and e-mail for each
   If student, please identify and name supervising professor in this space

3) Project Title: The Tuition Model of Institutional Design: A Proposed Model for Faculty Development Programs in Technology Integration

4) LSU Proposal? Yes or No: [ ] Yes, LSU Proposal Number: [ ]
   If Yes, LSU Proposal Number: [ ]

   Also, if YES, either: [ ] This application completely matches the scope of work in the grant
   OR [ ] More IRB Applications will be filed later

5) Subject pool (e.g. Psychology Students), study population, etc.:
   [ ] Vulnerable populations
   [ ] All others

Circle any "vulnerable populations" to be used: children <18, the mentally impaired, pregnant women, the aged, other. Projects with incarcerated persons cannot be exempted.

6) PI Signature: [ ] Date [ ] (no per signatures)

"I certify my responses are accurate and complete. If the project scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

***Effective August 1, 2007, all Exemptions will expire three years from date of approval, unless a continuation report, found on our website, is filed prior to expiration date***
APPENDIX M

INSTITUTIONAL REVIEW BOARD APPLICATION FORM – NSU
NICHOLLS STATE UNIVERSITY
Request for HSIRB Exemption

1. Name(s) of Principal Investigator(s): Lori C. Soule Phone: 985-448-4402

Other Investigators: ____________________________

Faculty Sponsor (If Student Research): ____________________________ Phone: __________

2. College: A&S Department: CMPS Phone: __________

3. Title of Project or Proposal: Fusion Model of Instructional Design: A Proposed Instructional Design Model for Faculty Development Programs in Technology Integration

4. Description of Project or Proposal (attach additional information as needed):

   a. Briefly describe the population of human subjects involved (e.g., University students, community members, athletes, homemakers, school children, etc.) You MUST indicate if this participation is VOLUNTARY or NOT. Subjects must be 18 or older for HSIRB Exemption.

      Using a pilot study to test a proposed instructional design model for pre-dissertation research, faculty members at Nicholls State University will be asked to participate in the testing of this proposed model.

   b. Briefly describe your research procedures and techniques of data collection (e.g., interview, questionnaire, test administration, observation of public behavior, etc.)

      Observations of faculty members at introductory meetings and training sessions will be made. In addition, a questionnaire will be given to training session participants upon completion.

   c. Briefly describe the objectives of your research (e.g., what hypotheses you are testing.)

      The objective of this research is to perform a pilot test on this proposed model during pre-dissertation research; does this model encourage faculty to participate and take ownership of faculty development programs in technology integration resulting in implementation of knowledge gained.

5. a. How will you recruit subjects? (Submit verbal copies of all letters, notices, advertisements, etc. with an outline of all oral presentations to be used, e.g. Direct person-to-person solicitation, Telephone solicitation, Newspaper solicitation, Letters of solicitation, Notices of solicitation, Other - please explain)

      Using email solicitations, departmental representatives will be contacted using the following text:

      Due to your knowledge of and enthusiasm about computers, you are invited to participate in the pilot study of a new instructional design model specifically designed to create faculty development programs in technology integration. An informational meeting will be held in the near future. If you are interested in participating in this study, please respond to this email.

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b. List all criteria for including subjects.
   Subjects to be included in research must be faculty member of Nicholls State University.

c. List all criteria for excluding subjects.
   Persons who are not faculty members at Nicholls State University will be excluded from research.

6. Describe subject benefits and costs:

   a. Indicate what, if any, benefits may accrue to each of the following: (Payment to research subjects for participation in studies is considered a benefit.)

      1) The human subjects involved:
         Participants will be given the opportunity to participate in faculty development training sessions that were developed to meet their specific needs instead of attending sessions that were generic in nature.

      2) Individuals who are not subjects, but who may have similar problems:
         They might be given the opportunity to participate in future faculty development programs developed using the Fusion Model of Instructional Design.

      3) Society in general:
         No specific benefit derived from research.

   b. State type, amount, method of disbursement, schedule of payment to be offered, and the effect of withdrawal from participation in the study, if any:
      No payments will be made to participants.

   c. Estimated costs to each subject due only to the research participation:

      1) Time (i.e., total time commitment for the duration of the project)
         A time commitment of about four hours will be required for each of the participants.

      2) Money
         There will be no monetary costs to the participants.

      3) Is repeated testing required? Explain:
         This is the initial pilot test of the model. Additional testing will occur in the future. However, no decision has been made on future testing dates or participants.

7. BASIS OF REQUEST FOR EXEMPTION - One of the following (A-E) must be checked.
A. The research will be conducted only in established or commonly accepted educational settings (like classrooms) AND it involves normal educational practices such as research on regular and special educational instructional strategies, or research on the effectiveness of, or the comparison among, instructional techniques, curricula or classroom management methods.

B. It will be conducted using only questionnaire or interview survey methods AND the subjects are elected or appointed public officials or candidates for public office.

C. It is limited to the collection and study of existing data, documents, records, pathological or diagnostic specimens which are available to the public.

D. It is limited to the collection and study of data obtained using only the following techniques AND the data or information obtained will be recorded in such a manner that subjects cannot be identified, directly or indirectly, through identifiers linked with the subjects:

Check the applicable technique(s):

   ____ The data will be obtained through the use of educational tests (cognitive, diagnostic, aptitude, achievement, etc.), or

   ____ Data will be obtained by observing the public behavior of subjects, or

   ____ Data will be obtained using survey or interview procedures, or

   ____ Data will be obtained from existing documents, records, pathological or diagnostic specimens.

E. It is limited to the collection and study of data obtained by:

   1. Observing the public behavior of the participants, or

   2. Using survey or interview procedures, AND:

BOTH OF THE FOLLOWING MUST BE CHECKED IF E-2 IS THE BASIS FOR THE REQUESTED EXEMPTION:

   ____ i) The information collected about the subjects behavior does not involve sensitive subjects such as illegal or immoral conduct, drug or alcohol use, sexual behavior, mental illness, or other possibly personally embarrassing subjects AND,

   ____ ii) The information collected about subjects, if it became known to outsiders, could not reasonably be expected to place the subject at risk of civil or criminal liability, or be damaging to the subjects social or financial standing or employability.

8. STATEMENT OF RISK:

The undersigned certify that they believe that the conduct of the above described research creates no risk of physical or emotional harm, or social or legal embarrassment to any participating human subject.
9. FACULTY SPONSOR (if a student is the principal investigator)

Signature of Faculty Sponsor  Date

10. RECOMMENDATION OF HSIRB COLLEGE REPRESENTATIVE OR HSIRB CHAIR:

I recommend that the above described research project be exempt from review.

Signature of Chairperson  Date  HSIRB PROTOCOL NUMBER 02280702AS

(Assigned by HSIRB)

The mailing or distribution of surveys or the collection of data may begin ONLY after this form has received committee approval (ALLOW 10 DAYS FOR PROCESSING) and has been properly filed with the College HSIRB representative or HSIRB Chairperson. It also must have signatures of the Principal Investigator(s) or Faculty Sponsor. The Committee may, upon review of this claim, deny the request for an exemption. To inquire about approved status, please call the HSIRB Chairperson.
VITA

Lori Cole Soule is the daughter of the late Mr. and Mrs. Odis E. Cole, Sr. of Raceland, Louisiana. Lori is a graduate of Central Lafourche High School and attended Nicholls State University (NSU) where she was awarded a Bachelor of Science degree in computer science. While working as a programmer, she began teaching adjunct classes at the local vocational-technical school, now known as L. E. Fletcher Community College. It was during this time, she discovered her true passion—teaching. As a result of her love of teaching, she pursued a master’s degree with the hope of attaining a permanent teaching position. She obtained a Master of Business Administration degree from NSU and began as an instructor in the Department of Mathematics and Computer Science. Having enjoyed the challenge of her coursework while pursuing her master’s degree, Lori decided to continue her education and pursue a doctoral degree. At the time her doctorate was conferred, Lori was still teaching at NSU and was looking forward to many more years of inquiring students.