Fall 1-6-2012

College Faculty Experiences with Technological Innovation: An Exploratory Case Study

Peggy A. Lumpkin
Georgia State University

ACCEPTANCE

This dissertation, COLLEGE FACULTY EXPERIENCES WITH TECHNOLOGICAL INNOVATION: AN EXPLORATORY CASE STUDY, by PEGGY ANN LUMPKIN, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree Doctor of Philosophy in the College of Education, Georgia State University.

The Dissertation Advisory Committee and the student's Department Chair, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty. The Dean of the College of Education concurs.

_____
Stephen W. Harmon, Ph.D.
Committee Chair

_____
Brendan Calandra, Ph.D.
Committee Member

_____
Wanjira Kinuthia, Ph.D.
Committee Member

_____
Jennifer Esposito, Ph.D.
Committee Member

_____
Date

_____
Dana L. Fox, Ph.D.
Chair, Department of Middle-Secondary Education and Instructional Technology

_____
R.W. Kamphaus, Ph.D.
Dean and Distinguished Research Professor
College of Education

AUTHOR'S STATEMENT

By presenting this dissertation as a partial fulfillment of the requirements for the advanced degree from Georgia State University, I agree that the library of Georgia State University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote, to copy from, or to publish this dissertation may be granted by the professor under whose direction it was written, by the College of Education's director of graduate studies and research, or by me. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this dissertation which involves potential financial gain will not be allowed without my written permission.

_____

Peggy Ann Lumpkin

NOTICE TO BORROWERS

All dissertations deposited in the Georgia State University library must be used in accordance with the stipulations prescribed by the author in the preceding statement. The author of this dissertation is:

Peggy Ann Lumpkin
1338 McLendon Ave. Apt 4
Atlanta, GA 30307

The director of this dissertation is:

Dr. Stephen W. Harmon
Department of Middle-Secondary Education and Instructional Technology
College of Education
Georgia State University
Atlanta, GA 30307 – 2057

VITA

PEGGY ANN LUMPKIN

ADDRESS: 1338 McLendon Ave.
Atlanta GA 30307

EDUCATION:

Ph.D.	2011	Georgia State University Instructional Technology
M.Ed.	1977	Case-Western Reserve University Vocational Rehabilitation Counseling
B.A.	1973	Case-Western Reserve University Psychology

PROFESSIONAL EXPERIENCE:

2002-Present	Teaching Assistant Research University, GA
2010-2010	Administrator and Trainer Georgia State Department of Community Health
2001-2002	Teaching Assistant, Instructional Technology for Teachers
2001-2002	Teacher, High School South Gwinnett High School, Snellville, GA

PROFESSIONAL SOCIETIES AND ORGANIZATIONS:

2006-Present	American Educational Research Association
2005-Present	Graduates in Instructional Technology Student Assoc.
2004-Present	Association for Educational Communication and Tech

PUBLICATION

Lumpkin, P. (2012). Facilitating diversity online. In R. Conrad and A. Donaldson (Eds.) *Continuing to Engage the Online Learner*, Jossey-Bass: San Francisco.

PRESENTATIONS:

Lumpkin, P. (2011). *University faculty experiences with technology innovations: An exploratory case study*. Paper presented at the meeting of the American Educational Research Association, New Orleans, LA

Lumpkin, P. (2005). *Tenure, promotion and review: Exploring guidelines for evaluating and counting technology related activities.* Paper presented at the meeting of Association for Educational Communications and Technology, Orlando, FL.

Lumpkin, P. (2004). *Counting technology integration in faculty tenure and promotion decisions.* Paper presented at the meeting of Association for Educational Communications and Technology, Chicago, IL.

ABSTRACT

COLLEGE FACULTY EXPERIENCES WITH TECHNOLOGICAL INNOVATION: AN EXPLORATORY CASE STUDY
by
Peggy Ann Lumpkin

This exploratory case study examined faculty members' experiences with the introduction of technological innovations. The introduction of LiveText, a web-based learning, assessment, and accreditation system, to a department in All Star Research University's (ASRU) College of Education was examined to explore how faculty members navigated this event. Teacher educators are role models for both current and future educators. Therefore their experiences matter as more technological innovations are incorporated in education at all levels.

Rogers's (1995) generalizations about the diffusion of innovations provided the conceptual framework for understanding the factors that influenced the adoption of LiveText as an innovation. A qualitative research approach was used to examine faculty members' experiences with the introduction of this technological innovation. Data collection methods combined questionnaires, in-depth interviews, and document reviews. Six participants were selected and interviewed about their experiences with the introduction of LiveText. Inductive methods were used to generate emergent themes based on analysis of the data collected from participants (Glaser & Strauss, 1967). Themes reflected the adoption process of LiveText in one department of ASRU's teacher education program. The primary themes revealed were a climate of accountability in teacher education, an initiating event, the acknowledgement of a need for change, the process of selecting a solution, communications, utilization, and an evaluation of whether

the chosen solutions fixed the problems that initiated their introduction. In addition, a new model, trigger, transition, utilization, and perceptions (TTU-P), was introduced to describe the adoption process. Experiences detailed in this case study will provide valuable insight for other groups in similar situations or circumstances.

COLLEGE FACULTY EXPERIENCES WITH TECHNOLOGICAL INNOVATION: AN EXPLORATORY CASE STUDY

by

Peggy Ann Lumpkin

A Dissertation

Presented in Partial Fulfillment of Requirements for the
Degree of
Doctor of Philosophy
in
The Department of Middle-Secondary Education and Instructional Technology
in
Instructional Technology
in
the College of Education
Georgia State University

Atlanta GA
2011

ACKNOWLEDGEMENTS

It truly took a village's help for me to finish this journey. Attaining the doctorate is the culmination of a childhood ambition. I thank my parents, Dorothy and Lincoln Lumpkin, who instilled in me a love of learning at an early age. A huge dictionary on a pedestal in the hallway of our home in Hubbard, Ohio, represented their respect for learning. My brothers, Ken and Gary, supported me through all of my challenges.

My committee, Dr. Steve Harmon, Dr. Wanjira Kinuthia, Dr. Brendan Calandra, and Dr. Jennifer Esposito, were fantastic as my mentors. Supportive faculty members throughout the college helped me in my journey.

Graduates in Instructional Technology Student Association (GrITS) were a lifeline and contributed to the richness of my academic journey. I appreciated opportunities to share my work individually and via our colloquia.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

ABBREVIATIONS

ACI	Adopter category innovativeness
AECT	Association for Educational Communications and Technology
ARCS	Attention getting, relevance, confidence building and satisfaction
ASRU	All Star Research University-pseudonym for research site
CBAM	Concerns-Based Adoption Model
IIS	Individual Innovativeness Scale
NCATE	National Council for Accreditation of Teacher Education
PIIT	Personal innovativeness in the domain of IT
TAM	Technology Acceptance Model

CHAPTER 1

INTRODUCTION

There is a call to action for faculty to use the same technologies and tools on higher education campuses that students use at home or will use in the workplace (CDW, 2009). Allsopp, Alvarez-McHatton, and Cranston-Gingras (2009) observed that teacher education programs have not kept pace with advances in technology across their curriculum. Therefore, an important goal in teacher education is to help pre-service teachers obtain technological skills and proficiency so they, in turn, can provide meaningful, technology-based learning experiences for their future students (Bai & Ertmer, 2008). Concluding that a majority of teacher education programs were not adequate in terms of preparing teachers to teach in 21st-century classrooms, the National Council for Accreditation of Teacher Education (NCATE) noted the importance of technology integration for teachers in developing standards for colleges of education. In addition, technology standards provided by the International Society for Technology in Education (ISTE) also impacts teacher education (Grabe & Grabe, 2004). Haymes (2008) recommends acknowledging the world view of technology adopters as a way of fostering increased diffusion of innovations. The challenge for implementing technology on campuses is to recognize how intimidating technology can be to new users (Haymes, 2008).

There is much discussion about integrating technology into the pedagogy of all disciplines in higher education (Georgina & Olson, 2008; Haymes, 2008; Kozma, 1978). Institutions of higher education are challenged with providing technology-enriched learning environments for multi-generational students. Students represent Prensky's (2001) "digital natives" (those who grew up using technology from childhood) and "digital immigrants" (those who were primarily introduced to current technological innovations as adults). The majority of students are using emerging Web 2.0 technologies such as social networking, text messaging and more in their private lives; however, many university faculty members are not incorporating these technologies to supplement traditional learning methods (Ajjan & Hartshorne, 2008). Faculty members' perceptions of their abilities to integrate technological innovation are critical to the adoption of technology in higher education (Allsopp, Alvarez McHatton, & Cranston-Gingras, 2009).

The motivation for doing this study stems from the researcher's experiences as an instructional technology support specialist in faculty development. Faculty members are supported in integrating Elluminate Live web conferencing and Blackboard learning management system applications in their curricula. Workshop and one-to-one training sessions were a challenge to faculty members as they learned to integrate technology to facilitate student learning. Staff involved with instructional support developed creative ways to influence faculty members to try various technological innovations. Haymes (2008) reported research that documents that faculty members were not as fascinated by, or as adept with, technology as were instructional technology staff. This discrepancy highlighted the need to explore faculty members' experiences with technological

innovations. The introduction of LiveText provided an occasion to explore technology adoption in All Star Research University's (ASRU) College of Education. Instructional support for LiveText was within the College of Education. This afforded an opportunity to study reactions to a previous innovation as experienced by faculty members who were current users.

Problem Statement

Methods to support, motivate, and equip faculty members with the skills necessary to adopt technological innovations are required in higher education (Keengwe, Kidd, & Kyei-Blankson, 2008). Since faculty members in higher education do not uniformly adopt university-implemented innovations in technology, it is important to explore what supports and what dissuades adoption of technology. Rogers (1995) states, "implementation occurs when an individual (or other decision-making unit) puts an innovation into use" (p. 172). Meanwhile, adoption is defined by Rogers as "a decision to make full use of an innovation as the best course of action available" (p. 21). If technology use on campuses is inadequate, careful decision-making is required during subsequent technology acquisition cycles to increase adoption rates for helpful technologies (Keengwe, Kidd, & Kyei-Blankson, 2008).

Context of the Problem

An understanding of the background and issues facing teacher educators provides a context for the problem. Paper-based portfolios in teacher-education programs have

traditionally been used to provide evidence of pre-service teachers' mastery of subject matter in their content areas. A portfolio is a purposeful collection of student work that demonstrates effort, progress and achievement which provides a more comprehensive picture of student performance than can be gained from more traditional, objective forms of assessment. Traditional standards-based portfolios were 3-ring notebooks, organized with dividers and sections for paper-based documents demonstrating each standard. Portfolios have been widely used in teacher education programs and are often used as formative assessments, exit requirements for their teacher education program, and entry requirements to the teaching profession (Berrill & Addison, 2010). Electronic portfolios use multimedia technology allowing students/teachers to collect and organize portfolio artifacts in many media types (audio, video, graphics, and text) with hypermedia links connecting that evidence to the appropriate standards. Teacher-education programs have begun to implement electronic versions of portfolios, or e-portfolios (Barrett, 1999; Wilhelm, et al., 2006). Samples of students' work are uploaded to digital platforms to create e-portfolios. Wilhelm et al. (2006) describe LiveText as well as Task Stream, a LiveText competitor, as customized systems (CS) for storing accreditation data. A CS uses a web-accessed database for the storage and retrieval of student assignment artifacts and faculty evaluation data. The institution configured a customized framework or structure for students to display their artifacts and link the content of student learning reflections, program goals, and evaluations to vendor-provided server space for storage and data retrieval. Since the processes were automated, minimal skills in uploading and linking information were required of end users (Wilhelm, et al., 2006).

E-portfolios are congruent with standards-based reforms in teacher education (Wilhelm, et al., 2006). Standards define what students should learn and therefore what teachers should teach. For instance, a math standard would specify a grade level and age to teach the multiplication tables. Benchmarks describe what should be done by students over several grade- level intervals to demonstrate a standard. Continuing with the math analogy, benchmarks would specify when to teach multiplication beginning at an elementary level to when to teach geometry in higher grades (Grabe & Grabe, 2004). Cochran-Smith (2008) notes unprecedented emphasis on teacher quality in the United States and in many nations around the world, with extremely high expectations for teachers' performance. It was presumed teachers can – and should – teach all students at world-class standards levels, serve as the linchpins in educational reforms of all kinds, and produce a well-qualified labor force to preserve the nation's position in the global economy (Cochran-Smith, 2008). Cochran-Smith traces the increased scrutiny on teacher education in the United States to the reauthorization of the Higher Education Act (HEA) in 1998. Title II provisions from this act stipulated numerous mandatory reporting and accountability requirements for teacher education. All states are required to provide evidence of the quality of teacher preparation to the federal government which leads in turn to institutions involved with teacher preparation providing states with evidence about the qualification of candidates recommended for certification (Cochran-Smith, 2008).

Shoffner, Dias, and Thomas (2001) also reference increased accountability in all aspects of K-12 education and teacher preparation with a focus on instructional technology. Accountability has led government agencies in the United States to allocate

funds to assist students and teachers to meet these standards. Instructional technology programs and teacher education programs collaborated with assistance from Preparing Tomorrow's Teachers to Use Technology (PT3) federally-funded grants. A PT3 grant funded a collaborative demonstration project between teacher education and instructional technology faculty members to improve technology integration in teacher preparation. Collaboration led to the integration of a stand-alone instructional technology course to be introduced early in pre-service teachers' coursework. Thus, by the time they finished their programs, there were plenty of opportunities to integrate technology in their content fields. A key component was a process of portfolio development and assessment.

> The portfolio is accepted in a variety of formats. Students may submit an electronic portfolio (on compact disc), a website, or a notebook for faculty review. The majority of students in program continue to favor the notebook version. (p.140)

Learner-centered e-portfolios serve three purposes: (a) learning systems for professional development, (b) platforms for formative and summative assessment, and (c) databases for employment portfolios (Hartnell-Young, 1999). With requirements mandated by NCATE and state accrediting boards for the systematic assessment of teacher candidates, institutions were quick to see the advantages that e-portfolio systems offered for tracking student attainment of standards. A fourth purpose for e-portfolios is accountability for accreditation (Barrett & Knezek, 2003). These were some of the events and issues facing ASRU faculty members around the time LiveText was introduced.

Purpose of the Study

The main purpose of this study was to explore ASRU faculty members' experiences with the introduction of LiveText as representative of technological innovations. The data and results from this study will help administration and technology professionals in their efforts to integrate technology and to understand the influences and hindrances that faculty encounter. The outcomes of this study may also help ensure a better targeting of scarce resources for faculty development for technological innovations.

Research Questions

Since the research problem concerned the faculty members' experiences with the adoption and implementation of technological innovations in higher education generally and teacher education specifically, the study addresses the following questions:

1. How do faculty members' experience a technological innovation process?
2. What are faculty members' experiences with LiveText as a technological innovation?

Conceptual Framework

Rogers's (1995) study of the diffusion of innovations serves as the primary theoretical lens for this study. In his research, Rogers explored (a) elements of adoption, (b) the innovation-decision process, (c) characteristics of adoption, and (d) categories of adopters of innovations. These concepts are foundational in every diffusion research study (Rogers, 1995). They are defined in the following paragraphs.

The elements of adoption are described as the innovation, communication channels, time, and the social system. An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 1995 p.11). A communication channel is the means of getting information from one person to another. Time, in the innovation decision process, refers to the period when an individual passes from knowing of an innovation to either adopting or rejecting it. Time is also relevant in the rate of adoption in a social system (see Figure 1). Social systems are defined as a set of interrelated individuals who are engaged in joint problem-solving to achieve a goal. Diffusion is defined as the process by which an innovation is communicated over time among members of a social system (Rogers, 1995, 10).

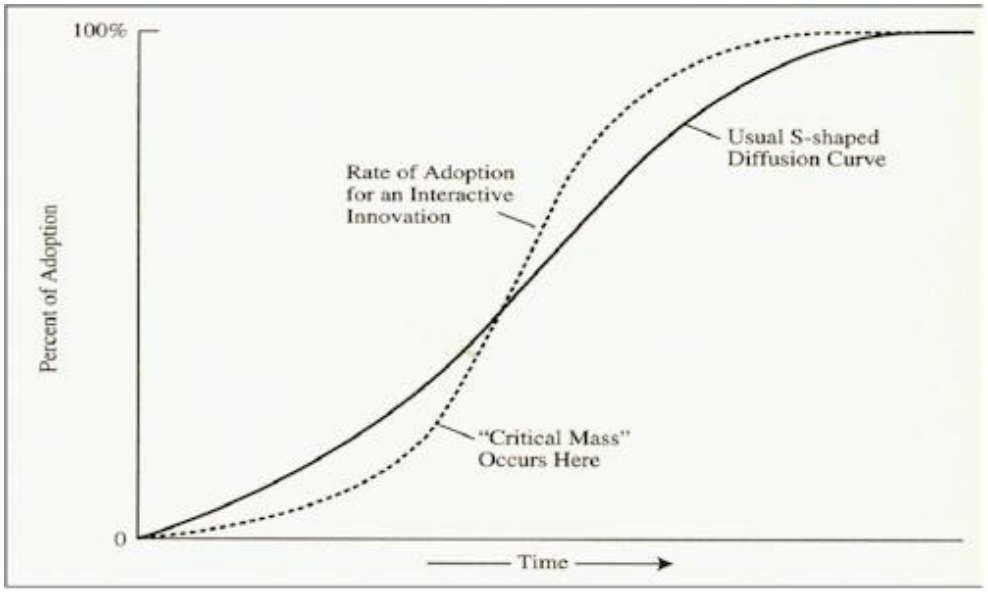


Figure1. Adoption and Diffusion

Figure 1 shows the percent of adoption over time. Five characteristics of innovation that affect the rate of adoption as reported by Rogers are: relative advantage, complexity, compatibility, triability, and observability. Relative advantage explains the degree to which an innovation is perceived as being better than a current application. Complexity indicates the degree to which an innovation is perceived as difficult to understand and use. Compatibility denotes the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. Trialability is the degree to which potential adopters may experiment with an innovation without fully committing to it. Observability is the degree to which the results of innovations are visible (Rogers & Shoemaker, 1971).

Other relevant concepts from Rogers's diffusion of innovations research are the five steps of the innovation-decision process: (a) knowledge, (b) persuasion, (c) decision, (d) implementation, and (e) confirmation. Knowledge occurs upon awareness of an innovation by an individual or group. Persuasion occurs when an individual or group forms any attitude towards an innovation. Decision refers to the activities that lead to the choice to adopt or reject an innovation. Implementation occurs when an individual or group places an innovation into use. Finally, confirmation refers to the stage at which an individual or group seeks reinforcement of an innovation-decision already made (Rogers, 1995).

Diffusion of innovation researchers noted the differences in earlier versus later adopters of an innovation. Based on this observation, individuals were categorized into five groups: innovators, early adopters, early majority, late majority, and laggards.

Innovators, the first 2.5 percent of a population who adopt a new technology, are described in the research as risk-takers who are willing to absorb high costs and uncertainties for the reward of being first to adopt new technologies. Early adopters, the next 13.5 percent to adopt, are those who find it easy to imagine, understand, and appreciate the benefits of new technologies, and can relate these potential benefits to their other concerns. Early majority are more likely than most of the population to adopt an innovation. Although rarely leaders, these people usually adopt new ideas before the average person and they represent 34 percent of individuals in a system to adopt an innovation. The late majority also represent 34 percent of individuals in a system to adopt an innovation. This group of people is skeptical of change and will adopt an innovation only after a majority has tried it. The laggards represent the final 16 percent of the individuals in a system to adopt an innovation. They are usually conscious about price, suspicious of change, tradition-bound, and conservative by nature (Rogers, 1995).

Technology definitions. Technology innovations are defined as either product innovations or idea innovations (Surry & Land, 2000). Product technologies include both hardware and software innovations. Examples include multimedia, authoring tools, internet, and computer capabilities, such as speed or storage space. Idea technologies "represent ways of conceptualizing the teaching, learning, and technology partnership" (Surry & Land, 2000, 146). The term technology represents both types of technological innovation as described above. Instructional technology is a theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning (Seels & Richey, 1994).

Technological innovations can be understood using the concepts of both individual diffusion of innovations and diffusion of innovations in organizations (Nworie & McGriff, 2001). What this means for faculty development is the need to provide a training support model that is tailored to individuals (Hartman, Dziuban, & Brophy-Ellison, 2007).

Models of adoption. Models of adoption provided assistance with a framework for the exploration of faculty experiences with technology adoption. One model of faculty and technology innovations is the Concerns-Based Adoption Model (CBAM) (Hall & Loucks, 1979). The Technology Acceptance Model (TAM) focuses on individual computer usage (Davis, et al., 1989). It explains that computer usage by individuals is due in part to perceived usefulness and perceived ease of use. Perceived usefulness is the probability, subjective to the user, that using a specific application system will increase his or her job performance within an organizational context. Meanwhile, perceived ease of use refers to whether the user views the innovation as free of effort (Davis, Bagozzi, & Warshaw, 1989).

Accreditation. In addition to teacher preparation, teacher education programs and colleges of education are required to maintain accreditation. NCATE is an independent accrediting body which determines whether teacher education programs obtain and maintain accreditation (NCATE, 2011).

LiveText. LiveText is a web-based learning, assessment, and accreditation system, which offers learning solutions for students, course management solutions for faculty, and a way for administrators to document compliance with accreditation standards. For

example, faculty can have their students create e-portfolios using LiveText. One innovation provided by LiveText is the integration of national and other standards like those created by intake NCATE which provides standards for institutions involved with professional teacher education. Colleges of education and teacher education programs are reviewed by NCATE to ensure standards are maintained.

The ability to integrate teaching and learning with applicable standards makes LiveText an attractive option for institutions of higher education. Johnson-Leslie (2007) provides an overview of her personal experiences with the College LiveText (CLT) edition and lists skills necessary to operate successfully in the application. These are:

1. Basic word- processing skills
2. Web browser navigation skills
3. Ability to access files on a computer
4. Proficiency with a personal computer

These comparisons to familiar technological applications seek to emphasize LiveText's ease of use for their end-users. Like other electronic portals, CLT enables the users to:

1. Create documents in CLT
2. Create and edit pages and sections of documents
3. Add text, images, and attachments to a document

Additional features important for accreditation but not available in other portals like BlackBoard.com, include but are not limited to, the following capabilities:

1. Sharing documents with other CLT users in a safe environment only accessible to selected users (not on the web)

2. Performing document review and assessment

3. Creating personal reports based on assessment data generated from LiveText (most important for NCATE reports)

For example, when some writes a lesson for ninth grade math, they select the standards that are to be addressed from a comprehensive list of standards in LiveText's database (Johnson-Leslie, 2007).

Significance of the Study

Knowing more about the end users of technological innovations will assist with overall technology planning. This research will add to the understanding of faculty experiences with technological innovations. Insights from this study will aid in understanding the process of integrating innovations in higher-education and teacher-education settings. Especially with the current downsizing of technology budgets (The Campus Computing Project, 2010) the diffusion and adoption of technological innovations requires careful planning.

Terms and Definitions

A definition of the following terms according to their use in this study is provided in order to aid in understanding the material.

Adopter categories - the groups of people who evidence different rates of adoption of innovations in a population, as developed by Rogers (1995). The categories are: innovators (risk-takers), early adopters (social leaders), early majority (deliberate), late majority (skeptical), and laggards (traditional).

Adoption - "a decision to make full use of an innovation as the best course of action available" (Rogers, 1995, p. 21).

Instructional Technology - the study and the ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (Januszewski & Molenda, 2008, p. 1)

Implementation – the process by which an individual (or other decision-making unit) put an innovation to use (Rogers, 1995, p. 172).

Innovation - "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1995, p 11).

Perception – a person's comprehension or judgment of an idea or object, influenced by the totality of generic knowledge structure-schemata, constructs information and beliefs (Parajes, 1992).

*Technological innovation*s- product technologies or idea technologies; product technologies are described as hardware and/or software innovations (i.e., multimedia, authoring tools, internet, and computer capabilities); idea technologies represent ways of conceptualizing the teaching, learning, and technology partnership and process (Surry & Land, 2000).

Summary

Technological innovations adopted in higher education are as diverse as the various needs of constituents involved in adopting them on campus (Lane & Yamashiro, 2008). Faculty members are an important segment of end users on campus as role models

for their students. Therefore, the selection of technological innovations, the implementation of those innovations, and the support for faculty integrating technological innovation are important to support and coordinate successfully. Money, time, and talent are all spent in the introduction and deployment of technological innovations (The Campus Computing Project, 2008). This study serves to add to the understanding of how faculty experience and navigate technological innovations by examining the introduction the LiveText application to a community of teacher educators.

CHAPTER 2

REVIEW OF THE LITERATURE

Technological innovations in higher education and in teacher preparation involve exploring multiple facets of innovation research. This literature review provided an examination of research on faculty adoption of LiveText as a technological innovation in a teacher education program. The review revealed that many studies relied on, or were based on, diffusion of innovations research and concepts introduced by Rogers (1995). Because they are based upon Rogers's research, studies tend to have a focus on specific concepts: elements in the diffusion of innovations, the decision process, the characteristics of innovations, and characteristics of adopters.

Topics covered by the review were technological innovations in higher education, teacher education and technological, innovation adoption and diffusion of innovation, motivations and barriers to technological innovation, organizational support for technological innovation, and innovativeness and measures of innovations. In addition, the review covers models of adoption and research dedicated to the study and creation of instruments to measure adaptability of individuals to technological innovations.

Technological Innovations in Higher Education

This section reviews studies that explore efforts to understand ways to facilitate faculty members as they adopt technological innovations. Researchers have often

questioned disparities in the adoption of technological innovations by faculty members in higher education. Kozma (1978) looked at faculty involved in a Faculty Fellowship Project designed to explore and support classroom innovations. This longitudinal study looked at faculty technology adoption over two years. Faculty completed a pre and post-questionnaire to measure the change in their adoption of new technologies after their participation in the project. The project was based on conceptual models and concepts of Rogers (1995), and Rogers and Shoemaker (1971), concerning the decision to adopt an innovation. The four steps they highlight in the decision making process are knowledge, persuasion, decision, and confirmation. The knowledge step occurs when a decision maker (individual or group) learns of an innovation's existence and gains more understanding of how it functions. Persuasion happens when an individual or group forms a favorable or unfavorable attitude about the innovation. Decision occurs when an individual or group takes action to adopt the innovation. Implementation occurs when the innovation was put into use. Finally, confirmation happens when the decision-maker seeks reinforcement for decisions already made. However, decisions can be reversed if conflicting information is acquired regarding an innovation (Rogers, 1995).

In addition, Kozma (1978) cites three of the five characteristics of innovation that affect the rate of adoption: relative advantage, complexity, and observability. Relative advantage explains the degree to which innovation is perceived as being better than a current application. Complexity indicates the degree to which an innovation is perceived as difficult to understand and use. Observability is the degree that the results of innovations are visible (Rogers & Shoemaker, 1971). Observation occurred during participated in weekly seminars and trainings on instructional technological innovations.

The researchers administered pre- and post-tests. Results showed an increase in technology use for faculty members in this project (Kozma, 1978). A comparison with faculty members, who were not involved in the project, indicated that the project's participants' use of technology was greater that non-participants. In this instance, the decision making process for the integration of technological innovation was decided by the scope of the project. The characteristics of innovations (relative advantage, complexity and observability) were expressed in the training provided to the participants. The project's success demonstrated the benefits of faculty development for technological innovations.

Other academic divisions were also the subject of technology innovations and faculty members in higher education. Academic libraries have experienced a number of technological innovations in recent years that served to improve access to resources and services. Starkweather and Wallin (1999) conducted focus group sessions and personal interviews with university faculty to discover their attitudes towards academic library technological innovations. The researchers contracted with a faculty colleague in the marketing department in order to conduct both the interviews and focus groups. A key part of the study was discerning whether a faculty member's level of adoption, as defined by Rogers (1995), impacted their use of the library for research and teaching. For example, faculty members classified within the late majority group appreciated the depth and breadth of the library's print collection more than those in the early majority. For the early majority, the electronic resources meant they were free from having to be physically in the library to use library resources. The researchers report similarities, as well as differences, among faculty with different adopter categories in terms of their use of

library technological innovations. The researchers recommend more qualitative research related to library technological innovations citing a lack of qualitative research compared to quantitative research about faculty adoption of technological innovations (Starkweather & Wallin, 1999).

Additional research on technological innovation focuses upon individuals involved in the decision-making process. Albright and Nworie (2008) suggest rethinking academic technology leadership in higher education. Their research explores the organization of academic technology services at 150 randomly selected institutions of higher education. Those selected included 50 institutions with a range of Carnegie degree granting designations (doctorate, masters, and baccalaureate degrees). Through an examination of campus websites and follow up e-mails, the researchers sought to identify a single individual with overall responsibility for instructional technology at each campus. The individuals selected had to meet specific criteria. Their study participants had to be responsible for just academic technology (e.g. not the institutional website or staff workstations), and administratively no lower than two levels below the Vice President (VP), or at the department head level reporting directly to the Chief Information Officer (CIO) if the CIO was at the VP level (Albright & Nworie, 2008). Based on these criteria, only 10 or 15 percent of the institutions surveyed employed individuals who met the criteria as outlined. Albright and Nworie (2008) were concerned because other non-academic departments like the library, student affairs, and athletics have dedicated director or deans. The researchers suggest the position of Senior Academic Technology Officer (SATO) for instructional technology leadership and direction at higher education institutions. While there are similarities between CIOs and SATOs, SATOs would

dedicate their efforts to the appropriate adoption of instructional technology and lead integration of technology for teaching and learning on campuses.

Another approach involves shifting the focus in making technological innovation adoption to include more participants from different units of the institution in the decision process. Lane and Yamashiro (2008) adapted the University of Wisconsin-Madison's (UWM) annual technology surveys for students and faculty for their research on adoption decisions. The university used data from technology surveys to make informed decisions about acquiring technology that meets the needs of the university community. These surveys were used to make evidenced-based decisions about acquiring technological innovations on campus that met the needs of the university community. In 2005, the researchers added focus groups. The focus groups served to add additional qualitative information about the adoption and use of technology that went beyond the open ended questions on the survey (Lane & Yamashiro, 2008).

Lane and Yamashiro (2008) realized that, in their 2005 study, they failed to explore how or why individuals did (or did not use) specific technological innovations. For their 2008 survey, the researchers added questions that focused on the context or situations that the technological innovations were used (e.g. small lectures, to cultivate community on campus or research). As important as the survey was the collaboration of partners from the offices of Office of Educational Partnership and Learning Technologies, Computing and Communications, UW Libraries, the Office of Educational Assessment, Classroom Support Services, Educational Outreach, and the Student Technology Fee Committee (Lane & Yamashiro, 2008). These partners worked as a team to support various aspects of technology on campus. Representatives of these units were

responsible for research decisions and writing survey questions. This experience highlighted a broader and more inclusive model of adopting technological innovations with a broader range of stake holders involved in decision-making.

Baltaci-Goktalay and Ocak (2006) researched online technology in higher education. Their research uncovered an increased frequency of individual users influencing technology adoption on campus. This "bottom up" approach supported greater rates of technology adoption than a "top down" approach in which administrators made technology adoption decisions based on their perceptions and strategies. Their research explored how technology influenced pedagogy and presentation styles of faculty members. They defined pedagogy as instructional design and strategies that an educator would use to deliver their course content. Presentation style refers to the medium used to present course material. An adoption of a new technology leads to a new or modified pedagogy which leads to a new or modified presentation style (Baltaci-Goktalay & Ocak, 2006)

Teacher Education and Technological Innovation

Faculty members in teacher education programs faced similar issues as other faculty members in higher education as they adopted technological innovations. Allsopp, Alvarez-McHatton and Cranston-Gringras (2009) pointed to systematic efforts to integrate technology in K-12 education. Laptop initiatives provided students in K-12 with access to wireless computing and an array of applications, both software and hardware, from Microsoft and Apple. However, teacher education programs were slower to integrate technology across the curriculum. Often students were offered a single three-

hour stand-alone technology course. Focusing on a one-to-one laptop initiative in a special education undergraduate teacher education course, the researchers sought to increase understanding of the process of technology integration. Research questions concerned both pre-service teachers' perceptions of the proficiency with integrating technology, as well as pre-service teacher's perception of their faculty's integration of technology. Pre-service teachers increased their perception of their ability to use technology as a result of having their faculty and field supervisors as role models for technology integration. Pre-service teachers' perceptions of faculty uses of technology were shown to influence how they anticipated using technology in their classrooms (Allsopp, et al., 2009).

Perceptions, attitudes, and opinions are important when dealing with technology integration for both pre-service teachers and teacher educators. Bai and Ertmer (2008) explored the influence of beliefs, attitudes, and perceptions about technology as an influence on pre-service teachers' technology adoption. Teacher educators' beliefs, attitudes, and perceptions about technology integration, as well as their current use of technology, in instruction were also explored. (Bai & Ertmer, 2008). Both groups completed pre and-post surveys at the beginning and end of spring semester. Analysis of the data revealed a strong influence on pre-service teachers' attitudes towards technology integration was provided by a stand-alone course on technology integration. The course received positive reviews from pre-service participants because it taught them how to integrate computer technology into their classrooms and to appreciate the importance and usefulness of technology in the classroom. Meanwhile, another course was about examining the meaning of teaching, learning, and the work of teachers and a third course

explored multiculturalism in relation to pedagogical issues. Post-survey results showed students increased their understanding of the subjects taught in those courses. They did not increase their beliefs in their ability to integrate technology in their classrooms. Specificity of course goals and objectives was demonstrated to be important for all courses.

Snider (Spring 2002), a teacher educator at Texas Women's University, examined the integration of technology into the pre-service teacher education curriculum. The research was funded through the federally-funded PT3 program. The study addressed two significant barriers to the integration of educational technology: in-service teacher resistance and faculty inexperience. The researcher evaluated how the Learning and Integrating New Knowledge and Skills (LINKS) project prepared and supported the technology integration of pre-service teachers, their mentors, and university professors. Such a unified and consistent focus resulted in the increased efficacy of pre-service teachers with technology integration. The methodology used evaluation measures from the Concerns-Based Adoption Model (CBAM). These included questionnaires dealing with self-evaluation, technology concerns, and training evaluations (Snider, 2002).

Accreditation and standards. McAlpine and Dhonau (2007) coined the term "NCATEing" for what they described as creating a culture for an NCATE visit. They reported the experiences of a foreign language teacher education program's first NCATE visit. The lessons learned were the importance of preparing faculty for the visit by educating them about the process of the NCATE review. An important activity was gathering the documentation required by NCATE to demonstrate that the program met NCATE standards. This meant providing a method for students to archive their work for

easy retrieval and review. Chalk and Wire (2011) was selected for the task of archiving documentation for NCATE and as an online e-portfolio system. Students participating in the foreign language program were required to purchase a license for the use of the e-portfolio system. The system permitted students to create professional e-portfolios that benefitted them in their search for employment. Faculty members upload rubrics designed to assess program standards and designed assessments that demonstrated that standards were met.

With the increased use of online accreditation and e-portfolio systems, Wilhelm et al. (2006) compared the implementation of e-portfolio systems at three universities. The e-portfolios systems were Taskstream (2011). LiveText (2011), and an "in-house" locally created system. Both Taskstream and LiveText were described as customized systems (CS) that used a web based database for the storage and retrieval of student artifacts, faculty accreditation, and evaluation data (Wilhelm, et al., 2006). The third university used a general tools (GT) system of word processing software, multimedia authoring tools, and portable document format (.pdf), to create artifacts. Artifacts were stored on CDs, disk drives, or online space provided by the university. The researchers discovered that no one solution fit all the needs of departments across the universities studied. Taskstream and LiveText had an advantage over the GT system because of their archival capacity. From the experiences of these e-portfolio adopters, the researches offered the following recommendations:

1. Choose a vendor that is an appropriate fit with the university infrastructure, faculty goals, and the college pricing structure. Most vendors do an adequate job of archiving data.
2. Be aware that one person (faculty, staff or other) may need to be assigned a "go to" role for faculty training and ongoing development.

3. As e-portfolios are implemented, carve out some time for faculty to revisit program matrices and refine the data collection process.
4. Do not expect the e-portfolio process to be embraced by all departments initially. Allow uneven initial implementation.
5. Begin with departments that hold an interest in the process, gradually inviting others to join. (Wilhelm, et al., 2006, p. 70).

NCATE determined in 1997 that the majority of teacher education programs were not effectively preparing teachers to use technology in the classroom (Shoffner, Dias & Thomas, 2001). NCATE recommended that technology education be central to the teacher preparation process (Shoffner, et al., 2001). In 2000, the International Society for Technology in Education (ISTE) published National Educational Technology Standards for Teachers (NETS-T). This increased call for technology integration in teacher preparation programs was eventually translated to the state and university level. Shoffner et al. (2001) describes their state university system's requirement for all new and re-certified teachers to demonstrate computer competency skills. In response, their instructional technology department and one of the K-12 departments involved with initial and continued certification of teachers in the College of Education established a collaborative to meet the new expectations. Some of the work involved in developing standards originated with Elam's (1971) description of performance-based teacher education (PBTE). A report to the American Association of Colleges for Teacher Education Features (AACTE) on PBTE referenced competency based assessments for teachers with specific mastery levels made known to students in advance. A brief description of the levels follows:

1. Competencies to be demonstrated by students are stated so as to make possible assessment of a student's behavior in relation to specific competencies.
2. Criteria to be employed in assessing competencies are explicit in stating expected levels of mastery under specific conditions.
3. Assessment of a student's competency takes into account evidence of the student's knowledge relevant o planning for, analyzing, interpreting, or evaluating situations or behavior.
4. A student's rate of progress through a program is determined by demonstrated competency rather than by time of course completion.
5. An instructional program is intended to facilitate the development and evaluation of a student's achievement of competencies specified.

PBTE works best when learning objectives can be measured in behavioral terms. Field placement, portfolio development, and role-plays represent facets of PBTE. Pressure to implement PBTE originated from state departments of education, professional societies and public schools. PBTE became one of the tools for achieving accountability in teacher education (Elam, 1971).

Adoption and Diffusion of Innovations.

Rogers's (1995) diffusion of innovations research forms the foundation that has propelled adoption and diffusion research since his early studies. Through his research, he identifies the influences and possible barriers to diffusion that increase the rate of success in the adoption of innovations. Rogers (1995) defines diffusion as the process by

which an innovation is communicated through certain channels over time among the members of a social system. The diffusion model focuses on how an innovation is communicated. Rogers explains four elements: innovation, communication, time and the social system. These elements are identifiable in diffusion research that has followed in the years since Rogers's original research.

The adoption of technological innovations has had an important impact on teaching and learning experiences on campuses. However, not all faculty members are at the same level when it comes to being innovative relative to technology. Rogers (1995) developed, as part of his conceptual framework for explaining the differences in adoption patterns, five adopter categories: innovators, early adopters, early majority, late majority, and laggards. Hartman, Dziuban, and Brophy-Ellison (2007) summarize the adopter categories by defining innovators as pioneers and visionaries who introduce innovations to an organization. Early adopters, after observing innovators, begin to adopt and move the innovation into the mainstream use. As use of an innovation is proven as reliable and relevant, early and late majority begin to adopt the innovation. Meanwhile, the laggards remain relatively unwilling to adopt the new innovation. These adopter categories are presented as ideal types for purposes of easier comparison when explaining the differences between adopters of technological innovation. Figure 2 illustrates the normal distribution of Rogers's adopter categories. Rogers's concepts have provided fertile ground for numerous studies on technological innovation in higher education.

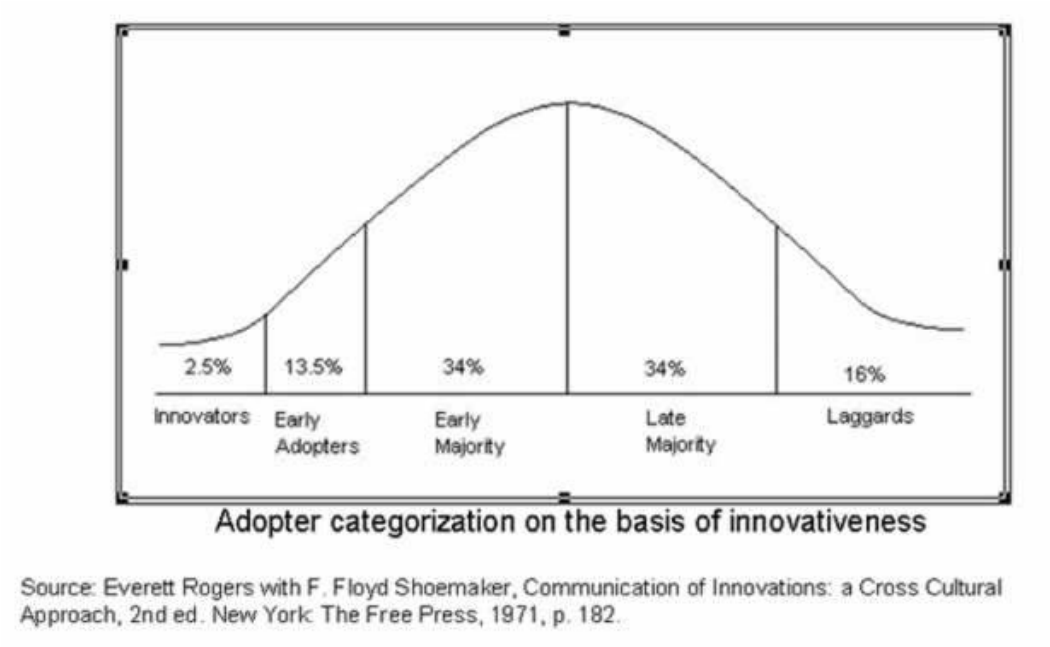


Figure 2. Distribution of Adopter Categories

Models of adoption. Other models of adoption relevant to this population were the CBAM (Hall & Loucks, 1979) and TAM (Davis, et al., 1989) described briefly in Chapter One. The CBAM describes seven levels of concern as teachers adopted a new practice. This CBAM's seven levels explain a developmental process of individuals' investment in innovations. These levels are illustrated in Figure 3. Adams (2002) examines technology driven changes involving post-secondary faculty using the CBAM as part of the study's conceptual framework. The study investigates the degree to which attendance at faculty development programs correspond to technology use in teaching practice about three years into the change process.

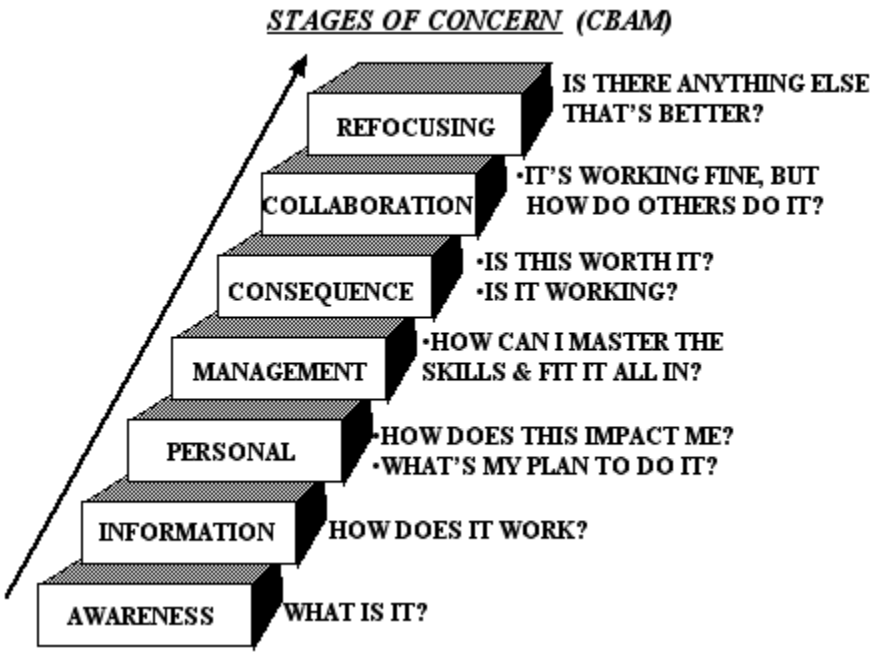
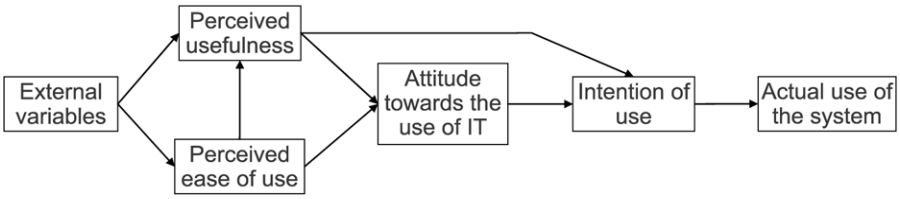


Figure 3. Concerns-Based Adoption Model

1. Awareness - Little concern about or involvement with the innovation.
2. Informational – A general awareness of the innovation and interest in learning more detail about the innovation.
3. Personal – Individual is uncertain about the impact of using the innovation.
4. Management – Attention is focused on the processes and the tasks of using the innovation.
5. Consequence – Individual is concerned about the impact of the change.
6. Collaboration – The focus is on coordination and cooperation with others regarding the use of the innovation.
7. Refocusing – The focus is on improvement of innovation.



Source: Davis *et al*. (1989)

Figure 4. Technology Acceptance Model Diagram

The results mirror Rogers's adopter categories with the types of participants involved in faculty developed. The researchers reportedly regret that they did not study the non-users beyond recording their numbers (Adams, 2002).

The Technology Acceptance Model (TAM), focuses on individual computer usage (Davis, et al., 1989). The diagram in Figure 4 illustrates the TAM. Computer usage by individuals is due in part to perceived ease of and perceived usefulness, of the technology. Perceived usefulness is the prospective user's subjective probability that using a specific innovation will increase his or her job performance within an organizational context. On the other hand, perceived ease of use refers to whether users view the innovation as free of effort (Davis, Bagozzi, & Warshaw, 1989).

Motivations and Barriers to Technological Innovation Adoption

Successful technological innovation integration works when the motivations and barriers experienced by faculty are understood and considered when structuring faculty development programs. Surry and Land (2000) study the motivations and barriers to faculty use of technological innovations in order to explore concerns about the low use of such innovations for instruction in higher education. Their review of research technology integration points to biases toward "technological determinism," meaning that providing technology is sufficient, when combined with minimal support, to ensure change in the

adoption of technological innovations (Surry & Land, 2000). However, greater access to technology on campuses had not resulted in greater of technology in the classrooms. Surry and Land (2000) urge administrators to consider the concept of individual adaptability in developing strategies to increase faculty involvement with technological innovations. According to the researchers, change viewed from the individuals' perspectives was grounded in instrumentalist theories. These theories propose that adoption and utilization of technological innovations are individualized and contextualized processes. Ultimately, faculty adoption of technological innovation depends on faculty buy-in. Strategies for individual adopters were informed by Keller's (1983) Model of Motivation with its categories of Attention Getting (increased curiosity and arousal), Relevance (fulfillment of important personal needs), Confidence Building (increased expectancy for success), and Satisfaction (attainment of intrinsic and extrinsic rewards) ARCS. Surry and Land (2000) have devised motivational strategies for each adopter category for every level of Keller's ARCS model. For instance, an attention gaining might include offering rewards to faculty members who integrate new technologies.

The addition of technological innovations in higher education represents a change for both the institution and for individuals in the institution. Ertmer (1999) describes first-order barriers as obstacles extrinsic to educators, usually described in terms of resources like equipment, time, training, and support that are inadequately provided. Since these barriers are usually easier to measure and address (e.g. allocate money), early integration efforts focus on eliminating these barriers (Ertmer, 1999). Often the assumptions were that once hardware and other resources were in place; technology integration would

follow. Ertmer (1999) reports second-order barriers rooted in educators' underlying beliefs about teaching and learning. Such beliefs are usually not apparent to others and often not apparent to the individuals themselves. While there are methods to overcome second-order barriers (e.g. modeling of best practices with technology, reflection, and collaboration) the awareness that successful technology integration requires more than access to applications is an important consideration when planning for technology adoption.

Maguire (2005) conducted a literature review to explore faculty member's barriers and motivators for participation in online distance education. The review focused on thirteen studies, most of them employing surveys using a quantitative method of data collection. Some of the surveys had open-ended questions that permitted a qualitative aspect to the studies. Results reveal extrinsic motivators that are either institutional or administrative. Institutional motivators are those perceived by faculty members as the institution's ability or power to alter procedures to meet the needs of the faculty members. These include technical support, recognition for online efforts, credit toward tenure and promotion, and monetary rewards (stipends, continuing education, overload pay, or increased salaries). Faculty members' uses of distance education face both intrinsic and extrinsic inhibitors. Faculty members are resistant to change and were intimidated by technology. Extrinsic inhibitors include concerns about the quality of online teaching, misinformation found on the Internet, a decrease in interaction with students, and concerns about whether technology enhanced or detracted from instruction and student learning. There were additional concerns over issues related to copyright and intellectual property, reliable equipment, lack of technical support, and training,

(Maguire, 2005). These extrinsic inhibitors may be alleviated by experience and/or education provided by an institution's faculty development program.

Mitchell (1999) opts for the implementation of distance education programs to explore faculty members' motivation to participate in this specific technological innovation. A survey was conducted using a sample of both faculty and administrators. Both intrinsic and extrinsic motivators were found to be important to faculty. There were differences in the perceptions of motivators between administrators and faculty. Faculty valued time and support to create and deliver distance education. However, administrators and the institution rewarded research, traditional teaching methods, and the number of students in the classroom. The researcher suggests faculty and administrators work to devise a solution that fosters both intrinsic and extrinsic rewards for faculty engaged in distance education.

Groves and Zemel (Ali, 2003; 2000) survey university faculty responsible for the training of future teachers to discover their rewards and challenges with technological innovations. Their survey asks faculty to document the reasons they chose to use some technologies and not others. Participants check off possible motivations for adopting a technology (e.g. ease of use, adds to teaching) or check off barriers (e.g. lack of time, not enough technical support) that limit or stop their adoption of other technological innovations. Results show that faculty members are more comfortable with familiar technology like word processing. Adopting new technologies require the same level support supplied to faculty members when current technology was first introduced. The researchers created a website with training resources. The resources are added as needed to support training of newly introduced applications.

Researchers continue to explore the motivations and barriers to technological innovation adoption in higher education. Nicolle and Lou (2008) cite the increasing acquisition and implementation of technological innovations for teaching and learning as an impetus for their mixed methods study on the motivations and barriers to technological innovations adoption. A survey sent to 733 faculty members from the colleges of art and sciences, basic sciences, and education at a Research I university formed the quantitative portion of their study (Nicolle & Lou, 2008). This research focuses on mainstream faculty members' adoption of technological innovations. The study explored institutional assumptions that non-diffusion of technological innovations is the fault of later adopters. Rogers (1995) notes that the perception of stereotypes can be a self-fulfilling prophecy. Change agents do not contact non-adopters due to the assumption that they would not be interested. Without inputs and assistance, later adopters are even less likely to adopt (Nicolle & Lou, 2008). An analysis (Gall, Borg & Gall as cited in Nicolle & Lou, 2008) performed on the interview data reveals constructs, themes, and patterns. The overall themes indicate the importance of both institutional and peer support to mainstream faculty members.

Ali (2003) studied efforts to help faculty integrate technology into their teaching, making note of training experiences and conducting interviews with selected faculty members. The researcher examined the faculty perceptions regarding technology and its adoption into the educational setting. Suggestions for improvement emphasize a need for greater institutional support and administrative backing for faculty, employment of technology assistants, and allowing greater flexibility in instructional styles and curriculum to cater to individual needs and concerns. Ali (2003) observes that the use of

technology by faculty at colleges, though increasing, is not widespread. Many faculty members lack opportunity, training, or motivation to use technology. Most importantly, according to this researcher, focus should be on training faculty first and not providing technology first (Ali, 2003).

Some research studies the diffusion and adoption of innovation by studying the deployment of one application or system. Hanson and Salter (2001) research diffusion and adoption through a case study of the planning and implementation of a web-based software application called "Platform Web." Platform Web is a web-based content delivery system merged with an administrative software system (a web portal). The researchers had been on the Platform Web development team from The University of Western Sydney's Department of Computing and Information Systems. Integrated, these usually distinct teaching and administrative systems achieve economies of scale (Hansen & Salter, 2001).

One study seeks to understand the technological and pedagogical requirements to prepare education faculty for the paradigm shift envisioned by leading educators and driven by information technology. Lan's (2001) study is a systematic assessment of faculty needs for the incorporation of web-based instruction into the teacher education curriculum. The needs assessment model involves defining optimal performance, assessing actual practice, and identifying the gap separating the two. The four variables of the study are: environment, innovation, motivation, and skill or knowledge. The study supports the concepts that flexible, multifaceted, and meaningful training would encourage and enable mass participation in technology integration. According to this

study, the success or failure of an innovation rests ultimately on the people who implement it (Lan, 2001).

Schifter (2000) modifies and distributes a survey to full-time faculty, deans, and senior administrators to explore both motivational and inhibiting factors to using technological innovations at an urban, Research I, state institution to determine how faculty members view participation in distance education. The top motivating factor is revealed to be personal motivation and the top inhibiting factor was a lack of technical support. Another inhibitor is the belief that the technology is not supported by the institution, which caused faculty to believe the technology to be unstable and students to believe that they will not receive technical assistance. Schifter recommends that learning opportunities be provided to faculty, but cautions that not all faculty members need the same learning experience (Schifter, 2000).

Organizational Support for Technological innovations

In addition to research focused on faculty as individual adopters, there are other studies focused on both organizational support for and individual faculty adoption of technological innovations. Surry and Land (2000) point to technology as a tool for higher education reform given the challenges currently facing institutions. These challenges include aging facilities, non-traditional students, decreased enrollments, and decreased government funding. Administrators see technology as cost-effective and innovative solutions for these challenges. Part of the solution involves providing faculty greater access to technological innovations. Except for a relatively few instances of creativity, greater faculty access to technology does not translate to greater utilization of technology

(Surry & Land, 2000). Greater utilization results from implementation of a system of attention getting, relevance, confidence building and satisfaction (ARCS) (Keller, 1983). The ARCS Model of Motivation provides a framework for strategies to motivate faculty to increase technology use. Surry and Land (2000) created four sets of motivational strategies to solve technology problems. For example, if faculty members are unaware of a technology, a showcase featuring an application of the technology gains faculty attention and increases curiosity about incorporating the technology (Surry & Land, 2000). Specific examples include a campus wide conference or peer demos.

Chief Academic Officers (O'Meara, 2005) and education administrators Marchant and Newman (1994) were surveyed about the importance of merit pay, contract renewal, and tenure and promotion as motivators in faculty evaluation and reward structures. Faculty endeavoring to integrate technological innovations for teaching, learning, and research are doing so within parameters may hinder or encourage their efforts. Relevant to this study is the finding about the importance of external pressures from accreditation agencies in influencing faculty behaviors.

Huber (2002) provides examples of faculty being innovative in balancing teaching and research while incorporating new media. Institutions support faculty adoption of technology by providing training. In addition, broadening the scope of what is considered a part of scholarship fosters an environment that allows for exploration of technological innovations. Hartman, Dziuban, and Brophy-Ellman (2007) point out that faculty did not enter academia for a love of technology or for their willingness to be involved in rapid change. Faculty development is then tasked with the need to provide a systems approach that avoids a one size fits all solution. Each population of adopters requires a different

approach (Hartman, Dziuban, & Brophy-Ellison, 2007). The authors caution that "bolting on" technology results in modest improvement in faculty utilization of technology. They suggest that higher education institutions design a process that emphasizes the enabling capabilities of technologies to provide benefits to the greatest number of faculty members (Hart, Dziuban & Brophy-Ellison, 2007).

Change dynamics offer an additional lens to view technological innovations implementation in higher education. Owen (2004) used case study methods to explore technological innovations at a community college. In-depth interviews were conducted with administrators, faculty, and students about technology implementations. The following themes emerged, and were coded and analyzed: (a) turbulence, (b) tension, (c) planning, (d) implement, (e) barriers, and (f) culture. The themes describe the impact on faculty, students, funding and support of introducing technology to the campus. Anxiety is generated from trying to keep pace with the unpredictable changes in the availability and capability of new technology. Meanwhile, users experience frustration from trying to stay current with new software and hardware (Owen and Demb, 2004).

While many researchers study barriers to adoption, other researchers explore facilitative factors for successful implementations of innovations. Surry and Ely (2002) discuss eight facilitative conditions which are all or partly involved in all successful implementations of innovations. These conditions are (a) dissatisfaction with the status quo, (b) knowledge and skills exist, (c) availability of resources, (d) availability of time, (e) rewards or incentives exist, (f) participation, (g) commitment, and (h) leadership. Besides the eight facilitative conditions, the importance of the innovation itself and the setting for the innovation influences the degree to which the conditions are evident (Surry

& Ely, 2002). In addition to Rogers's adopter categories, Surry and Ely (2002) explain Rogers's five-stage innovation-decision model (a) knowledge (awareness and understanding), (b) persuasion (forming of a positive or negative view), (c) decisions (adopt or reject), (d) implementation (use), and (e) confirmation (use information to continue or discontinue use).

Innovativeness and Measures of Innovativeness

Innovativeness. Research on innovations adoption also focuses on individual innovativeness and methods of measuring innovativeness. Innovativeness is described as the degree to which an individual or other unit of adoption is earlier in adopting new ideas than other members of the system (Rogers, 1995). Personality variables (e.g. cognitive style) have been used in psychology as predictors of human beliefs and behaviors. (Davis, Bagozzi, & Warshaw, 1989). Rogers and Shoemaker (1971) find innovativeness to be a normally distributed one-dimensional characteristic in a given population. Kirton and Mulligan (1969) and Jacoby (1971) demonstrate strong relationships between innovativeness and personality traits that are also normally distributed. The normal distribution of innovativeness, similar to other personality traits, lead Hurt, Joseph and Cook (1977) to measure innovativeness using self-report techniques. This has led to the development of their Individual Innovativeness Scale (Hurt, et al., 1977). This scale is administered to participants to determine their adopter categories.

*Measures of innovativeness***.** Generally paralleling the study of innovativeness has been the study of ways to measure innovativeness. Individuals, as Rogers (1995) notes, vary in their speed of adoption of technological innovations. Davis (Davis, Bagozzi, & Warshaw, 1989)(1986) with the TAM deals with the prediction of the acceptability of a technological innovation system. Hurt, Joseph, and Cook (1977) first seek to define innovativeness and then to determine how to measure innovativeness in the development of their Individual Innovativeness Scale (see Appendix A). One definition of innovativeness is the degree to which an individual is relatively early in adopting new ideas compared to others in his social system (Rogers & Shoemaker, 1971). Hurt, Joseph, and Cook (1977) note that the work of Rogers and Shoemaker (1971) finds innovativeness to be a normally distributed one-dimensional characteristic in a given population. Research by Kirton and Mulligan (1969) and Jacoby (1971) demonstrates strong relationships between innovativeness and personality traits that are also normally distributed. The normal distribution of innovativeness, similar to other personality traits, leads Hurt, Joseph and Cook (1977) to measure innovativeness. Another important point for the researchers is that it also allows for self-report procedures that would predict innovativeness. The researchers created an initial pool of 53 items based on the innovativeness categories described by Rogers and Shoemaker (1971). The items were administered to 231 college students and 431 public school teachers in the United States. Using factor analysis, the final 20 item instrument was developed. Construct validity was shown by their instrument segmenting the participants into a similar distribution of adopter categories as was seen in research by Rogers and Shoemaker (1971). This finding makes this instrument a valid measure of individual innovativeness.

Pallister and Foxall (1998) performed an appraisal of the Hurt, Joseph and Cook's (1977) Individual Innovativeness Scale. Hurt, Joseph and Cook's scale was developed with 231 US college students and 431 U.S. public school teachers. Pallister and Foxall assessed the Individual Innovativeness Scale with 308 British consumers. The scales were demonstrated to have reliability and discriminant validity. Reliability means that scores on an instrument are nearly the same on repeated administrations of the instrument (Creswell, 2005). Discriminant validity correlates the scores of an instrument statistically with other instruments or scales (Creswell, 2005) based on whether the instrument being compared measures the same or different factors. Discriminant validity of the Individual Innovativeness Scale was then established with scales by Zaichkowsky (1987) and Mittal (1989). The scales of Zaichkowsky (1987) and Mittal (1989) were developed based on the study of consumer purchase involvement. Pallister and Foxall (1998) concluded that the Individual Innovativeness Scale did not measure purchase involvement, but did measure innovativeness.

Agarwal and Prasad (1998) have developed a scale specific to information technology called the personal innovativeness in the domain of IT (PIIT) and defined as "the willingness of an individual to try out any new information technology (p. 206). Rather than measure distinct adopter categories, the PIIT uses a Likert Scale to measure innovativeness on a continuum.

Yi, Fiedler and Park (2006) have developed another scale based on Rogers's adopter categories called Adopter Category Innovativeness (ACI). This scale is designed to capture an individual's predisposition to try a new technology. The ACI is then compared with the PIIT with the adoption of process innovation of online shopping and a

product innovation of a personal digital assistant. The ACI represents a new scale to map individuals into adopter categories. Similar to the Technology Acceptance Model (TAM), discussed in the next section, the ACI study also notes the importance of usefulness and ease of use.

All three studies reviewed above have a common theme suggesting that those responsible for overseeing the adoption process of technological innovations devise different strategies to improve the chances of individuals adopting technological innovations. This study focuses on LiveText as a representation of technological innovations and examines the experiences of faculty in one college in All-Star University. The relevance of adopter categories is a part of the data to emerge from this study.

Summary

This literature review covers Rogers's adoption and diffusion of innovations theories as well as the CBAM, TAM, and Keller's ARCS models related to individuals and the adoption of technological innovations. These models provide conceptual frameworks for analyzing data collected for this study. The review of the literature relates to faculty and individual innovativeness, faculty barriers and motivations during process adoption of technological innovations, faculty development and support, and reveals a need for understanding individual reason for the both the adoption and non-adoption of technological innovations in higher education. Starkweather and Wallin's (1999) research explores similarities and differences between earlier and later adopters' use of academic library technological innovations. Jacobsen (1998) and Nicolle and Lou (2008) focus on

later adopters or mainstream adopters. Surry and Land (2000) urge administrative consideration of individual innovativeness in developing strategies for faculty adoption of technological innovations. Ertmer (1999) explores motivations and barriers to technology adoption for teacher educators. Finally, methods of measuring individual innovativeness are covered and inform the researcher of methods to measure the innovativeness categorized by Rogers (1995). This exploratory case study seeks to add to previous research about faculty experiences with technological innovations by examining the adoption of LiveText as an example. The next chapter covers the design, data collection and data analysis plans for this study.

CHAPTER 3

METHODOLOGY

This case study explores faculty member's experiences with the adoption of technological innovations in a College of Education at ASRU. LiveText, an accreditation and assessment tool, was chosen as the technological innovation. This chapter summarizes the procedures that are used in this study to address the research questions outlined below:

1. How do faculty members experience a technological innovation process?
2. What are faculty experiences with LiveText as a technological innovation?

Methodology-Case Study.

A case study, as "an intensive, holistic description and analysis of a single instance, phenomenon, or social unit" (Merriam, 1998, p. 21) was chosen for this study as the most appropriate means of exploring faculty members' perceptions, beliefs, and experiences of technological innovation adoption. Patton (2002) suggests that a case study should take a reader into a situation, a person's life, a group's life or a program's life. Case studies are a category of qualitative naturalistic inquiry, meaning they are the study of human situations in a natural setting. Naturalistic inquiry is conducted by the researcher as human instrument, who, using interviews and data analysis builds upon their knowledge of the subject area (Lincoln & Guba, 1985). The case itself is important

for what it reveals about the phenomenon and for what it might represent. This specificity of focus makes it an especially good design for practical problems (Merriam, 2009).

To study a question, an embedded case study design was employed (Yin, 2009). In an embedded case study, the focus is on a single unit within an organization. The organization for this study was the College of Education. One department was selected as the unit of study. The participants for the study were selected from one department because they met the criteria of faculty membership and LiveText user. The introduction of LiveText was an episode in the professional lives of the faculty members. This meets Schram's (2006) definition of a case study as a focus and analysis of an individual event, activity, episode, or specific phenomenon. The adoption and of LiveText, an accreditation management system, in a College of Education as well as the experiences of faculty members in adopting LiveText defined this study.

The case was also bounded, meaning the researcher made a choice about what would be the object of the study (Merriam, 2009). For example, studying the experiences of older adults learning about computers would have been a qualitative study, but not a case study since an unlimited supply of older adult learners with their experiences could be selected. A case study would be a particular program or a particular individual selected for their uniqueness, typicality or other characteristic (Merriam, 2009). Participants were selected for particular characteristics that made them appropriate to aid in providing answers relevant to the focus of this research. The six participants represented a single case because they were considered to be representative or typical of the population of teacher educators present in this department who used LiveText.

This case study was considered exploratory because social phenomena were investigated with minimal preconceptions or presumptive expectations (Lincoln and Guba, 1985). This was in contrast to an initial research decision to match participant responses to the CBAM or TAM models of adoption, an etic approach, using a preconceived theoretical approach to analyze data. Instead, in keeping with the exploratory nature of this inquiry, an emic stance of organizing schemes from the data itself was implemented, thus considering an insider's view of the subject (Merriam, 2009).

Role of the Researcher. The role of the researcher in qualitative research is critical in that the researcher is the research instrument (Lincoln & Guba, 1985). The advantages of the human research instrument are abilities to be immediately responsive and adaptive in the collection and analyzing of data. The disadvantages of the human research instrument are biases that may affect the research (Merriam, 2009). This researcher has both public school and higher education teaching experience. There is also a background of instructional technology training and support. These experiences exposed the researcher to experiences with instruction as well as with technological innovations. The researcher has a pro-technology bias which correlates to Rogers's assertion that adoption research tends to have a pro-adoption bias (Rogers, 1995). The structure of the interview protocol (see Appendix B) with its open-and close-ended questions aided the researcher to focus on the study's participants and their responses.

Study Participants

Faculty members of a Colleges of Education were purposely selected for this study. The criteria for participant selection, as mentioned, were teacher educators who used LiveText.

Study participants were female faculty members. Emails were sent twice to the faculty members known to use LiveText explaining the study and inviting participation. Most of the faculty members in this department were female. Male faculty members either did not respond or indicated they were too busy to participate.

Pseudonyms were used to protect the privacy of the participants. The respondents ranged in their experience and tenure, in the field of education, at ASRU (see Table 1). There was also a wide range of experiences with LiveText. The faculty members who responded to the invitation and were interviewed are described below.

Dr. Alexis Andrews, clinical assistant professor in science education, was introduced to LiveText soon after her arrival and had used LiveText throughout her 4 years at ASRU.

Dr. Betty Bell, a clinical assistant professor in language arts had one year of experience with LiveText. Her prior experiences with technology included ASRU's version of WebCT, now Blackboard (2011).

Dr. Cassandra Cranston, associate professor of mathematics education, listed among her interests the preparation and retention of mathematics teachers in urban centers. She remembered the department's transition to LiveText four years ago. Prior to the introduction of LiveText, students were using three-ring binders for their portfolios.

Dr. Dorothy Dennison, clinical associate professor of mathematics education, has had special interests in learning communities; and mathematics education and mentoring new mathematics teachers are important aspects of her work. Her students present at national conferences on mathematics education. Dr. Dennison had taught at ASRU for 7 years. She had used LiveText for four to five years.

Dr. Katy Conner, associate professor in literacy and language arts, reported interests in literacy and secondary school English. Dr. Conner had used LiveText for one and a half years at the time of the interview.

Dr. Anna Marlowe, associate professor of literacy, had used LiveText since it was introduced four years ago. Dr. Marlowe's interests are in adolescent literacy and middle school education.

Table 1.

Faculty Background Information

Faculty (Pseudonyms)	Gender	Age Group	Title	Subject/Content Area	Number Of Years of LiveText Use	Years at ASRU as Faculty member
1 Andrews	F	40-50	Clinical Assistant Professor	Science education	4	4
2 Bell	F	50-60	Clinical Assistant Professor	Language Arts	1	1
3 Cranston	F	50-60	Associate Professor	Mathematics Education	4	15
4 Dennison	F	40-50	Assistant Professor	Mathematics Education	4	7
5 Conner	F	50-60	Associate	Literacy and	1.5	15

			Professor	Language		
6 Marlowe	F	50-60	Associate Professor	Literacy	4	5

Data Collection

Three data collection methods were used for this study: interviews, a questionnaire, and archival document review. Creswell (2005) notes that multiple methods of data collection are important for triangulation; a method for validating results in qualitative studies. Triangulation corroborates evidence obtained from individuals, types of data, or methods of data collection. Each information source was examined for evidence to support themes that emerged from the data.

In-depth interviews were used to explore individual faculty members' introduction to and adoption of LiveText. Six faculty members were selected using purposive sampling for participants who were users of LiveText. Merriam (2009) suggests estimating a sample size that might be adequate to answer the research question, realizing that the size might be readjusted during the study. Participants signed an Internal Review Board (IRB) approved consent form (see Appendix C). A semi-structured interview instrument (see Appendix B) facilitated interviews about faculty members' experiences with LiveText. The interview instrument included both closed-ended and open-ended questions designed to elicit context, experiences, and any additional information the participants wanted to share. Closed-ended questions yielded short answers from interview participants, and open-ended questions yielded more narrative responses from the interview participants.

Innovativeness Scale. In addition to in-depth interviews, a self-report questionnaire, The Individual Innovativeness Scale (IIS) (Hurt, Joseph, & Cook, 1977; see Appendix A), was administered to determine the participants' innovation adoption category. Hurt, Joseph and Cook (1977) determined reliability of .94 using split half comparisons for the 20 item scale. In the split half comparison method to determine reliability, two sets of scores are obtained from the same test, one from even items and one from odd items, and the scores are correlated (Huck, 2000). Internal reliability is the extent that items in an instrument that measure the same characteristic are correlated (1998). The internal reliability for the IIS was reported as Nunnally's r= .89. Pallister and Foxall (Pallister & Foxall, 1998) performed an appraisal of the IIS and reported Cronbach alpha for internal reliability, from four administrations of the scale, to be from .86 to .90. These results favorably compared to Hurt et al. results of .89 for internal reliability (Hurt, et al., 1977; Pallister & Foxall, 1998). Meanwhile, construct validity was demonstrated for the IIS by the similarity of distribution of adopter categories to Rogers's distribution (Hurt et al., 1977).

The order of administering the interview facilitation tool and the IIS questionnaire followed protocols suggested by Miles and Huberman (2000) on linking qualitative and quantitative data collection. The IIS questionnaire was scored after the participants' interviews to minimize researcher bias concerning characteristics of persons in the individual categories. Administering and scoring the IIS after each interview served to minimize researcher bias about individuals in various adopter categories (Miles & Huberman, 1994).

Data Analysis: Coding

Data gathered from multiple sources informed this study. Using inductive analysis, the researcher looked for patterns, themes, and categories that emerged from the data rather than being imposed from outside theories. Data for this study was collected from in-depth interviews, a self-report questionnaire, and public documents related to adopting LiveText. Each category of data collection served as a point of triangulation to establish validity, reliability, and trustworthiness.

Reliability

The question reliability concerns itself with whether a study is repeatable and if repeated would others get similar results. The analysis of the data collected from in-depth interviews was facilitated by the use of NVivo 8 (QSR International, 2008) a computer-based qualitative data analysis software. Transcribed texts were entered into the program and used to code, categorize, and construct themes from the transcribed texts. After transcribed data were imported into NVivo 8, open coding was used to detect initial patterns in the data that were divided into nodes. After the initial coding, the data was further reduced by taking those initial nodes and reducing them into sets. Sets were determined by the researcher to correspond to categories. For example the codes "departmental experts" and "who initiated training" were placed in the category "people involved".

In each cycle of analysis, the researcher got a better understanding of the patterns from the data. In addition to NVivo 8, Microsoft Word was employed to order the data into tables created from each participant's transcribed and coded data. Creating charts

and tables assisted in visualizing data for analysis (Miles & Huberman, 1994). Responses were entered in the table with a code and the statement demonstrating that code. As each table was created, the data was compared to that from previous tables to compare participants. The list below is from the memo written by the researcher during data analysis that provided the steps taken doing constant comparison of data displayed in participants' charts:

1. Read through the first sample, then re-read to identify statements to categorize as a unit of analysis that can be grouped into theme.
2. Read the second sample, and again categorize statements or groups of statements into a theme. Then compare those with the previous sample.
3. Read the third, fourth, fifth and sixth samples and repeat steps one and two. To facilitate steps, highlight, mark and outline raw materials.

In-depth interviews were transcribed, coded, and analyzed to reveal categories, themes, and patterns (Merriam, 2009; Yin, 2009). Raw data were reduced to manageable pieces for easier analysis (Boyatzis, 1998). After each transcribed interview was coded, constant comparison between interviews uncovered similar and dissimilar patterns (Glaser & Strauss, 1967). Peer review of initial codes indicated that the categories and themes were appropriate and that they captured the information needed to discern faculty experience with technology integration.

Three volunteer coders were provided with a code sheet, (Appendix D) as well as data from transcribed interviews. Coders were provided with instructions about matching transcription data with the codes provided. Each coder was sent the transcription from the same participant. They were instructed to identify the data in the transcript that matched

the code from the code sheet. Each coder correctly matched codes from the code sheet with data from the transcribed data. Observing the frequency that coders matched codes described in the code sheet from the data sample served to validate the researcher's codes (Boyatzis, 1998). After interviewing and analyzing data from participants, similar themes were revealed. These similar themes marked the attainment of data saturation. Data saturation occurs when the data has been heard before and it is reasonable to assume that further interviews would reveal similar data. Member checking was performed by checking analyses with participants by providing them with copies of their transcripts to verify their responses and their agreement with the interpretation of their responses.

As data was collected, analyzed, and written into summaries, these results were read by graduate student and faculty peer reviewers for comment and feedback as a validating procedure (Yin, 2009). Additionally, an audit trail in the form of an ongoing journal was maintained to record processes of the research and the reflections of the researcher. Audit trails are important in qualitative research for describing the research performed in detail and are an important part of insuring consistency and reliability in conjunction with triangulation, member checking, and peer review (Yin, 2009). The IIS survey questionnaire, as mentioned above, was also used to collect data for this research study. The questionnaire is viewed as a type of interview and as a complement to other research tools (Yin, 2009).

Document review. In addition to interviews and IIS, data collected includes documents that verify the events mentioned in data collected from participants. Yin (2009) discusses a variety of documentary information as sources of evidence in research. Documentation can be valuable because once created, it is available for review. Also,

documents were not created for the study and can be seen as providing an additional level of trustworthiness to a study. One online document reviewed was the notice of ASRU's accreditation on the NCATE site which served to verify events mentioned by participants (NCATE, 2011). Another document reviewed was NCATE's accreditation notice found in a file on ASRU's website. This source was not cited to maintain the institution's anonymity.

Validity

*Trustworthiness***.** In qualitative studies, trustworthiness is defined as the ability of research findings to be seen as dependable, credible, transferable, and confirmable (Lincoln & Guba, 1985). Credibility was established by triangulation of data and was accomplished by conducting interviews, administering a survey, and conducting a document review. Yin (2009) refers to this process as establishing a chain of evidence through the process of gathering multiple forms of data.

Member checking was also used as a form of credibility. Member checking refers to researchers allowing participants the opportunity to read and provide feedback on the data gathered from them during the study (Merriam, 2009). This step helped to prevent misinterpretations and identified researcher misunderstandings of data collected.

Transferability was achieved by descriptive writing and including verbatim quotes in the findings that illuminated categories and themes.

Limitations of the Study

Yin (2009) states that one of the concerns of case study research is the claim that there is little basis for scientific generalization. As an exploratory case study, the emphasis was on understanding the experiences faculty members during the introduction of a specific application. Their experiences and observations, as described here, may resonate with readers who have undergone similar adoptions of new applications resulting in a generalization of the experiences to their situations. The exploratory case study is a method used to study a phenomenon in-depth with no preconceived assumptions or expectations about the outcome (Lincoln & Guba, 1985). The data collection methods used -were in-depth interviews, questionnaires, and document reviews. To increase the trustworthiness of the data collected from participants, the researcher conducted member checking, during which interview respondents were asked to verify the researcher's interpretation of their responses (Merriam, 2009).

Another limitation is researcher bias arising from the researcher's experiences in instructional technology support. These experiences may have predisposed this researcher to possess views and opinions that may have affected the selection and analysis of the study data. This potential bias was offset by concurrent peer reviews with faculty members who were not participants in the study. Peer reviews were also conducted throughout the course of the study.

Summary

This study expands on the previous qualitative studies exploring faculty integration of technology. As a case study, the case was bounded by faculty members within a single department within ASRU's college educations, who used LiveText, and

were in the department when LiveText was introduced. Narratives of the faculty members' experiences with technological innovations provided contextual information for the study. They also add to the discourse of technology adoption and diffusion in higher education. In planning for the future of technological innovations, this study could facilitate the understanding of faculty members' lived experience with the adoption of technological innovations in higher education. Having a better understanding could create a structure for innovative implementation of technology deployment that could benefit student, faculty, and institutions of higher education.

CHAPTER 4

RESULTS

This case study explored faculty experiences with the adoption of LiveText as a representation of technological innovations in a College of Education at ASRU. ASRU is located in the southeastern region of the United States of America. LiveText (LiveText Inc., 2011) is a web-based learning, assessment, and accreditation system. It offers learning solutions for students, course management solutions for faculty, and a way for administrators to document compliance with accreditation standards. LiveText is a customized system (CS) that uses a Web-accessed database for the storage and retrieval of student artifacts and faculty evaluation data. This system provides a framework or structure for students to display their artifacts and link the content to program goals, while the vendor provides server space for storage and data retrieval. The CS automates the process, and end users need only minimal skill in uploading and linking information (Wilhelm, et al., 2006).

Interview participants were purposely selected teacher educators with experience using LiveText. Inductive methods were used to analyze the data collected, working from specific observation to build concepts, hypotheses or theories based on in-depth

interviews about faculty members' experiences with LiveText (Merriam, 2009). NVivo 8, (QSR International, 2008) a computer-based analysis software package, facilitated the reduction of raw data into categories, themes, and patterns that represented how the introduction of LiveText was experienced by faculty.

Review of study questions. Since the research problem concerned faculty experiences with the adoption and implementation of technological innovations, the study addressed the following questions:

1. How do faculty members experience a technological innovation process?
2. What are the experiences of faculty members with LiveText as a technological innovation?

This chapter covers the results of data analysis of the data collected. After an overview of participants, the data are reported based on organizing the data into stages that follow the narratives provided by the participants. The data are clustered into stages because participants began discussing their experiences with the NCATE review visit, the introduction of LiveText, and finished by discussing the ways they are now using LiveText. Finally, themes are revealed that are representative of the events shared by the participants.

Setting-Participants

The researcher conducted interviews with faculty members in the College of Education of ASRU. Its College of Education participates in initial and advanced teacher preparation. The content areas taught are mathematics, education, science education, language, and literacy.

A description of each participant is provided below. Their adopter categories and IIS scores are in parentheses in the following paragraphs. All participants reported technology experiences prior to their introduction to LiveText with Elluminate Live (conferencing software), WebCT/Blackboard (learning management system), and Second Life (a 3-D virtual world), plus other software and hardware. This prior experience may explain why participants were either innovators or early adopters as indicated by their IIS scores. In keeping with their adopter categories, the participants experienced few problems adopting and learning to use the software once it was introduced.

In addition to the adopter categories, the following concepts from Rogers were used as frameworks for analysis: elements of adoption and the process of adoption (Rogers, 1995). The elements of adoption were described as the innovation, communication channels, time, and the social system.

Participant 1.

Dr. Alexis Andrews (Innovator-87), Clinical Assistant Professor of science education, had been at ASRU four years. She was introduced to LiveText soon after her arrival and had used LiveText throughout her four years at ASRU. Dr. Andrews cites her experience with instructional technology from her previous post as a professor in another institution of higher education.

> I went to professional development at another local university and I learned the WebCT over there, and when I came to ASRU, I already knew WebCT. It was the same software, so I didn't have to learn it.

Dr. Andrews arrived during the NCATE review and received LiveText training during her first month at ASRU. She described face-to-face workshops offered initially,

with online training offered a year later. Dr. Andrews expressed confidence in faculty development. She prides herself on developing effective teaching strategies.

> We take professional development courses and then we have the faculty technology center. I call the faculty help center all the time to get help.

Participant 2.

Dr. Betty Bell (Early Adopter-76), Clinical Assistant Professor in language arts discussed LiveText's training support. Her academic interests range from teacher education to critical literacy and diversity. She describes her previous technology experience as follows:

> I've used PowerPoint and basic stuff. I was learning how to use Elluminate a little bit. I learned Moviemaker and iMovie for a final project with students.

Participant 3.

Dr. Cassandra Cranston, Associate Professor of mathematics education (Innovator-91) has interests that include preparing and retaining mathematics teachers in urban centers. She remembered the days when students used three-ring binders for their portfolios before LiveText's adoption. When asked about her experiences with other technological innovations, she responded:

> I use a lot of other technologies as well--Google Groups, Google Docs, and Wiki Spaces. One thing I'm doing is Second Life. My students and I were simultaneously working in Second Life and learning about Second Life. We had a meeting where 36 students could be a part of it. That did not work, so we had smaller groups based on topics of interest. The other thing I do is Skype. I love Skype.

Participant 4.

Dr. Dorothy Dennison, Clinical Associate Professor of mathematics education (Early adopter-74) has special interests in learning communities. Mathematics education and mentoring new mathematics teachers are important aspects of her work. Her mentees have presented at national conferences on mathematics education. Dr. Dennison has taught at ASRU for seven years. LiveText was introduced in 2005, so she had used LiveText for four to five years. When asked about her prior technology experiences, she responded:

> So for me, technology is like a no brainer. Even if I don't know it, I can figure it out. If you ask me, I may not be able to tell you how to do something, but if you take me to the computer I can show you. I don't memorize it, but if I get on the computer I can figure it out.

Participant 5.

Dr. Katy Conner is an Associate Professor in literacy and language arts (Early Adopter-80) with interests in literacy and secondary school English. Dr. Conner had used LiveText for one and one-half years at the time of the interview. Queries about previous technology experiences produced this response:

> I know about Second Life. I was involved in a project with an outside organization. I have also participated in webinars using Elluminate Live, but I have not set one up myself.

Participant 6.

Dr. Anna Marlowe, Associate Professor of literacy (Innovator-85), has used LiveText since it was introduced five years ago. Dr. Marlowe's interests are in adolescent literacy and middle school education. In responding to the question about technology experiences, Dr. Marlowe cited a current project:

> I'm working with the computer lab resource person to learn more about embedding videos, taking video clips and putting them up, and linking that to our LiveText portfolio. No one's made me do that. I think it would be good for our students to do it. So before I asked them to do it, I should know how to do it.

Data Analysis

NVivo 8 was used to perform initial data analyses of transcripts with the partial use of word processing (Microsoft Word) and concept mapping (Inspiration) applications. Three levels of coding were used as described by Miles and Huberman (1994): data reduction, data display, and drawing conclusion. These levels allowed for the sorting of raw data that eventually resulted in emergent categories and themes.

Data reduction included the process of selecting, focusing, abstracting, and transforming data from field notes or transcripts. Open coding, axial coding, and selective coding from grounded theory (Glaser & Strauss, 1967) represented how data reduction was performed. Open coding was used to identify, define, and code words, phrases, incidents, and events found in the interview transcripts. Ideas, words or phrases were provided with a code that represented an underlying concept. Axial coding provided a way to make connections between incidents, ideas, and events identified through open coding. Categories were formed by grouping coded data based on shared characteristics. Next, selective coding allowed for the integration of categories into themes that were then used to provide a picture of the meanings that participants used to construct their experiences. NVivo 8 was used for open coding and axial coding using NVivo's node and set functions respectively. Microsoft Word's table function and Inspiration's concept

mapping function provided the means for data display that facilitated the creation of themes.

Categories.

Six categories emerged from coding using inductive methods of pattern recognition and constant comparative method (Glaser, 1978; Glaser & Strauss, 1967) as detailed in the methodology section. These categories and their descriptions are listed below:

1. Triggers, crises, and challenges:
    a. Provided context for the introduction of an innovation.
    b. Describe an incident or event that marks the beginning point at which people start to explain the beginning of a phenomenon. It can also be referred to as an initiating event.
2. Awareness-introduction to solution:
    a. Awareness refers to the revelation of a weakness or gap in the way processes were managed either during the event or an evaluation after the event.
    b. Solutions are explored to deal with the weakness or the gap.
3. Faculty Development (formal and informal training):
    a. Solutions are introduced and personnel are trained to use the application.
4. Institutional accreditation and assessment:
    a. Some issues this product was implemented to solve were institutional concerns.

5. Facilitation of student learning:
    a. Some issues this product was implemented to solve were programmatic concerns.
6. Emergence of a departmental expert/advocate:
    a. Someone is appointed or emerges as an expert.

During the events mentioned in the previous steps, participants expressed their feelings, attitudes, and opinions about the events. Narratives about LiveText were told in chronological order. Therefore, the categories were ordered in stages which are ordered sequenced events. The timelines starting with the NCATE review were reported in three broad stages based on the focus of events during each stage.

In the following paragraphs, the participants' responses to the above categories are presented.

Category 1. Introduction, Triggers, and Challenges

The circumstances surrounding the events during the NCATE audit highlighted deficiencies with workload, work flow, and document management. At this pre-introduction stage, there was no solution in place to handle the challenges of participating in the trigger event. Faculty recalled ASRU's NCATE visit with the following remarks:

Dr. Andrews:

> They were just finishing up an NCATE visit and they had to make some modifications and revisions for a revisit to maintain accreditation. The NCATE review served to highlight deficiencies and challenges faced by faculty in organizing their workloads.

Dr. Cranston remembered challenges in reviewing student artifacts developed for both student and institutional assessment that were done manually with hard copies of student portfolios:

> It was a department decision because we were using--for student portfolios--three-ring binders. Our department decided we wanted to go to electronic portfolios. It sounded good at the time because we were all using portfolios. The department wanted to use it, to pull all the graduates in, and we decided to look at it.

Dr. Marlowe also provided a view of workload challenges:

> We were still, as faculty, evaluating each portfolio. It would take me between two to four hours to evaluate a portfolio. Then you send it back to the student, and then they make revisions and send it back to you and you review it again. It's a very long, tedious process, and if you have a large program, and at the same time our programs were growing, and instead of having 10 students, you had 60 students in the program. So evaluating the students' portfolios had become an impossibly large task.

The NCATE review marked a turning point and served to uncover the need for changes in workload and document management.

Category 2: Awareness - Introduction to Solution

These categories developed as the participants discussed the first time someone in the department or a representative from the vendor introduced LiveText. This stage is distinguished from stage one because there is an application from a vendor that promises to address the problems identified in stage one. Before LiveText, students collected paper-based artifacts illustrating their work in three-ring binders. After LiveText, students created electronic or e-portfolios. What follows are some representative memories from this transitional stage:

Dr. Marlowe recalled her introduction to LiveText:

> The first time I learned about LiveText, Dr. Wilson (pseudo.) introduced it to the department. She was doing some checking around. I'm not sure where she went, but she had compared several different programs and was very excited about LiveText™. So she brought some representatives from the company here. They introduced it to us, showed us a PowerPoint presentation, and talked about what it could do for us.

An additional factor that distinguishes the awareness introduction categories and its placement in the transitional stage is the tentative nature of the process. Is this the solution that will be used? Will it be required for everyone? Who is behind this particular product? These concerns were expressed by Dr. Denison.

Dr. Denison:

> They did not say, "here's your chance you better get on board." They said that this is something that ASRU is considering. The presenter said that it was one of the ways we may be going. If you were not comfortable with the application, you did not have to use it.

Another step in the awareness-introduction categories involved the actual decision to use LiveText. None of the participants considered themselves agents in the decision to approve the application. Some referenced "they" while others remembered group decisions:

Dr. Marlowe:

> I was not in on that decision. I'm sure we voted on it at some point, but I don't recall. I don't remember personally looking at any other program besides LiveText as an option. I remember they were excited about it. I know we did not have other options. As a faculty, we did not review other options.

Dr. Cranston:

> Our department decided we wanted to go to electronic portfolios. It sounded good at the time because we were all using portfolios. The department wanted to use it to pull all the graduates in, and now it is a mandate.

The category of faculty development, formal and informal training, represents the demarcation between the transitional stage and the utilization stage that follows. Once the solution was selected, faculty members required training on the new application before it could be effectively utilized to solve or fill the gaps identified during the trigger event. For LiveText, training meant participants learned to use a tool to benchmark programmatic standards through student artifacts used as evidence. LiveText training also involved learning how to facilitate student learning and to engage students to create artifacts that are used for their individual assessment and training as future educators in multiple disciplines. After LiveText was adopted by the College of Education at ASRU, training became the topic discussed by the participants.

Category 3. Faculty Development: Formal Training

Formal training refers to training that is organized and presented by the college department--often in conjunction with LiveText trainers. Participants shared their experiences with the following statements:

> Dr. Andrews:
>
> When I first came to ASRU that September, we had our first training with LiveText in a face-to-face workshop. The second training was online. I think LiveText is user friendly enough once you get used to it and have basic training.
>
> Dr. Dennison:
>
> There was face-to-face workshop. Our associate chair (Dr. Marlowe) learned LiveText too. She became a liaison. At faculty meetings she would present a piece of LiveText™. I would make notes and so on. But I'm the sort of person to work by myself. It was easy for me to learn.

Faculty development-informal training.

Informal training is a part of faculty development and involves peer-to-peer training among faculty members. At other times, students in the program may show faculty members how to use an application. Examples of both are provided below:

Dr. Andrews:

> He was a Ph.D. student who graduated last year. I watched him in a one-to-one session, and once I got the hang of it, I was set.

Dr. Cranston:

> I can talk to a colleague next door. I think there's training for everything, but I did not go to any training, because there is also training online. But I bypass all that, and one person called me "clickety" because I like to click around a new application in order to learn.

Dr. Bell:

> I think once you've mastered LiveText it is a good program and I can see its many uses, but I think you will lose people if you don't provide training, and that means hands-on and being able to look at all screens--faculty and student screens. At ASRU, Dr. Marlowe was always available. Dr. Marlowe always said if you need some help and they were there to help. It took me a minute to learn it, primarily because when I received training it was done in a fast-paced way.

Category 4. Institutional Accreditation and Assessment

LiveText was introduced as a result of an institutional accreditation and assessment audit by NCATE. Faculty members reported their understanding of how that process facilitated introduction of LiveText. This category represents an ongoing function of LiveText:

Dr. Bell:

Standards are there for me to implement; since we are a portfolio-based department, this is an excellent tool for that.

Dr. Cranston:

We have program standards. We make sure the students are meeting the standards using benchmarks. What can we measure about their knowledge in those specific areas?

Category 5. Facilitating Student Learning and Assessment

The category of student learning and assessments encompasses the other gap shown by the NCATE review: a need to find an easier way for students to create artifacts that demonstrated that they met program standards. The faculty members use LiveText to teach and create artifacts that verify that standards are met. The following are some examples of faculty members' facilitation of student learning:

Dr. Andrews:

One class I teach is a hybrid and other courses are completely online.

I will use LiveText for working on classes where students are working on pieces that are going to be in their e-portfolios. I pretty much set up the course with an overview, objectives for the course, and the expectations. Then I try to divide the course into modules. I make it a part of the course assignments for LiveText, and once they finished with that and I evaluated it, they go into the template for the exit portfolio.

Most of my classes, they are full semester courses. They may have anywhere from 10 to 14 modules to complete, and within those 10 to 14 modules they are developing and constructing artifacts for the exit portfolio.

I just did a session for the online degree program on LiveText on Tuesday. I went to the MSIT website and just went to the area that said LiveText and used those documents and talked the students through the process, and then I opened up my desktop in Elluminate and actually built a portfolio using LiveText.

> So I think we do an excellent job of orienting our students to LiveText™. We graduated some students who didn't have a problem using software. They had some other issues. The use of the software was not an issue.
>
> That's one of the things I pride myself on is when you come onto the class I have everything built so you know what the entire course is about. So it's like a construction process where they are continuously building until they have finished everything and they are ready for graduation.

Faculty members from this study were knowledgeable about the importance of benchmarking standards and shared details about this function provided by LiveText.

> Dr. Bell:
>
> Good thing for students is this information is available for them for a year or two, so they can use this information in their actual teaching and it's a good place to keep all your documents as a student. So they have a place to file their papers. In the future they can say, "Oh I wrote a paper on this for whatever course. I can access it through LiveText and it also saves paper."

> Dr. Cranston
>
> That's the main reason we are using it: because it has a means to capture data about the student, so we can benchmark them in our program. So for every program we have standards. You're asking a question we are all grappling with right now so you are ahead of us in even asking these questions. We have program standards. We benchmark and make sure the students are meeting the standards. We look at an alignment of the program and we look at whether the students are meeting those standards.
>
> And in LiveText they can upload artifacts and they can upload where they can talk about a narrative and how that responds to their growth across a standard, or maybe several standards and their artifact, shows evidence of that growth. So that's collected in LiveText. That's how it's benchmarked because that's how the program is divided up. We are going through changes now in trying to work with the different conceptual frameworks and alignment.

The importance of LiveText for both benchmarking standards and as an online course management system was mentioned by Dr. Marlowe. The course management system was represented as a recent addition to the functions available from this product:

> Dr. Marlowe:
>
> That's the main thing we use is for here, portfolios, and for course management.
> So we used it for portfolios for a few years, then they introduced course management.
>
> Also, we found that students were just putting things in their portfolio that they had already done for their classes. So when LiveText came out with their course management system, it has a way to assess students' work and generating reports on their work as they go. So we try to streamline the portfolio process and make it a more meaningful process, so the students aren't just taking the things they've done before and regurgitating it into the portfolio. Because they have already done that, faculty members have already evaluated it. So it was an important and necessary step to cut down on the busywork for faculty.
>
> That's the most important thing from an administrative standpoint. That's what we use LiveText for is to generate reports for NCATE.

Category 6: Departmental Expert-Advocate

A departmental expert-advocate emerged as a category based on participant's observations. Dr. Wilson was mentioned as someone who introduced LiveText and brought in the first representatives to present the application. The emergence of a departmental expert or advocate occurred after initial training sessions were completed for LiveText. When asked about who introduced LiveText, responses were as follows:

Dr. Marlowe, by her own admission and in the eyes of others, emerged as a leader and advocate for LiveText. She described her conflicts and triumphs as she learned this application:

Dr. Marlowe:

> It's kind of learn as you go, so the more frustrated I got, the more I would dig in and try to find the answers. At some point people were coming to me for the answers. Somehow I got the nickname of the LiveText guru, long before I deserved it.

Dr. Marlowe's facility with using LiveText added to her desire to share her enthusiasm for the program. It has led her to develop her own training on-line and off-line:

> The more I use it the more I like it. I really do. I think it does much more than faculty and students are aware of. It's just a matter of time. I would love to do a lot more training sessions, create more videos, and, of course, there's a mess of new people coming in. I would like to get more efficient about training faculty and students.
> At the end of each assessment period, I run a report and I send those reports back to the faculty so they can see the results of the assessments for their program and they can use those for a number of things--most practically for PAR reports and gathering data for NCATE

When asked about who was responsible for initiating training, Dr. Bell responded:

> Dr. Marlowe. At ASRU, Dr. Marlowe was always available. Dr. Marlowe always said if you need some help and they were there to help.

Perceptions, beliefs, attitudes, and opinions. As faculty members discussed their experiences, they also expressed their feelings and opinions. Perceptions (beliefs, attitudes, and opinions) were not included in the stages because elements of category seven were expressed throughout the stages. The data from this category was coded and revealed the following subcategories: (a) usability (ease of use), (b) benefit to faculty members (c) time constraints, (d) feeling supported and developed professionally, (e) mandates to use LiveText, and (f) education and accreditation

Usability (ease of use). After some experience with LiveText, there were opinions expressed concerning the usability and ease of use of LiveText. This topic concerns how easy or hard users found the online LiveText application to access and use when they wanted to perform a function. LiveText was considered user-friendly by some as evidenced by the following remarks:

> Dr. Andrews:
>
> I think LiveText is user friendly enough once you get used to it. And have basic training.

Meanwhile, some participants either had issues with the software itself or with LiveText's website, and by extension, customer service:

> Dr. Bell:
>
> I feel initially when they put out the first version they didn't really have all the bugs out of it... They didn't have any guiding Q&As on the website. If they did I never saw it. To answer questions, I do know there is a telephone number you can call. I believe if you are introducing a software program there should be more help on the front end. I believe that LiveText had more responsibility to make sure there were Q&As and that materials were set up to be easy to understand. It wasn't as intuitive as it could have been.

> So they kind of put people through needless worries and anxieties because it wasn't explained well initially. I think that they could have done a better job.

Benefits to faculty members. Some faculty members expressed opinions about the benefits of LiveText. The management of workflow and workload was expressed best by Dr. Marlowe:

> So we try to streamline the portfolio process and make it a more meaningful process, so the students aren't just taking the things they've done before and regurgitating it into the portfolio. Because they have already done that, faculty members have already evaluated it. So it was an important and necessary step to cut down on the busywork for faculty.

Time Constraints. This category references the time away from other duties due to training in and utilization of a new technological innovation like LiveText. The following remarks reflect these concerns:

> Dr. Conner
>
> Time is precious and you pick and choose what you need to learn. Attending classes--I don't have time. I'm sure you know that the emphasis is on research and writing more than ever, so any spare minute you have, it has to go that way. I'm certainly concerned about my teaching, but time is limited.

Feeling supported in the area of professional development. Feeling supported involved more than the mechanics of training. This theme involved the quality and quantity of training. There was also a feeling of goodwill from the university for offering support services:

Dr. Andrews:

I think faculty members are truly developed. We take professional development courses and then we have the faculty technology center. And no matter when I've gone over, there has always been someone there to work with me and to help me through my crisis. I go all the time to get help. Then you can call people. I call the faculty help center all the time to get help.

Sometimes support is not just going to jump in your face and say, "I'm going to help you." You have to go out and seek help and ask for help. I don't mind doing that. There is always something good over there at the Faculty Help Center, and with me going completely online, it has been good for me.

Dr. Bell:

However, this is my feeling: There were so many people to learn LiveText, and she (Dr. Marlowe), had so many things to do. I felt uncomfortable asking her questions over and over to help me. I know she is an extremely busy person, and that's my own hang-up. She never made me feel uncomfortable. I know she is busy. And for me to learn technology I need time to see it and perhaps have some hands on materials. When I was first introduced to it I was not taught that way. I did have difficulties with it.

LiveText mandated. This category covers whether faculty members felt LiveText use was optional or if there were mandates from the department and college to use it. There were differing opinions:

Dr. Cranston:

Our department decided we wanted to go to electronic portfolios. It sounded good at the time because we were all using portfolios. The department wanted to use it to pull all the graduates in, and now it is a mandate.

Dr. Dennison:

Once again, we are told it is not essential to use LiveText. However, if you are using another system they want to know, because they can see in LiveText that you are not grading the work.

> Dr. Marlowe:
>
> It is required of most of the programs in our department, because the portfolio is an exit requirement and we use LiveText as our portfolio submission vehicle. That allows us to collect the data we need from students.

The above categories were further refined to reveal the themes illustrated in table two. The themes were developed by extracting the main sentiment from comments from the participants about the events and their opinions about these events. The researcher used their memo as an aid to query the data by asking "what is this about? or "what is going on?" These questions and their answers are additional data analysis techniques to answer the study questions (Merriam, 2009).

Study Themes

These are the themes identified in Table 2 with illustrations:

1. A climate of accountability in teacher education
    a. Illustrated by the presence of national standards for Colleges of Education and content standards that are both national and local depending on the discipline. Because of the climate there were methods in place to address them.
        i. Hardcopy portfolios and documentation for accreditation spread across multiple media sources.
2. Initiating event that presaged change:
    a. NCATE visit and review.
3. Need for change

   a. Identified gaps in record keeping.
   b. Department needed to maintain accreditation.
4. Solution
   a. LiveText identified as a solution for institutional and student assessment.
5. Roles
   a. Initiator/Introducer: LiveText selected based on suggestion from a faculty member who initially introduced it.
   b. Expert/Advocate: One person identified as “guru”, and person to answer questions and provide training.
6. Communication agents
   a. Individuals shared information about LiveText in faculty meetings and by vendors from LiveText.
7. Utilization of Innovation
   a. Integrating the innovation for student learning and accreditation.
8. Innovation provided solutions
   a. Institutional assessments and standards are documented.
   b. Student assessments and e-portfolios are used for documenting standards.

Table 2.

Themes Derived From Interview Data:

Theme	Category
Climate of accountability	College education- teacher education
	Accreditation documentation exist in multiple formats
	Paper portfolios
Initiating event	NCATE Review
	Triggers, crisis, and challenges
Need for change	revelation of a weakness or gap
	Need to maintain accreditation
A solution	LiveText
	Problems: Institutional Assessment Student Assessment
Roles	Initiator-Introducer
	Expert-Advocate
Communication	Faculty meetings
	Individuals
	Vendor
Utilizing Innovation	Training-faculty
	Teaching-students
Innovation provided solutions	Institutional assessment and standards are

	documented Student Assessment and e-portfolios

Summary

Many categories and themes emerged in this study exploring faculty experiences with technological innovations using LiveText as representative of a recent innovation at ASRU. These themes were: climate of accountability, initiating event, need for change, solution, roles, communication agent, utilization of innovation, and innovation-provided solutions. The categories and themes introduced here will be reviewed and explored in the discussion section.

CHAPTER FIVE

DISCUSSION AND CONCLUSIONS

The results of this study extend current understandings of the adoption of technological innovations. This chapter summarizes the findings from this study and relates them to the study questions, contextual framework and emergent themes. In addition, a proposed model of adoption is compared and contrasted to previous models. Finally, the implications of the findings are presented along with study limitations and suggestions for future research.

The purpose of this study was to explore faculty members' experiences with technological innovations through the introduction of LiveText. The six participants are faculty members, involved with teacher preparation, from one department of ASRU's College of Education. Participants possessed one to five years of experience using LiveText at the time of the study. Content areas taught included mathematics, science, literature and language arts. As noted in previous research on technological innovations in higher education, teacher educators responsible for the training of future teachers were role models for both pre-service and in-service teachers (Ertmer, 1999; Groves & Zemel, 2000). Therefore, this study adds to the research on teacher educators and technology integration. This study addressed the following questions:

1. How do faculty members experience a technological innovation adoption process?

2. What are faculty experiences with LiveText as a technological innovation?

Research Question 1: How do faculty members experience a technological innovation process?

Review of Conceptual Frameworks

Participants' experiences with the adoption of LiveText resemble the processes explained in the study's conceptual frameworks. This section provides a review of the study's conceptual frameworks and how they relate to the study's results. The following examples serve to illustrate the point at which the study's results intersect with the conceptual frameworks. LiveText's introduction to ASRU's College of Education provided faculty members experience with a technological process that paralleled the finding of previous on adoption and diffusion of innovations. Sample statements from participants are included to illustrate specific concepts. Rogers's (1995) research on the diffusion of innovations serves as the primary theoretical lens for this study. The following concepts were examined: (a) elements of adoption, (b) the innovation-decision process, and (c) characteristics of innovations (Rogers, 1995). The data from the study reveal that participants' experiences are similar those described in prior adoption research.

*Elements of adoption***.** The elements of adoption are innovation, communication channels, time, and a social system. LiveText served as an innovation that represented new ways of performing established practices of maintaining documentation for accreditation and creating students' assessments. Dr. Andrews indicates how LiveText facilitated data collection based on the work of students:

> With LiveText, our documentation of the student's work indicated that they have successfully completed the work for the accrediting body.

A communication channel is the element that represents the means of transmitting information from one person to another. Dr. Dennison refers to a mandated faculty meeting where a LiveText representative discussed the adoption of LiveText. This indicated that a discussion about LiveText was critical to the department.

> They did not say, "Here's your chance you better get on board." They said that this is something that ASRU is considering. The presenter said that it is one of the ways we may be going.

The concept of time as measuring the rate of adoption was not covered in this study. Since participants were recalling past events, it would have been difficult to measure the rate of adoption within the boundaries of this study.

As indicated before, social systems are sets of interrelated units engaged in joint problem-solving in order to achieve a goal. The social system, in this study, is the department within ASRU's College of Education, with faculty members representing interrelated units. Dr. Cranston recalls "Our department decided we wanted to go to electronic portfolios. It sounded good at the time because we were all using portfolios. The department wanted to use it, to pull all the graduates in it." The department, as a social system, decided to transition from paper-based to e-portfolios.

Innovation-decision process. Another important concept from Rogers's diffusion of innovations research is the five steps of the innovation-decision process. The innovation-decision process depicts how individuals move through the five stages of adoption. These steps illustrate answers to Research Question 1.

1. Knowledge - learning about the existence and function of the innovation.

2. Persuasion - becoming convinced of the value of the innovation.
3. Decision - committing to the adoption of the innovation.
4. Implementation - putting it to use.
5. Confirmation - the ultimate acceptance (or rejection) of the innovation.

The innovation-process consists of actions and choices made over time through which an individual or group evaluates an innovation and decides whether or not to incorporate it into ongoing practice (Rogers, 1995). Once again, examples are provided to illustrate these concepts.

Knowledge occurs upon awareness of an innovation by an individual or group. In the knowledge stage individuals are seeking information about the innovation. Examples of the knowledge stage in the decision process about LiveText were provided by Dr. Marlowe:

> The first time I learned about LiveText, Dr. Wilson introduced it to the department. She was doing some checking around. I'm not sure where she went, but she had compared several different programs and was very excited about LiveText. So she brought representatives from the company to the university. They introduced it to us and showed us a PowerPoint presentation and talked about what it could do for us.

Persuasion occurs when an individual or group forms a favorable attitude towards an innovation. At departmental meetings, LiveText was presented as a tool that faculty could try when they were ready. This concept was illustrated by Dr. Dennison:

> They said that this is something that ASRU is considering. The presenter said that it is one of the ways we may be going. If you are not comfortable with it, you don't have to use it.

Decision refers to activities that lead to the choice to adopt or reject an innovation. The decision step involves either deciding that adopting the innovation is the best course of action, or deciding that it is not the best course of action. Dr. Bell provided a reason for the decision to adopt LiveText: "Since we are a portfolio-based department LiveText was an excellent tool for that." Dr. Marlowe explained why LiveText was a good match:

> Because the portfolio is an exit requirement and we use LiveText as our portfolio submission vehicle. That allows us to collect the data we need from students, so our department adopted LiveText across the board.

Implementation occurs when an individual or group places an innovation into use. Implementation in the decision process involves observable behaviors to use the innovation. Dr. Marlowe expressed her growing proficiency and pleasure with LiveText as she used it in her work, "The more I use it the more I like. I really do." Dr. Cranston voiced a practical reason for implementing LiveText, "I am using LiveText. It is a requirement that every degree program has it up."

Dr. Andrews relates the choice of LiveText to the need to store documentation required for an NCATE Review:

> We submitted standards for accreditation during the transition to LiveText when I came to ASRU. Modifications were made for a second visit to maintain accreditation.

Finally, confirmation occurs when an individual or group seeks reinforcement of an innovation decision already made (Rogers, 1995). Dr. Marlowe provided a statement

that reflected this concept: “LiveText was such a leap forward from what we had been using before. So we tried to streamline the portfolio process and make it a more meaningful process.”

The innovation-decision process also involves time in the sense that the five steps occur in a time-ordered sequence (Rogers, 1995). During this study, participants discussed their experiences with LiveText as sequential events that happened over time. This links this study to both the CBAM and TAM (Davis, et al., 1989) models which are representative of sequential models of adoption. Yin (2009) also discussed chronologies in case studies. The conditions for chronology are explained as: (a) some events must always occur before other events, with the reverse sequence being impossible, (b) some events must always be followed by others, on a contingency basis, (c) some events can only follow other events after a pre-specified interval of time, and (d) certain time periods in a case study may be marked by classes of events that differ substantially from those of other time periods. Study participants identified the NCATE review as an event that differed from past events in the ASRU’s College of Education, setting the stage for the eventual introduction of LiveText.

Characteristics of innovations. Rogers (1995) defined five elements needed for the successful diffusion of an innovation. The characteristics of innovations, as perceived by individual adoptees, help to explain their different rates of adoption.

1. Relative advantage – the degree to which an innovation is perceived as better than the idea it supersedes.

   Dr. Marlowe describes the advantages of LiveText over paper portfolios:

Also, we found that students were just putting things in their paper portfolios that they had already done for their classes. So when LiveText came out with their course management system, it has a way to assess students' work and generating reports on their work as they go.

2. Compatibility – the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An idea that is incompatible with the ideas and norms of a social system will not be adopted as readily as an innovation that is compatible.

   Dr. Cranston's (on compatibility) remarks on a group decision about LiveText meeting their needs "Our department decided we wanted to go to electronic portfolios. It sounded good at the time because we were all using portfolios. The department wanted to use it."

3. Complexity – the degree to which an innovation is perceived as difficult to understand and use. An innovation, that is simple to understand, is adopted more rapidly than innovations that require the adopter to develop new skills and understanding. Dr. Andrews describes LiveText as easy to use with just basic skills, "I think LiveText is user friendly enough once you get used to it. And have basic training."

4. Trialability – the degree to which an innovation may be experimented with on a limited basis. New ideas that can be tried in smaller stages will generally be adopted more quickly than innovations that are not divisible. People are more inclined to bite off a pilot of an idea or try a new product if it does not require a

long-term investment or commitment. Dr. Dennison's comments illustrate the concept of trialability:

> We had a faculty who did not want to use it, but the constant coming back to it; people probably picked up in the end and said "Let me try something." The approach they use is to not make it mandatory. They follow adult education principles and let people learn at their own pace.

5. Observability – the degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it.

   Dr. Marlowe provided one example of observability:

   > The faculty just went down there and sat at the computers and a LiveText representative demonstrated its use. They have a Georgia user's group, tech support, videos online, live chat, and webinars. There's a schedule of webinars and I think there is excellent support.

These characteristics refer to the innovation itself that are perceived by individuals as reason to adopt an innovation. LiveText's possession of these characteristics facilitated it adoption. Participants' expressed examples of these characteristics as they discussed working with LiveText.

Review of Study Questions and Themes

This section presents a discussion of each of the study's themes and relates them to relevant research and concepts. The themes reflect the contexts and issues that were occurring in teacher preparation during LiveText's introduction at ASRU. Study Question 1 reflects Rogers's innovation-decision process to understand how participants experienced the adoption as a technological innovation.

Rogers's innovation-decision process depicts how participants experience the adoption of LiveText as a technological innovation and how individual moves through the five stages of adoption.

Research Question 2: What are faculty members' experiences with LiveText as a technological innovation?

Themes are a reflection on the issues and forces happening during the time that ASRUS' College of Education were considering solutions uncovered by the NCATE review. These themes are derived from background information described in the introduction and from the literature review. Themes illustrate that the decision to use LiveText did not take place in a vacuum, but was a product of national influences in teacher preparation that were impacting faculty members and their decision to use LiveText. These forces were the focus on accountability in teacher preparation, the increased use of technology in all stages of education, and the development of technological standards and the use of standards to in accreditation of teacher education programs and colleges of education.

Theme I: Climate of accountability in teacher education. Participants in the present study agreed that ASRU's NCATE review began their experience with LiveText. The NCATE review was symptomatic of the movement of standards-based reform in teacher education. Elam (1971), contributes to the standards movement by discussing the importance of performance-based teaching measured by performance standards. In performance-based teacher education, teachers are expected to demonstrate competencies necessary to promote learning or exhibit behavior known to promote learning (Elam,

1971). Darling-Hammond (2006) reports that the federal Higher Education Act now requires that education departments be evaluated based on graduates' performance on licensing tests, and the National Council for Accreditation of Teacher Education now requires that programs provide evidence of outcomes as they respond to each of the accreditation standards.

Theme 2: Initiating event and change. The occasion of an NCATE visit can cause anxiety for members of the program taking part in a review. McAlpine and Dhonau (2007) coined the term "NCATEing" for what they described as creating a culture for an NCATE visit. Creating a culture includes diverse tasks from engaging faculty in the process of an NCATE visit, which includes educating faculty about standards under review, preparing assessments that document proficiency in content areas, and using technology to store and present student artifacts documenting proficiency. After the NCATE review at ASRU, there were no immediate solutions for dealing with the deficits revealed during the review; materials necessary for review were on different media formats (floppy disks, paper and CD-ROMs) and students' portfolios were in three ring binders which made them difficult to review in bulk. In addition, Dr. Andrews raised the specter of whether or not ASRU was going to maintain accreditation, "They were just finishing up an NCATE visit and they had to make some modifications and revisions for a second visit to maintain accreditation." With accreditation in question, there was a need for the department to find a solution that would help maintain accreditation.

Theme 3: Finding a solution, roles, and communication. Finding a solution involved roles played by faculty members who found a solution and introduced it to others in the group. Some faculty members reported that Dr. Wilson introduced LiveText

at a faculty meeting. Others reported voting on LiveText in a faculty meeting. Wilhelm et al. (2006), on reviewing the adoption of accreditation systems for teacher education, suggested that the selection be an appropriate fit with the institution. Dr. Cranston's remarks illustrated LiveText's fit for their department:

> Our department decided we wanted to go to electronic portfolios. It sounded good at the time because we were all using portfolios. The department wanted to use it.

Unlike the recommended or preferred way to select a solution (Wilhelm, et al., 2006), the perception was that LiveText was adopted at ASRU without much exploration of other systems. Dr. Marlowe pointed out this lack of exploration of other systems with this comment:

> I don't remember personally looking at any other program besides LiveText as an option. I remember they were excited about it. I know we did not have other options, as a faculty we did not review other options.

Theme 4: Utilization of innovation and innovation provided solution. Participants reported that LiveText allowed them a convenient way to provide evidence for accreditation. LiveText facilitated a more organized system for data collection than previous methods of data collection for accreditation and student assessment. Wilhelm et al. (2006) reported that e-portfolio systems provided both student value and institutional accountability. Students were able to upload their artifacts to create e-portfolios. Later, students were able to re-purpose their e-portfolios for professional and presentation uses. The institutional purpose of e-portfolios was to have a convenient method of archiving and retrieving evidence of student achievement of standards, thus documenting institutional accountability. This purpose was a major impetus for selecting and for

purchasing an e-portfolio system. Dr. Cranston explained the importance of documenting students' work:

> We have program standards. We benchmark and make sure the students are meeting the standards.

Dr. Marlowe describes other benefits provided by LiveText from Dr. Marlowe:

> It grew out of our need for a portfolio management system. Now we have a number of our courses in which our key assessments are active in those courses. We now have LiveText for those. For example, the practicum courses are the field experiences; our students are doing that right now. They submit all their assignments through LiveText. Those courses contain some of our assessments for certification and program evaluation.

Emergent Model

Models help conceptualize representations of reality by providing a representation of more complex forms, processes, and functions of physical phenomena or ideas (Gustafson & Branch, 2002). In the next section, a three stage sequential model of adoption is proposed based on data from this study. This proposed model is compared to the CBAM (Hall & Loucks, 1979), TAM (Davis, et al., 1989), and as well as a social system of technology adoption model (Vannoy & Palvia, 2010).

Trigger, transitions, utilization, and perceptions model (TTU-P). Once the themes were established, the overall data was again analyzed to determine how the themes and categories related to sequence of events shared by the participants. A pattern was discerned from the themes with their categories that illustrate the events discussed by the

participants (Yin, 2009). Narratives about LiveText were told in chronological order. Therefore, themes and categories were ordered in stages which are ordered sequenced events. Names for the stages describe a broad overview of events around which the emergent themes were clustered (Miles & Huberman, 1994). The timelines, starting with the NCATE review, were reported in three broad stages based on the focus of events during each stage:

1. Triggering event or challenge

   This event represented the "beginning" where all participants started the story or explanation of what precipitated the need for LiveText. This stage is represented by the theme of a climate of accountability in education.

2. Transition stage-introduction and training

   In this stage, a solution was investigated, introduced, and training was started. The theme is an accreditation review that pointed to gaps which threatened accreditation. The solution found was LiveText, an application that required a change how tasks were accomplished

3. Utilization stage.

   This stage involved the deployment and implementation of an innovation. In this stage, LiveText's features were demonstrated to provide solutions to problems identified in the first stage.

Three stages with six categories are reviewed in Figure 5 which includes associated themes. Stage one (Trigger) contains subcategory one (introduction crisis or challenge). A crisis or challenge can lead to organizational change, in which technology

plays a major role (Surry, 1997). For this case study, the NCATE review led to the adoption of LiveText.

Stage two (Transition) covers category two (awareness and introduction to solutions) and theme three (faculty development and training). Stage three (Utilization) involves category four (institutional and student assessment); and category five (facilitation of student learning), and category six (emergence of a departmental expert/advocate).

Figure 5 presents a chronological characteristic of the innovation decision process formed the basis for the sequential model. Stages represent a way to order and cluster events over time. Within time periods, different discrete events occurred that were clustered into overall stages.

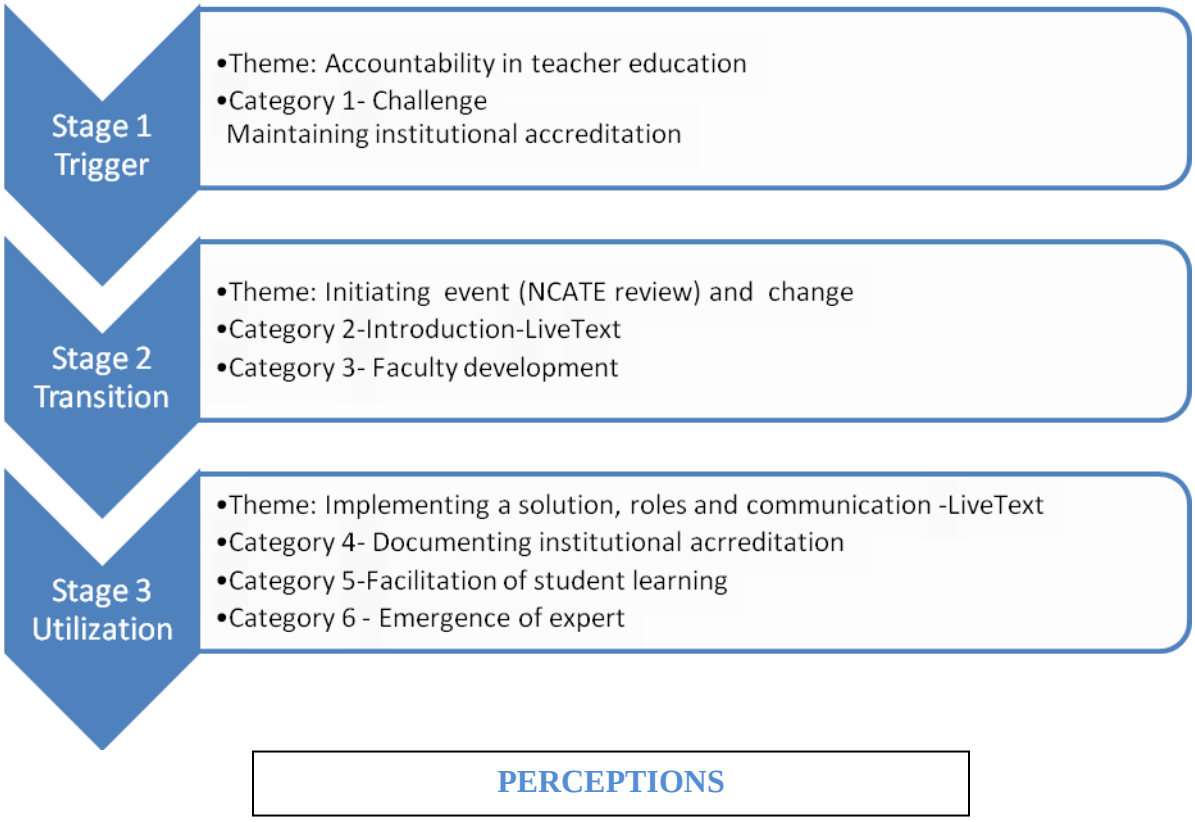


Figure 5. Trigger, Transition, and Utilization (TTU-P) Model, Lumpkin,

Stage 1: trigger event or challenge. Introduction crisis or challenge is the category associated with stage one trigger event or challenge. What emerged from the data was the importance of the most recent National Conference for the Accreditation of Teacher Education (NCATE) review. NCATE is an independent accrediting body which determines whether departments of education meet rigorous national standards (NCATE, 2011). ASRU received NCATE approval or reaffirmation in 2006 (US Department of Education, 2011).

This NCATE visit at ASRU had an impact as evidenced by all six participants mentioning this event. McAlpine and Dhonau (2007) coined the term "NCATEing" for what they described as creating a culture for an NCATE visit. Creating a culture meant preparing faculty members for the diverse tasks involved in NCATE visits. It was important to educate faculty members about standards, about how to prepare assessments that documented proficiency in content areas, and about technologies to store and present student artifacts to document proficiency.

This study revealed the importance of accreditation and standards to the work of the participants, in addition to those of technological innovation. Every participant mentioned LiveText's role in assisting them to fulfill requirements to benchmark standards using artifacts created by their students in LiveText.

Stage 2: Transition. This stage represents the time between the recognition of a problem needing a solution through steps taken to find a solution. Stage two involves category two - awareness and introduction and category three - faculty development and training. Awareness is highlighted by Surry and Land (2000) in their exploration of

motivating faculty members to adopt technology, as well as the attention phase of Keller's (1983) ARCS Model of Motivation. Keller's ARCS model defines four categories: (1) attention getting (increased curiosity and arousal), (2) relevance (fulfillment of important personal needs), (3) confidence building (increased expectancy for success), and (4) satisfaction (attainment of intrinsic and extrinsic rewards). The relevance category in Keller's ARCS model applies in this transition stage as the introduction of LiveText at this time was relevant for solving an immediate need for a better method of managing the NCATE assessment. Faculty members related that documentation needed by NCATE reviewers for accreditation was housed on multiple types of media that included paper documents, floppy discs, zip drives and CDs. In addition, student portfolios were created using three-ring binders and stored in various place throughout the college. Wilhelm et al. (2006) described similar method of storing documentation as a GT system because the documentation incorporated a variety of "general tools' as employed by one of the universities from their study on e-portfolio applications.

The solution selected was LiveText, an online CS application. CS applications like Taskstream and LiveText, were identified as superior to GT systems due to their better archival capabilities. When LiveText was introduced, participants remembered either Dr. Wilson, a colleague, introducing LiveText at a faculty meeting, that a decision to use the application was a group decision made by voting at a faculty meeting. Although Surry and Land (2000) discussed technological innovations introduced by an organization or individual in authority, a colleague, in this case, introduced the technological innovation. For Surry and Land, implementation includes making the

innovation accessible to faculty of higher education. Training made the implementation of LiveText easier and the innovation was more accessible to faculty members.

Faculty development involved providing training and support for faculty in the use of technological innovations. Participants reported a variety of training opportunities. Some training came from the vendor while other trainings were arranged by the university. Training took place shortly after the decision to adopt LiveText. Most of the training took place in computer laboratories on campus. The features of the application reviewed were mainly those related to student training and institutional assessment. The practical nature of the training followed the suggestions for technology training for educators that build confidence in the use of the application (Surry & Ely, 2002).

Stage 3: Utilization. Utilization covers the deployment and implementation of an innovation. In this stage, the application is being used as a solution for the problems identified in Stage 1 (the trigger stage). These problems were identified as not being prepared for the NCATE review because data for documentation was difficult to present to NCATE because it was housed on many different media from paper, CD-ROMs and digital files. Student artifacts that would document that standards were being met were stored in three ring binders. LiveText provided the solution identified in Stage 2 (transition stage) which was providing one application to collect data necessary to document compliance with standards required by NCATE. The Stage 3 category, utilization, included: category four (emergence of a departmental expert/advocate); category five (institutional accreditation and assessment); and category six (facilitation of student learning).

Institutional Accreditation and Assessment

LiveText was introduced as a result of an institutional accreditation and assessment audit by NCATE. At the utilization stage, faculty members reported their implementation of LiveText. Now they had a tool that permitted the facilitation of benchmarking standards, the facilitation, and assessment of student learning.

Departmental Expert-Advocate

Dr, Wilson and Dr. Marlowe assumed roles of experts and advocates. Dr. Wilson, recognized as the person who introduced LiveText to the department, would be considered an advocate because of her role in promoting LiveText. Dr Marlowe was considered an expert who provided training to some participants. Finally, Dr. Marlowe acknowledged her role as a "guru" for LiveText. Wilhelm et al. (2006) suggested in their recommendations that universities be aware that one person (faculty, staff or other) may need to be assigned a "go to" for faculty training and ongoing faculty development (p. 70).

Surry and Ely (2002) list leadership as one of the eight facilitative conditions which are involved in the successful implementation of innovations. Leadership can reside in a designated administrator or someone may emerge as a leader during the completion of a project. Dr. Marlowe emerged as a leader with participants referencing her as a source of both information and training. Dr. Marlowe also reported on her own emergence as an expert user as she detailed becoming more and more competent with LiveText.

Facilitating Student Learning and Assessment

The category of student learning and assessment encompasses the other gap shown by the NCATE review: the need to find an easier way for students to create artifacts that demonstrate that students and faculty met program standards.

Facilitating student learning. LiveText was used by participants to teach asynchronous courses, methods courses, and to create artifacts that were used to build e-portfolios. Dr. Andrews shared her desktop in Elluminate's Live Conferencing application and demonstrated to students how to build e-portfolios using LiveText. Students unable to attend could later retrieve the Elluminate recording. Dr. Andrews set up her LiveText courses with overviews, objectives, and expectations.

Facilitating student assessment. Faculty members were knowledgeable about the importance of benchmarking standards and shared details about this function as provided by LiveText. Dr. Marlowe mentioned the importance of LiveText for both benchmarking standards and as an online course management system. The course management system was represented as a recent addition to the functions available from this product:

Teacher educators act as role models for pre-service and in-service teachers. Therefore they are also role models for technology integration by modeling technology uses in their classes (Bai & Ertmer, 2008). Study participants reported that as students used LiveText to create their e-portfolios they also experienced hands on learning about technology integration in the classroom. Participants also mentioned students sharing their LiveText e-portfolios with prospective employers or teaching positions.

Perceptions (beliefs attitudes, and opinions). As faculty members discussed their experiences they also expressed their feelings and opinions. (a) usability and ease of use, (b) benefit to faculty members, (c) time constraints, (d) feeling supported and developed professionally, and (d) mandates to use LiveText. This study aligns with the work of Bai and Ertmer (2008) who explored issues of beliefs among teacher educators and their powerful influence on future teachers. Parajes (2008) asserted that teachers' beliefs influence their actions in the classroom and by extension teacher educators; beliefs influence their teaching. Perceptions were valuable to add to the model. Prior research on technological innovations has shown the importance of attitudes and beliefs for the adoption of technology (Bai & Ertmer, 2008; Parajes, 1992).

Usability – ease of use. This topic concerns how easy users found the online LiveText application to access and use when they wanted to perform a function. After some experience with LiveText there were opinions expressed concerning the usability and ease of use of LiveText. LiveText was considered user-friendly by some but not by others. Four of the six participants reported that LiveText was easy to learn.

The Technology Acceptance Model (TAM) focuses on individual computer usage (Davis, et al., 1989). It was modeled on the Theory of Reasoned Action (TRA) that was adapted specifically for computer usage. It explains that computer usage by individuals is due in part to perceived ease of use and usefulness. Perceived usefulness is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context. Meanwhile, perceived ease of use refers to whether users view the innovation as free of effort (Davis, Bagozzi, & Warshaw, 1989).

Time constraints. This category refers to time away from other duties due to training in and utilization of a new technological innovation like LiveText. Participants noted that their time was valuable as they worked to complete duties related to research, publication and teaching. Nicolle and Lou (2008) noted in their research that faculty members' involvement with activities related to merit, tenure and promotion left little time to learn technology or create technology enhanced courses. In this study participants referred to the pressures of teaching, research, and publishing as having increased claim on their time which in turn allows less time to focus on learning new technological innovations.

Feeling supported in the area of professional development. Feeling supported involves more than the mechanics of training. This theme involves the quality and quantity of training. There was also a feeling of goodwill from the university for offering support services. Previous research focused on the necessity of institutions of higher education to support lifelong learning opportunities in technology integration to faculty members (Duhaney, 2005). In the present study, participants remarked on the ease of finding support from instructional technology support, the College of Education technology center and from individuals in their departments.

Comparing Model TTU-P with Other Models

In this section, TTU-P is compared with three established models. The TAM, CBAM, and the Social Influence Model (SIM) of Technology Adoption (Vannoy & Palvia, 2010). The TTU-P is illustrated in Figure 5. This study had six categories that

were divided into three stages. The emergent model for this study is trigger, transition, utilization and perception (TTU-P). A trigger is an event that precipitates other events. In this study, the NCATE review triggered the search for a solution to handle both institutional and student assessments in an efficient manner. As shown in the comparisons below, the Trigger phase is the unique feature that sets the TTU-P model apart from previous models and warranted the creation of a new model of technological innovation. External variables, see Figure 6, also refers to environmental factors that may influence beliefs about technology adoption. Davis (1989) defined external variables as task characteristics, political influences, the nature of the implementation process, and organizational structure. The NCATE review acted as a trigger that changed how an organizational structure collected process and reported relevant information.

Transition refers to the time between recognition of the need for a solution, the search for and selection of a solution. Transition also includes initial training for users of the solution selected. Utilization covers the time that the solutions selected are implemented to perform the tasks that solve the problems revealed by the trigger event. These stages can be compared to previous adoption models. Figures 6, 7, and 8 provide comparisons between the TTU-P and previous models. In the TAM model, computer usage by individuals is due in part to perceived ease of use and usefulness of the technology. Perceived usefulness is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context.

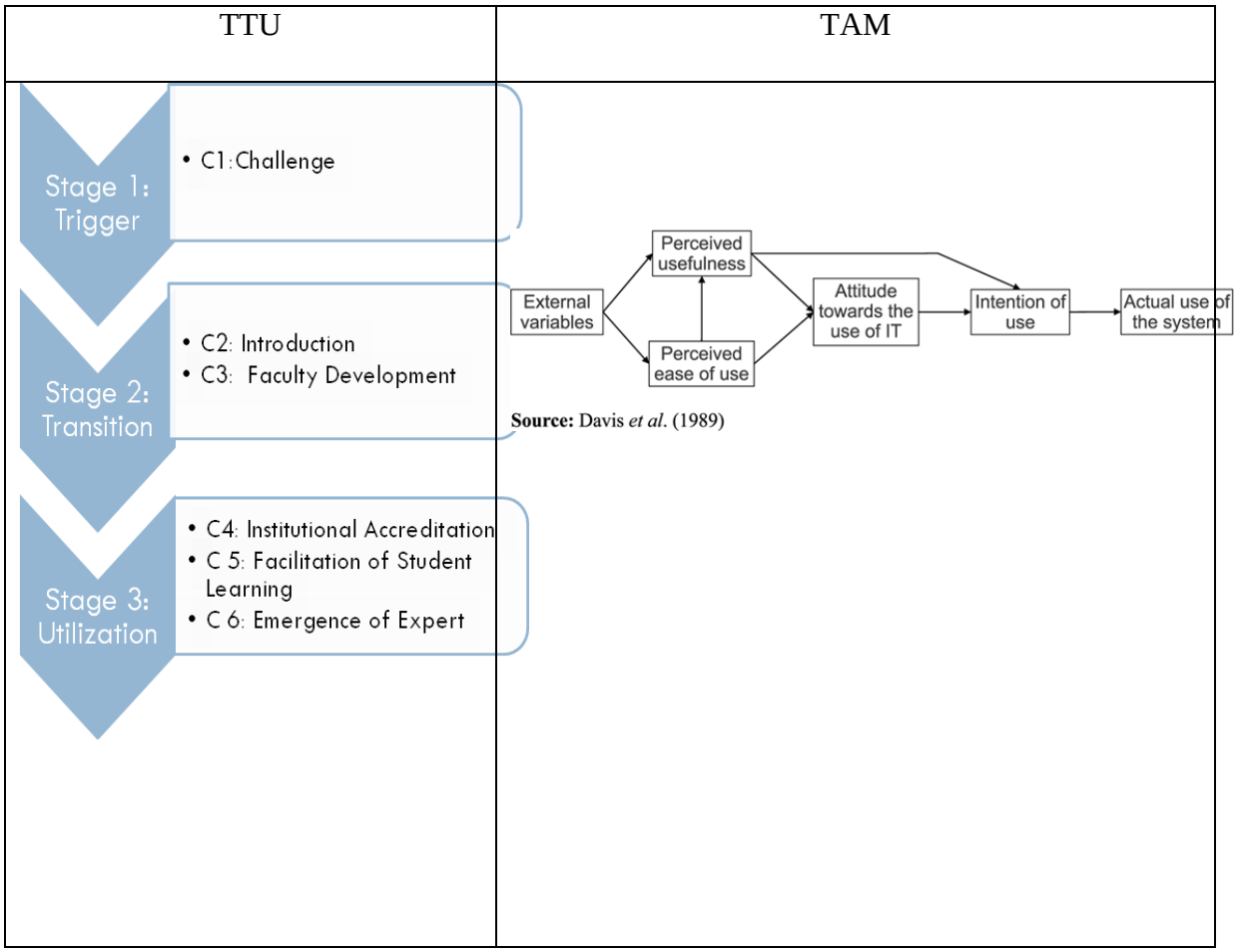


Figure 6. TTU-P and TAM Model Comparison

Perception in the TTU-P model correlates with TAM's perceived ease of use as reported ease of use with LiveText. Most participants found the application easy to use, once trained. By comparison, the TTU-P model covers not only the use of a computer mediated application, but the events that led up to application's adoption. In addition Utilization refers to how the application is used once it is adopted. The TTU-P also compares whether or not the application meets the needs for which it was adopted.

CBAM (Hall & Loucks, 1979) is aanother model of faculty and technological innovations. CBAM describes seven levels of concern as teachers adopt a new practice.

This model explains a developmental process of individuals' investment in innovations. These levels are (a) Awareness - Little concern about or involvement with the innovation, (b) Informational – A general awareness of an innovation and interest in learning more detail about the innovation, (c) Personal – Individual is uncertain about the impact of using the innovation, (d) Management – Attention is focused on the processes and the tasks of using the innovation, (e) Consequence – Individual is concerned about the impact of the change, (f) Collaboration – The focus is on coordination and cooperation with others regarding the use of an innovation, and (g) Refocusing – The focus is on improvement of innovation.

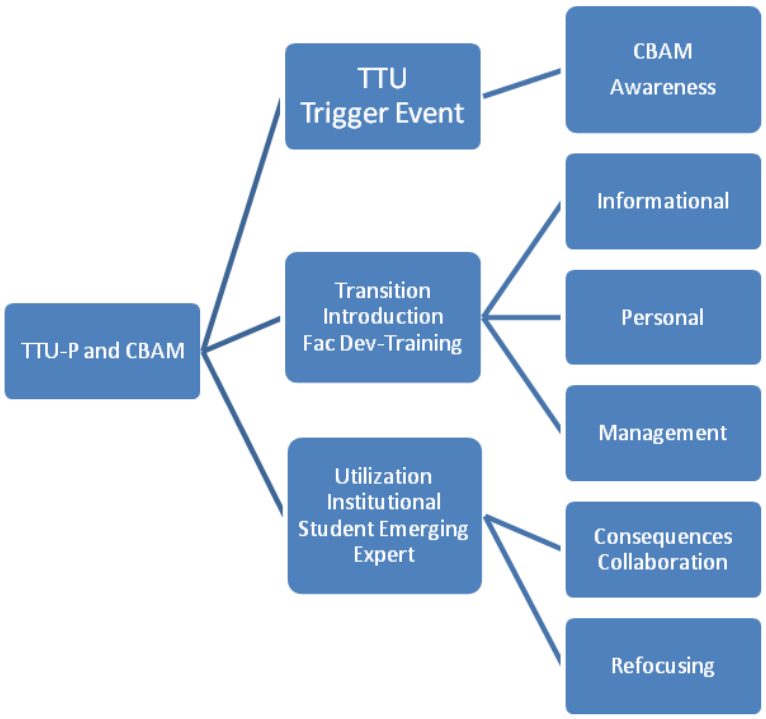


Figure 7. Comparison between TTU and CBAM

In comparing the emergent model of this study (TTU) with CBAM (Figure 7), the differences and similarities noted are: CBAM level one describes awareness as one of little concern about or involvement with the innovation. In this study, the CBAM level one stage is similar to the Trigger (Stage 1) in the TTU model because there was no knowledge of an innovation at the time - just the discovery of problems uncovered during an event (the NCATE review). CBAM levels two (informational), three (personal), and four (management) roughly are similar to the transition stage with its themes of introduction and faculty development/training because LiveText was introduced, participants were not certain at the time of the impact of innovation beyond what vendor representative told them, and they were involved during faculty development/training with the processes and tasks of LiveText. Lastly, the TTU stage 3 Utilization corresponds CBAM levels 5 (consequence), level 6 (collaboration) and level 7 (refocusing).

In this study, participants were concerned about issues of standards and facilitating student learning. They were also collaborating with their department and college in using LiveText for benchmarking standards and providing e-portfolios and other student artifacts as evidence of standards met. For level seven (refocusing), participants were not in a position to improve the innovation except to make recommendations to the vendor.

The SIM model, created by Vannoy and Palvia (Vannoy & Palvia, 2010), is a more recent addition to models of technological innovation. The SIM model

> posits to inform current knowledge by the development of a Social Influence construct applicable to technology adoption wherein social influence results at the

> confluence of four related phenomenon: social computing action, or actions performed through the use of technology such as Web browsers, cell phones and file sharing software, social computing consensus, or agreement from all people that it is right to carry out the action, social computing cooperation, or participating in a way that is in the best interests of the group, and social computing authority, or recognizing that the authority imposed by the group supersedes traditional authority (Vannoy & Palvia, 2010, p. 151).

The SIM model highlights end users as a primary agent in the adoption process. Their model features a bottom up approach rather than a top down approach to the adoption of technological mentioned by other researchers (Sehnaz Baltici-Goktalay & Mehmet Afik Ocak, 2006; Surry & Land, 2000) This TTU-P intersects with the SIM model because faulty members are embedded in a culture and are socially influenced to use a variety of technological innovations in their work. During TTU-P's transition phase, Dr. Wilson discovered LiveText and faculty members were trained to use it for institutional assessment and teaching students. The concept of a social computing authority aligns with TTU-P emerging departmental expert, Dr. Marlowe.

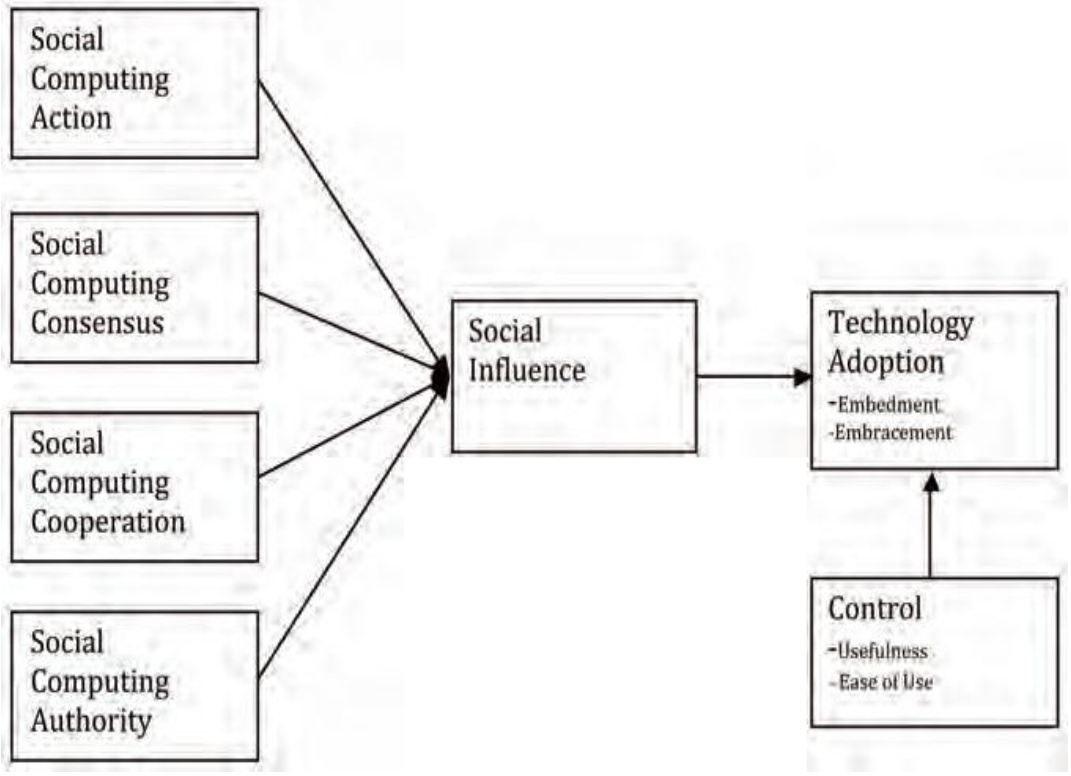


Figure 8. Social Influence Model of Technology Adoption

Figure 8 illustrates the Social Influence Model (Vannoy & Palvia, 2010) which explores roles and relationship involved in the adoption of technological innovations. Often, technological innovations are adopted through the efforts of technology support services or at an administrative level. Innovations are then introduced to the faculty. However, the SIM presents a model that explores adoption from within and among members of social systems. It points the way for faculty members to be involved with decision making and highlights the importance of champions or advocates among the faculty to support an innovations' use. Surry and Land (2000) also urged administrators

to consider the concept of individual innovativeness in developing strategies to increase faculty involvement with technological innovations. Study participants are innovators and early adopters, based on their scores on the IIS and their individual innovativeness assisted in the adoption of LiveText. In addition, faculty members decided to use LiveText as a solution to an urgent need to support for the continued accreditation of ASRU's College of Education.

TTU differs from the models discussed because it includes a trigger event that leads to the introduction of an innovation. In addition, there is an acknowledgment of perceptions that occur throughout the stages of the introduction of technological innovation. The significance for higher education and technology support is the need to be aware of these feelings and to respond to the faculty throughout the process of the introduction and implementation of technological innovation.

Implications

What can be learned from this study? This study examined the experiences of faculty members as they recalled their experiences with the introduction of LiveText at ASRU. The impetus for adopting LiveText was an NCATE review which uncovered issues with the storage and retrieval of documentation necessary for the continued accreditation of ASRU's College of Education. Both Rogers's (1995) Knowledge stage in the innovation-decision process and CBAM's (Hall & Loucks, 1979) Awareness stage focus on learning about the existence and function of an innovation. However, the Trigger stage from the TTU-P model and the External Variables stage from the TAM (Davis, et al., 1989) focuses on the circumstances that prompt a search for a solution.

The importance of a focus on circumstances is an evaluation of all facets a problem and consideration of the best solutions for a situation. It is important to remember that a technological solution may include hardware, software, processes or a combination of these products. Ideally, an evaluation and comparison of several solutions with the participation of all potential end-users would identify the best solution. Wilhelm et al. (2006) suggested, when recommending steps to choose an accreditation and e-portfolio management system, "Choose a vendor that is an appropriate fit with the university infrastructure, faculty goals, and the college pricing structure. Most vendors do an adequate job of archiving data." Based on this suggestion, LiveText or may not have been ASRU's best choice. A summative evaluation could determine if ASRU should continue with LiveText or transition to a different solution.

These results will be added to current tools to assist with overall technology planning for faculty members in higher education. With the current downsizing of technology budgets (Campus Computing Project, 2008) the diffusion and adoption of technological innovations requires careful planning. In this study, a faculty member, Dr. Wilson introduced LiveText and invited LiveText representatives to explain the product. Then either one faculty member emerged as an expert or one designated faculty member was assigned to be the expert for their department. Having faculty members involved from the beginning of the introduction increases the chances of the successful implementation of a technological innovation.

Limitations of the Study

The findings of this study on the experiences of faculty members' experiences

with the adoption of LiveText need to be understood in the context of the following limitations:

1. Although a comparison of faculty members was made based on Rogers's adopter categories (Rogers, 1995), there were only two adopter categories observed. Giving the IIS to a broader population would have permitted a sample based on all five adopter categories.
2. Also participants were from one department within a College of Education. Participants from different departments may have illuminated different issues during the adoption of LiveText.
3. This was a retrospective study with observations based on an NCATE review from 2006 and memories therefore are based on five year old events.

Recommendations for Future Research

This study builds on the previous research on the adoption of technological innovations in higher education, in teacher education, and in the general population. The technology experiences of six faculty members revealed three stages and feelings that occurred during the adoption. However some of their experiences have led to other questions. Recommendations for future research include:

- How does having departmental technology experts effect the adoption of technology?
- What role can instructional support play to support faculty of technology adoption?

From previous work in instructional support these questions have implications for how such units in higher education work with faculty members as new technological innovation are introduced.

Summary

This study explored faculty members' experiences with the adoption of a technological innovation. LiveText was selected as an innovation to focus on because its introduction was recent enough to be remembered by members of a department in the College of Education at ASRU. Six participants were selected from one department that prepares teachers for positions as middle and high school teachers. Participants' transcribed interviews were analyzed to create emerging categories and themes which described the experiences.

From the initial categories the following themes emerged: (a) climate of accountability, (b) initiating event, (c) need for change, (d) solution, (e) roles, (f) communication, (g) utilization of innovation, and (h) innovation provided solution. Six categories divided into three stages emerged in this study exploring faculty experiences with technological innovations using LiveText as representative of a recent innovation at ASRU. The emergent model (TTU-P) illustrates the categories: (a) Introduction crisis, triggers, or challenges to provide context (b) awareness - introduction to solution, (c) faculty development: formal and informal training, (d) institutional and student assessment (e) facilitation of student learning, (f) Emergence of a departmental expert/advocate, and perceptions, beliefs, attitudes, and opinions.

This research outlined a process of adoption/implementation that also acknowledges the

feeling, attitudes and beliefs that faculty members hold throughout these events. Therefore, they should be consulted concerning an adoption of any technological innovation that they will be using in their facilitation of student learning. Faculty members should be acknowledged and supported as originators or discoverers of technological innovations.

References

Adams, N. B. (2002). Educational computing concerns of postsecondary faculty. *Journal of Research on Technology in Education, 34*(3), 285-304.

Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research, 9*(2), 204-215.

Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *Internet and Higher Education, 2*, 71-80. doi: 10.1016/j.iheduc.2008.05.002

Albright, M. J., & Nworie, J. (2008). Rethinking academic technology leadership in an era of change. *Educause Quarterly, 1*, 14-23.

Ali, A. (2003). Faculty adoption of technology: Training comes first. *Educational Technology, 43*(2), 51-53.

Allsopp, D. H., Alvarez McHatton, P., & Cranston-Gingras, A. (2009). Examining perceptions of systematic integration of instructional technology in a teacher education program. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children, 32*(4), 337.

Bai, H., & Ertmer, P. A. (2008). Teacher educator's beliefs and technology uses as predictors of preservice teachers' beliefs and technology attitudes. *Journal of Technology and Teacher Education, 16*(1), 93-112.

Baltaci-Goktalay, S., & Ocak, M. A. (2006). Faculty adoption of online technology in higher education. *The Turkish Online Journal of Educational Technology, 5*(4), 37.

Baltici-Goktalay, S., & Ocak, M. A. (2006). Faculty adoption of online technology in higher education. *The Turkish Online Journal of Educational Technology, 5*(4), 37.

Baltici-Goktalay, S., & Ocak, M. A. (2006). Faculty adoption of online technology in higher education. *The Turkish Online Journal of Educational 5*(4).

Barrett, H. (1999). Electronic teaching portfolios. *Technology and Teacher Education Annual, 2,* 1029-1034.

Barrett, H., & Knezek, D. (2003). E-Portfolios: Issues in Assessment, Accountability and Preservice Teacher Preparation.

Berrill, D. P., & Addison, E. (2010). Repertoires of practice: Re-framing teaching portfolios. *Teaching and Teacher Education, 26*(5), 1178-1185.

Blackboard. (2011) Retrieved March 10, 2011, from http://www.blackboard.com/

Boyatzis, R. E. (1998). *Transforming Qualitative Information: Thematic Analysis and Code Development*: SAGE Publications, Inc. .

CDW. (2009). CDW-G 2009 21st-Century Campus Report.

Chalk and Wire Learning Assessment. (2011). Chalk and Wire Retrieved July 5, 2011, from http://www.chalkandwire.com/

Cochran-Smith, M. (2008). The new teacher education in the United States: directions forward. *Teachers and Teaching: Theory and Practice, 14*(4), 272-282.

Creswell, J. W. (2005). *Educational research: Planning, conducting, and evaluation quantitative and qualitative research*. Upper Saddle River, NJ: Pearson.

Darling-Hammond, L. (2006). Assessing teacher education. *Journal of Teacher Education, 57*(2), 120.

Davis, F. D. (1989). Perceived usefulness, ease of use, and user acceptance of infromation technology. *MIS Quarterly, 13*(3), 319-339.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theorectical models. *Management Science, 38*(5), 982-1003.

Duhaney, D. C. (2005). Technology and higher education: Challenges in the halls of academe. *International Journal of Instructional Media, 32*(1), 7-15.

Elam, S. (1971). Performance Based Teacher Education. What is the State of the Art? *ERIC* (pp. 36). Washington, DC: American Association of Colleges for Teacher Education.

Ertmer, P. A. (1999). Addressing first-and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 46-61.

Georgina, D. A., & Olson, M. R. (2008). Integration of technology in higher education: A review of faculty self perceptions. *The Internet and Higher Education, 2*(1), 1-8. doi: 10.1016/j.iheduc.2007.11.002

Glaser, B. G. (1978). *Theoretical sensitivity : advances in the methodology of grounded theory*. Mill Valley: Sociology Press.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory*. New York: Aldine.

Grabe, M., & Grabe, C. (2004). *Integrating Technology for Meaningful Learning* (4th ed.). New York City: Hougton Mifflin Company.

Groves, M. M., & Zemel, P. C. (2000). Instructional TechnologyAdoption in Higher Education: An Action Research Case Study. *International Journal of Instructional Media, 27*(1), 57-63.

Gustafson, K. L., & Branch, R. M. (2002). *Survey of Instructional Development Models* (4 ed.). Syracuse, New York: Syracuse University.

Hall, G., & Loucks, S. (1979). Implementing innovations in schools: A concerns-based approach. *Research and Development Center for Teacher Education, University of Texas. Austin, Texas*.

Hansen, S., & Salter, G. (2001). The adoption and diffusion of web technologies into mainstream teaching. *Journal of Interactive Learning Research, 12*(2/3), 281-299.

Hartman, J. L., Dziuban, C., & Brophy-Ellison, J. (2007). Faculty 2.0. *Educause Review*, 62-74.

Hartnell-Young, E. (1999). *Digital professional portfolios for change*: SkyLight Professional Development (Arlington Heights, Ill.).

Haymes, T. (2008). The three-e strategy for overcoming resistance to technological change. *Educause Quarterly, 4*, 67-69.

Huber, M. T. (2002). Faculty Evaluation and the Development of Academic Careers. *New Directions for Institutional Research, 114*, 73-83.

Huck, S. W. (2000). *Reading Statistics and Research* (Third ed.). New York: Addison Wesley Longman.

Hurt, H., Joseph, K., & Cook, C. (1977). Scales for the measurement of innovativeness. *Human Communication Research, 4*(1), 58-65. doi: 10.1111/j.1468-2958.1977.tb00597.x

Jacobsen, D. M. (1998). *Adoption Patterns of Faculty who Integrate Computer Technology for Teaching and Learning in Higher Education*. Paper presented at the ED-MEDIA and ED-TELECOM 98: World Conference on Educational Multimedia and Hypermedia & World Conference on Educational Communications, Freiburg, Germany.

Jacoby, J. (1971). Multiple-indicant approach for studying new product adopters. *Journal of Applied Psychology, 55*(4), 384-388. doi: http://ezproxy.gsu.edu:2313/10.1037/h0031538

Januszewski, A., & Molenda, M. (2008). *Educational Technology: A Definition with Commentary*. New York: Lawrence Erlbaum Associates.

Johnson-Leslie, N. (2007). Living and Learning with College LiveText: Lessons from a Self-study. *TECHNOLOGY AND TEACHER EDUCATION ANNUAL, 18*(5), 3062.

Keengwe, J., Kidd, T., & Kyei-Blankson, L. (2008). Faculty and technology: Implications for faculty training and technology leadership. *Journal of Science Education and Technology, 18*(1), 23-28.

Keller, J. M. (1983). Motivational design of instruction. In C. Reigeluth (Ed.), *Instructional Design Theories and Models*. Hillsdale, NJ: Lawrence Erlbaum.

Kirton, M. J., & Mulligan, G. (1969). Correlates of manager's attitudes toward change. *Journal of Applied Psychology, 58*(1), 101-107. doi: http://ezproxy.gsu.edu:2313/10.1037/h0035425

Kozma, R. B. (1978). Faculty development and the adoption and diffusion of classroom innovations *Journal of Higher Education, 49*(5), 438-449.

Lan, J. (2001). Web-based instruction for education faculty: A needs assessment. *Journal of Research on Computing in Education, 33*(4), 385-399.

Lane, C., & Yamashiro, G. (2008). Assessing learning and scholarly technologies: Lessons from and institutional survey. *Educause Quarterly, 3*, 18-26.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Beverly Hills: Sage.

LiveText Inc. (2011). LiveText Accreditation Management System Retrieved February 14, 2011, from https://www.livetext.com/

Maguire, L. L. (2005). Literature Review-Faculty Participation in Online Distance Education:Barriers and Motivators. *Online Journal of Distance Learning Administration*. Retrieved from http://distance.westga.edu/~distance/ojdla/Spring81/maguire81.pdf

Marchant, G., & Newman, I. (1994). Faculty Activities and Rewards: Views From Education Administrators in the USA. *Assessment and Evaluation in Higher Education, 19*(2), 145-155.

McAlpine, D., & Dhonau, S. (2007). Creating a Culture for the Preparation of an ACTFL/NCATE Program Review. *Foreign Language Annals, 40*(2), 247-259. doi: 10.1111/j.1944-9720.2007.tb03200.x

Merriam, S. B. (1998). *Qualitative Research and Case Study Applications in Education.*: Jossey-Bass Publishers, San Francisco, CA.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco: John Wiley & Sons.

Miles, M., & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook* (Second ed.). Thousand Oaks, CA: SAGE publications, Inc.

Mitchell, M. R. (1999). Effects of Faculty Motivation in Distributive Education Environments at Institutions of Higher Education.

Mittal, B. (1989). Measuring purchase decision involvement. *Psychology and Marketing, 6*, 147-162.

NCATE. (2011). NCATE: The Standard of excellence in teacher education Retrieved January 29, 2011, from http://www.ncate.org/

Nicolle, P. S., & Lou, Y. (2008). Technology adoption into teaching and learning by mainstream university faculty: A mixed methodology study revealing the "How, When, Why, and Why Not". *Journal of Educational Computing Research, 39*(3), 235-265.

Nworie, J., & McGriff, S. J. (2001). *Towards the transformation of higher education: Educational technology leadership.* Paper presented at the National Convention of the Association for Educational Communications and Technology, Atlanta, GA.

O'Meara, K. A. (2005). Encouraging multiple forms of scholarship in faculty rewards systems. *Research in Higher Education, 46*(5), 479-510.

Owen, P. S., & Demb, A. (2004). Change dynamics and leadership in technology implementation. *The Journal of Higher Education, 75*(6).

Pallister, J., & Foxall, G. (1998). Psychometric properties of the Hurt–Joseph–Cook scales for the measurement of innovativeness. *Technovation, 18*(11), 663-675.

Parajes, M. F. (1992). Teachers' beliefs and educational research:Cleaning Up a messy construct. *Review of Educational Research, 62*(3), 307.

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: SAGE.

Prensky, M. (2001). Digital natives, digital immigrants Part 1. *On the Horizon, 9*(5), 1-6.

QSR International. (2008). NVivo 8 Getting Started: QSR International Pty Ltd.

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

Rogers, E. M., & Shoemaker, F. F. (1971). *Communication of innovations: A cross-cultural approach*. New York: Free Press.

Schifter, C. C. (2000). Faculty motivators and inhibitors for participation in distance education. *Educational Technology*, *40*(2), 43-46.

Schram, T. H. (2006). *Conceptualizing and Prosing Qualitative Research* (2nd ed.). Upper Saddle River, NJ: Pearson Education Inc.

Seels, B. B., & Richey, R. C. (1994). *Instructional Technology: The Definition and Domains of the Field*. Bloomington, IN: Association for Educational Communications and Technology.

Shoffner, M. B., Dias, L., & Thomas, C. (2001). A model for collaborative relationships between instructional technology and teacher education programs. *Contemporary Issues in Technology and Teacher Education, 1*(3), 395-411.

Snider, S. L. (Spring 2002). Exploring Technology Integration in a Field-Based Teacher Education Program: Implementation Efforts and Findings. *Journal of Research on Technology in Education, 34*(3), 230-250.

Starkweather, W. M., & Wallin, C. C. (1999). Faculty response to library technology: Insights and attitudes. *Library Trends, 47*(4), 640-668.

Surry, D. W. (1997). *Diffusion Theory and Instructional Technology*. Paper presented at the Association for Educational Communications and Technology, Albuquerque, New Mexico.

Surry, D. W., & Ely, D. P. (2002). Adoption, diffusion, implementation, and institutionalization of instructional design and technology. In R. A. Reiser & J. V. Dempsey (Eds.), *Trends and Issues in Instructional Design and Technology* (pp. 183-193). Upper Saddle River, NJ: Pearson Education, Inc.

Surry, D. W., & Land, S. M. (2000). Strategies for motivating higher education faculty to use technology. *Innovation in Education and Training International, 37*(2), 145-153.

Taskstream. (2011). Taskstream Retrieved July 6, 2011, from https://www.taskstream.com/pub/

The Campus Computing Project. (2010). Faculty training is a major investment for online ed programs;ADA compliance remains a major vulnerability. *2010 Managing Online Education Survey (w/video)* Retrieved April, 2011, from http://www.campuscomputing.net/item/2010-managing-online-education-survey-wvideo

US Department of Education. (2011). Accreditation in the US. *US Department of Education Database of Accredited Postsecondary Institutions and Programs* Retrieved January, 2011, from http://www.ope.ed.gov/accreditation/ViewAgencyInfo.aspx?agencyId=57

Vannoy, S. A., & Palvia, P. (2010). The social influence model of technology adoption. *Communications of the Association for Computing Machinery, 53*(8), 149-153. doi: 10.1145/1743546.1743585

Wilhelm, L., Puckett, K., Beisser, S., Wishart, W., Merideth, E., & Sivakumaran, T. (2006). Lessons Learned from the Implementation of Electronic Portfolios at Three Universities. [Article]. *TechTrends: Linking Research & Practice to Improve Learning, 50*(4), 62-71. doi: 10.1007/s11528-006-0062-9

Yi, M. Y., Fiedler, K. D., & Park, J. S. (2006). Understanding the role of individual innovativeness in the acceptance of IT-based innovations: Comparative analyses of models and measures. *Decision Sciences, 37*(3), 393-426.

Yin, R. K. (2009). *Case Study Research: Design and Methods* (Fourth ed. Vol. 5). Thousand Oaks, CA: SAGE Publications Inc.

Zaichkowsky, J. L. (1987). *The personal involvement inventory: Reduction,revision and application to advertising*. British Columbia Canada: Simon Frazer University.

APPENDIXES

APPENDIX A

Individual Innovativeness Scale

Individual Innovativeness (II)

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption (like an organization). People and organizations vary a great deal in their "innovativeness." Innovativeness has to do with how early in the process of adoption of new ideas, practices, etc. that the individual or organization is likely to accept a change.

The individual innovativeness scale was designed to measure individuals' orientations toward change. Research has indicated that this orientation is associated with several communication variables. The II instrument has been found to be highly reliable and the predictive validity is good.

Directions: People respond to their environment in different ways. The statements below refer to some of the ways people can respond. Please indicate the degree to which each statement applies to you by marking whether you: Strongly Disagree = 1; Disagree = 2; are Neutral = 3; Agree = 4; Strongly Disagree = 5Please work quickly, there are no right or wrong answers, just record your first impression.

_____ 1. My peers often ask me for advice or information.

_____ 2. I enjoy trying new ideas.

_____ 3. I seek out new ways to do things.

_____ 4. I am generally cautious about accepting new ideas.

_____ 5. I frequently improvise methods for solving a problem when an answer is not apparent.

_____ 6. I am suspicious of new inventions and new ways of thinking.

_____ 7. I rarely trust new ideas until I can see whether the vast majority of people around me accept them.

_____ 8. I feel that I am an influential member of my peer group.

_____ 9. I consider myself to be creative and original in my thinking and behavior.

_____10. I am aware that I am usually one of the last people in my group to accept something new.

_____11. I am an inventive kind of person.

_____12. I enjoy taking part in the leadership responsibilities of the group I belong to.

_____13. I am reluctant about adopting new ways of doing things until I see them working for people around me.

_____14. I find it stimulating to be original in my thinking and behavior.

_____15. I tend to feel that the old way of living and doing things is the best way.

_____16. I am challenged by ambiguities and unsolved problems.

_____17. I must see other people using new innovations before I will consider them.

_____18. I am receptive to new ideas.

_____19. I am challenged by unanswered questions.

_____20. I often find myself skeptical of new ideas.

Scoring:

Step 1: Add the scores for items 4, 6, 7, 10, 13, 15, 17, and 20.

Step 2: Add the scores for items 1, 2, 3, 5, 8, 9, 11, 12, 14, 16, 18, and 19.

Step 3: Complete the following formula: II = 42 + total score for Step 2 - total score for Step 1.
Scores above 80 are classified as Innovators.
Scores between 69 and 80 are classified as Early Adopters.
Scores between 57 and 68 are classified as Early Majority.
Scores between 46 and 56 are classified as Late Majority.
Scores below 46 are classified as Laggards/Traditionalists.

In general people who score above 68 and considered highly innovative, and people who score below 64 are considered low in innovativeness.

Source: Hurt, H. T., Joseph, K., & Cook, C. D. (1977). Scales for the measurement of innovativeness. Human Communication Research, 4, 58-65.

APPENDIX B

Faculty Experience with Technological innovations Tool

Faculty Experiences with Technological innovations
This study explores faculty members' experiences with technology innovations in a higher education. While there are guiding questions, the interview will follow the responses and concerns of the participants.
Interviewer # _____ Department _____ Interview Setting _____
1. What technological innovations are available on your campus?
2. What technological innovation have you recently adopted?
3. How did you learn about the innovations?
4. Describe how you typically use the technological innovation.
5. Describe how you learned or were trained to integrate technological innovations with your instruction and/or research.
6. How did you view the innovation prior to your adopting the innovation?
7. How do you view the innovation now?

APPENDIX C

Consent Form

Georgia State University
Department of Learning Technologies

Informed Consent
Title: College Faculty Experiences with Technology Innovations: An Exploratory Case Study

Principal Investigator: Stephen W. Harmon, PI
Peggy A Lumpkin, Student PI

I. Purpose:

You are invited to participate in a research study. The purpose of the study is to explore faculty experiences with technology adoption in higher education. LiveText will be used as an example of technology adoption. You are invited to participate because of your experiences with instructional technology and higher education. Up to 20 participants will be recruited for this study. You will do one interview and one survey. The interview will take up to an hour. The survey will take about 15 minutes.

II. Procedures:

If you decide to participate, you will be involved in one interview and a survey. You will have a choice to complete the survey online or in paper form.

The interview will be face to face and will be recorded using a tape recorder. The interview will take place in a private setting. You will be interviewed by Peggy A. Lumpkin (student PI). The recording will be transcribed. The transcribed text will be analyzed for this study. You will be able to review these materials and make corrections.

III. Risks:

In this study, you will not have any more risks than you would in normal everyday life.

IV. Benefits:

Participation in this study may or may not benefit you personally. We hope to gain information that will support faculty technology use in higher education. This information will also benefit learners.

V. Voluntary Participation and Withdrawal:

You do not have to be in this study. You can drop out at any time. You may skip questions. If you decide not to participate, you will not lose any benefits due to you.

VI. Confidentiality:

We will keep your records private to the extent allowed by law. The PI (Dr. Harmon) and the student PI (Ms. Lumpkin) will have access to your information. The GSU Institutional Review Board and the Office for Human Research Protection (OHRP) may review the study to be sure it is done correctly.

A study number rather than your name will be used on study records. Facts that might point to you will not appear in verbal or written reports related to this study. Results will be on password and firewall protected computers or in locked file cabinets.

VII. Contact Persons:

For questions about this study, contact Peggy Lumpkin (student PI) at 404-413-8060 or plumpkin@earthlink.net. Contact Dr. Stephen W. Harmon (PI) at 404-413-8064 or swharmon@gsu.edu . If you have questions or concerns about your rights as a participant in this research study, you may contact Susan Vogtner in the Office of Research Integrity at 404-413-3513 or svogtner1@gsu.edu.

VIII. Copy of Consent Form to Subject:

You will be given a copy of this consent form to keep.

If you are willing to volunteer for this research and be audio recorded, please sign below.

_____	_____
Participant	Date
_____	_____
Principal Investigator or Researcher Obtaining Consent	Date

APPENDIX D

Code Sheet

Code Sheet Faculty Integration of Technology Innovations	
Directions: Please code the data from a transcribed interview (sent as a separate attachment) using the coding information described below. • Use the "comments" function to number the statement or phrase that corresponds to the codes indicated. Ex:" I used LiveText for three year would or I started using it in 2008" would receive a code of "**1"** Some codes may occur multiple times. • If a statement seems to apply to more than one, indicate those codes Note: Use space below for additional code ideas or notes.	
1-Length of use (LiveText) • Date or years	
2- Content taught by participant • Math, science etc.	
3-Who introduced and/or initiated training for LiveText • Some ones name • Title-e.g. department chair Note: Don't remember is ok also	
4-Participant's initial training on LiveText • In a laboratory • Group setting • One-to-one	
5- Faculty technology development/training from the university • Courses offered • Laboratory provided • Individual provided • Contact with vendor (LiveText)	

Note: after initial introductory training	
6-Informal Training: • From Colleagues • From students • Self instruction Not from college or vendor	
7-LiveText Institutional assessment-mention of: • Standards or • Benchmarking Note: documentation of student work like, exit portfolio, for accrediting body	
8-Self- efficacy (confidence) with technology use • Proud of skills or ability • Comfortable using technology	
9-Prior Technology Experience • Applications used prior to or in addition to LiveText e.g. WebCT, Second Life,	
10-Perceptions (beliefs, attitudes, opinions) • Discussion of how, why, feels like, sounds like e.g. time constraints is an example of a type of perception Note: Comments like time constraints, time is valuable,; ease of use or usability; like or dislike application or process etc,	
Please list below any additional codes that you would add as you searched through the document. I will compare them with other codes I generated from the data.	