THE INTEGRATION OF TECHNOLOGY INTO TEACHING BY UNIVERSITY COLLEGE OF EDUCATION FACULTY

By

LARA CATHERINE HAGENSON

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

2000

Submitted to the Faculty of
The Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
December, 2001

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TEACHING BY UNIVERSITY COLLEGE

OF EDUCATION FACULTY

Thesis Approved:

Kathryn Castle

Thesis Adviser

Patricia Lamphere Jordan

Sandra Goetze

Sue Christian Parsons

Timothy J. Pettibone

Dean of the Graduate College

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to my major advisor, Dr. Kathryn Castle, for her constructive guidance and leadership, dedication and commitment to her work, and caring disposition. My sincere appreciation extends to my other committee members—Drs. Patricia Lamphere-Jordan, Suzii Parsons, and Sandra Goetze—for their encouragement, guidance, assistance, and friendship.

I would like to express my sincere appreciation to those who provided suggestions and assistance for this study: Dr. Susan Stansberry, who is a great leader in the field of technology and a wonderful friend, and Dr. Leigh Thompson, my only sister and best friend, who guided me through my data analysis.

I would like to express my sincere gratitude to my parents, Drs. Randy and Mary Jane Hagenson, for their encouragement through difficult times, financial support for higher education, and unconditional love and devotion until the end of time, I love you Mom and Dad. And to the one I love, you have been there since the beginning and have seen me throughout, thank you for your patience and perseverance.

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CHAPTER 1

INTRODUCTION

Educational technology is a field of study that advocates integrating computers into all areas of education. From elementary school teachers to those in higher education, technology is becoming increasingly important. As teachers gain experience with technology, they often discover ways it can help them carry out their varied duties better, faster, or more effectively (Dooley, 1999). This research study involves the integration of technology into teaching by university faculty in a college of education (COE).

The level of experience and expertise in technology use is dependent upon training and teaching done by professionals in the technological field. Individuals who do not work with technology or who are not trained to use technology will be at a disadvantage when they are expected to use technology. Bedeian and Armenakis (1999) believe that initiating an organizational change, such as increased technology use, may lead to invalid situated skills among individuals. This means that individuals' skills (skills used before technology was incorporated) will not help them deal with new technologies. A person must be trained and taught how to use the new technological methods. Once the individual has been trained to use the new methods they will continue to develop skills in implementing these techniques. Technology is growing at rapid speeds; therefore, increasing usage and data (discourse) necessary to use technology. If a professional is not keeping up with the growth of technology he or she could be left behind and have little data, expertise, or skills to work with technology.

Technology can influence professionals (those who are experts in their own field of study) to expand their level of thinking and operations at work, by giving them the ability to explore many different areas of study and faster ways of exploring new areas. Professionals can use distance learning in their classrooms to speak with a class across the globe. Why would some teachers not want to take advantage of the newly formed technology? Do they believe that it is too hard for them to understand, do they feel as though there is not enough training available for them to learn, not enough time to be trained, or is it just not pertinent to their field?

An organization's ability to promote learning among its members may make the difference between its thriving or perishing in the years ahead (O'Neil, 1995). If higher education wants to survive in the expansion of technology, then it must be prepared and prepare its faculty to implement the new technologies within their classrooms. This can be accomplished through training, workshops, and philosophical shifts in thinking about pedagogy.

Language is a barrier between cultures and fields of study. Recognizing the significance of this barrier is critical in understanding the construction of knowledge and expertise (Porac & Glynn, 1999). Fields of study tend to have their own discourse (a way in which ideas are communicated). A barrier in language can occur when a person using technology is trying to teach a teacher (the learner). The jargon that is used by the technology professional may be hard for the teacher to understand. Therefore, breaking the language barrier between technology professionals and new users, so the learner can fully understand concepts and ideas necessary to construct their own knowledge base.

Dooley (1999) demands that an advanced technological development must occur in our schools and educational institutions if we are to prepare students for a competitive, global market. The global economy needs to be aware of the rapid growth in technology. Technology allows individuals to advertise on the Internet, create extravagant graphic designs, and deliver products to many different areas with just a click of the button.

Innovation and Adoption

Thirty-five years ago, Everett M. Rogers developed a theoretical framework, based on research evidence, that described the adoption and diffusion of innovations throughout organizations and social systems (The Boulder Valley Internet Project: Lessons Learned, 1997). Roger's (1995) theory of diffusion of innovations defines an innovation as an idea, practice, or object that is perceived as new by an individual. The characteristics of innovations, as perceived by individuals, tend to influence their rate of adoption and are associated with the persuasion stage of the innovation-decision process. This process is defined as occurring over time and consisting of a series of actions and decisions (Jacobsen, 1998).

Rogers lists five attributes to an innovation:

1. *Relative Advantage: Is the innovation seen as better than what it replaces?*
2. *Observability: Can others see how the innovation works and observe its consequences?*
3. *Compatibility: How consistent is the innovation with the values, past experience, and needs of potential adopters?*
4. *Complexity: Is the innovation easy to understand, use, and maintain?*

5. *Trialability: Can the innovation be tried out on a limited basis? These are perceived by members of the social system in the process of adopting it, and determine its rate of adoption* (Sherry, 1997, p. 2).

The innovation-decision process is essentially an information-seeking and information processing activity in which the individual is motivated to reduce uncertainty about the relative advantages and disadvantages of an innovation (Rogers, 1995). This process ranges from knowledge about an innovation to confirmation by adoption.

The innovation this research investigation refers to is instructional technology (IT). In adopting the innovation, professionals rely on colleagues or various forms of information, to teach them techniques and strategies for personal use within their classrooms. By using technology, faculty members will show that they have adopted technology for their own personal use. The faculty can utilize instructional technology within their classrooms by incorporating Power Point slides or developing a web-based project for their students to use on the computer. Therefore, the more instructional technology that faculty members use personally, the greater their rate of adoption of instructional technology in the classroom.

In a decentralized system, innovations tend to fit more closely with individual users' needs and problems. Users seek information through personal networks or colleagues, participate in making decisions about what sort of training and support they would like to see as they learn more about the innovation, and then tailor it to their own specific needs as they begin to develop the expertise, knowledge, and skills to use it effectively. As, a result, a decentralized diffusion system is closely geared to local needs. A solution that works for one particular *school may not be suitable for another, even within the same school district* (Sherry, 1997, p.2).

A reason for using technology must be in place before any adoption can or will take place. Once a reason to use technology becomes evident, individuals can rely on instructional and developmental growth to help them expand their own knowledge of IT. Once, they have figured out what they want to learn and where their own innovation is leading them, then they will adopt IT within the classroom. This adoption process signifies their growth in technology.

Integration and Diffusion

Diffusion is the process by which the adoption of an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995).

> *Rogers' (1995) Diffusion of Innovations framework and Hall and Hord's (1987) Concerns-Based Adoption Model (CBAM) did not adequately describe the systemic process in which technological, individual, organizational, and pedagogical factors interact throughout the life span of an instructional technology program. However, these models form the conceptual framework for many new studies of innovations* (Sherry, Billig, Tavalin, & Gibson, 2000, p. 1).

This diffusion model, innovation-decision making (Rogers, 1995) and the *CBAM*, composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task (Hall & Hord, 1987), lead Dooley to create a model that attempts a holistic view to aid institutions with the process of change (Dooley, 1999).

Integration is the ability to form, coordinate, or blend into a functioning or unified whole (Merriam-Webster's Collegiate Dictionary, 1999-2000). In integrating technology within the society, we can diffuse IT learning to create a unified whole. If some use IT and others do not, then society may have a harder time functioning as a group and futuristically face the possibility of falling apart. We, therefore, must integrate adoption into the society so the diffusion will spread throughout campuses for a combined, full-functioning society. Integrated adoption of technology leads to diffusion within social systems, therefore increasing the level of education needed by those involved to develop the skills and knowledge for further involvement.

Adoption and Diffusion

"As we applied Roger's model, Hall and Hord's model, and Dooley's model to the adoption and diffusion of technology into classrooms in Vermont, we found that they did not fit well" (Sherry, Billig, Tavalin, & Gibson, 2000, p. 1). Batty (1999) states that innovations such as the Internet, the World Wide Web (WWW), and online learning technologies are not static. In fact, they evolve faster than traditional research studies can deal with them. Moreover, the first stage of adoption is gaining knowledge about innovations. "For interactive technologies, this is a continuous learning process for all users, be they novices or experts" (Sherry, Billig, Tavalin, & Gibson, 2000, p.1). Further research is necessary to explain the growth of the Internet, IT programs, levels of technology, learning tools, and a cyclical nature of the change process (Sherry, Billig, Tavalin, & Gibson, 2000). Therefore, a more adequate integrated adoption and diffusion model was designed to help professionals develop and integrate technology into their classrooms. This new model, Integrated Technology Adoption and Diffusion Model

(Sherry, 1998; Sherry, 1999) describes a cyclical process in which teachers evolve from learners to adopters of educational technology, to co-learners/co-explorers with their students in the classroom, and finally, to a reaffirmation/rejection decision (Sherry, Billig, Tavalin, & Gibson, 2000). This model was developed to enhance knowledge about the integration of adoption and diffusion within a social system.

Wolf and Black (1993) identified five barriers that directly impact a teachers' use of the Internet: (a) access, (b) time, (C) training, (d) resources, and (e) usability (Sherry, Lawyer-Brook, & Black, 1997). There have been many problems with finding the "time" to work on a project or little "training" given that will enable appropriate research techniques. Many of these barriers are very familiar to teachers and faculty members who feel that they do not have the time or knowledge to explore technology.

Farquhar and Surry (1994) state that organizational factors involve both the physical environment and the support environment in which Internet-based classroom activities are to be used (Sherry, Lawyer-Brook, & Black, 1994, p. 9). Some may have a harder time creating the physical environment (computers, desks, paper, etc.) due to the lack of funding or grants given for technology, while others may be overpopulated by laptops and distance learning centers. The support environment may cause intimidation for those who have difficulties dealing with technology. There are many different discourses relating to technology (technological jargon), which cause a discourse barrier between users and non-users. The last factor is the organizational factor. This includes the complex needs of the institution; dealing with the overlap between what the district brings to the diffusion process and the impact of the innovation (Sherry, Lawyer-Brook, & Black, 1997). Some districts may see their curriculum as fit for their needs while others envision a technological playground where they can bounce from one URL to another. Districts are given monies to increase the quality of a students' education. We as educators have a goal to help student's function within our society, which is revolving around the use of technology. When a student is taught any subject through the use of technology, that student is then more likely to adopt the use of technology in his/her professional and personal life.

This in fact has been a concern in the COE, so more training courses and online help resources have been made readily available to the teachers themselves.

> *The particular factors that facilitated adoption varied, depending upon the stages of implementation. For example, the types of professional development and support needs changed over time as teachers became more comfortable. Onsite support became less important than online support. Similarly, curriculum integration was difficult at first as teachers struggled to learn technical skills, but then became more important in making long term decisions about adoption*
>
> (Sherry, Billig, Tavalin, & Gibson, 2000, p. 4)

This research investigation will gather data about faculty members' use of technology. The data will be analyzed to provide a foundation of information on where COE faculty reside in their technology knowledge and adoption. In turn, this information will help identify effective strategies, which can be implemented into the general curriculum or as faculty development for a better, more effective way of integrating technology and pursing adoption techniques for the diffusion of IT.

Purpose of the Study

The research involved in this investigation will probe into the integration and diffusion of IT throughout a college of education (COE) at a Midwestern University. Instructional technology in higher education is increasing. Some professors want to use distance learning and on-line courses in place of traditional classrooms. What has happened to the other professors who have not embarked on the adoption of technology? Will they be left behind or will they integrate technology so they can keep up with the times? It seems reasonable to investigate in what ways some faculty members integrate technology into their teaching. In addition, it is important to investigate why some teachers integrate technology into their teaching and others do not.

The purpose of this study is to determine in what ways faculty members integrate technology into their teaching. Using a survey modeled on Michele Jacobsen's survey instrument, Teaching and Learning in Higher Education (1998), I will explore the adoption techniques and diffusion processes seen within the COE faculty at a Midwestern University. The first task will be to categorize faculty by their level of knowledge about IT. There are many different forms of technology the survey will explore to find out what faculty use and adopt in their teaching. Sherrys' Learning/Adoption Trajectory Model (2000) will be used to analyze the categories in which the faculty seem to fall according to survey results. The categories are: Teacher as Learner, Teacher as Adopter, Teacher as Co-learner, Teacher as Reaffirmer, or Teacher as Leader.

The survey (Appendix A) will be administered with a letter (see Appendix B). This survey will be identified to provide feedback for faculty personal use, as well as data to provide to a faculty support team to better assist college faculty in developing skills and knowledge about technology. The data will be used to develop strategies to help strengthen technological skills.

Research Question

In what ways do faculty integrate technology into their teaching?

Significance of the Study

Faculty members in higher education have seen a greater impact of technology through the growing use of distance education, multimedia presentations, on-line courses, or course components. It would be unfortunate if a faculty member wanted to use technology, but could not find the resources. Administration desires to make a change in higher education by the adoption of new technologies to expand the learning of each student. How will such change affect those who must deal with it first hand, the faculty? The more dramatic a change in an organization, the less effective established situated skills (skills used prior to the change, not new changes) are likely to become and the greater the experience of uncertainty (Bedeian & Armenakis, 1999). This statement reports that if there may be a dramatic change to an institution, then there could be devastating results. If there were a better way of assisting faculty to adopt technology, then they will find an advantage in using technology.

Stress caused by demands that are placed on individuals charged with enacting new behaviors might also serve as a barrier to change (Bedeian & Armenakis, 1999). Some faculty members may feel an obligation to the administration to adopt IT. This will mean difficulties for those who do not receive adequate technological support.

Some faculty were asked why they want to implement technology into their teaching or what do they want to achieve by using technology? Those who respond to the questions often answer, "Everyone else is doing it, so I should do it too!" Others have a more definite reason for using technology. IT is not something that can be easily learned by yourself if there is no one else to assist you. Those wanting to use technology will be at a crossroads of learning.

"Really deep learning is a process that inevitably is driven by the learner, not by someone else. And it is always moving back and forth between a domain of thinking and a domain of action," states Peter Senge (O'Neil, 1995, p. 1). In other words, people are in charge of what they learn, when they learn the information, and how they learn the information. Many faculty members have developed a plan to implement technology into their classroom, however they frequently will not have any part in its actual creation. They will hand their idea for a multimedia presentation to somebody with technological skills and have them create the presentation. The faculty may use technology, but will still be dependent on a skilled person to create additional pieces. The faculty will have regulated their utilization of a technological product, but no knowledge about its creation is gained. This increases the distance between coping, having someone else do your work, and learning, creating your own knowledge of the subject.

Limitations of the Study

One limitation may be the misunderstanding of the purpose of the study. A second may be a lack of understanding of the technological discourse used. Technology is comprised of many discourses, which must be defined and categorized to provide the user with the correct information.

In receiving the survey, faculty will be asked to answer questions involving their use of technology (personal and professional). Some faculty members might think they are being tested by the administration and may respond differently if they knew it was for their own specific purposes.

Language, which is universal, becomes critical in understanding the construction (development) of knowledge and expertise (Porac &Glynn, 1999). Faculty might have difficulty understanding the technological terms used throughout the survey, if they have limited knowledge of technology. The language barriers between users and non-users have made it difficult for some people to function fully in an ever increasingly technological world.

Definition of Terms

Adoption – a process by which the individual has applied what they have learned to their own personal experiences.

Diffusion – a process by which the adoption of an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995).

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

Integration – ability to form, coordinate, or blend into a functioning or unified whole (Merriam-Webster's Collegiate Dictionary, 1999-2000).

Technology - the specialized aspects of a particular field of endeavor (Merriam-Webster's Collegiate Dictionary, 2001)

CHAPTER 2

LITERATURE REVIEW

Introduction

Technology is a tool and a process, which must be dissected and evaluated for each individual's specific needs. If faculty have a deep admiration for technology and its uses, then they may find themselves adopting technological ideas and diffusing them to other colleagues throughout the institution more readily than a person who is not an admirer of technology. "We know that the Internet affects student learning, but the research is still ongoing about how members of learning communities adopt technology and telecommunications and use them to enrich teaching and learning" (Sherry, Billig, Tavalin, & Gibson, 2000, p. 42). There have been many models and theories to increase understanding of adoption, innovation, and diffusion of technology that have been studied.

Models of Innovation, Adoption, and Diffusion

Many models have been developed and used to rate the ability of people to become innovative, adoptive, and then diffuse what they have learned about technology to others. The next sections will describe several of these models that lead to the development of the Learning/Adoption Trajectory Model that will be used for analysis of this research data. The names of these models are: Roger's Diffusion of Innovations Model; Hall's and Hord's Concerns Based Adoption Model (CBAM); Speilberger's and Starr's Model of Epistemic Curiosity; Farquhar's and Surry's Adoption Analysis Model;

Jones', Valdez's, Nowakowski's, and Rasmussen's Engaged Learning Model; Schein; Senge; Havelock and Zlotolow; Engestrom's Activity Theory Framework; and The Learning/Adoption Trajectory Model.

Linear Models

Linear means involvement of a single dimension (Merriam-Webster's Collegiate Dictionary, 2001), while a model is described as a structural design (Merriam-Webster's Collegiate Dictionary, 2001). We can therefore describe linear models as a dimensional and structural design. Some theorists believe that a person can only go through a linear model one step at a time stopping on the last level. This would hinder our idea that learning about technology is an ongoing process that continues to evolve everyday with every new idea.

The models shown in the next few paragraphs are examples of linear models that have been used, analyzed, and critiqued. The names of these models are: Roger's Diffusion of Innovations Model; Hall's and Hord's Concerns Based Adoption Model (CBAM); and Speilberger's and Starr's Model of Epistemic Curiosity.

Roger's Diffusion of Innovations Model

In 1962, Everett Rogers published the first edition of *Diffusion of Innovations*. In this seminal work, an innovation was conceived as an object with five perceived attributes- -relative advantage, compatibility, complexity, trialability, and observability - -that help one to explain its rate of adoption. The decision by a user to adopt or reject the innovation is an event- -a point in a linear process- -with time as an independent variable. The process of adoption consists of a series of actions and choices over time, based on internal factors within a social system.

Potential adopters vary in socioeconomic status, personality values, and communication behavior. The five categories of adopters are:

(a) innovators, who are the first to adopt

(b) early adopters, who are often the opinion leaders in the group

(c) early majority

(d) late majority adopters, who form the bulk of the adopter group

(e) laggards, who are often the last to adopt

(*Sherry, Lawyer-Brook, & Black, 1997, p. 206*).

Rogers' diffusion studies addressed innovations such as new types of grain, water purification systems, and birth control clinics in underdeveloped countries (Sherry, Billig, Tavalin, & Gibson, 2000). Though the Integrated Technology Adoption and Diffusion Model drew heavily from the Rogers' model, the initial data that were collected revealed that one cannot simply characterize early adopters as "techies" and late adopters as "technophobic". Such simplistic labeling of the adopting population cannot fully describe the complex relationship between the technology and the human element (Sherry, Lawyer-Brook, & Black, 1997).

Rogers, like his colleagues in the realm of diffusion scholarship, primarily envisioned an organization as a structured social entity in which power and control in the system was concentrated in the hands of relatively few individuals. In such a system, innovations originate from a centralized source and then diffuse to others (Sherry, Lawyer-Brook, & Black, 1997). Rogers studied many people to view their process of adoption and to determine its (technologies) rate of adoption. He found this to be a very useful model, but when technology began to expand Rogers realized he would have to use the model all over again and train each new teacher to use the new technology.

Hall's & Hord's Concerns Based Adoption Model (CBAM)

Like Diffusion of Innovations, the CBAM model is also linear in nature (Sherry, Billig, Tavalin, & Gibson, 2000). In 1987, Gene Hall and Shirley M. Hord wrote a book entitled *Change in schools: Facilitating the process.* This book brought about a psychological shift from properties of an innovation to the concerns of its users. In the Concerns Based Adoption Model (CBAM) of Hall and Hord, users pass from self concerns, through task concerns, to impact concerns as they become more experienced with the use of the innovation. The stages of concern that an individual goes through when adopting a change or innovation are:

0. Awareness (little concern about or involvement with the innovation);
1. Informational (interest in learning more details about it);
2. Personal (concerns about its demands and their adequacy in meeting them);
3. Management (processes and tasks of using the innovation);
4. Consequence (impact of the innovation on student outcomes);
5. Collaboration (coordination/cooperation with other users); and
6. Refocusing (altering or replacing the innovation)

(Sherry, Lawyer-Brook, & Black, 1997,p. 206).

The CBAM model worked as well as Rogers' model did in educating new teachers about technology and training them in its use. The CBAM model did not continue (was not a cyclical process) once the learner has arrived at the final stage where they must begin the process all over again. This model works very well, but the process of learning about what people know about technology is an ongoing process that is expands everyday. These new ideas and thoughts must again be adopted and diffused among the group members.

Speilberger's and Starr's Model of Epistemic Curiosity

Speilberger's and Starr's (1994) model of epistemic curiosity describes a dual process consisting of anxiety and curiosity. The lower the comfort level of the new users of an innovation, the less willing they are to experiment with it, which is very similar to Hall's and Hord's model (Sherry, Lawyer-Brook, & Black, 1997). "Uncertainty implies a lack of predictability, of structure, of information. In fact, information is a means of reducing uncertainty" (Rogers, 1995, p. 6). There is always a measure of uncertainty throughout our everyday lives (e.g. what clothes should I wear? does this outfit make me look fat?). These uncertainties are within the comfort range of the average person. In dealing with technology (e.g. where does that cord go?), some people would neglect to explore different areas due to uncertainty in their own behavior and knowledge (e.g. Is this the "Blow up the computer button?"). This uncertainty is outside the comfort range for many people. Others feel the urge to explore, innovate, and to be curious about different things in which they are not familiar. They are not intimidated by the uncertainties of technology.

The model of epistemic curiosity created by Speilberger and Starr (1994) is a valid model that categorizes learners by their levels of uncertainty. This model rates people by their own behavior and ability to explore beyond the initial innovative platform. This model is linear in nature as well, therefore once the learner has progressed to the highest level of curiosity about one form of technology (explored it), then they will begin to fall into uncertainty when a new type of technology is addressed.

Organizational and Learning Factor Models

As Lewis and Romiszowski (1996) state, an educational system must be studied as a learning organization in which all members are actively involved in both planning and participating in learning programs adapted to the specific requirements of the changing work or social environments in which they find themselves (Sherry, Lawyer-Brook, & Black, 1997, p. 12). Many factors affect one's ability to innovate, adopt, and/or diffuse. One factor is that of the physical environment (Are there computers that teachers may use in the classrooms?). A few models that involve these factors are described, each affecting the way the Learning/Adoption Trajectory Model was created.

Farquhar and Surry' s Adoption Analysis Model

Farquhar and Surry (1994) developed a model with users' perceptions, which were the same as Rogers, namely (a) relative advantage of the innovation over the existing system; (b) observability of the innovation's consequences; (c) compatibility with users' values and needs; (d) complexity vs. simplicity; and (e) trialability – in other words, can the innovation be tried out on a limited basis? Their Adoption Analysis model states that the more positively new users perceive an innovation with regard to these five characteristics, the greater the likelihood that the innovation will be adopted (Sherry, Lawyer-Brook, & Black, 1997).

In Farquhar's and Surry's Adoption Analysis Model organizational factors involve both the physical environment and the support environment in which Internet-based classroom activities are to be used. An example of the difference *between an organizational factor concerning the physical environment and a technological factor concerning availability of technology is the use of a library modem. The modem may be working and in good condition (a technological factor), but if it is constantly used by the librarian and is not open for use by any of the teachers, that is an organizational factor.*

(Sherry, et al, 1997, p.10)

Farquhar and Surry (1994) state that successful implementation requires not only that adopters buy into the use and application of the innovation, but also that the adopting organization also provide a worthy environment in which to use the new technology along with all of the resources and services needed to install and maintain it. Accessibility and training for technology are very important when implementing technology into teaching. Those who have more access to technology, as well as support and training may use technology more in their teaching.

Jones, Valdez, Nowakowski, & Rasmussen's Engaged Learning Model

Initially, the Engaged Learning model of Jones and his colleagues (1995) was incorporated into the Integrated Technology Adoption and Diffusion Model. Engaged learning issues take into account the various learning styles and roles of students in the classroom, authentic and relevant tasks, multidisciplinary curriculum, interactive and generative activities, and a learning context that emphasizes collaborative knowledge building. Jones and his colleagues identified eight variables that are related to a set of indicators of engaged learning: (a) the teacher's vision of learning; (b) indicators of engaged learning; (c) ongoing, authentic, performance-based assessment; (d) a constructivist instructional model responsive to student needs; (e) the concept of students as part of a learning community incorporating multiple perspectives; (f) collaborative learning; (g) the co/learner/co-investigator; and (h) the roles of students as cognitive apprentices, peer mentors, and producers of products that are of real use to themselves and others (Sherry, Lawyer-Brook, & Black, 1997).

> *In Boulder Valley (area in which this model was used and analyzed), the teacher's vision of learning is closely related to his/her role in the classroom and his/her perception of the relationship of the classroom curriculum to state and district standards, whether the existing curriculum is to be enriched, enhanced, or replaced, and the precise role of Internet-based instructional activities in the classroom*
>
> *(Sherry, Lawyer-Brook, & Black, 1997, p.13)*

The two models mentioned above are integrated within the Learning/Adoption Trajectory Model in regards to organizational and learning environments, which are crucial for the foundation and processes of learning.

Cyclical Models

Sherry, et al (2000) began looking at the linear models of design, but found that the ongoing process of learning is more of a cyclic process. A cycle is a course or series of events or operations that occurs regularly and usually lead back to the starting point. In technology we have learned that a person will learn about a certain program or piece of software. They learn it and understand its use very well. When a new form of software is distributed, then they must begin the process of learning all over again. The cyclical models were more appropriate than the linear models. The next few paragraphs will describe the models used to create the latest version of the Learning/Adoption Trajectory Model.

Schein

In Schein's (1996) view, from the perspective of the user, members of a learning organization begin to "unfreeze" their perceptions as their experiences with an innovation fail to match their preconceived notions. Organization members go through a change and refocusing process; and to "refreeze" their concepts to match their current experiences (Sherry, Billig, Tavalin, & Gibson, 2000). As technology increases the level of "unfreezing" will continue to grow.

Instead of the "refreezing" process, which was never used, members of The WEB Project became quite good at soliciting feedback and using it for continuous improvement (Sherry, Billig, Tavalin, & Gibson, 2000). This model seemed to focus more on the users and their own conceptions of opening ideas to learn, grasping an innovation, and then closing your mind with your conception of the new innovation. This model contributed to the creation of the cyclical Learning/Adoption Trajectory Model, but was not used in its entirety.

Senge

Peter Senge wrote a book entitled, <u>The Fifth Discipline</u> (O'Neil, 1995), which describes the characteristics of learning organizations in schools and the ability to expand learning and disciplines meaning commitment, focus, and practice (O'Neil, 1995). Senge (1990) believed in the balancing and reinforcing of loops. I consider that to be the bringing in of new innovations, balancing them to achieve full understanding and knowledge, and then reinforcing the loops by diffusing them into the social system for everyone to use, with adequate amount of training and technical help.

> *"The Fifth Discipline was never meant to be a practical book; it was never meant for a large audience. It was actually written for people who were already involved in this work and wanted something serious to deepen their understanding of the underpinnings of what they were doing. It's been a big surprise to see how many have bought The Fifth Discipline. I'm sure many of them read it for 20 minutes and say, " Well there's nothing I can do with this, " and set it aside," states Senge.*
>
> *(O'Neil, 1995, p.5)*

"In a learning organization, members are constantly and collectively improving their capacity to create and realize a common vision" (O'Neil, 1995, p.1). This model developed by Senge has created a foundation for understanding the capabilities of integrating new ideas for the betterment of the organization.

Havelock and Zlotolow

In contrast with Schein's user-centered framework, Havelock and Zlotolow (1997) focus on the role of the changing facilitators as they move a system through six stages of planned change, beginning and ending with care and concern for all clients within both the local and larger community. As in Senge's (1990) view of systems theory, Havelock and Zlotolow note that the bigger the change, the bigger the forces acting against it. To counteract this, multiple channels of diffusion are needed, which can carry shared vision throughout the entire community (Sherry, Billig, Gibson, & Tavalin, 2000). This means that someone or something must help diffuse innovations throughout a given community to assure proper training and teaching for their specific use of technology.

This model greatly influenced what was needed to enforce appropriate training and teaching needed to innovate, adopt, and diffuse successfully. Knowing what is needed, in terms of training and support for an organization, helps to maintain and may help to diffuse new technologies to others. If there is no indication of support or training for a specific technology, then why should people learn the technology?

Engestrom's Activity Theory Framework

Engestrom's (1996) Activity Theory integrates users, their intentional uses of the tools of technology, their desired outcomes, and the community of users with its norms, conventions, and social structure into a framework in which a change to any part of the system ripples through the entire system, affecting each and every component and user (Sherry, Billig, Tavalin, & Gibson, 2000).

This framework helped give the WEB project (Sherry, Billig, & Perry, 1999) a boost to eliminate internal boundaries, so communication would become seamless giving the teacher and his/her colleagues a collaborative, helpful, and problem solving relationship.

Learning/Adoption Trajectory

Sherry, Billig, Tavalin, and Gibson state:

> "Having observed teachers and students in the WEB project, a Technology Innovation Challenge Grant in Vermont, cooperating schools for the past three years, we have found that the adoption, implementation, and institutionalization process of technology-based active learning in the arts, social sciences, language

arts, and humanities, is simply not linear. Teachers are co-learners and co-explorers with their technologically-savvy students. Thus we must look for alternative views that can explain the explosive growth of the Internet and the learning communities that it supports, realities of federally funded instructional technology programs, multiple levels of scale, both individual and group, use of interactive learning tools in an intentional context, and a cyclical nature of change process (2000, http://www.rmcdenver.com/webproject/SITEproc.html, p.1)."

Based on three years of evaluation of The WEB Project (http://www.webproject.org), Sherry, Billig, & Perry, found that the learning/adoption trajectory model, (teacher as learner, adoption, teacher as co-learner, and reaffirmation or rejection) was validated (Sherry, Billig & Perry 1999), but as The Web Project moved along so did the cyclical processes of the learning/adoption trajectory model creating the teacher as leader stage, the fifth stage, but to break away from linear models (technology is an ongoing process, therefore acting as a cycle instead of a line) we must start looking at more dynamic models such as:

- the "unfreezing-change-freezing" process described by Schein (1996);
- the circular change model of Havelock and Zlotolow (1997);
- the balancing and reinforcing loops described by Senge (1990); and
- the interaction of users, tools, agency, and the community of users described by Engestrom's (1996) Activity Theory framework

(Sherry, et al, 2000)

Teacher as Learner

This stage in the learning/adoption trajectory model is an information-gathering stage where teachers learn the knowledge and skills necessary for performing instructional tasks using technology (Sherry, Billig, Tavalin, & Gibson, 2000). In this stage teachers will gather material and attend sessions that will improve their understanding about technology and how they can use technology effectively in their classrooms. Teachers must make time for training exercises and show a willingness to learn. This stage includes teachers who have yet to begin working with technology, they are just beginning (learning).

Teacher as Adopter

In this stage teachers progress through stages of personal and task management concern as they experiment with the technology, begin to try it out in their classrooms, and share their experiences with their peers (Sherry, Billig, Tavalin, & Gibson, 2000). During this stage teachers will have given a little more thought to learning about technology. They will have found more readily accessible elements to help them on their journey of learning about technology. This stage consists of technology adopters, those who want to incorporate technology within the classroom and to learn how to use it effectively.

Teacher as Co-Learner

In this stage, teachers focus on developing a clear relationship between technology and the curriculum, rather than concentrating on task management aspects (Sherry, Billig, Tavalin, Gibson, 2000). During this stage teachers will work side by side with "technology," learning the capabilities that it has and comparing technological components to that of the curriculum. The teacher will be willing to share information with colleagues to inform them of the benefits derived from using the technology in their specific curriculum area's.

Teacher as Reaffirmer

In this stage, teachers develop a greater awareness of intermediate learning outcomes and begin to create new ways to observe and assess the impact on student products and performances, and to disseminate exemplary student work to a larger audience (Sherry, Billig, Tavalin, & Gibson, 2000). Since technology usage is so different from paper and pencil usage, the grading criteria changes for the benefit of the student and to enhance technological guidelines. Teachers will assess students by the quality of their work, which is allotted to them by the use of technology. This is a different form of the grading criteria, but allows the students to learn about technology and will prepare them for the future society.

Teacher as Leader

In this stage, experienced teachers expand their roles to become action researchers who carefully observe and monitor their practice, collect data, share the improvements in practice with peers, and teach new members in the area of technology. Their skills become portable (Sherry, Billig, Tavalin, & Gibson, 2000). This stage consists of all the other stages put together to provide an overall learning of technology. The teacher is the spark of technology implementation ensuring that the flames of sustainability will follow with his/her help.

The most important lesson to remember is this: in large scale instructional technology programs, one must consider the total context of learning activities, *including all people in the community (teachers, students, resident experts, administrators, and involved parents) who are using rapidly evolving technological tools to accomplish their intended purposes. It is through community participation, not simply through individual agency or perceptions, that the total identity of the system is shaped and sustained.*

(Sherry, Billig, Tavalin, & Gibson, 2000, p. 46)

It is not essential that a principal, or in our case a School Head, must be a leader in technology, but some assurance of a supporting environment must be seen. This model worked very well in identifying and categorizing teachers in The WEB Project. The teachers were then able to view their own level of learning at different phases and make adjustments when needed. This model will be used in my research to view and categorize the different levels of learning or leadership among the participants in the college of education (COE) in this Midwestern University.

Summary

There have been many models and methods used to categorize people into certain levels of technological knowledge, but it is uncertain if one model is superior to others. The Learning/Adoption Trajectory was developed and formed by using many different models and programs involving K-12 teachers, students, and other resources.

Technology varies from institution to institution, integrating educational technology, to instructional technology (IT), and technology in general. Depending on the characteristics of the school and the individuals to understand what is necessary for them to use technology within their own classroom implementation may or may not be seen across the community in this case the COE. Some faculty may be innovators, adopters, and even diffusers, but it depends on their own needs. Faculty may feel an obligation to use technology, but they have to be innovative and confident enough to adopt it into their own classroom.

CHAPTER 3

METHODOLOGY

Introduction

Instructional Technology (IT) may support and increase the efficiency of the teaching-learning transaction or even modify educational processes, especially with regard to distance education and "anytime, anywhere" access (Daniel, 1997). Technology growth is seen throughout many universities. Recent estimates indicate that colleges and universities invest billions of dollars per year for the acquisition of computer technology (Geoghegan, 1994).

This was a qualitative study that employed survey methodology. Qualitative research emphasizes understanding and is often concerned with process as well as with outcomes; "descriptive accounts provide practicing educators with a means of drawing parallels and contrasts between the phenomena being investigated and their own practice" (Jacobsen, 1998, p.40). This type of methodology was used to categorize college of education (COE) faculty members at a Midwestern University in terms of their technology use. It has lead to a greater understanding of where the faculty reside in their personal and professional knowledge involving technology.

A Land Grant, Midwestern University

This land grant, Midwestern University was founded in 1890, twenty months after the Land Run of 1889. The town in which the university is located is about an hour away from two large metropolitan areas and with a population of more than 38, 000 inhabitants

(University Catalogue, 2000-2001). "The land grant university serves the state, national, and internal communities by providing its students with exceptional academic experiences and by conducting scholarly research and other creative activities that advance fundamental knowledge" (pg. 8). New knowledge is disseminated to people throughout the state and around the world. The campus is one of exceptional beauty, with modified Georgian style architecture in many of the buildings encompassing about 840 acres and more than 200 permanent buildings. In 1995, the education building was completely renovated and rededicated as the new home for the College of Education (COE), (University Catalogue, 2000-2001). "This university is emerging as a leader in network computing resources. The university has utilized the student tech fee in concert with other university resources to create a second-to-none networking system on campus that includes new computer laboratories, high speed inter-laboratory connectivity, and a virtually seamless interface to the exploding Internet community" (pg. 9).

Design of Study

The study was a descriptive study designed to draw conclusions from survey data about the integration of technology among the COE faculty in a Midwestern University. Before the survey was distributed to faculty, the survey was divided into categories according to levels of innovation or adoption process within the Learning/Adoption Trajectory Model. For example, Section 5 of the survey asked participants to choose a stage of development in which they believe they fit. This was an indicator of how faculty see themselves using instructional technology. This process of categorizing each question and placing it within the model was used as the basis for the questions for analysis after the results were collected.

The results were analyzed categorizing the abilities of faculty to adopt, innovate, integrate, or diffuse technology. This research was compiled and distributed to those who had expressed an interest in the results. Instructors and others responsible for helping faculty learn and implement new technologies can review the results and expand programs to further the knowledge and skills of the faculty in the college. In addition, results were provided to faculty who requested them.

Participants

This descriptive research investigation surveyed approximately 110 faculty members (participants) in the COE at a Midwestern University. The college consists of three schools with programs ranging from teacher education, to counselor education, and to leisure studies education. Each participant was invited to participate in this research study via campus mail. The invitation, sent through campus mail, contained a consent form, giving each participant a choice to participate (this was a voluntary survey), and a copy of the survey.

The survey was estimated to take about 20 to 30 minutes to complete. Each participant was asked to return the invitation to participate and survey (paper-based) within a week of their obtaining the packet through campus mail. A flyer was distributed about a month after the first survey was distributed to each faculty mailbox, asking those who had not filled out the survey to please do so and thanking those who already participated. A few more surveys were returned. Then, the survey was distributed for the last time to faculty at their first faculty meeting, about a month after the flyer, who were then asked to answer and return the survey.

Survey

The instrument on which the survey for this research study was modeled was an exploratory tool used to gather a large data set of information relevant to faculty adoption and integration of technology for teaching and learning in higher education (Jacobsen, 1998). The results from the original survey were used to/as:

1. *Establish baseline data for future comparison and to measure changes over time.*

2. *Identify trends, issues, and concerns unique to post-secondary instructors and for subsequent probing during interviews.*

3. *Differentiate between two distinct groups (i.e., early adopters and mainstream faculty).*

4. *Measure differences between on-line and conventional survey participation methods.*

5. *A source of demographic and attitudinal data in descriptive and exploratory statistical data.*

(Jacobsen, 1998, p. 41)

A single standardized survey instrument was not currently available for Jacobsen to use that would serve the varied purposes for her study. This was a problem that I also encountered. Therefore, a systematic process for survey development, grounded in consideration for the college of education faculty was used to modify Jacobsen's survey. Each section of the survey was selected from prior research and /or constructed to gather information about attitudes, behaviors, and psychological constructs relevant to understanding and questioning the integration of technology into faculty teaching in the

COE. The survey used in this study was designed for the purpose of ascertaining familiarity with and the use of technology in their own teaching.

The paper-based form of the survey was modeled after Jacobsen's survey. The questions were focused on levels of knowledge that were necessary for providing faculty with effective skills for implementing technology. Jacobsen gave two reasons for the availability of the paper-based survey, both which were viable in the administration of this survey. The two reasons given for using a paper/pencil survey were: (a) to provide a means for non-adopters of technology to participate, thus including more mainstream faculty in the sample, and (b) to avoid excluding any potential participants from this investigation who may not be comfortable using a web-based form. Jacobsen used the format and page layout based upon a similar instrument used to survey academic staff at the University of Alberta (Anderson, Varnhagen, Campell, 1997). A web-based survey was created for this research, but disposed of due to confidentiality problems. Faculty may feel freer to express what they really think if they know their colleagues or their supervisors will not see their survey responses even if they are anonymous (Zeitz, Gerald, et al, 1997). The consent letter indicated that the survey was administered to faculty in the COE, but did not indicate work assignment or position.

Fienburg, Stephen, and Tanur (1989) believe sample surveys randomly selected from the population have become extremely important data-gathering devices in the last half-century. The survey was the method selected to gather data for showing the adoption, integration, and diffusion of technology at the Midwestern University COE faculty. The 48 items of the "Survey of Technology Use in the COE" survey instrument (see Appendix A) were divided into 6 sections of selected-response and open-ended items. The survey was modeled after the Teaching and Learning with Technology in Higher Education Survey given by Jacobsen in 1998. Questions were answered by the means of a Likert type scale or by an open-ended response.

Section 1: Participant Information

Section 1 consisted of four questions that asked about gender, academic rank, years of faculty experience in the COE, and total years of faculty experience in higher education. Information gathered about participants were treated confidentially and were only used for descriptive data. This section was used to organize the levels of faculty to discern where they were located in the Learning/Adoption Trajectory Model (Sherry, Billig, Tavalin, & Gibson, 2000). This information was used to factor in gender, years of faculty experience, and number of undergraduate and graduate students taught (Jacobsen, 1998) to learn if this information organizes the faculty into different groups of learning and adopting. Does gender or number of years worked affect participants' willingness to adopt, innovate, or diffuse technology? The answers helped to correlate a listing, which was organized in the different levels of the Learning/Adoption Trajectory Model.

Section 2: Computer Experience

Section 2 consisted of 15 items used to gather two types of information, such as faculty members' experience with computers (i.e., Level of Expertise). For example, "How much experience do you have with a P.C. operating system?" As seen in section 1, the questions were categorized using the Learning/Adoption Trajectory Model.

Section 3: Instructional Technology Used in Teaching

This section was created to incorporate instructional technology used within the COE into the survey. For example, "Do you use Lotus Notes for a totally online course?" Participants were asked how they use actual platforms in their teaching.

Section 4: Instructional Hardware Used in Teaching

This section listed examples of instructional hardware that were found in the COE. Faculty who filled out the survey were asked how well they knew how to run this hardware. This section was also used to clarify faculty use of instructional hardware in the COE.

Section 5: Learning About Technology

Individuals tend to have preferred methods for learning more about technology. This section contained 3 questions and 28 sub questions that collected data about the individual's preferred methods for learning about technology. For example: "In terms of HELP OR ASSISTANCE with using computers, how important are each of the following sources of support to you?" This section was used to build upon the model described by Sherry, Billig, Tavalin, and Gibson's (2000) learning trajectory research using higher education teaching. Their model was used to encourage effective strategies that increase professional development and collaborative technological skills in COE faculty.

Section 6: Profile of Instructional Technology use in the COE

This section was created for participants to categorize themselves using The Learning/Adoption Trajectory Model. For example, "Which stage describes you, the teacher?" This allowed categorical data about faculty using instructional technology in their teaching.

Procedures

This study was conducted over a period of time, in which the faculty were asked via campus mail to participate. They were given a week to fill out the survey and were asked to send the paper survey back to the researcher anonymously. The most important requirement in administering the survey to faculty was not to identify respondents by name or number when they filled out the survey, but to keep it confidential (Zeitz, Gerald, et al, 1997). The survey did not contain any areas or spaces that required a name or number. The main objective of the survey was to receive data involving faculty usage of technology.

Data Analysis

Data were gathered by a paper-based survey. After the surveys were returned, the final results were coded to form descriptive data using the Learning/Adoption Trajectory Model. Coding was used to categorize the questions into areas of innovation, adoption, diffusion, or maybe even rejection. This information was critical in providing faculty with appropriate training and professional development for the organization.

In this qualitative study, survey data were reported from faculty and were placed into a data spreadsheet. Once the data were finalized in the spreadsheet, then the data were placed into tables for better presentation. The data shown in table form made it a little easier to analyze any comparisons or major findings. Once the findings from the table were acquired, then the description of each finding was addressed.

Ethical Considerations

Institutional Review Board (IRB) Approval (see Appendix C)

I did not begin my study until my IRB application was approved. Participants gave written consent to participate (see Appendix B).

CHAPTER IV

RESULTS

Introduction

The purpose of this study was to investigate the integration and diffusion of instructional technology (IT) throughout a college of education (COE) at a land grant, Midwestern University. A survey was used to collect information from tenure track faculty. This chapter presents the results of this descriptive study.

Survey Results

The survey instrument for this study was designed as an exploratory tool to gather a large data set of information about faculty adoption and integration of technology for teaching and learning in higher education. This survey, The Survey of Technology Use in the COE (College of Education) (Appendix A) was a modification of one used by Jacobsen (1998) who found that her survey data supported Rogers' (1995) theory "in that, based upon adoption patterns and faculty innovativeness, there are statistically significant differences between early adopting faculty and mainstream faculty on several variables" (Jacobsen, 1998, p.163). This survey was used as the only data source in this study to determine the ways in which faculty adopt, innovate, integrate, or diffuse technology into their teaching (Learning/Adoption Trajectory Model, Sherry, Billig, Tavalin, & Gibson, 2000). The framework used to analyze survey data was the Learning Adoption Trajectory Model (Sherry, Billig, Gibson, & Tavalin, 2000) which categorized faculty as

Teacher as Learner, Teacher as Adopter, Teacher as Co-Learner, Teacher as Reaffirmer, or Teacher as Leader.

The 48 items of the Survey of Technology Use in the COE were divided into 6 sections of selected-response and of open-ended items:

Section 1: Participant Information

Section 2: Computer Experience

Section 3: Instructional Technology Used in Teaching

Section 4: Instructional Hardware Used in Teaching

Section 5: Learning About Technology

Section 6: Profile of Instructional Technology use in the COE

A total of 39 (35%) out of 110 faculty members from the COE returned the survey by the deadline. The results are presented below organized by the 6 sections of the survey.

Section 1: Participant Information. The 39 participants who returned the survey included 21 female and 18 male faculty members ranging from new assistant professors (0 years experience) to tenured veterans with over 20 years experience. There were 10 (7 female, 3 male) assistant professors, 20 (10 female, 10 male) associate professors, and 9 (4 female, 5 male) professors who completed the survey. The average number of years in higher education for all ranks was 15.03 years and in the COE was 11.10 years.

Section 2: Computer Experience

This section of the survey asked for faculty's level of expertise with operating systems and instructional courseware used in teaching. Table 1 presents responses from the survey in table form, "enabling the researcher to present a large amount of data in a small amount of space" (American Psychological Association, 1994, p.120). The table shows self-reported levels of expertise across available operating systems and instructional courseware. Response options range from no expertise (none) to mastery (high level) of the technology.

TABLE I

OPERATING SYSTEMS: INSTRUCTIONAL COURSEWARE USED IN TEACHING

OPERATING SYSTEMS

Operating Systems	NONE	A LITTLE – know a little about it	MODERATE – know it pretty well	SUBSTANTIAL – know quite a bit	EXTENSIVE – know a lot	HIGH LEVEL – I have mastered it	OTHER
P.C.	-	9	4	8	10	1	-
Win 95	3	4	7	12	7	1	-
Win 2000	7	8	7	4	4	-	-
Win 98	2	5	6	11	7	2	-
Win NT	20	8	1	1	1	-	-
Win 3.1	14	4	5	5	2	2	1
Macintosh	10	3	7	7	4	3	1
OS-WARP-II	28	2	-	-	-	-	-
Other							3

INSTRUCTIONAL COURSEWARE USED IN TEACHING

Instructional Courseware	NONE	A LITTLE – know a little about it	MODERATE – know it pretty well	SUBSTANTIAL – know quite a bit	EXTENSIVE – know a lot	HIGH LEVEL – I have mastered it	OTHER
Tutorials	11	6	4	5	5	1	1
Drill & Practice	14	4	3	5	1	4	1
Simulations	14	5	4	4	3	1	1
Integrated Learning Systems	17	2	3	5	3	-	-
Games	10	7	4	3	3	1	-
Other							7

Table I shows a high concentration of "NONE" responses on both the operating system and instructional courseware sections of the table, thus indicating that newer operating systems or Macintosh's were where faculty reported a lack of expertise. In general, almost half (19.5/39) the faculty report no expertise with instructional courseware. The results from the other half are spread across the range from a little knowledgeable to a higher level.

Participant written comments included knowledge of additional operating systems: UNIX, DOS, Palm and Pocket Pilot P.C. Written comments included a listing of other types of instructional courseware used in teaching, such as presentations, PowerPoint, trial and error, tests, and web pages.

Section 3: Instructional Technology Used in Teaching

This section indicated the faculty's use of Blackboard.com, Lotus Notes, and Learning Space for:

a) Use in the class that meets on a weekly basis as a supplement to the course.

b) Totally online courses.

Table II presents responses from the survey in table form. The table shows self-reported answers to the survey. Response options range from supplemental to totally online use of platforms (Blackboard, Lotus Notes, and Learning Space) in teaching.

Participant's written comments included knowledge of additional instructional technology used in teaching: Do not use at all and how they used them (Supplement and Totally Online) for both.

TABLE II

INSTRUCTIONAL TECHNOLOGY
USED IN TEACHING

Instructional Technology Used in Teaching				
Instructional Technology	Supplement	Supplement and totally online courses	Totally Online Courses	Do not use
Blackboard.com	19	4	3	1
Lotus Notes	15	2	1	-
Learning Space	4	-	1	1

Table II shows a high concentration of answers in the supplement column of the table, indicating that a majority of faculty in the study use instructional technology in their teaching as a supplement to their courses.

Section 4: Instructional Hardware Used in Teaching

Table III presents data from Section 4 of the survey. This section of the survey indicated COE faculty level of expertise in the use of instructional hardware in teaching.

Table III shows a high concentration of answers in the NONE column from PC Laptops to Handheld Recorder and in the HIGH LEVEL column from TV and VCR Cart to Slide Projectors. This may indicate that the longer the instructional hardware used in teaching has been around, the more likely faculty are to have mastered it and the newer the instructional hardware the less likely faculty are to have any expertise.

TABLE III

INSTRUCTIONAL HARDWARE USED IN TEACHING

Instructional Hardware	NONE	A LITTLE – know a little about it	MODERATE – know it pretty well	SUBSTANTIAL – know quite a bit	EXTENSIVE – know a lot	HIGH LEVEL – I have mastered it	OTHER
PC Laptops	11	6	5	5	5	2	-
Apple iBook DV	18	6	5	1	4	1	-
Epson Projectors	14	3	8	6	4	-	-
Wireless Classroom	17	7	5	3	3	2	-
Sony Cameras	8	10	8	5	2	4	-
Transcribers	24	6	2	2	-	2	-
Handheld Recorder	12	8	5	4	3	4	-
TV and VCR Cart	-	2	4	5	13	11	-
Overhead Projectors	-	1	1	4	8	23	-
Projection Screen	-	2	1	5	7	22	-
Easel Stands	2	2	4	4	7	18	-
Walkie Talkies	15	2	6	5	1	5	-
CD/Tape Player	2	2	1	9	6	17	-
Camcorders	4	3	5	11	5	9	-
Slide Projectors	3	3	5	6	6	14	-
Teamstation	11	5	9	8	3	1	-
The Cart	4	8	6	7	7	4	-
Other	-	-	-	-	-	-	-

Section 5: Learning About Technology

Table IV summarizes reported methods for learning more about technology. The following three questions asked faculty to indicate the importance of various sources for learning about technology, getting, and accessing information about innovations. This section contains 3 questions and 28 sub questions about each individual's preferred methods for learning about technology. The three questions were:

I. In terms of media and methods for acquiring NEW computer application skills and knowledge, how important are the following to you?

II. In terms of HELP OR ASSISTANCE with using computers, how important are each of the following sources of support to you?

III. How important are the following sources of information to you for keeping abreast of changes/adoptions in the area of computers?

TABLE IV

LEARNING ABOUT TECHNOLOGY

LEARNING ABOUT TECHNOLOGY							
Learning About Technology Resources	NOT IMPORTANT	SOMEWHAT IMPORTANT – a little	MODERATELY IMPORTANT – pretty important	SUBSTANTIALLY IMPORTANT – quite important	EXTENSIVELY IMPORTANT – know a lot	HIGHLY IMPORTANT – very, very important	OTHER
On-Line Manuals	19	7	10	4	2	4	-
Hardcopy Materials	3	8	10	3	5	7	-
Hands-On Experimenting	2	2	4	7	11	11	-
Manual & Hands On	4	1	9	6	5	12	-
Workshop & Presentations	1	5	9	5	7	10	-
Structured courses/ Guidelines	4	12	8	2	6	4	-
Graduate Students	4	3	5	6	7	12	-
Colleague(s) on campus	4	3	7	6	8	9	-
Colleague(s) at another institution	15	6	8	4	2	1	-
Outside Professional Training	9	8	6	6	6	2	-
Media Center Support Staff	2	3	3	11	8	10	-
Hot-Line/Telephone	10	8	7	4	6	2	-
One-on-one	1	1	6	8	4	17	-
Friends & Family	5	7	3	8	6	8	-
Colleague(s) on Campus	4	4	5	7	4	13	-
Colleague(s) at another institution	14	7	5	3	5	3	-
Department Chair	18	11	2	1	-	1	-
University Administration	17	11	3	3	-	4	1
Graduate Students	3	7	8	6	6	6	-
Newspapers and Television	14	10	8	3	1	1	-
Computer Magazine	19	6	5	3	1	3	-
Computer Journals	25	5	3	1	1	2	-
Conferences, demonstrations, workshops	3	6	9	7	7	4	-
Newsgroups and Websites	15	9	7	1	3	1	-
Online Journals	21	9	3	1	2	1	-
Publications from Major Vendors	17	13	5	1	-	1	-
Hard/Software Catalogues/Broch.	15	13	7	1	-	1	-
Hard/Software V.	16	12	7	1	-	1	-

A heavy concentration of responses in the NOT IMPORTANT column indicate online and off-line, catalogues, brochures, and anything that does not involve a physical contact of some kind are not considered important. The most frequently selected responses indicating highly important included some form of physical contact with a person or experiment.

Section 6: Profile of Instructional Technology Use in the COE.

This section asked faculty to select in which level of expertise (or stage) they consider themselves to be:

Stage 1: Teacher as Learner

Stage 2: Teacher as Adopter

Stage 3: Teacher as Co-Learner

Stage 4: Teacher as Reaffirmer

Stage 5: Teacher as Leader

Faculty were also asked to explain the reason why they selected the category.

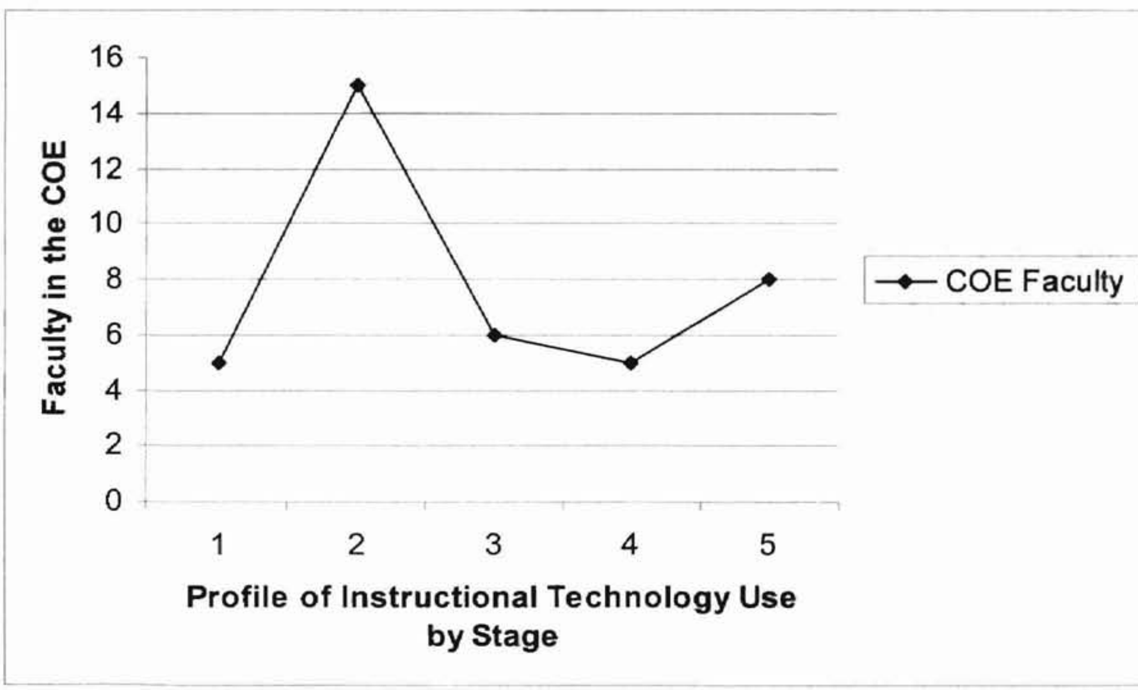

Figure 1. All Faculty by Stage.

Figure 1 shows a high concentration (15 out of 39) of faculty fall into Stage 2, Teacher as Adopter.

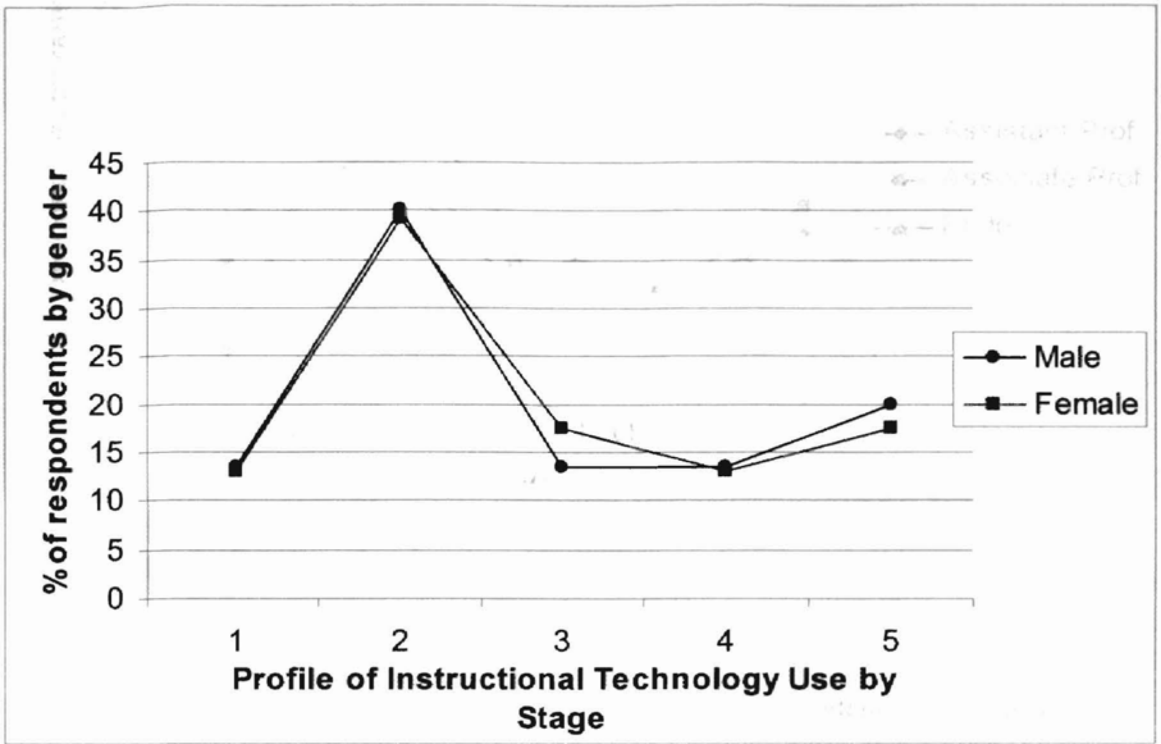

Figure 2. Percent of respondents (male; female) by stage.

Figure 2 shows a high concentration of faculty falling into Stage 2, Adopter, indicating that 39.13% of the faculty are categorized in the Teacher as Adopter Stage, regardless of gender. In addition, the majority of faculty (15) reported to be in stage 2 or below.

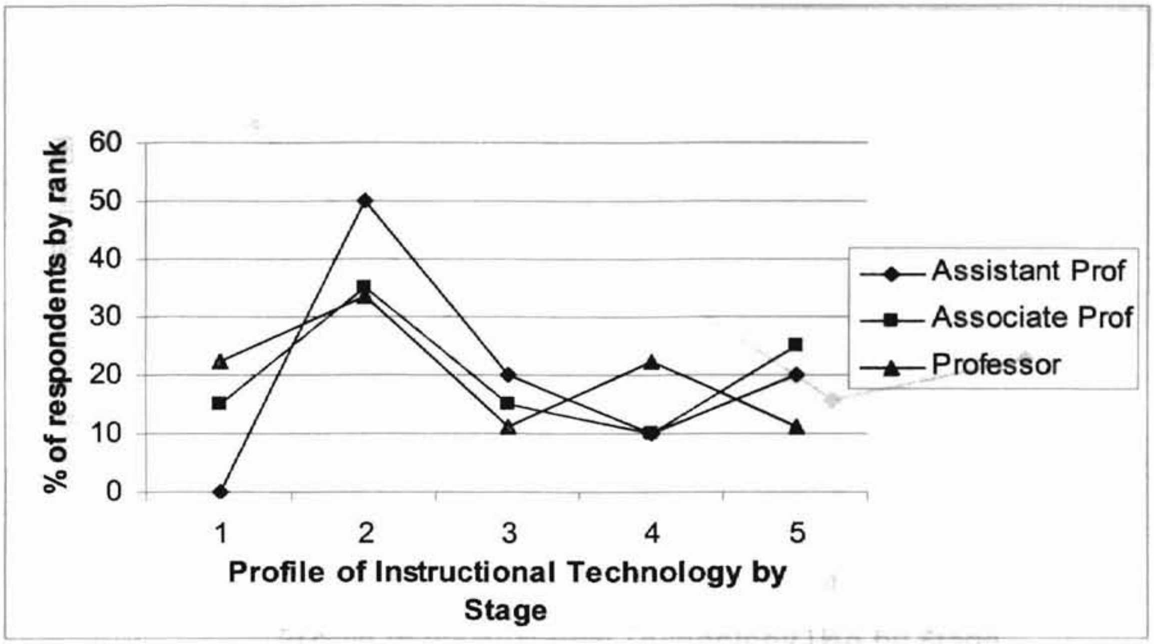

Figure 3. Percent of respondents (associate professor, assistant professor, professor) by stage.

Figure 3 shows that the highest concentrations of respondents (50% assistant professor, 35% associate professor, 33.33% professor) were categorized in the Teacher as Adopter Stage of the Learning/Adoption Trajectory Model (Sherry, Gibson, Billig, Tavalin, 2000). Most responses fall at Stage 2 or below.

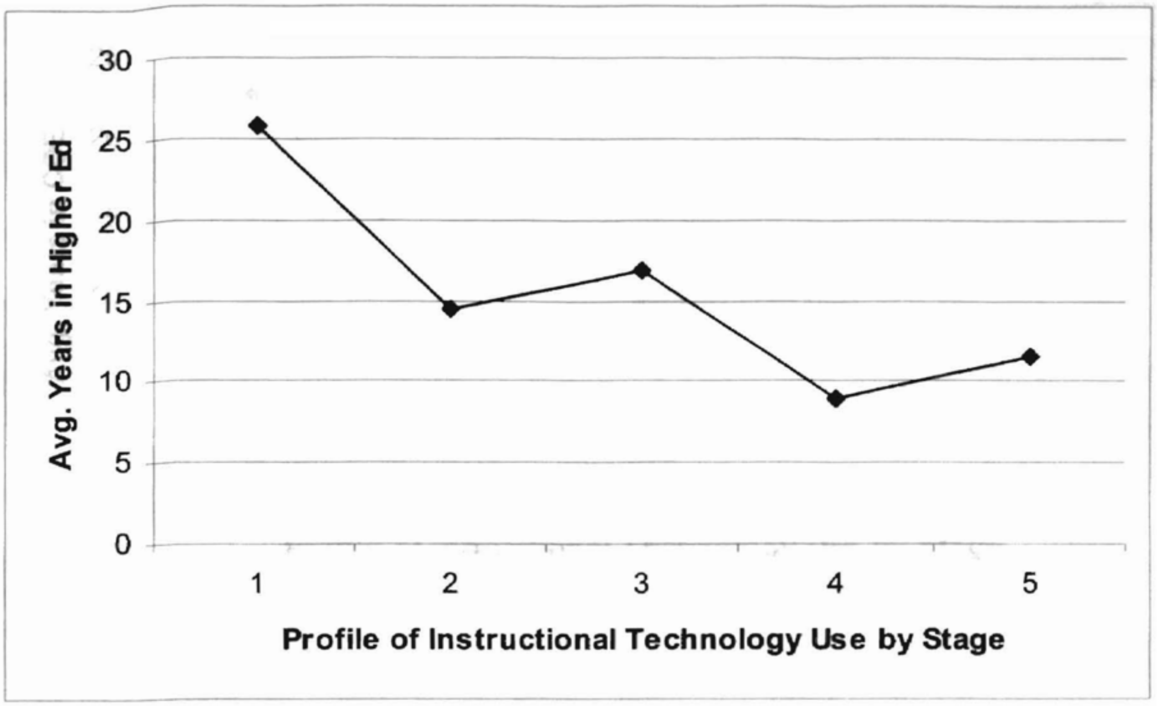

Figure 4. Average Years in Higher Education by Stage.

This figure compares the average number of years in higher education for each stage in the Learning /Adoption Trajectory Model. Figure 4 shows a declining "staircase" graph, indicating in general that the longer the faculty member has been in higher education, the lower the stage in which they feel comfortable using instructional technology in their teaching. The shorter period of time the faculty member has been in the COE the more comfortable they are with using technology.

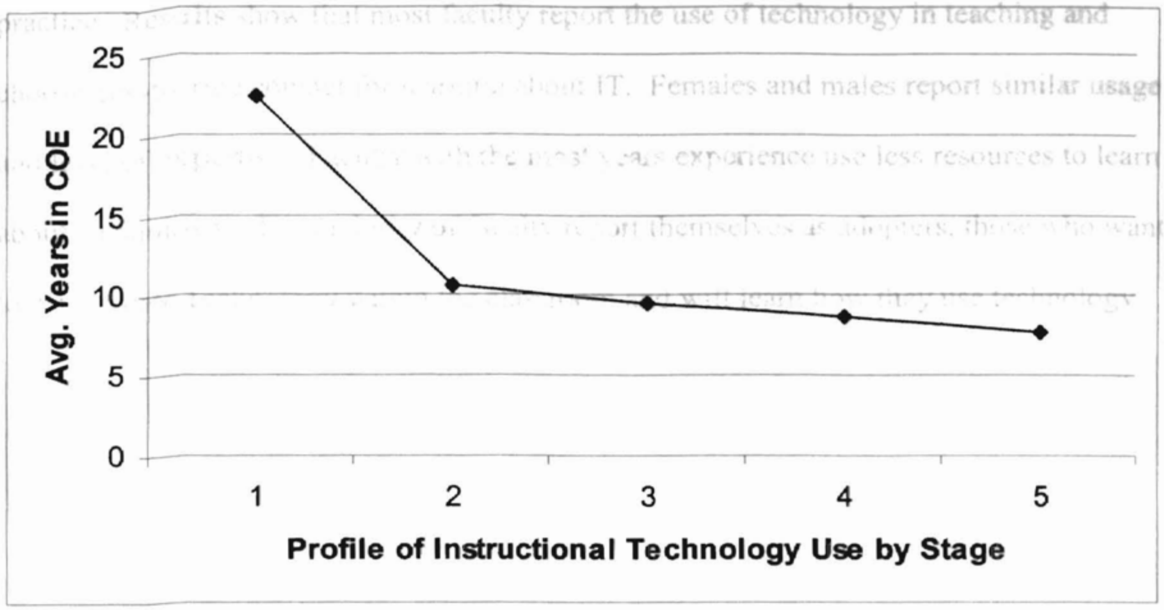

Figure 5. Average Years in COE by Stage.

Figure 5 compares the average number of years in the College of Education (COE) for each stage in the Learning /Adoption Trajectory Model. Figure 5 has a descending slope from the highest point, highest number of years in the COE, to the lowest point, fewest number of years in the COE. Indicating that the longer a faculty member has been in the COE, the lower the stage in which they report falling. The newer the faculty, the higher the stage they report. This may indicate that newer faculty may be more aware of newer technology, while faculty with more years in service may be less likely to keep up with technology.

Summary

The purpose of this study was to determine in what ways faculty members integrate technology into their teaching. Faculty in the COE report using technology in their teaching depending on training, knowledge, ability to be comfortable in using it, accessibility, years of experience and motivation in which to diffuse the knowledge into practice. Results show that most faculty report the use of technology in teaching and choose one-to-one contact for learning about IT. Females and males report similar usage and level of expertise. Faculty with the most years experience use less resources to learn about technology. The majority of faculty report themselves as adopters, those who want to incorporate technology within the classroom and will learn how they use technology.

CHAPTER V

DISCUSSION AND IMPLICATIONS

Introduction

This study found that college of education (COE) faculty report integrating technology into their teaching in a variety of ways. Preferred resources for learning technology vary as well. The level of expertise (or stage) most representative of faculty in this study is the adopter stage which indicates an incorporation of technology within the classroom and indicates various ways in which faculty incorporate technology effectively. Faculty integration of technology can be seen in many different ways and in many different areas of teaching.

A total of 39 (35%) out of 110 faculty members from the COE returned the survey by the deadline. The low return rate may be due to: time of year in which survey was distributed; faculty may have been too busy with the first of the year; or some faculty may have negative feelings about technology.

Interpretation of Results

Each table, in Chapter IV, contains data that reports faculty answers to each question in the survey and contains findings about how faculty learn and how they may not learn. According to Table I, faculty report that they may or may not use operating systems or instructional courseware in their teaching. Since most faculty report knowing a little about operating systems other than the one they use, they may need a little more incentive in increasing the use of operating systems and instructional courseware in the classroom. Table II reports that faculty are very involved with using instructional technology as a supplement to their teaching. Faculty use technology in their teaching as a tool to facilitate learning and not like a crutch that teaches for them. This result may show that some faculty are venturing into totally online courses, while others are moving more cautiously in using online course options as supplements. This could also be due to the development and recent improvements in online tools such as Blackboard.com. Table III reports that faculty know how to use older forms of technology, but may not have had training or time to use and learn about the new forms of technology. This result may show that more training and time for training is necessary. According to Table IV (number of respondents higher than 10 in the highly important category), most faculty report learning about technology by: one-on-one contact (17), hands-on experience (11), manual and hands-on (12), workshops and presentations (10), graduate students (12), media support center staff (10), and colleague(s) on campus (13). In other words, faculty learn about technology by collaborating with someone in the technology field, collaborating with someone who reports to be a teacher as leader, or by personal learning experiences. Participation with others in their own learning may influence a personal use of instructional technology in their own teaching, which may lead to a greater rate of adoption in the classroom.

When asked about learning new technology, faculty members' common response is they will learn it when they need it. Faculty learn about technology at their own pace and when interested may become motivated to incorporate new techniques into their teaching. If they begin increasing the use of instructional technology (IT) into their teaching, then their rate of adoption of IT may increase, signifying their growth in learning about instructional technology through each stage.

In integrating adoption within the society, the diffusion of IT helps to create a unified whole. If some use IT and others do not, then the society will function less effectively as a group and have the potential of futuristically have the potential of decomposing. We, therefore, must integrate adoption into the society so that the diffusion will spread throughout the group for a combined, full functioning organization. Integrated adoption of technology leads to diffusion within social systems, therefore increasing the level of education one needs to develop the skills and knowledge necessary for further involvement.

Comparison to Other Studies

Figure 4 and Figure 5 report a descending slope beginning at the Teacher as Learner stage down to the Teacher as Leader stage, which supports Hargrove's (2000) study in which she found that the longer the respondents had been teaching in higher education, the less likely they were to integrate technology. Participants in the present study indicated that the longer the instructional hardware used in teaching has been around, the more likely they are to have mastered it and the newer the instructional hardware the less likely faculty are to have any expertise in its use. This would lead one to assume that age might also be significantly related to technology integration (Hargrove, 2000). The longer faculty have been in higher education or in the COE, the less likely they are to know about technology. This may be due to fewer opportunities to learn about technology, lack of time to learn about it, lack of administrative support, or to other factors. Future research would be needed to determine influenced factors.

The results of this study also support MacDonald's (1999) study in which it was found that faculty members seem to gain the most benefits from collegial sharing and peer coaching. The highest concentration of respondents learning about technology learn through one-on-one contact (Table IV, Highly Important column (17)) according to my survey data. In other words, they would rather be face-to-face, working beside someone, than watching a video or reading books to learn about technology. Collaboration is very important for a faculty to successfully integrate technology into their teaching.

Implications

The highest concentration of faculty in the COE are categorized in the Teacher as Adopter Stage. This stage is three stages below the final stage (Teacher as Leader). Faculty can change levels of expertise (stages) by implementing and applying various forms of technology content to their teaching. Faculty may skip stages (those who become extremely innovative in using technology) indicating that learning and utilizing technology is an ongoing process that continues to evolve everyday with each new idea and is not a linear, one-dimensional process. Implications for this study concentrate on ways to increase levels of expertise (stages) for higher education faculty and to increase faculty technology use. Only 39 out of 110 respondents returned the survey, which is why implications for this study should not be seen as what the college needs as a whole, but what may be beneficial for those who did participate.

Higher Education

Teacher as Learner Characteristics

Five faculty members report to be in the Teacher as Learner stage. The Learning/Adoption Trajectory Model, stage 1 or Teacher as Learner stage is characterized as an information-gathering stage in which teachers learn the knowledge and skills necessary for performing instructional tasks using technology (Sherry, Billig, Tavalin, & Gibson, 2000). Faculty in this stage reported that they gained their understanding about technology from reading magazines and various journals, personal contacts, or other various resources (Table IV). Faculty also reported how they can use technology in their classroom (Table I-IV).

To increase instructional technology (IT) knowledge (moving from one stage to others) faculty must be willing to set aside time for training, professional development, and learning effective strategies to integrate technology into the classroom and the curriculum. Incentives given to faculty if they use technology in their teaching, may increase faculty motivation to make time to learn about technology and its many uses.

Teacher as Adopter Characteristics

Fifteen faculty members report to be in the teacher as adopter stage. In this stage teachers progress through stages of personal and task management concern as they experiment with the technology, begin to try it out in their classrooms, and share their experiences with their peers (Sherry, Billig, Tavalin, & Gibson, 2000). Faculty know a moderate amount about technology and have found more readily accessible elements to help them on their journey of learning about and implementing technology. This stage consists of technology adopters who want to incorporate technology within the classroom and will learn how they can do it effectively.

To increase IT knowledge to move faculty from one stage to a higher stage, they must be willing to collaborate with co-workers, access readily available technical support as well as online resources, and incorporate technology in their teaching given availability of technical support for their content which involves the use of technology. If the COE administration were to mandate technology use within the curriculum, then there may be more accessible forms of technology in every room, as well as, more technical and instructional support for different technological needs. Accessible technology and support for faculty may increase the rate of adoption and diffusion among faculty.

Teacher as Co-Learner Characteristics

Six faculty members report to be in the Teacher as Co-learner stage. In this stage, teachers focus on developing a clear relationship between technology and the curriculum, rather than concentrating on task management aspects (Sherry, Billig, Tavalin, Gibson, 2000). Faculty, as reported in Table IV indicated a substantial amount of collaboration (Graduate Students (12), One-to-one (17), etc.) in working with "technology."

To increase IT knowledge faculty must be willing to learn from or with students, attend workshops or online instructions to enhance instruction and the integration of technology into the curriculum, and work with colleagues to incorporate technology into their curriculum. The COE administration could give the faculty an incentive to incorporate technology, which may include release time with proof that faculty finished an online workshop or attended a training course to learn about technology.

Teacher as Reaffirmer Characteristics

Five faculty members report to be in the Teacher as Reaffirmer stage. In this stage, teachers develop a greater awareness of intermediate learning outcomes and begin to create new ways to observe and to assess the impact of technology on student products and performances, and to disseminate exemplary student work to a larger audience (Sherry, Billig, Tavalin, & Gibson, 2000). Faculty knew about technology hardware usage (Table III) which may be used in the classroom for the benefit of the student.

To increase IT knowledge faculty must anticipate learning outcomes involving the use of technology, encourage engagement among students, and identify evidence of technological impact on student products and performances. Faculty who have readily available technology to use in their classroom may be better prepared to evaluate students who use technology because they may use it in their teaching more because it is accessible to them. Faculty may need to encourage the administration to buy technology equipment for each room (computer, projector, and/or overhead projector) which would better facilitate the needs of teachers and would create less hassle in rounding up the technology needed to teach.

Teacher as Leader Characteristics

Eight faculty members report to be in the Teacher as Leader stage. In this stage, experienced teachers expand their roles to become action researchers who carefully observe their practice, collect data, share the improvements in practice with peers, and teach new members. Their skills become portable (Sherry, Billig, Tavalin, & Gibson, 2000). This stage consists of all the other stages put together providing an overall learning of technology. Faculty have mastered technology usage in and out of the classroom.

To increase IT knowledge faculty must have outside collaboration and support increasing role changes (ex. leader instead of co-learner), peer coaching, and outside support. Faculty must have the knowledge and time to disseminate data through workshops to their peers (teaching others about the information they have learned about using technology in the classroom). Faculty who reported to be in this stage may enjoy using technology and may use it without the help from anyone or without incentives from anyone. Therefore, the administration may need to help maintain up to date information about technology (like a faculty library with recent issues as well as back issues) to further the skills and knowledge of those who are leaders which may be disseminated to those around them.

Faculty Technology Use

More than half (20) reported to be in the 1st and 2nd stage, indicating much room for growth. The other respondents reported their range between the last three stages, with 8 reporting to be Teachers as Leaders. Those at the highest stage may be a significant asset for disseminating technological innovations throughout the college or they may become a model for others. COE administration could give each faculty member a professional development point, released time, or funds to purchase new technology for speaking to others about what they learned about using technology in their teaching giving them an incentive to collaborate with fellow faculty.

Faculty in higher education may use technology in many different ways, but do they know enough about products, support, or services to properly implement technology into their teaching? Organizational factors play key roles in the implementation and faculty use of technology. Administration for the COE has many ways in which they can influence faculty: incentives, mandatory knowledge about certain technologies, and accessibility to equipment. Incorporating IT into the curriculum with appropriate resources for faculty would raise adoption rate, which could be mandated by the administration.

> *Administrative support and availability of time to experiment and develop lessons or units and rubrics for assessment influenced adoption and integration, as did the sheer accessibility of equipment. Technology plans and support within the school and the larger community also served as significant facilitators* (Sherry, Gibson, Billig, & Tavalin, 2000, p. 44).

An organization's ability to promote learning among its members may make the difference between its thriving or perishing in the years ahead (O'Neil, 1995). If higher education wants to survive in the expansion of technology, then it must be prepared and prepare its faculty to implement it within their classrooms.

Technology Assistance

Faculty need reassurance that they are working with technology appropriately to best support their own teaching needs. Support personnel, colleagues, and administrators work together in the COE to better incorporate technology into their personal pedagogy. Without the help from those who integrate technology into the classroom, faculty may become frustrated or feel lost.

Faculty would benefit from technology assistance when the information given about technology usage (to learn about or to teach in their classrooms) is presented in a way that is understandable for the user who may implement technology into their teaching. Tutorials for technology equipment set-ups, workshops instructing the use of IT within teaching, and personal support for specific faculty needs may be very important pieces to help satisfy faculty needs in incorporating technology into their teaching and may help them incorporate technology into their teaching in many different ways.

Faculty would benefit from one-on-one contact with a technology person. The organization may hire a specific technologist who is then assigned to specific faculty for the sole purpose of meeting their needs and desires in using technology. Faculty would be able to call and arrange appointments at any time or ask for help at any time.

Future Research

This study was a descriptive study and had 39 (35%) out of 110 faculty from the COE return the survey, therefore limiting our interpretation of all faculty in the COE. It would be helpful in future research to have more participant involvement as to further determine any statistical significance in the data or goals for all faculty to incorporate.

Other future research could involve faculty and their students, categorizing students and teachers in the model (The Learning/Adoption Trajectory Model; Sherry, Billig, Tavalin, & Gibson, 2000) according to survey data to find learning levels for both and ways to increase the levels. Helping to identify whether the students value technology as much as the teacher in the class and to see what stages students and teachers are placed.

Conclusion About Faculty Integration of Technology into Their Teaching

Faculty may work with technology, but may not feel comfortable enough to use it on their own without nearby support. Faculty in the COE use older forms of technology

(Table III, TV and VCR Cart – Slide Projectors, High Level column) to integrate instructional technology in their teaching according to the data collected.

Bryan (1999) wrote that there will always be motivated (innovative) faculty that experiment in one form or another with technology. Motivated faculty will work with limited resources. However, universities wanting to offer programs or entire degrees online have to be willing to allocate sufficient resources to the project, in turn, increasing faculty's rate of adoption.

"Educational institutions can either embrace technology and support its use or suffer the consequences of an ill-prepared workforce entering our global economy" (Hargrove, 2000, p. 81). The world is constantly changing: technology is increasing, and faculty's technological innovativeness and integration of technology into their teaching is ever rising.

> *The most important lesson to remember is this: in large scale instructional technology programs, one must consider the total context of learning activities, including all people in the community (teachers, students, resident experts, administrators, and involved parents) who are using rapidly evolving technological tools to accomplish their intended purposes. It is through community participation, not simply through individual agency or perceptions, that the total identity of the system is shaped and sustained.*
>
> *(Sherry, Gibson, Billig, Tavalin, 2000, p. 45)*

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APPENDIXES

APPENDIX A

Survey of Technology Use in the College of Education (COE)

This survey was modeled on Michele Jacobsen's survey, Teaching and Learning with Technology in Higher Education, 1998.

Participant Information

The intent of this section is to obtain some information about individuals who respond to this survey. Information gathered about participants will be treated confidentially, and only GROUP data will be reported as an outcome of this research.

1. What is your gender?
   - ❑ male
   - ❑ female

2. What is your academic rank?
   - ❑ Assistant Professor
   - ❑ Associate Professor
   - ❑ Professor

3. How many years have you been a member of an academic faculty in higher education?

4. How many years have you been a member of the academic faculty in the COE at OSU?

Computer Experience

For each of the following 15 examples of instructional technology in the COE, please indicate:

Your current level of expertise

Level of Expertise: (0) None
(1) A little – know a little about it
(2) Moderate – know it pretty well
(3) Substantial – know quite a bit
(4) Extensive – know a lot
(5) High Level – I have it mastered
(6) Other – please specify

Operating Systems:

1. P.C. _______________
2. Win 95 _______________
3. Win 2000 _______________
4. Win 98 _______________
5. Win NT _______________
6. Win 3.1 _______________
7. Macintosh _______________
8. OS-WARP-II _______________
9. Other:_________________________

Instructional Courseware Used in Teaching

10. Tutorials _______________
11. Drill & Practice _______________
12. Simulations _______________
13. Integrated Learning System _______________
14. Games _____________
15. Other:___________________________

Instructional Technology Used in Teaching

For each of the following 3 examples of instructional technology, please indicate which one you use by marking each with an X:

(a) Use in a class that meets on a weekly basis as a supplement to the course.

(b) Totally online courses

16. Blackboard.com (a)_____________(b)_____________

17. Lotus Notes (a)_____________(b)_____________

18. Learning Space (a)_____________(b)_____________

Instructional Hardware Used in Teaching

For each of the following 18 examples of instructional hardware available in the COE, please indicate:

Your current level of expertise

Level of Expertise: (0) None
(1) A little – know a little about it
(2) Moderate – know it pretty well
(3) Substantial – know quite a bit
(4) Extensive – know a lot
(5) High Level – I have it mastered
(6) Other – please specify

19. PC Laptops from Pentium MMX to Pentium II ______________
20. Apple iBook DV SE ______________
21. *new Epson PowerLite Multimedia Projectors* ______________
22. Wireless, Portable Classroom (11 iBooks with wireless internet connectivity) ______________
23. Sony Digital Cameras with Floppy Interface ______________
24. Transcribers ______________
25. Handheld Recorder ______________
26. TV and VCR Cart ______________
27. Overhead Projectors ______________
28. Projection Screen ______________
29. Easel Stands ______________
30. Walkie Talkies ______________
31. CD/Tape Player ______________
32. Camcorders ______________
33. Slide Projector ______________
34. Teamstation ______________
35. The Cart (projector and computer on portable cart) ______________
36. Other:______________________________

Learning About Technology

Individuals tend to have preferred methods for learning more about technology. In the following three questions, please indicate the importance of each of the following methods to you for learning about technology, getting support, and accessing information about innovations.

Level of importance – please indicate how important each of the following items are to you.

a. Not Important
b. Somewhat Important – a little
c. Moderately Important – pretty important
d. Substantially Important – quite important
e. Extensive Importance – really important
f. Highly Important – very, very important
g. Other – please specify

I. In terms of media and methods for acquiring NEW computer application skills and knowledge, how important are the following to you?

37. on-line manuals _______________
38. hardcopy materials (books, etc.) _______________
39. hands-on experimenting & trouble shooting _______________
40. mixture of manual and hands-on _____________
41. workshops and presentations _______________
42. structured courses and guidance _______________

II. In terms of HELP OR ASSISTANCE with using computers, how important are each of the following sources of support to you?

43. experienced graduate student(s) _______________
44. colleague(s) on campus _______________
45. colleague(s) at another institution _______________
46. outside professionals trained in technology use _______________
47. media center support staff _______________
48. hot-line, or telephone assistance _______________
49. one-on-one assistance _______________

Level of importance – please indicate how important each of the following items are to you.

- *a. Not Important*
- *b. Somewhat Important – a little*
- *c. Moderately Important – pretty important*
- *d. Substantially Important – quite important*
- *e. Extensive Importance – really important*
- *f. Highly Important – very, very important*
- *g. Other – please specify*

III. How important are the following sources of information to you for keeping abreast of changes/adoptions in the area of computers?

50. Informal network of friends and family ______________
51. Colleague(s) on campus ______________
52. Colleague(s) at another institution ______________
53. Department chair ______________
54. University administration ______________
55. Innovative graduate students ______________
56. Popular newspapers and television ______________
57. Popular computer magazines ______________
58. Refereed computer journals ______________
59. Conferences, demonstrations, and workshops ______________
60. On-line computer newsgroups & websites ______________
61. On-line computer journals ______________
62. Publications from major computer vendors ______________
63. Hardware and software catalogues and brochures ______________
64. Hardware and software stores, vendors, supplies ______________

Profile of Instructional Technology use in the COE

Place an X in the square that describes you as a teacher using technology.

STAGE 1. Teacher as Learner In this information-gathering stage, teachers learn the knowledge and skills necessary for performing instructional tasks using technology.	
STAGE 2. Teacher as Adopter In this stage, teachers progress through stages of personal and task management concern as they experiment with the technology, begin to try it out in their classrooms, and share their experiences with their peers.	
STAGE 3. Teacher as Co-Learner In this stage, teachers focus on developing a clear relationship between technology and the curriculum, rather than concentrating on task management aspects.	
STAGE 4. Teacher as Reaffirmer In this stage, teachers develop a greater awareness of intermediate learning outcomes (i.e. increased time on tasks and greater student engagement) and begin to create new ways to observe and assess impact on student products and performances, and to disseminate exemplary student work to a larger audience.	
STAGE 5. Teacher as Leader In this stage, experienced teachers expand their roles to become action researchers who carefully observe their practice, collect data, share the improvements in practice with peers, and teach new members. Their skills become portable.	

Please give a reason for the category you have selected:

Thank you for participating in this VOLUNTARY research survey. Please return the survey within a week of its arrival. Please fold the survey in half and place it within the addressed envelope. Please put in outgoing campus mail. Thank you again for your time.

APPENDIX B

Letter to COE Faculty at a Midwestern University

Date

Dear Faculty,

I am working on my thesis research in Curriculum and Instruction with an emphasis in educational technology. I have created a survey modeled on one developed by Michele Jacobsen (1998) to collect information about the use of technology in your teaching.

Your participation in the collection of data is greatly encouraged, but entirely VOLUNTARY. All the information given in the survey will remain CONFIDENTIAL and will NOT be connected to a particular person in any way. No specific information will be disseminated. This survey is to better understand the use of technology in faculty teaching. Results will provide future directions for faculty technical assistance.

The survey is attached to this letter and will take approximately twenty to thirty minutes of your time. Please fill out the survey and return it within a week of your receiving it. Once you have filled out the survey please fold it in half and place it within the envelope located in the packet. Completing and returning this survey will imply consent to participate in this study.

If you would like to have a copy of the results please check the appropriate box.

- ☐ Yes, I would like a copy of the results.
- ☐ No, I would not like a copy of the results.

If you have any questions about the survey or my research, please contact me at 744-8010 or by email. You may contact my advisor Dr. Castle at 744-8019, a committee member, Dr. Lamphere-Jordan at 744-8142, or the IRB:
Sharon Bacher
IRB
Office of Research Compliance
Division of the Vice President for Research
Oklahoma State University
203 Whitehurst
Stillwater, OK 74078
405-744-5700

Thank you for your VOLUNTARY participation in my thesis research,

Lara Hagenson
Master's Candidate, Curriculum and Instruction (Emphasis in Educational Technology)
006 Willard Hall
744-8010
hagensonlara@hotmail.com

APPENDIX C

Oklahoma State University
Institutional Review Board

Protocol Expires: 5/24/02

Date: Friday, May 25, 2001 IRB Application No ED01129

Proposal Title: THE INTEGRATION OF TECHNOLOGY IN TEACHING BY UNIVERSITY COE FACULTY

Principal
Investigator(s):

Lara Hagenson
002 Willard
Stillwater, OK 74078

Kathryn Castle
235 Willard
Stillwater, OK 74078

Reviewed and
Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson

Carol Olson, Chair
Institutional Review Board

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VITA

Lara Catherine Hagenson

Candidate for the Degree of

Master of Science

Thesis: THE INTEGRATION OF TECHNOLOGY INTO TEACHING BY UNIVERSITY COLLEGE OF EDUCATION FACULTY

Major Field: Curriculum and Instruction

Biographical:

Personal Data: Born in Los Alamos, New Mexico, On February 12, 1978, the daughter of Randy and Mary Jane Hagenson.

Education: Graduated from Bartlesville High School, Bartlesville, Oklahoma in May 1996; received Bachelor of Science degree in Elementary Education from Oklahoma State University, Stillwater, Oklahoma in May 2000, respectively. Completed the requirements for the Master of Science degree with a major in Curriculum and Instruction at Oklahoma State University in December, 2001.

Experience: Employed by Oklahoma State University as a library assistant during my undergraduate and graduate status from May 2000 to December 2001; employed by Oklahoma State University, Education Extension as an Information Technology Instructional Support staff (G.A.) and Star Schools Grant (G.A.), December 2001 to present.