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Walden University
2015

Abstract

Factors Influencing the Adoption of Learning Management Systems by Medical Faculty

by

Kristy Burrough

MA, Southern Nazarene University, 2011

BS, Southern Nazarene University, 1999

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Education

Walden University

December 2015

Abstract

Despite recommendations by the Association of American Medical Colleges regarding the adoption of technology in medical universities, faculty are still reluctant to adopt new learning technologies. The purpose of this qualitative interview study was to determine the factors existing in the adoption of learning management technology among late adopters within the faculty of colleges labeled as comprehensive academic medical centers. Using the Everett Rogers diffusion of innovations theory as its framework, this study sought to ascertain the factors late adopters identify as preventing them from adopting technology and to determine what measures they suggest to increase technology adoption among their peers. This qualitative study used interviews of participants identified as “late adopters” and subsequent document analysis to provide evidence for the factors identified. Using in vivo coding, data were organized into 5 themes: factors, learning management systems, demographics, general technology, and solutions. Results showed that late adopters avoided adopting learning management technology for several reasons including training, time, ease of use, system changes, lack of technical support, disinterest, and the sense that the technology does not meet their needs. Recommended solutions offered by faculty included varied times for trainings, peer mentoring, and modeling learning management system use among faculty. Understanding these factors may contribute to social change by leading to more rapid adoption and thus introducing efficiencies such that faculty can dedicate more time to medical instruction. It also may aid other universities when considering the adoption of a learning management system.

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Chapter 1: Introduction to the Study

Introduction

Academic medical centers are fundamental to creating knowledge and educating more than 200,000 health profession students yearly. Comprehensive academic medical centers comprise professional health schools in medicine, dentistry, public health, allied health, pharmacy, graduate studies, and nursing. Educators in these centers consist of health professionals and researchers who are experts in their fields, but often do not have traditional training as educators (Lewis & Baker, 2009). As a result, they need the help of trained education professionals to excel in the classroom. For example, the mission of academic technology departments is to train faculty on how to use technology. As technology changes and technology use among medical students increases, so too do the modes and methods of how teachers educate students. Given the rapid pace of technological transformation, determining the factors influencing the adoption of technology among faculty in the classroom is even more important, especially given the lack of traditional teacher training and changes in technology. This study thus focused on the factors affecting the adoption of a learning management system with medical educators at a major comprehensive academic medical center.

Chapter one introduces the study. The background includes an overview of studies used in the literature review of the study. I review the problem and the gap addressed in this study in the problem statement section. In this section I also discuss the purpose of this study and my research questions. Rogers' (2003) theory of diffusion served as the framework for this study, and I outline how I used Rogers' theory framework section. Next I set forth the rationale, key concepts, and methodology I used,

and offer a list of definitions to assist the reader through this study. In the assumption section I discuss the assumptions that I brought to the study, and then move to a discussion of the scope of delimitations in order to articulate the boundaries of the study and why the specific problem was chosen. In the limitations section, I set forth the limitations that existed in my methodology, and discuss researcher bias and how I addressed biases in the study. I conclude this chapter with a discussion the significance of studying this problem.

Background

Education in general, and medical education in particular, has been slow to adopt technology (Phillips & Vinten, 2010). Medical educators are subject matter experts in their field, but most are not traditionally trained as educators, and thus are often slow to adopt educational changes including changes in educational technology. The University employs them as researchers or clinicians who are given the additional duties of teaching. Faculty training and support can help to make their experiences as educators more manageable and advantageous, and training and support benefit both the educator and the student alike.

The adoption of technology in educational contexts has multiple effects on both faculty and students. Joseph (2007) reported on a study conducted by Netday and the U.S. Department of Education showing that students were knowledgeable in technology use and application. This technological savvy has led students to seek colleges and universities that are technologically enabled (Crowson, 2005). E-learning is one tool used to integrate technology into the classroom while increasing faculty and student effectiveness. Several reports and surveys conducted within higher education have shown

job skills, the integration and evolution of eLearning, and data-driven assessment and learning are emerging trends in higher education. While higher education has adopted the use of this technology, many medical educators are still grappling with adoption. A study by Chowdhury (2009) examined the large sums of money being spent by higher education for these types of systems that lack adoption by faculty and found that these systems were not being utilized.

Technological changes in the medical field and changing role of technology in the health sector also suggest the need for the adoption of new technologies in medical educational contexts. In a recent study, Robin, McNeil, Cook, Agarwal, and Singhal (2011) examined these changes, and offered suggestions for preparing medical faculty for the adoption of technologies, which the authors had first identified at the *20/20 Vision of Faculty Development Across the Medical Education Continuum* conference in February 2010. The digitization of information, the rising amount of new information, a new generation of students, new emerging educational technologies, and constant change were recognized as trends affecting medical education. The following recommendations were made by the authors, use technology to support learning; focus on basics; allocate varying resources; support and applaud faculty as they adopt new technology; and stimulate collaboration (Robin et al., 2011).

Several other studies have examined the use of technology in medical education. A study conducted by Chavis (2010) focused on the adoption of electronic medical records and their use among faculty in higher education. The study aimed to determine if age, job role, learning culture, and time in specialization had any effect on the adoption of technology. A sociocultural model, organizational learning model, fifth discipline model,

and Dimensions of Learning Organization Questionnaire® model guided Chavis' (2010) mixed methods study. The use of eLearning in medical education has also been examined in several other notable studies including those by Delf (2013), Harden (2005), and Ruiz, Mintzer, and Leipzig (2006).

As a framework for this study, I used Rogers' theory of diffusion, one of the most widely used in the social sciences to determine the diffusion of innovation process (Hazen, 2011; Joseph, 2007). In particular, Rogers' different levels of adoption have been used in many technology studies. Rogers (2003) defined five different adopter levels including innovators, early adopters, early majority, late adopters, and laggards. Late adopters are the category I focused on in this study.

The university that I studied is considered a comprehensive academic medical center covering all areas of health service. These areas consist of a college of allied health, college of dentistry, college of pharmacy, nursing, college of medicine, college of public health, and a graduate college. No research was discovered in reference to the adoption of a learning management system at a comprehensive academic medical center.

Problem Statement and Purpose of the Study

The rise of technology in medical universities has changed how students learn. Faculty are still slow to adopt new technologies despite this rise. The reluctance to adopt technology by faculty becomes relevant "because the use of online resources as a primary source of learning or in conjunction with traditional education methods has been shown to enhance student learning and encourage self-directed learning" (Kowalczyk & Copley, 2013, p. 28). At the 2010 "2020 Vision of Faculty Development Across the Medical Education Continuum" conference, dialogue ensued around technology's role in medical

education and the support of faculty who adopt technology. The digitization of information, the rising amount of new information, the new generation of students, new emerging educational technologies, and constant change were recognized as trends affecting medical education. Conference participants established these recommendations for medical education: technology to support learning, focus on basics, allocate varying resources, support and applaud faculty as they adopt new technology, and stimulate collaboration (Robin et al., 2011). However, faculty are still hesitant to adopt new technologies, and cite the absence of skills and resources, inadequate facilities and equipment, and time pressures as reasons for their lack of technology adoption (Baldwin, 1998; Ruiz et al., 2006). A deep understanding of why these factors exist can help boost the adoption of technology in a comprehensive academic medical center, especially the adoption of learning management systems that have been proven to offer significant help to students and faculty.

Online learning tools offer faculty and student's easy access, flexibility, and the integration of multimedia tools (Johnson, Adams, Becker, Estrada, & Freeman, 2014), and the importance of technology use with medical students has been shown in several studies. While there is plenty of research concerning the adoption of technology and distinct demographics, none has related to the specific factors informing technology adoption, especially learning management systems, in comprehensive academic medical centers. This study becomes even more relevant because faculty are subject matter experts in their area of medicine or research, but most are not traditionally trained educators. The adoption of technology helps faculty improve classroom management, improve student cognitive skills, increase cost-effectiveness, and increase collaboration

(Kidd, 2013; Ruiz et al., 2006). Therefore, the purpose of this qualitative interview study is to determine factors that prevent the adoption of learning management technology among late adopters within the faculty in colleges labeled as comprehensive academic medical centers.

Research Questions

The research questions for this study are:

RQ1: What factors do late adopters identify as preventing them from adopting technology in a comprehensive academic medical center?

RQ2: What measures do late adopters suggest to increase technology adoption among faculty in a comprehensive academic medical center?

Framework

In carrying out this research, I examined the barriers to adoption and how to diffuse those barriers using Rogers' (2003) diffusion of innovations theory. Diffusion is defined as "the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 5). Rogers (2003) has described five different stages that define the innovation-decision process including knowledge, persuasion, decision, implementation, and confirmation. He has also defined five adopter categories and their associated rate of adoption: innovators, early adopters, early majority, late majority, and laggards. This study focused on what prevents the adoption of technology by late adopters in a comprehensive academic medical center. Building on Rogers' theory, Myers (2010) posited that the lack of adoption by faculty in the health industry could lead to costly failures, delays, and workforce issues. In his study of the diffusion process among African-American dentists in Chicago, Abdullah (2005)

likewise has stated that diffusion studies can aid in showing how innovations are diffused in industries such as healthcare. Phillips and Vinten (2010) studied clinical nursing instructors and their willingness to adopt teaching strategies by looking at the compatibility, trialability, and relative advantage of the strategies.

Nature of the Study

This study was a qualitative interview study. The characteristics of a qualitative study include the focus on the analysis of a case, the use of interviews, and the development of a detailed description to provide in-depth understanding of the case (Creswell, 2013). My study closely followed the techniques of a case study, which involves the study of an individual or group in a real-life setting (Yin, 2014). Field work, in a case study, is conducted in the setting in which participants conduct their normal daily activity, allowing the researcher to collect in-depth information by using data collection methods such as observations, interviews, and focus groups about the research being conducted. This qualitative study allowed me to discover in-depth what prevented the adoption of a learning management system and why those factors existed by using interviews and document analysis. I organized the data by using the ATLAS.ti software package.

I requested course coordinators choose the participants in each college. I encouraged them to identify and select faculty participants who had waited until the last year to adopt the learning management system, who were skeptical about adopting until success was evident with other faculty members, who were typically not as social as other faculty, and who were typically not the leaders in technology adoption among their peers (Rogers, 2003). I used face-to-face interviews to determine the factors that

informed the adoption of the learning management system with late adopters. In order to validate the interview findings, I conducted a document analysis

Definitions

eLearning or electronic learning: Learning that takes place with a student or instructor by using online technology such as a learning management system (Sanders & Udoka, 2010).

Blended Learning: A form of instruction that blends the use of technology and face-to-face learning to conduct classes (Delf, 2013).

Learning Management System: A tool used in eLearning, distance learning, and blended learning as a curriculum management tool. Available tools include discussion boards, chat rooms, grade books, online exams, announcements, assignment management, and email (Findik, Coşkunçay & Ozkan, 2013; Joseph, 2007).

Educational Technology: The Association for Educational Communications and Technology define educational technology as “the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources” (Januszewski & Molenda, 2008, p. 1).

SCHOLAR: A type of computer aided instruction (CAI) and created by Carbonell (1970) used to review the knowledge of a student in a content area.

LOGO: Programming language created by Seymour Papert to help teach youth constructive learning using the constructivist philosophy (What is Logo, n.d.).

Assumptions

Assumptions of this study included the following:

- Because adoption barriers of late adopters were studied, participants should have

adopted the learning management system within the last year and are considered amongst the last third of adopters in the college.

- Because of the confidentiality precautions put into place for the study, I assumed participants would be truthful with their answers.

Scope and Delimitations

The scope of this study included one late adopter from each health college at a local comprehensive academic medical center. I examined the adoption of a learning management system, a tool that can lead to increased classroom management, increased collaboration among students, and increased cost effectiveness.

The study was bound to a local comprehensive academic medical center and its faculty within each college. I chose one late adopter from each college to participate in the study, and selected alternate participants in the event that a participant dropped out of the study. Late adopters were chosen because of the need to identify existing factors involved in the adoption of a learning management system. I chose Rogers' (2003) theory of diffusion of innovations for my methodological framework because of its long history and use with determining barriers to technological adoption.

Limitations

Limitations of this study included my inexperience as a researcher and the time I had to conduct the study. Student dissertations are not designed to last for a long periods of time, but I plan to continue the study subsequent to enrollment in my doctoral program. My role as a student in the dissertation process may also have been a limitation. Working with the dissertation committee helped eliminate these problems. To address challenges and bias in the study, I used member checking and triangulation (Maxwell,

2013; Yin, 2014). Member checking consists of creating a report of the data collected then sending it to the participants for analysis (Creswell, 2013). I collected data for this study by conducting interviews and document analysis of the data collected. I also used purposeful and criterion sampling to prevent unusable data in the study.

Significance

This study contributes to existing research by aiming to increase understanding of the factors involved in faculty adoption of a learning management system in a comprehensive academic medical center. This study will hopefully aid in increased collaboration among students, increased classroom management, and increased cost effectiveness. Changes in health care have increased the load on faculty and affect classroom time; thus, improved classroom management has become an important concern (Kidd, 2011; Ruiz et al., 2006). Also, “e-learning can be used by medical educators to improve the efficiency and effectiveness of educational interventions in the face of the social, scientific, and pedagogical challenges” (Ruiz et al., 2006, p. 207).

Ruiz et al., (2006) also noted that technology use in the classroom enriched the teaching experience and the learning experience among faculty, students, and administration. They also recognized the increased collaboration because the ability to learn from students outside the university. Learning management systems also allow for anytime, anywhere learning, and academic medical centers have spent a large amount of money to support this technology infrastructure (Myers, 2010). In addition, with the use of Electronic Medical Records (EMRs) within the healthcare system it has become imperative for health professionals to be technology savvy. Lack of faculty adoption in universities ultimately leads to a waste of resources and creates inequality in education

for students (Chavis, 2010).

Summary

This chapter served as an introduction to and outline of the study I conducted. It began with a brief overview of the background of the key literature I examined, and was followed by the problem, purpose, and research questions for the study. Next I offered a short description of the theory used in the study, and concluded with an overview of the nature of the study, key definitions, assumptions, scope and delimitations, limitations, and the significance of the study. Chapter two begins with a survey of the history of educational technology since World War II. This survey demonstrates the different technologies that have emerged and grown over the years. Next, I offer an examination of the use of technology in higher education and medical education, and conclude with a review of the theoretical literature used for the study.

Chapter 2: Literature Review

Introduction

History has shown us change is inevitable but that many are resistant to change. For decades, many universities have offered distance education via a variety of platforms including postal correspondence (Hazen, Wu, Sankar, Jones-Farmer, 2012). However, higher education has traditionally been slow to adopt changes to methods of course delivery. Like their peers across campus, medical educators often resist potentially beneficial changes to education. The purpose of this study was to determine the factor in adopting learning management technology by faculty in colleges that are labeled as a comprehensive academic medical center. I began my research by conducting a literature review using the following databases and search tools: Google Scholar, Walden and ProQuest Dissertations, Thoreau, EBSCO Education Research Complete database, and EBSCO CINAHL Complete database. Keywords used for the searches include: *diffusion studies, medical diffusion studies, Rogers' diffusion studies, education, medical education, technology, learning management systems, history, educational technology, eLearning, higher education, and health education*. I also used the Association of American Medical Colleges (AAMC) website to find up-to-date literature on eLearning and medical colleges. This research focused on literature within the last five years, but did discover literature that was older. There is one publication that showed significance in the field and was used in this literature review but is dated 2007. Terms used for searches included terms such as eLearning, online learning, and educational technology. As a student member of The Sloan Consortium, I also searched the Journal of Asynchronous Learning Networks using keywords *eLearning* and *health education*. This

literature review provided me with an understanding of the use of and need for technology in the healthcare sector, higher education, and medical schools. It also helped me identify a gap in studies related to the lack of adoption by comprehensive academic medical centers.

The next sections of the literature review focus on (a) the history of educational technology since World War II, (b) technology in higher education, (c) technology use in medical education, and (d) Rogers' diffusion of innovations theory. The history of educational technology since World War II shows the evolution of educational technology. This history is important in showing how technology and learning theories have grown over the years. The section regarding technology and higher education shows the trends and challenges for faculty when adopting technology in the higher education setting. Five key technology trends affecting medical education and recommendations for dealing with these trends are the focus in the technology use in the medical education section. Finally, the section on Rogers' (2003) diffusion of innovations theory looks at studies conducted in higher education and medical education using his diffusion of innovations framework.

History of Educational Technology Since WWII

The history of educational technology finds its origins in military training and research with individual influence from psychologists such as Robert Gagne, Leslie Briggs, Howard Gardner, and Jean Piaget (Reiser, 2001; Saettler, 2004). Noting these origins, Dousay (2015) has stated, "our beginnings are really rooted in the explosion of the uses of various technologies like film, slides, and instructional design techniques as applied to large numbers of learners in the military who had to be effectively prepared for

battle in very little time” (p. 18). The definition of educational technology has changed throughout the years, with the Association for Educational Communications and Technology (AECT) defining educational technology as “the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources” (Januszewski & Molenda, 2008, p. 1). Key phrases in this definition include ethical practice, facilitating learning, improving performance, and managing technology. All these should be taken into account when integrating technology into the classroom. There is also a historical connection between communication and educational technology with a blending of cinema, radio, television, journalism, and speech with curricula such as psychology, social psychology, social science, English, and library science (Saettler, 2004).

Between the 1950s and 1980s, communication technologies and the theory of behaviorism began to impact the classroom. Saettler (2004) has noted “a major impact of behaviorism on educational technology can be seen in the development of teaching machines and programmed instruction during the 1960s” (p. 293). Originally having its beginnings in the military, programmed instruction used the principle of operant conditioning to apply positive reinforcement in education (Molenda, 2008). In 1957, Harvard University was the first to use programmed instruction in higher education (Januszewski & Molenda, 2008; Saettler, 2004), and Robert Gagne and Leslie Briggs proposed a model for instructional technology with the following five components: action, object, situation, tools, constraints, and the capability to learn (Saettler, 2004). The 1950s also saw the rise of computer-assisted instruction, a spin-off of programmed instruction (Januszewski & Molenda, 2008; Saettler, 2004). The first commercial

computer was the UNIVAC 1, which emerged on the market in 1951 and was sold to the U.S. Census Bureau (Technology timeline: 1752-1990). By the 1960s, Skinnerian teaching machines were being used for drill-and-practice and tutorials. In drill-and-practice, a student would be asked to respond to questions on the screen. Depending whether the question was correct or incorrect the machine would respond with “wrong” or additional study material. Because of inconsistencies in effectiveness, lack of theoretical support, and student boredom, programmed instruction began to see a decline as early as the 1960s (Saettler, 2004).

Another revolution taking place between the 1950s and the 1980s centered on cognitive science, and by the 1970s cognitive science impacted education. Saettler (2004) defines cognitive science as placing emphasis on the student’s active problem solving as opposed to the student as a passive participant. Psychologists such as Gardner, Miller, Neisser, Piaget, and Bruner, and events such as the Symposium on Information Theory, Cognitive Psychology, and the Study of Thinking were key to “the cognitive revolution” (Saettler, 2004). With the focus on cognitive science, education began to take a renewed interest in students problem solving. Computer-assisted instruction began to rise with programs such as SCHOLAR (Carbonell, 1970) and LOGO (Saettler, 2004). Carbonell’s (1970) SCHOLAR program focused on Socratic tutoring and was meant to imitate the way a teacher taught. As a way to allow more active problem solving, Papert created the LOGO program to teach young students cognitive skills by learning how to program a computer (Saettler, 2004).

The 1980s marked the beginning of the digital age with the rise of the microcomputer and continued increase in computer-based instruction (Reiser, 2001). The

Macintosh computer was making its way into the K-12 classroom and the report *Information Technology and Its Impact on American Education* was released by the Office of Technology Assessment. IBM also introduced its first personal computer in 1981. At first, computers were used for drill and practice and it did become somewhat common in the classroom (Saettler, 2004). In 1983, the personal computer was named Times 1982 Man of the Year (Technology timeline: 1752-1990). The 1980s paved the way for technology in the classroom. Because of the need for students to learn cognitive skills, education in the 1990s began to see improvements on tools such as improved computer-assisted instruction software, interactive multimedia systems, and intelligent tutoring systems (Saettler, 2004).

Our current period is known as the information age or the Internet age where there is a vast amount of information available (Albirini, 2007; Aslan & Reigeluth 2011). As a result of the introduction of the World Wide Web, we have more information at our disposal and it is accessible anytime and anywhere (Toffler, 1990). The use of the Internet in education has required teachers to change how they teach in the classroom. Instead of a teacher being the “sage on the stage” they are now encouraged to engage students in the classroom (Thormann, Gable, Fidalgo, & Blakeslee, 2013). Therefore, students are now expected to construct their learning and teachers are expected to facilitate that learning. Internet-based activities have produced a close relationship to constructivism. Constructivism is defined as a social process that often takes place during activities such as discussions, conversations, and listening. The use of technology allows students to interact with others in and outside the classroom, thus allowing the construction of knowledge (Schroll, 2007). Learning management systems, Web 2.0

tools, and other applications tools for education are all a result of using the Internet in the classroom (Aslan & Reigeluth 2011). Tools we will see in the future classroom including gaming, wearable technology, robotics, and 3D printing (Dousay, 2015). However, even with the advent of these tools, there is still reluctance by educators to use them. This reluctance is related to civic, economic, political, and social supports (Cuban, 2010). Our current time has also seen a rise in health information technology in both healthcare as a whole and medical education.

Technology and Higher Education

The increase of technology in the 21st century has presented challenges to colleges and universities throughout the nation, and many have been slow to meet these challenges. Patzer (2010) notes “in particular, numerous online learning programs, high-tech mobile devices, social media applications, and the accompanying modifications in teaching practices revolutionized the academic world” (p. 1). Joseph (2007) reported on a study conducted by Netday and the U.S. Department of Education that students today are knowledgeable in technology use and application. Technology savvy students have strong feelings and values about technology as a component of their everyday lives, and they have begun to seek colleges and universities that remain competitive by becoming technology-enabled (Crowson, 2005). Organizations also continue to express the need for educational institutions to include technologies to help prepare students for future careers. Justification for this increase includes improved quality of learning, education of students on everyday technology skills, and increased access to educational tools (Ernst & Clark, 2012; Patzer, 2010). It should be noted, the use of technology alone does not improve student learning, but does show more student engagement and student collaboration

(Edwards & Bone, 2012; Ernst & Clark, 2012).

With regards to skills needed after a student's education career, Joseph (2007) has claimed, "It has become a necessary requirement of most employers that prospective employees must be fully knowledgeable in the use of computing technologies" (p. 21). In a survey conducted by Educause, higher education leaders reported colleges should be targeting job skills with students (Bichsel, 2013). The following studies show research has been conducted in higher education institutions to determine adoption rates, adoption successes, and adoption barriers.

In a 2014 New Media Consortium Horizon Report of Higher Education, there were several challenges and trends affecting higher education and the adoption of technology (Johnson, Becker, Estrada, & Freeman, 2014). The growing ubiquity of social media, integration of eLearning, increase of learning driven by data and assessment, agile approaches to change, shift from students as consumers to students as creators, and the evolution of eLearning are among all the key trends accelerating technology in higher education (Johnson et al., 2014). Of particular interest to this literature review is the information regarding eLearning. The report showed that eLearning leverages students skills, allows for increased collaboration, equips students with digital skills, ease of use access, offers flexibility, allows for integration of multimedia technologies, and addresses individual student needs. The challenges higher education will face with the increase in eLearning include low digital fluency of faculty, lack of rewards for teaching, competition from evolving models of education, escalating teaching innovations, expanding access, and protecting education relevancy. The report showed, despite the increase in digital tools in education, educators are still not receiving the training during

their teacher preparation courses. However, this training is being conducted in professional development with faculty in higher education. Higher education is reacting to the issue of faculty balancing priorities between research and citations by hiring more adjunct professors (Johnson, et al., 2014).

According to Patzer (2010), distance education, an online learning program, is the most successful technology innovation in higher education. A report conducted by the Association of Public Land–Grant Universities-Sloan National Commission on Online Learning in 2009 surveyed 45 public institutions, 231 interviews with administrators, faculty, and students with approximately 11,000 responses from a faculty survey focusing on key factors contributing to successful online programs in higher education. Among these key factors were support for course design and delivery, policies regarding intellectual property, and faculty incentives (McCarthy & Samors, 2009). The advantages of eLearning include improved learning delivery, standardized content and delivery, easier content and learner tracking, active learning, student control, and transparency (Joseph, 2007; Ruiz et al., 2006). Some disadvantages include substantial investments in faculty, money, time, and space. Faculty who are not technology savvy, also require more coercing and training (Joseph, 2007). Challenges of e-learning include the need for program directors to “restructure their organizations, develop new policies, train instructors, maintain a robust technology infrastructure, and offer online student services, all while they sustain the quality of online instruction” (Patzer, 2010, p. 48).

Learning management systems are one tool used in eLearning as a curriculum management tool; therefore, addressing many of the issues related to eLearning (Findik Coşkunçay & Ozkan, 2013). Joseph (2007) describes learning management system as

platforms for collaboration that make tools such as discussion boards, chat-rooms, and email available for faculty and students. Other tools used with learning management systems include announcements, online grade books, schedules, online exams, syllabi, assignment management, and course plans (Findik Coşkunçay & Ozkan, 2013; Joseph, 2007; Spelke, 2011). Moodle, Desire2Learn, Blackboard, Angel, and Sakai are among the well-known learning management systems used in higher education (Spelke, 2011). Gautreau (2011) determined that the ability to differentiate learning, incorporate multimedia, improve communication, and improve teaching and learning are all benefits of using a learning management system. Despite the problems or benefits, the decision to adopt a learning management system is usually left up to the decision of the instructor (Findik Coşkunçay & Ozkan, 2013).

Joseph (2007) conducted a quantitative study at a university to determine the level of computing skills and attitudes necessary to adopt technology. He discussed two different schools of thought regarding technology adoption. First, the explosion of innovative projects and activities placed on technology has impacted the future of education. This explosion has pressured higher education institutions to adopt technologies for online educational purposes. The other school of thought says the high cost of technology is stalling the efforts for universities to adopt. Joseph (2007) found faculty were using tools such as PowerPoint, word-processing, database, and desktop publishing to deliver instruction with word-processing having the highest use. The faculty were presently using a learning management system, but would like to increase the use for managing course content.

Crowson (2005), Prater (2010), Wright (2014) all conducted studies of higher

education institutions using Rogers' diffusion of innovations theory. The mixed-method study by Crowson (2005) examined 145 Texas colleges to determine the rate of adoption, and the successes and barriers of adopting online student services. The five categories of adopter include: innovators, early adopters, early majority, late majority, and laggards were used to determine the adoption rate of each college. Crowson (2005) determined the larger the college, the more likely to adopt online services. Identified barriers to adoption include security, need for more market saturation, software updates and maintenance, lack of data integrity, inability to test systems, commitment by upper level administration, steep learning curve, lack of resources, and a resistance to change (Crowson, 2005). Patzer (2010) conducted a qualitative study of the Ohio Learning Network and determined barriers to included lack of time, budget constraints, and technical problems with the projects. She further determined several questions higher education institutions could rise when adopting new technologies. Among these are:

- Will the new technology still be around in several years, or will it be obsolete?
- What teaching techniques are the most effective with new instructional technologies?
- Should the college host the software applications in-house or employ third party services?
- How will the college community learn to use the new products?
- How will the innovation be spread campus wide to justify the initial cost of the purchase? (Patzer, 2010, p. 2)

Wright (2014) conducted a mixed-method study at a large southeastern state university including Rogers' theory of diffusion of innovations as a framework to determine the

factors that motivate and impede faculty from teaching online. Wright (2014) determined that time and effort, quality of online instruction, and academic dishonesty are among the barriers to adopting online learning.

Chowdhury (2009) conducted a quantitative study “to investigate the nature of the relationship between ICT (information and communication technology) integration into teaching and faculty members’ perceptions of ICT use to improve teaching” (p 8). He discovered higher education institutions are paying large sums of money and faculty members are not adopting those technologies. He further noted faculty who are adopting these technologies are not properly integrating them into the classroom. Rogers’ theory of diffusion of innovations is used as a foundation for this study, he discovered faculty supported the use of technology in the classroom but were apprehensive about its effectiveness. Reasons for not using technology consisted of mistrust of its impact and lack of knowledge of effectiveness (Chowdhury, 2009). Other areas of concern from other studies with faculty when adopting technology include time allocation, attention given, and resources allocated to the diffusion of an innovation. Also, the ease of use and anticipated usefulness of the technology affected adoption in the health sector (Myers, 2010).

Spelke (2011) conducted a study to determine the decision process when adopting a learning management system in higher education. Using Rogers’ diffusion of innovation theory, Spelke (2011) discovered a group driven process mostly by administrators and faculty members with the final decision being made by the higher level of administration. Concerns regarding technology use were related to intellectual property rights, Fair Use, the Teach Act, and the Digital Millennium Copyright Act. This

study took into consideration Rogers discussions focusing on the consequences of adoption. Many organizations do not consider the consequences of an adoption whether those consequences are positive or negative. The innovation consequences related to learning management system adoption include staffing concerns and economic concerns.

Educational technology can be seen in most areas of our lives and this includes healthcare and healthcare education. The Association of American Medical Colleges Effective Use of Educational Technology in Medical Education Report (2007) offered several recommendations for technologies that can be used in medical education. These technologies included computer-aided instruction, human patient simulations, and virtual patients. The report stated “our understanding of how these resources might best be incorporated into the curriculum is inadequate, as advances in what could be created outpace our ability to understand how they should be developed or used” (Candler, 2007, p.5). Despite these recommendations, healthcare higher education has been slow to adopt these technologies for education (Phillips & Vinten, 2010).

Technology in the Medical Sector

The World Healthcare Organization (WHO) stated that technologies in the health care sector could help to solve healthcare problems and improve the quality of life (Myers, 2010). These are all significant because the U.S. Department of Labor (2014) shows healthcare as the largest contributor to employment growth with an addition of 28,000 jobs in the month of December 2013. The year 2013 has seen an average of 19,000 jobs per month while 2012 saw an average of 27,000 jobs per month (U.S. Department of Labor, 2014). The healthcare sector is expected to reach 5.6 million by the year 2020. As the healthcare sector grows, so does the cost of technology use in this

sector. The Hastings Center shows new technology cost is 40-50 percent of annual cost increases in the healthcare industry (Callahan, 2008). Stakeholders expect budget money to be used responsibly. With the growth of technology in the healthcare sector, it has also become imperative to use these tools with students in medical education. Candler (2007) stated in the colloquium on educational technology:

The advent of multimedia technology, the World Wide Web and the ubiquitous nature of networked computers, have transformed educational technologies from esoteric legacy applications used by a few pioneering faculty to mainstream applications integral to the medical school educational enterprise. (p. 3)

Amin, Boulet, Cook, Ellaway, Fahal, Kneebone, and Ziv (2011) also stated that the major use of technology in medical education is for computer-based assessment, human simulators, and the management of assessment. Although there is a need for widespread adoption of technology in medical education, studies by Crowson (2005), Myers (2010), Tannan (2012), and Tsai (2010) have shown there are barriers and resistance to adopting technology and are discussed below.

At the *2020 Vision of Faculty Development Across the Medical Education Continuum* conference held in February 2010, five technology trends affecting medical education were discussed (Robin et al., 2011). The following recommendations were made by the Continuum for Medical Education: technology use to support learning, focus on basics, the allocation of varying resources, support and applaud faculty as they adopt new technology, and stimulate collaboration (Robin et al., 2011). Following is a discussion of the five trends affecting medical education.

Trend one examined the explosion of information and the accelerating rate of the

collective body of knowledge. It is believed medical information since the 21st century has been doubling every three years (Robin et al., 2011). This explosion requires the medical sector to become lifelong learners to adjust to the increase in medical information. Crowson (2005) pointed out this explosion is requiring universities to adopt technologies to stay competitive. Tsai (2010) agrees that healthcare professionals must be lifelong learners to stay current on medical education. With all the duties required of healthcare workers they require flexibility and anytime, anywhere learning. eLearning allows for this flexibility.

Trend two, the digitization of information, has caused concern over privacy issues thus causing adoption to accelerate a little slower for the medical sector. Electronic medical records (EMR) and sites such as Google Health are examples of how technology have enabled the sharing of medical records (Robin et al., 2011). The use and adoption of electronic medical records is an objective that has been set by the U.S. Government and is an example of the need for technology use in health education (Tannan, 2012). A study conducted by Tannan (2012) explored the opinions and beliefs on the adoption barriers of electronic health records. Advantages of electronic health records are an improved quality of healthcare by reducing errors such as test duplication, misread prescriptions, and miscommunication of test results in labs. In general, it can also improve the consistency of information by allowing quicker decision making in emergency cases, which can lower death rates among patients needing critical care. In this study, it was determined that time, change in work processes, and organizational factors, including finances, were all barriers to adopting this new technology. Electronic health records are just one example of technology adoption issues in the health sector.

Trend three deals with the new generation of learners entering into the medical field. Medical educators are represented by three categories: digital immigrants, digital natives, or traditionalist. Digital immigrants are those who learned technology later in their life, digital natives are those who were born during digital age, and traditionalists are those who have yet to embrace the use of technology. Digital natives are using technologies such as the Internet, video games, computerized shopping, and computerized banking (Crowson, 2005). Characteristics of digital natives include a 24/7 lifestyle, ability to multi-task, and constant connectivity with family and friends (Evans & Forbes, 2012). According to Joseph (2007) digital natives are demanding the use of these technologies. As digital natives enter the medical education sector, digital immigrants and traditionalists are expected to be able to use technologies in the classroom to help them with the technology they will encounter in their career. Wisniewski, Kuhlemeyer, Isaacs, and Krykowski (2012) reported that faculty with characteristics of digital immigrants, age and experience, typically have higher anxiety related to technology. Kazley, Annan, Carson, Freeland, Hodge, Self, and Zoller (2013) also found, “students indicated that they valued the use of technology because they thought it could facilitate learning, help them learn material in more meaningful ways, and aid in group work” (p. 64).

Trend four is the emergence of new technologies in education and the medical field. These technologies include video, web 2.0 tools, simulators, and virtual patients (Robin et al, 2011). The Internet is another tool being used in medical schools and practices throughout the world. Abdullah (2005) conducted a case study regarding the use of the Internet among dentists for dental healthcare management and administration.

Other areas of technology use in the dental practices include secretary and receptionist duties, office management, bookkeeping, and chairside assisting. The Internet in dental practices, as well as all health sectors, can be used for multimedia information and cyber consulting and monitoring. Despite the benefits of these technologies, there has still been a reluctance to adopt them in the dental field. In this study by Abdullah (2005) of ten African American dentists in Chicago, it showed that all the participants in the study used the Internet in their practice. The concerns that existed among these participants included lack of security, high cost, and high-pressured marketing campaigns directed at consumers. In another study conducted by Myers (2010), she sought to determine the technology readiness of 72 health professionals. The study concluded “health professionals to be optimistic towards new technologies, paradoxical regarding innovativeness and somewhat insecure and uncomfortable regarding the safety of information on the Internet” (Myers, 2010, p. 128). With the increased use of technology in the health sector, failure to understand the outcome of this study could result in “wasted investment in new equipment, lack of training, loss of time, early retirements, and poor retention” (Myers, 2010, p. 128). These results aid in the understanding of the importance and complexity of these emerging technologies in medical education.

Trend five deals with how the rate of change is accelerating (Robin et al, 2011). These rates of change in healthcare delivery and technology advances have also impacted the amount of time an educator has for teaching. ELearning is one technology advance that is quickly accelerating in higher education universities and medical universities. “Elearning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance” (Ruiz et al., 2006, p. 207). In their study, they

discussed the different aspects of eLearning and its role in medical education. One change brought about in the medical classroom includes a shift from the instructor-led classroom to a student-centered classroom and an emphasis on competency-based curriculum (Ruiz et al., 2006, p. 207). This shift also allows for a more collaborative and self-directed learning environment. The attitude of the instructor toward eLearning and their teaching style is critical to the success of the learning experience (Kowalczyk & Copley, 2013). Elearning can be used to help increase the efficiency and effectiveness of the instructor and the student. In a mixed-methods study conducted by McDonald, Lyons, Straker, Barnett, Schlumpf, Cotton, and Corcoran (2014) they stated, “institutions of higher learning are currently grappling with the question of how to deliver rigorous learning experiences through flexible delivery platforms to meet the needs of an increasingly fast-paced and complex society” (p. 1). They point out that when adopting an eLearning course, the design the course needs to be considered. Not only must time be a consideration, but also the cost and course availability should be taken into consideration. Delf (2013) posited that eLearning also makes economic sense in medical universities and targets individuals who would otherwise not have the ability to complete a degree.

The different forms of eLearning include distance education, computer-based instruction, and blended learning (Delf, 2013; Harden, 2005). Distance education in medical universities uses technology to conduct classes with students who are at remote sites. Computer-based instruction uses technology such as eLearning to aid in the delivery of curriculum to the student. ELearning is also helping medical universities offer continuing medical education, by offering on-the-job learning, and just in time learning

(Harden, 2005). Blended learning is another concept and blends traditional teaching with computer-based instruction; this is the most used in healthcare education because of its ease of use (Delf, 2013). Multimedia technologies are another form of technology used in the classroom and eLearning. This form incorporates two or more media tools including images, video, animation, text, and audio to enhance the curriculum (Ruiz et al., 2006). Delf (2013) created an eLearning module dedicated to complete computer-based instruction for radiology healthcare professionals. Using a mixed-methods study, he discovered these healthcare professionals like the convenience, organization, and structure of the course. However, there were some software issues that arose. There was also a 50 percent improvement in beginning and mid-term assessments and a 63 percent increase in understanding. Pittenger and LimBybliw (2013) also conducted a study to determine effectiveness of peer-led learning conducted solely in an online course with the use of a learning management system. The course focused on three reflective writing assignments regarding controversial issues with healthcare systems and medications. The final review was a capstone mock grant proposal and was graded by their peers. The researchers determined that, “implementing peer-led team learning is an effective strategy for an all online course on the US healthcare system offered to a wide variety of student learners” (Pittenger & LimBybliw, 2013).

Ruiz et al. (2006) discussed several medical related resources available for eLearning in medical universities including repositories and digital libraries such as MedEdPortal, The End of Life/Palliative Education Resource Center, The Health Education Assets Library (HEAL), The Multimedia Educational Resource for Learning and Online Teaching (MERLOT), and The International Virtual Medical School

(IVIMEDS). Ruiz et al., (2006) concluded, “The integration of eLearning into undergraduate, graduate, and continuing medical education will promote a shift toward adult learning in medical education, wherein educators no longer serve solely as distributors of content, but become facilitators of learning and assessors of competency” (p. 212). ELearning often requires a shift from “sage on the stage” to “guide on the side” which can be a difficult change for faculty. While difficult for faculty to change, Wisniewski et al., (2012) reports the “sage on the stage” will continue to not engage students in the classroom. Once again, learning management systems have helped educators deal with some of the disadvantages.

Rogers’ Diffusion of Innovation Theory

Sociologists believe individuals go through a process when deciding whether to adopt an innovation (Fisher, 2005). This study will use Rogers’ diffusion of innovation theory to determine where faculty are on the adopter levels and what is preventing them from adopting new technologies. Rogers’ diffusion of innovation theory is among the most widely used frameworks for diffusion of innovations (Hazen, 2012; Joseph, 2007). The theory has been used extensively in teaching and learning to study the adoption of innovation (Phillips & Vinten, 2010). Diffusion is defined as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003, p.5). Lack of technology adoption in the health industry can lead to costly failures, delays and workforce issues (Myers, 2010). Diffusion studies can allow an industry to examine how technology innovations are diffused into a society and industries such as healthcare (Abdullah, 2005).

The four major elements of diffusion noted in the definition are time, innovation,

communication channels, and social systems (Abdullah, 2005). “An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003, p. 12). A problem exists when determining where one innovation begins and another ends especially with the rate of technology growth (Rogers, 2003). The perceived attributes of how innovation is diffused through a society are compatibility, relative advantage, complexity, trialability, and observability (Abdullah, 2005; Rogers, 1995; Schroll, 2007). Relative advantage is the degree in which a new innovation is considered an improvement to the innovation it supersedes. Compatibility is defined as the degree to which the innovation meets the needs, values, and past experiences of the adopter. Complexity is defined as the degree of difficulty or use of an innovation. Trialability is defined as the degree to which an innovation can be experimented with prior to adoption. The degree to which an innovation can be observed before adopting is defined as observability (Rogers, 2003; Abdullah, 2005; Phillips & Vinten, 2010). A pilot study conducted by Phillips and Vinten (2010) aimed to determine the intentions of nursing faculty in adopting innovative technologies such as eLearning using Rogers’ diffusion of innovations theory as a framework. A survey was distributed to 75 nursing faculty who participated in an online course designed to teach them skills for teaching in a clinical setting. The participants ranked Rogers’ perceived attributes using a Likert scale with the factors of compatibility, trialability, and relative advantage all playing increasingly significant roles in the adoption of innovative technology with faculty.

The second major element of diffusion, communication channels, is defined as “the process by which participants create and share information with one another in order

to reach a mutual understanding” (Rogers, 2003, p. 18). These channels can consist of social systems, which consist of individuals, information groups, organizations, and sub-groups. These social systems can either speed up or impede an innovation’s diffusion by using interpersonal channels and mass media channels (Abdullah, 2005; Rogers, 2003). Mass media channels are more useful when creating knowledge regarding new technology; whereas, interpersonal channels are useful when changing attitudes toward adopting a technology (Rogers, 2003).

Time, “impacts the diffusion of innovation paradigm through its influence in determining variables such as the innovativeness of the individual adopter, the adopter’s innovation-decision process, and the rate of diffusion through the social system” (Abdullah, 2005, p. 8). The five steps conceptualized by time are knowledge, persuasion, decision, implementation, and confirmation. These steps help to provide a framework to understand the process individuals take to decide to adopt technology (Fisher, 2005). The exposure of an individual to an innovation and the understanding of how it works is when the knowledge stage occurs. When an individual forms a stance toward the innovation, they have joined the persuasion stage. When an individual decides to adopt the innovation they have reached the decision stage (Fisher, 2005; Rogers, 2003).

“Implementation occurs when an individual (or decision-making unit) puts an innovation to use” (Rogers, 2003, p. 179). Once an innovation is implemented, sustainability becomes important. Sustainability takes place when a teacher implements the innovation and re-invents it to fit their need. Sustainability also occurs in the confirmation stage. The confirmation stage occurs when an individual continues the use of the innovation or decides to abandon its use (Fisher, 2005; Joseph, 2007; Rogers, 1995). Many times

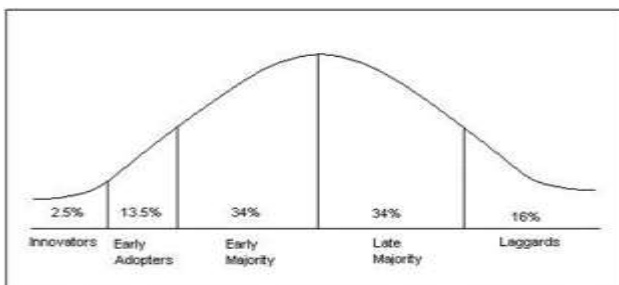
incentives such as cash are one way of increasing adoption of technology (Myers, 2010; Rogers, 1995).

A social system, the fourth element, is the unit or group who solve a problem together (Rogers, 2003). Opinion leaders and risk takers within these social systems were found to be pertinent roles in determining adoption for health professionals (Myers, 2010). Opinion leader characteristics include access to external communications, early adoption of technologies, and they often reflect the norms in their society (Myers, 2010). Health professionals considered as opinion leaders possess the following characteristics of being admired by their peers and are those who seek ways to improve health education through observing and adopting technologies. An important role in social systems is that of the change agent and is defined by Rogers (2003) as an influential person who affects the adoption of an innovation. There are seven roles defined by Rogers (2003). Included are establishing and assessing a need for the change, establishing an information exchange relationship, diagnosing the problem, determining the intent to change, turning the intent to action, sustaining the change, and the organization's self-reliance (Rogers, 2003). The introduction of innovations such as technology into the health education sector is important and difficult, but can be less difficult with the roles of opinion leaders and change agents.

The degree to which an adopter regards the diffusion of an innovation and the five adopter categories is considered the innovativeness (Rogers, 2003). Rogers (2003) defined five different adopter categories: innovators, early adopters, early majority, late majority, and laggards. Determining the innovators, early adopters, early majority, late majority, laggards, and change agents can be important to an innovations adoption. The

adoption process and adopter categories usually follows a bell curve or an S-shaped curve where the curve rises slowly in the beginning, accelerates toward the middle, and decreases toward the end of the diffusion (Rogers, 2003).

Figure 1. Adopter Categorization on the Basis of Innovativeness (Rogers, 2003)



Faculty members as early adopters can be critical to persuading additional faculty to adopt the technology (Joseph, 2007). The early adopter “has the highest degree of opinion leadership in most systems” (Rogers, 2003, p. 253). They are usually someone who is well respected among their peers and help to trigger adoption among other members.

Summary

This literature review began with a history of educational technology since World War II to show us a roadmap of where we have been and aid us in where we should go from here. Research has shown universities and faculty have been slow to adopt technologies including eLearning. Reasons faculty have not adopted technology include security, market saturation, software updates, software maintenance, lack of data integrity, inability to test systems, commitment by upper level administration, steep learning curve, lack of resources, a resistance to change, change in work processes, mistrust of its impact, lack of knowledge of effectiveness, time allocation, attention

given, resources allocated, intellectual property rights, Fair Use, the Teach Act, and the Digital Millennium Copyright Act (Chowdhury, 2009; Crowson, 2005; Joseph, 2007; Myers, 2010; Spelke, 2011; Tannan, 2012). Five trends affecting medical universities include the digitization of information, the rising amount of new information, the new generation of students, new emerging educational technologies, and constant change (Robin et al, 2011). While there have been some studies using Rogers' diffusion of innovations in the medical field none were discovered at a comprehensive academic medical center. Chapter three will show the qualitative research design aimed at discovering why faculty in a comprehensive academic medical center do not adopt the learning management system designed to help them in their teaching roles.

Chapter 3: Research Method

Introduction

The purpose of this qualitative interview study was to determine the factors involved in adopting learning management technology by faculty in colleges labeled as comprehensive academic medical centers. This study used Rogers' (2003) diffusion of innovation theory to help determine the factors related to adoption among faculty. This chapter will present the research design, my role as researcher, and the study's methodology and trustworthiness.

Research Design and Rationale

This qualitative interview study focused on the following guiding research questions: (a) What factors do late adopters identify as preventing them from adopting technology in a comprehensive academic medical center? And (b) What measures do late adopters suggest to increase technology adoption among faculty in a comprehensive academic medical center?

I chose a qualitative approach because it allows for a more in-depth examination of how the faculty decides to adopt, or not adopt, a learning management system. I did not use a quantitative methodology because quantitative methods simply look at a numeric representation of the data and provide little insight to why the data exists. I also decided against a mixed methods approach because it uses both quantitative and qualitative methodologies (Creswell, 2009). I did not need numeric data for this study, but instead sought the in-depth meaning of why faculty are not adopting technology. Because of the increased use of learning management system technology in higher education, I chose it for my research (Gautreau, 2011). A research study starts by

determining what you want to understand or your research question. This understanding does not indicate that questions will not evolve throughout the study, but they will continue to change and evolve as the study proceeds (Maxwell, 2013). Creswell (2013) defined five different qualitative approaches consisting of phenomenological, narrative, ethnographic, grounded theory, and case study. While these are not all inclusive, they are the main qualitative approaches. This qualitative study used the method of a case study.

This study closely followed the procedures of a qualitative case study, which involves studying an individual or group in their real-life setting. In this study, I examined faculty at a comprehensive academic medical center who I considered “late adopters” based on Rogers’ theory. The defining feature of a case study begins with the selection of a specific case. The case can consist of an individual, small group, or organization. Another feature is the intent to study a specific issue usually defined as intrinsic or instrumental. Yin (2014) discussed situations where a case study could be conducted. This includes asking “how” and/or “why” in the research questions, a lack of or no control over behaviors, and the focus current phenomenon and not historical. The research questions in this study go beyond asking a simple descriptive question by asking “what” in question number one and “how” and “why” in question two. An intrinsic case focuses on an unusual interest, whereas an instrumental case focuses on an issue or problem. My study was instrumental, focusing on factors contributing to or inhibiting adoption. Finally, a case study aims to present an in-depth understanding and description of the case (Creswell, 2013). With my study, I sought to generate a deeper understanding of existing causal factors informing the adoption of a learning management system. I took a cue from a case study conducted by Patzer (2010) aimed to determine the lack of

diffusion of technology in Ohio's higher educational institutions. She stated case studies apply to this type of study because it looks at the how and why a process is happening.

Concerns that traditionally exist in regard to a qualitative study include the rigor of the study, generalization, unmanageable information, and unclear comparisons. Establishing and following procedures can resolve overcoming the question of rigor. By looking at the negative and positive side of a problem, generalization can be avoided. Case studies can take a long time and generate large amounts of data. This can be resolved by the use of software tools known as Computer Assisted Qualitative Data Analysis Software (CAQDAS) to help organize the data. For this study I used ATLAS.ti to manage the large amount of data. Concerns also exist regarding the generalizability of small sample results to a larger population. It is understood that the outcomes of this study can only apply to the population of the colleges being studied. The purpose of an interview study is not to determine if a problem exists, but "why" or "how" it exists (Yin, 2014). In my study, I took the problem of slow technology adoption by faculty as a given. Participants from several different health colleges were the focus of this study. My detailed method focused on how and why these participants were affected by a learning management system in their real-life, contemporary setting. I gathered information by conducting interviews, and then analyzed the associated documents. Rogers' (2003) theory of diffusion innovation served as this study's theoretical framework. I used Rogers' (2003) theory to determine adopter levels and barriers to the adoption.

Other approaches not chosen included narrative study and grounded theory. Grounded theory is a qualitative method where "the inquirer generates a general

explanation of a process, an action, or an interaction shaped by the views of a large number of participants” (Creswell, 2003, p. 83). This method is different because as a theory emerges as the researcher proceeds through the study (Merriam, 2009). I did not examine an emerging theory explaining a process because I used an already established theory that has been widely used by other researchers for similar studies, Rogers’ (2003) diffusion of innovations theory. A narrative method includes the researcher collecting stories and the telling of experience, and gathering data through interviews and observations while the stories take place in chronological order. I did not gather stories about technology use in the classroom, but instead looked at why faculty are not adopting technology.

Research Questions

RQ1: What factors do late adopters identify as preventing them from adopting technology in a comprehensive academic medical center?

RQ2: What measures do late adopters suggest to increase technology adoption among faculty in a comprehensive academic medical center?

Participant Selection

I selected participants from a university with a comprehensive academic medical center consisting of seven different colleges: the College of Dentistry, the College of Allied Health, the College of Public Health, the College of Medicine, the College of Nursing, the College of Pharmacy, and the Graduate College. The faculty are not traditionally trained educators, but are subject matter experts in their field of medicine. They are primarily hired to run clinics or conduct research with teaching as an additional duty. Because of this fact, it is the goal of the medical center’s academic affairs and

faculty development branches to help train faculty in teaching techniques.

Qualitative studies can contain a single sample or multiple samples. Because of the amount of data gathered in a qualitative study, a sample small size is desired (Miles, Huberman, & Saldana, 2014; Patton, 2002). Creswell (2013) suggests not using more than four or five in a case study. There are no firm rules or methods when determining sample size in a qualitative study. Patton (2002) posits the “sample size depends on what you want to know, the purpose of the inquiry, what’s at stake, what will be useful, what will have credibility, and what can be done with available time and resources” (p. 244). Because each college has groups that have been slow to adopt, I used purposive sampling to choose a sample size of seven so that I had a representative from each college.

Purposeful sampling is more conducive than random sampling when the sample size is small (Patton, 2002). Purposeful sampling is where the selection consists of “particular settings, persons, or activities are selected deliberately to provide information that is particularly relevant to your questions and goals, and that can’t be gotten as well from other choices” (Maxwell, 2013, p. 97). When the sample size is small, purposive sampling allows for in-depth, focused research into the case; however, it also involves more bias (Patton, 2002). I used purposeful sampling but worked to mitigate bias by allowing course coordinators to select participants according to the participants’ levels of adoption. Rogers (2003) defined five different adopter categories: innovators, early adopters, early majority, late adopters, and laggards. Innovators are typically those who are venturesome and will adopt new ideas quickly. Early adopters have respect for new ideas and are next in line to adopt after innovators. They typically are looked at as role models for other potential adopters. They will look to what they adopt and ask for advice.

The early majority adopt before the average adopter and are usually about a third of all adopters. Late adopters are typically more skeptical and usually adopt after the average adopter. Laggards are the last to adopt and are suspicious of new ideas (Rogers, 2003). Random sampling would likely allow participants who are not considered late adopters and would produce data that is not useful for the study. One type of purposeful sampling is criterion sampling, which involves picking participants that meet a certain criteria (Patton, 2002). I used criterion sampling, and set the criteria set as that of a late adopter of the learning management system. I then asked course coordinators to suggest participants who were late to adopt the learning management system. Characteristics I asked course coordinators looked for were faculty who had waited until the last year to adopt or are in the last third to adopt; faculty who were skeptical until success was evident through other faculty; and faculty who are typically not as social and are usually not the leaders in technology adoption among faculty (Rogers, 2003).

Role of Researcher

This university medical center is composed of seven health colleges including the College of Dentistry, the College of Allied Health, the College of Public Health, the College of Medicine, the College of Nursing, the College of Pharmacy, and the Graduate College. For the past year, I have been the eLearning Manager at this medical center. My job entails administering the learning management system and training faculty to use not only the learning management system, but also other tools adopted by the university for use in the classroom. This technology is a standard for the university, but is not required, and use is left to the discretion of the colleges and their faculty. For the most part, the individual colleges leave the adoption process up to the decision of the individual faculty

member.

Creswell (2013) discussed the researcher's role in a qualitative study. The researcher collects data by using an instrument he/she created, or an instrument created by other researchers. The instruments created during a qualitative study use open-ended questions, observations, or documents. Because the researcher is active in collecting the data through interviews and document analysis, the researcher herself is an active instrument in the study. For this study, I served as an observer only by collecting data using interviews and document analysis.

To meet the challenge of researcher bias in the study the researcher used triangulation and member checking. Using multiple data sources or methods of data collection, triangulation, is one way to avoid bias in a study (Maxwell, 2013; Yin, 2014). Triangulation can be conducted by using multiple data sources, methods, and data type (Miles, et al., 2014). Miles, et al., (2014) posits "triangulation is a way to get to the finding in the first place-by seeing or hearing multiple instances of it from different sources by using different methods and by squaring the finding with others it needs to be squared with" (pg. 300). Triangulation allows for checking of methods for information that agrees or disagrees to aid in drawing a valid conclusion (Maxwell, 2013). For this study six data sources, one participant from each college (excluding the college of nursing), were used along with multiple methods including interviews and document analysis.

Creating a report of the collected data then sending a summary to the participants for review is considered as member checking (Creswell, 2003). The participant should be able to offer feedback in the way of verbal feedback or corrections and edits on the

summary (Miles et al., 2014). Miles et al. (2014), also suggested the summary should be in a participant-friendly format. Member checking helps to eliminate misinterpretations of the interview and helps to eliminate researcher bias by preventing any misunderstood participant responses (Maxwell, 2013). Member checking was initially conducted in this study by transcribing the initial interviews and then reviewing the recording against the typed transcript for accuracy.

Intercoder agreement is the analyzing of data conducted by more than one person to check for agreement on code themes (Creswell, 2013). Creswell suggested several steps in creating intercoder agreement. For example, “One of the key issues is determining what exactly the codings are agreeing on, whether they seek agreement on code names, the coded passages, or the same passages coded the same way” (Creswell, 2013, p. 253). Intercoding was conducted by asking two other individuals, my husband and a friend, to review the transcripts and code passages. The coders were initially trained by reviewing the examples in Miles et al., (2014) book showing how codes are determined. After training, each coder was given copies of the interviews without any personal information disclosed. First coding was conducted and then the coders met to discuss the data and how it was coded. After all agreed on like codes, second cycle coding was conducted. Once again all met to compare their coding and come to an agreement on code names and coded passages.

Instrumentation

The instrumentation used for this study were interviews and document analysis. Interviewing is a “meeting of two persons to exchange information and ideas through questions and responses, resulting in a communication and joint construction of meaning

about a particular topic” (Janesick, 2011, p. 100). The interview questions were created by researching articles by Caruso and Kvavik (2005), Clifford (n.d.), and Jacob and Furgerson (2012). Jacob and Furgerson (2012) suggest easy questions for the beginning and working toward more difficult questions and also using open-ended questions. They also suggest using a script and using a quiet place for the interview. Suggestions taken from Clifford (n.d.) include structuring the interview, asking questions to elicit participant’s experiences, and using probe questions to elicit a response. By reviewing various qualitative questions from Caruso and Kvavik (2005), interview questions were designed for this study. The interviews and documents produced the data needed to answer what factors existed in the lack of learning management system adoption, why these factors existed, and how to eliminate them.

Data Collection

As a beginning researcher, Jacob and Furgerson (2012) suggest writing an interview protocol. This protocol contains more than just the questions, but also contains a script for what will be said before and after the interview, collection of the informed consent, and the questions. Jacob and Furgerson (2012) also suggest using a script for the interview, use open-ended questions, start with basic questions and move toward the more difficult, use prompts, be flexible, and do not make the interview too long. For conducting an interview they suggest using a recording device, take notes, arrange for a quiet place, keep focused, and listen. To avoid bias in any of the interviews, do not share your feelings toward the question, do not use leading questions, and avoid expressive behavior (Clifford, n.d.).

I created an interview protocol and questions designed to gather data regarding

the participant's technology use, learning management system use, and perceived factors to adoption. Then face-to-face interviews were conducted with each participant (Appendix A). I held all interviews in a neutral, private location within the university, they were recorded, and the recordings were then transcribed. The interviews lasted no longer than one hour. Recordings were conducted using a digital recorder and using a LiveScribe pen. A LiveScribe pen is a Smartpen that allows writing and recording to be conducted simultaneously. The recording can then be uploaded to a computer. Using two different recording technologies will help eliminate possibilities of one technology not working properly. For the participation of the study participants were asked to sign a consent form (IRB #12-10-14-0242924). This consent form was created using the template on the Walden University Research Website (2014). Initially, member checking was performed by reviewing the transcripts against the interview recording. This eliminates any incorrect assumptions, transcription errors, and bias from the researcher. After the first interview of all six participants, it was to be determined if a second interview was needed. This was determined if data saturation had been met. Data saturation means the researcher is starting to hear the same information again and no new information is emerging. If data saturation is not met there could be gaps in the data (Given, 2008). All interviews will be kept confidential and stored at my home. Pre-and post-interview scripts have been provided in the appendix (Appendix B). To manage the possibility of a participant backing out of the study, an alternate participant was selected in each college.

Following the analysis of the interviews, document analysis will be conducted to verify the factors. Bowen (2009) defines document analysis as "a systematic procedure

for reviewing or evaluating documents-both printed and electronic (computer-based and Internet-transmitted) material” (p. 27). For instance, the lack of training was determined to be a factor. Then documents, to show the number of trainings conducted, were reviewed to show if indeed there is an authentic factor. Another example could be the lack of technical support when problems arise. Documents showing tickets submitted and how those problems were resolved can be analyzed. The information needed can all be gathered from within this office or the informational technology department. The documents reviewed were determined following the analysis of the interviews.

Data Analysis Plan

Analyzing data consists of coding in two steps that of first cycle coding and second cycle coding (Miles et al., 2014). The initial analyzing of data and assigning data chunks is considered to be first cycle coding. There are several different forms of first cycle coding. This study used In Vivo coding which is used for many studies. It is also easily used with researchers who are beginners and makes use of the participant’s own words or phrases (Miles et al., 2014). King (2008) in the SAGE Encyclopedia of Qualitative Research defines In Vivo Coding as “the practice of assigning a label to a section of data, such as an interview transcript, using a word or short phrase taken from that section of the data.” (p. 473). After gathering these common words or phrases in first cycle coding, they were used to conduct second cycle coding. These common words or phrases were collaboratively decided among the three coders.

Using the data chunks gathered during first cycle coding, if needed, is called second cycle coding. Second cycle coding is a way of taking the initial coding and refine it into smaller more manageable categories (Cooper, 2009). Second cycle coding helps

aid in determining the patterns and themes in the data (Miles et al., 2014). This study examined the data for patterns consisting of themes and explanations determined during first cycle coding. Identifying these patterns aids in the analysis of the data. Data can be analyzed by hand or by using a program called ATLAS.ti known as a Computer Assisted Qualitative Data Analysis Software (CAQDAS). Paez, Arendt and Strobehn (2011) using ATLAS.ti say the use of a computer-aided data software helped to verify any manual coding they had conducted.

The use of software tools in a qualitative study, known as CAQDAS, can be great for organizing data. Miles, Huberman, and Saldana (2014) suggest, “Researchers who do not use software beyond programs such as Microsoft Word will be hampered in comparison to those who do” (p. 46). ATLAS.ti was used to organize data for analysis. A study by Ghedin and Aquario (2008) discussed using ATLAS.ti with interviews by first identifying codes relevant to the research. After initial coding in a study is conducted Svederberg, Nyberg, and Sjöberg (2010) identify “code-families” by using ATLAS.ti. Code-families helped to organize the data, so analysis was not as cumbersome.

Issues of Trustworthiness

There are several validity threats to this study. Miles et al. (2014) call validity the “truth value” meaning is the study an accurate and correctly conducted study. One way to minimize threats to validity is by having a prolonged study. Because this study was short this is considered a limitation. The study will be continued after the dissertation process is complete and throughout my career. Another way to minimize threats to validity is triangulation and member checking. Member checking, the validation of the study by participants, was conducted by transcribing the interviews and then reviewing the

recording with the typed information for accuracy. A final member check was also conducted by having participants review the study before it is published (Creswell, 2013; Yin, 2014). This review was conducted by sending the results to the participants to review for correctness. Using more than one method, triangulation, was used in this study also to help the validity of the study. The methods used were interviews and document analysis. Building rapport and trust with the participants is important in conducting a valid study and earning the confidence of the participants (Maxwell, 2013). Also, understanding any bias of the researcher helps to validate the study. I indicated the study was conducted at my place of employment. Conducting a study at my place of employment can have an effect on how the participants respond or how I relate to the participants. Participants were informed of this prior to the first interview. No participants are supervised by me; thus, helping to eliminate some bias. The use of triangulation can help with this bias by corroborating information.

Ethical Procedures

Permission was gained by the university institutional review board and the Walden University institutional review board before conducting any of the research for this study. All participants received a consent form that was accepted and signed before conducting any interviews. Scripts for the interview included in the appendix (Appendix B) are stored in a confidential location outside of the university and research will not be conducted on company time.

Summary

This chapter explained the process that was used for researching the factors in adoption among the faculty at a comprehensive academic medical center. The study is a

qualitative interview study consisting of a total of six participants, one from each college. Sampling was conducted by using a purposeful criterion method. Course coordinators were asked to suggest faculty members who were slow to adopt the learning management system, but finally decided on adoption. To conduct a valid study without researcher bias, the researcher used triangulation and member checking. Data was gathered through interviews and document analysis. Chapter four examines the results of the research conducted.

Chapter 4: Results

Introduction

The purpose of this qualitative interview study was to determine the factors involved in adopting learning management technology by faculty in colleges labeled as comprehensive academic medical centers. The qualitative research design I chose for this study used a case study approach consisting of one participant from each of the seven college within the university medical center. I conducted one interview with each participant. The research questions guiding this study were:

RQ1: What factors do late adopters identify as preventing them from adopting technology in a comprehensive academic medical center?

RQ2: What measures do late adopters suggest to increase technology adoption among faculty in a comprehensive academic medical center?

The following section describes the seven university medical center colleges' degree offerings and current use of learning management systems. Following the setting section is a description of the participants in the study. The data collection section covers how I collected data from the participants. The data analysis section offers a breakdown of the information collected from the participants and includes information on how the data was analyzed. The evidence of trustworthiness section covers the transferability, credibility, dependability, and confirmability of the information and analysis. In the final results section, I break down the research questions and discuss the data gathered in answering those questions.

Setting

The university medical center is considered a comprehensive academic medical

center, meaning it covers the full spectrum of medical practice, and is comprised of seven learning and research medical colleges. The overall mission of the university medical center, as indicated, is:

The mission of the University Health Sciences Center, as a comprehensive academic health center, is to educate students at the professional, graduate, and undergraduate levels to become highly qualified health services practitioners, educators, and research scientists; to conduct research and creative activities for the advancement of knowledge through teaching and development of skills; and to provide continuing education, public service, and clinical care of exemplary quality.

The largest of the seven colleges is the College of Medicine, which offers medical education, research, and patient care. This college uses the learning management system with its students and faculty. There is no requirement by the administration to use the learning management system; however, some of the departments are beginning to require student grades be transferred from the learning management system to the student information system instead of being entered manually. This is requiring those departments and faculty to, at minimum, use the learning management system for grade entry. The college of medicine will also begin its first venture into distance education beginning in Fall 2015. Both the grade requirement and the distance education addition could affect faculty adoption of the learning management system. The mission states, “Our mission is leading health care – in education, research and patient care. Our goals are Uncompromising Quality, Exceptional Service, Innovative Education, Advancing Knowledge, and Institutional Strength. This mission is tied to our core values.” The

College of Pharmacy offers both Master's and Ph.D. degrees. With this college there was no requirement to use the learning management system; however, beginning in Fall 2014, faculty were required to begin using the learning management system gradebook to transfer the grades to the student information system. Beginning in Fall 2015, they will be required to use the learning management system for all assessments. This requirement does affect the adoption of the learning management system because it is now required. The College of Pharmacy conducts some distance education courses with an off campus location. This college conducts research, education, and service activities. "The mission of the University College of Pharmacy as part of a comprehensive academic health sciences center is to educate and empower professional, graduate, and post-graduate students to be highly qualified pharmacy practitioners, scientists and educators."

Audiology, nuclear medicine, occupational therapy, and radiation therapy are among the twenty-one programs offered by the College of Allied Health. The degrees offered consist of eight baccalaureate, one certificate, and twelve master's- and doctoral-level programs. As with the previous colleges, this college does not require faculty to use the learning management system. They also conduct academic services as well as conducting medical research. The mission states, "the mission of the College of Allied Health is to empower life by maximizing human potential through allied health interprofessional, education, research, care, and community engagement."

Among the degrees offered at the College of Dentistry are the Bachelor of Science in Dental Hygiene, Doctor of Dental Surgery, and advanced degrees in general dentistry, orthodontics, periodontics, and oral and maxillofacial surgery. Faculty are not required to use the learning management system, and are not yet transferring grades from

the learning management system to the student integration system. This college does offer distance education opportunities in the dental hygiene program. They conduct academic services, research, and on-site clinics. Their mission reads, “the mission of the University College of Dentistry is to improve the health of Oklahomans and shape the future of dentistry by developing highly qualified dental practitioners and scientists through excellence in education, patient care, research, community service, faculty and facilities.”

The College of Public Health is an academic and research college offering doctoral and master degree programs in biostatistics and epidemiology; health promotion sciences; health administration and policy; and occupational and environmental health. They also offer a certificate in public health programs. As with other colleges in this university, the learning management system is not a requirement. The college offers several initiatives related to American Indian health, biosecurity research, and public health training. The mission reads,

The mission of the College of Public Health is to protect and improve the health of the people of this state, the United States, and other nations through: (1) education, public health workforce development, and cutting-edge research; (2) translation of research and scholarship into public health practice and service; and (3) the development and advocacy of evidence-based health management and policy.

The graduate college offers Master of Science and Doctors of Philosophy degrees in conjunction with the six colleges based at the University. Students are involved in \$30 million in grants and contributed in 75 peer-reviewed papers.

The mission of the Graduate College is to prepare world-class biomedical researchers, educators, and health care professional who will identify the bases of human diseases, translate their findings into relevant clinical applications, and develop solutions to state, national, and global healthcare problems.

The College of Nursing offers bachelor's, master's, and doctoral programs in nursing through on-campus and distance education. This college also conducts academics as well as research in nursing along with several community initiatives. They are also not required to use the learning management system. Their mission reads, "the university College of Nursing strives to be the leader in nursing education, research, and practice innovations to promote excellence in education, research, and practice. This mission is tied to our core values and goals." All college setting characteristics are summed up in Table 1.

Table 1

College Learning Management Settings

College	General Requirement	Gradebook Requirement	Quiz Requirement
Medicine	No	Yes (Not all departments)	No
Pharmacy	No	Yes	Fall 2015
Allied Health	No	No	No
Dentistry	No	No	No
Public Health	No	No	No
Graduate	No	No	No
Nursing	No	No	No

Demographics

All participants are faculty at the university medical center. There was one participant from each college: the College of Public Health, the College of Medicine, the College of Allied Health, the College of Pharmacy, the College of Dentistry, and the

Graduate College. The only college that did not participate is the College of Nursing. After several attempts to seek a volunteer, I abandoned these efforts because the study needed to move forward. Participants' length of employment at the university ranged from two to thirty-seven years. There were three females ranging in age from 55 to 64, and three males ranging in age from 34 to 69 (Table 1). Pseudonyms were assigned to each participant to protect their confidentiality. Becky is a faculty member in the College of Pharmacy and has used the learning management system for about three years. She also uses PowerPoint and classroom clickers (Table 1). Kim is with the College of Dentistry and has used the learning management system for about three years. She also uses electronic medical record software and PowerPoint. Sara is with the College of Allied Health and has used the learning management system for about four years. She has also used several other learning management systems at various other colleges. Sam is with the Graduate College and has used the system for about three years. His use is limited to just presenting in a classroom setting. He usually has a staff member load all content into the system. Dean is with the College of Public Health and while he is an avid medical technology user, he has only used the learning management system for two years. Dale is with the College of Medicine and has used technology such as Microsoft Office, but has only used the learning management system for three years. All participants were considered late adopters by course coordinators in their respective colleges. Participant demographics are located in Table 2.

Table 2

Participant Demographics

Participant Name	College	LMS Use	Age	Tech Tools
Becky	College of Pharmacy	3 Years	64	PowerPoint, Clickers
Kim	College of Dentistry	3 Years	56	EMR Software, PowerPoint
Sara	College of Allied Health	4 Years	55	Various LMS, Digital Recorders, PowerPoint
Sam	Graduate College	3 Years	69	Microsoft
Dean	College of Public Health	2 Years	34	Medical Technologies, Microsoft
Dale	College of Medicine	4 Years	45	Medical Technologies, Microsoft, Various LMS

The course coordinators in each college named all participants. Characteristics course coordinators looked for consisted of faculty who waited until the last year to adopt or were in the last third of available faculty to adopt, faculty who were skeptical until success of the learning management system was evident through other faculty, faculty who are typically not as social, and are typically not the leaders in technology adoption among faculty (Rogers, 2003). Faculty characteristics varied for each college and were difficult for course coordinators to determine. Course coordinators were emailed a request, but usually I had to have a conversation with the course coordinators to define further the late adopter role. Most of the misunderstanding was due to the faculty member's length of use with the learning management system. While faculty may have been using the system for a long while, they were still among the last to begin using the system.

Data Collection

This qualitative interview study consisted of six interviews, one faculty member from each college except the College of Nursing. Each participant was recruited by gathering names of late adopters from the course coordinators located in each college. After the names had been given, then each recruit was sent an email with the consent form attached for their review. The first recruit to respond accepting the invitation to participate were chosen for the study. The interviews were intended to take place in a conference room located in the library, so the participant and researcher were away from distractions. While the meeting room was scheduled for the interview, 15 minutes before the first interview, the vice-provost needed the meeting room. Due to the lack of time to seek another conference room, the interview took place in my office. To allow for consistency with all interviews the remaining interviews took place in the same office. There was one exception to the location; one participant is located on the Northeast campus location, and the interview was conducted in the faculty member's office at that campus.

The office where the interviews took place was in the library in my office. The office setting was free of distraction and confidential. In order to avoid distractions, I forwarded the phones to voicemail, silenced the cell phone and closed the office door. My office is located on the floor below the main library and does not have a lot of foot traffic. The interviews took place away from the desk in a conversational area with two chairs. Originally I had planned on using a Livescribe pen and did for the first interview. Because the information on the Livescribe pen was not easily transferrable to the computer it was decided to use a different device after the first interview. The interviews

were recorded using an iPad application called PureAudio Pro and a digital recorder. Two devices were used to prevent the accidental loss of a digital recording. The Tulsa interview took place in the participant's office because of the location away from my home office and the convenience for the participant. Unfortunately, for this interview, despite the use of two recording devices they both failed. The recording failure was not known until I returned to the main campus. To prevent the participant having to schedule another interview it was conducted through email. The exact questions were sent via email and returned by the participant. In the beginning, transcription took place after each interview using a manual technique. To speed up the process of transcribing a transcription program called Dragon Dictation was used for the remaining interviews. Transcription was done by listening to the interview and repeating it into Dragon Dictation. Using Dragon Dictation cut the transcription process time in half.

At the beginning of the interview, consent forms were collected from each participant. The researcher reconfirmed with the participants their understanding of the consent form and their acceptance of the recordings. The interview data is stored at the researcher's home in a locked safe.

Data Analysis

In analyzing the data, the first step I took was creating a hermetic unit in ATLAS.ti, which is qualitative data analysis software. The project was called dissertation project, and all interviews were added to the project. Two outside people were used to help code the data. One person was a female friend who has a master's degree in social work, and the other was a male relative who has a bachelor's degree in leadership. Both have had experience with qualitative research in their personal, academic backgrounds.

Training was conducted with each coder. The main themes were identified for the coders while they were trained on how to recognize the sub-themes or additional themes that may have emerged.

All the data was uploaded into ATLAS.ti under each coder name showing the coding for that individual coder. There were five main themes: Factors, Learning Management System, Demographics, General Technology, and Measures. Each theme had a subtheme (Table 3).

Table 3

Study Themes, Sub-themes, Sub-theme Definitions

Themes	Sub-themes	Definitions
Factors	Doesn't meet needs	Learning management system does not meet the faculty needs
	Ease of use	Faculty does not feel the system is easy or worth the time
	Disinterest	Faculty has no technology interest
	System Changes	Changes to the learning management system by either the college or the company.
	Technical Support	Faculty feels lack of support when problems are encountered
	Time Training	Time to learn the system Faculty feel a lack of training
Learning Management System	Advantages	Reasons faculty believe the learning management system is helpful
	Disadvantages	Reasons faculty believe the learning management system is not helpful
	Tools Used	Learning management tools faculty use
Demographics	Technology	Faculty perception of technology skills
	Technology improvement	Faculty perception of skill improvement
	Technology use in the classroom	Technology used by faculty
General Technology	Pros	Faculty perception of the positive uses of technology
	Cons	Faculty perception of the disadvantages of technology
	Appropriate use	Faculty perception of appropriate technology use
	Inappropriate Use	Faculty perception of inappropriate technology use
Measures	Time	Faculty perception of measures for time barrier
	Training	Faculty perception of measures for training barrier
	Disinterest	Faculty perception of measures for disinterest barrier

I conducted coding with the assistance of two outside coders recruited by me. The

outside coders mainly reviewed the transcripts looking for factors in not using the learning management system and measures to increase faculty adoption. The coders using the subthemes labeled the factors and measures. Quotes were also indicated that inferred that code was applicable. After the coding was input into ATLAS.ti a query was run to indicate common coding words (Table 4).

Table 4

Code Occurrence Table

Themes	Sub-themes	Coding I
Factors	Doesn't meet needs	7
	Ease of use	3
	Disinterest	10
	System Changes	1
	Technical Support	5
	Time	27
	Training	23
Measures	Time	10
	Training	23

Case 1 - Becky:

Becky has used technology at the university and previous jobs and believes there has been an improvement over the years. She believed just about any technology could be appropriate for the classroom and currently uses clickers in the classroom. She posits students are tech savvy and have an expectation that you know everything about technology and also expect immediate responses.

She uses the learning management system for posting content such as the syllabus, handouts, reading assignments, dropbox, online quizzes, grade book, and email. Students having the ability to access content and turn in homework are among the advantages of using the learning management system. It also gives the ability to help

determine if students are plagiarizing. Becky stated, “I think sometimes the students believe that you are not having enough one on one with them because so much of your grading is done over the computer.” Because of this she worries the students will assume the faculty member is not looking at their work and just letting the computer grade the assignment. Another disadvantage using the learning management system is the inability to do formulas as answers in quizzes. If there can be more than one correct answer, it is difficult to cover all those possibilities in the answer key. Therefore, there is the need to grade manually short answers because of varying possibilities. Misunderstanding how to use formulas in the system can be attributed to poor training and lack of understanding when creating quizzes.

Becky believes some do not use the learning management system because they just do not have an interest or the lack of users in the college. She also attributed lack of use to system changes saying, “you develop it for one system in the university and they switch to another system.” Having to seek tech support was also listed as a minor barrier. Training was suggested as a major factor for this participant. Measures offered for training included finding someone in the college who can help and having written instructions available for referral when needed as a ‘cheat sheet’.

Case 2 – Kim:

Kim rated her technology use as medium and is using the learning management system, Axiom, and eClass. Axiom is a software system to aid in teaching students how to use electronic medical records and eClass is software specific to recording patient information during a procedure. Students have a definite advantage when they can access their content on their computing devices. Accessing their content on the system gives

them the ability to highlight and make notes directly on the content being presented. Kim also saw the Internet useful by stating, “Access to the Internet in general because it is very handy and I am saying something about a condition and we want to look something up and a student can look it up for me.” Having access to the Internet gives them the ability to look up information when needed. Often, the faculty member will catch the students off task and that poses a disadvantage.

Kim uses the learning management system to upload content, give exams and to use the grade book. Advantages include the ability for students to preview the content and take notes during class. Taking exams on the learning management system also allows the student to receive their grade in a faster manner than when hand grading. A definite disadvantage exists when the technology does not work correctly because of improper equipment or an outage.

Kim believes an issue can exist if a college does not have access to good technical support. An obvious measure to improve would be to gain support for these technologies. “Time to invest in learning the system” was a personal factor for this participant. Being able to conduct a task repeatedly helps the participant become better at using the system. She admitted that once the course is setup then it saved time for the faculty. Training and the lack of visual handouts were also mentioned as a factor. She is also a visual learner and needs easy access to steps that show pictures of how to perform a task. A measure suggested to improve training was to have an actual printout of the steps for those who might need a visual reference.

Case 3 - Sara:

Sara has an average class size of 30 students. She considers her technology use to

be moderate, and it has improved over time. She can use technology if taught, but does not try it on her own. Sara has used several different learning management system programs and specialized digital recorders. Projection systems, video players, and Elmo systems are used in the classroom. When asked about the use of technology in the classroom and its pros and cons Sara stated, “it really helps engage students in the learning process.” While the system is useful in the classroom, it is agreed that a secondary plan is needed in case the system does not work. Also, some students do not come prepared with the proper software during exams. There are occasions a student will be intimidated by technology, and this can affect the use. The ability to access research and journals online was considered to be a pro and con. It keeps the student from having to make photocopies of a study, but the studies tend to not be as good. Also, some undergraduate students have a difficult time determining what is considered to be valid research. It also allows this college to make specialized materials for clinics. This college also utilizes telemedicine with children at different school districts.

Sara uses the learning management system for the dropbox, grade book, post videos, online exams and post content such as PowerPoints. Online exams can help to save money by “not having to print or use Scantrons.” And it allows students to access their grades more quickly. Posting voice-over PowerPoints and videos on the learning management system prevents the faculty member from having to repeat a lecture and allows the student the ability to view it again.

Because some people in the department were not using the system Sara had to seek training through other people in the college. She posits faculty do not use the system because “they just do not want to, or they do not have time.” She agreed it takes more

time in the beginning but does become easier over time. She also suggested the learning management system has improved and become easier to use especially with the drag and drop feature. Having varying training time and dates would help alleviate training challenges. Sometimes the times offered are not convenient for all faculty. As other faculty members see someone using the learning management system and it is working, they will eventually adopt the system.

Case 4 - Sam:

Sam has been with the university for 37 years and has a minimal amount of technology experience. He uses PowerPoint for presentations occasionally adding some animation. He agrees with others in the fact that technology helps get information to the student in a quick manner but lacks the “social interactions.” There is a fear when sending an email or text type messages that the true message can be misunderstood. This participant conducts patient interviews with the students while some will just use written case studies. He feels there is something lost by not being able to have a direct dialog with the patient allowing for more in-depth information and “students do not have the opportunity to ask questions immediately.”

Sam uses the learning management system in the classroom, but someone else loads all the information for him. It is used for lectures as a faculty member and a student. If this faculty member needs to give a lecture on a subject he might be less knowledgeable in then he will listen to other faculty lectures as a refresher. Factors that exist for Sam are time and training. He states, “just hasn’t had time” to learn the system and is not aware of training that is available. He also feels he would benefit from handwritten training with pictorial representations.

Case 5 – Dean:

Dean feels his technology use is at a medium level with mostly using programs such as Microsoft Office products and research technology tools. Students using phones in the classroom is considered inappropriate use for Dean. He stated it will “send me over the edge if someone is texting in class.” He also uses video conferencing with the other campus for distance education.

Dean has classes of about 20 students. His use of the learning management system consists of using it for exams, content, and surveys. He finds creating an exam is not user-friendly. Exams become a problem when you want to use free response questions; they are difficult to grade on the learning management system. Being able to have a student take a quiz on his or her own time; however, saves valuable classroom time. An advantage is the student’s ability to access material and the ability to be “paperless and be more environmentally friendly.” It is also easy for the faculty member to update the material if needed. Having access to material sometimes allows students the ability to miss class. They have the information and feel they do not need to attend. There are times when the student has limited access to Internet connectivity preventing them from accessing the material. He also uses Dropbox for turning in assignments. There have been challenges with students not understanding how to turn in their papers.

Time, training, and ease of use are factors for Dean. Having to learn and create a course while having other responsibilities can be time consuming. It was helpful to use the previous faculty members course the first time and change the course over time. They also feel there are no tutorials or instructions available for using the learning management system. He indicated training courses offered do not seem to be at a good time or place

stating, “The trainings are across campus or he’ll have to stop what he is doing.” He has been learning from others or just trying to piece tasks together.

Case 6 - Dale:

Dale said he has fairly good tech skills and has used programs such as Microsoft Office programs, including Access; online DNA and protein sequence analysis (biotech job); and learning management system programs, such as Blackboard, Desire2Learn, and WebCT. For the last ten years he has been using learning management system programs, Camtasia to make video lectures, YouTube to host videos, and Poll Everywhere for polling in the classroom. He also feels technology should only be used in the classroom when the “pros vastly outweigh the cons” of its use. He is concerned with technology lessening the student’s access to the professor. Technology use in the classroom helps students acquire more advanced skills; classroom experience becomes more enjoyable; and the speed and efficiency of learning increases. He feels if the technology does not meet these items listed then it is not beneficial for the classroom.

Dale uses the learning management system to deliver quizzes and exams, delivering content, including files to view or download, such as slide presentations, learning objectives, and links to online videos. “The ability to maintain a question database and to analyze exam statistics is very helpful.” He feels a barrier to using the learning management system is the “poor design and it is not intuitive.” It took a while to figure out all of its eccentricities. Most of the training that took place was by calling support or by searching on Google because of this he feels there is more training needed. Training could be improved by offering more sessions, conducting appropriate level training, and more one-on-one training.

Evidence of Trustworthiness

There are several threats to this study including the length of the study, the experience of the researcher, and the location of the study. Patton (2002) suggests recognizing and making clear any biases and pre-dispositions, thus offering clarity for the researcher. The study was conducted at my place of employment. While I do not directly supervise any of the participants, I was aware it could affect the information gained through the interview. The consent form addressed this issue by stating that all information would be kept confidential and is physically kept away from the place of employment.

Triangulation and member checking were used to increase validity for the study. Triangulation of analysts allows for different views from multiple analysts observing the data and then comparing the findings (Patton, 2002). The researcher and two outside people analyzed the interview transcriptions and then compared findings for consistency. Triangulation of the data sources also allows for evaluating consistency of the data. Implementing interviews and then conducting document checking to verify the information supplied in the interviews was used for triangulation of the data. In particular, the training schedules and technical support logs were analyzed against what the participants indicated in the interviews. By transcribing the interview and then checking the information against the recording I conducted member checking and a triangulation of inquiry participants. Methods triangulation is the use of different data collection methods (Patton, 2002). This study used interviews and document checking to address consistency of data. Member checking was also conducted by having the participants review the study before publishing.

Transferability and dependability are addressed in this study. Transferability is the ability to transfer the study to a similar setting in a similar situation (Patton, 2002). Transferability was addressed by ensuring the study was small but information-rich allowing for other researchers to extrapolate information for use in other studies in similar settings and situations. The study's steps and results have been well documented and described for other researchers. The small sample was addressed by conducting purposeful sampling. The samples were chosen by using certain criteria, criterion sampling, given to course coordinators in each college. The course coordinators were asked to look for the criteria of late adopters within the college. These characteristics consisted of faculty: who have waited until the last year to adopt or are in the last third to adopt, who were skeptical until learning management system success was evident through other faculty, who are typically not as social, and are typically not the leaders in technology adoption among faculty (Rogers, 2003). A qualitative study also addresses dependability by gathering more in-depth data through interviews, etc. This study address dependability by conducting interviews to gather more insight into the participants technology use. The interview consent forms and questions were sent to each participant before the interviews were conducted. To be consistent, there was a script used by the research and the interviews were conducted in the same place except for the interviews conducted at the Northeast campus location.

Results

Results of the study data are listed below. They are listed by research question and the questions used from the interview to determine their results.

Research Question 1

What factors do late adopters identify as preventing them from adopting technology in a comprehensive academic medical center?

Data for question one was taken from answers to question five that was obtained during the participant's interview. The question was open-ended and gathered information about the factors affecting the participant's use of the current learning management system.

Question 5: Tell me about major obstacles affecting your use of the current learning management system. Participants were asked to identify obstacles that affect or limit their decision to use the current learning management system. Themes identified are time, training, tech support, ease of use, does not meet needs, no one else uses it, disinterest, and system changes.

Time. Five out of six participants agreed a factor was time. The aspects of time consisted of the time involved in learning the system, the lack of time to use the system, and the time to monitor student participation. Becky indicated taking the time to learn the system, to utilize its functions, and time to monitor students was a barrier. Becky is not using all tools available because of the barrier of time. In particular, discussions are not being used because of the time involved with monitoring what students put in the discussion boards. Becky stated this by saying,

Probably time, time to learn how to use it and time to utilize all the functions. I am not using discussions right now, but would be something I could use. It would also mean making sure I am checking on it so that the student did not put in something and I did not check it.

Kim also agreed that time is a factor. This participant indicated the time to invest in learning the system was difficult to find during the day by saying,

For me it is probably just the time to invest in learning the system. That has always been hard for me to find enough time to do that.

Sara said,

For me I think having time learning when we first started it seemed a lot to build a course. For me, it became easier when I started teaching online courses and building everything into a course.

This statement is an indicator of time to learn the system is also a factor. Sara does agree once the system was learned it became easier and less time consuming. Sam also suggested time to learn as a factor and indicated others who have used the system could help others learn by saying,

I have not really had time where people are not as familiar with it could have a learning session to see how one could use it.

Finally, Dean agreed with all other duties expected during the day that taking the time to learn was a factor. The task of preparing for a class alone is time consuming for Dean but adding technology increases that time involved and stated,

When you are trying to teach a new class for the first time then you have got a lot of other stuff you do not want to have hindrances from the mechanics of trying to execute the class; let alone prepare the material in a conventional way meaning PowerPoints are all there and the auxiliary materials that go with it.

Training. The next common factor indicated was training. All participants in the study agreed training was a factor. Two participants just lacked the knowledge of how to

use the tools in the learning management system. Becky indicated she did not know how to appropriately set up a quiz and the implications that came with not setting it up correctly. She said,

I did not realize all the implications of checking all the boxes or not checking all boxes. You know you find out later how it works.

Kim lacked the knowledge of how to use the dropbox tool and, therefore, chooses not to use it and is just using the system for quizzes, assessments, and content. She stated,

I don't know how to use dropbox very well, so I don't use it. I pretty much just use tests, quizzes or lectures.

Four participants suggested there was a lack of understanding about training sessions or not having the time to attend when the training sessions are scheduled. Sara indicated training times were inconvenient creating an inability to attend stating,

Training was at inconvenient times, so it was not possible to go.

Sam stated,

I have not had time where people are not as familiar with it could have a learning session to see how one could use it. And you may have had it, and I have not paid attention to it.

Dean suggested trainings were not offered at convenient times stating,

I do not know. I know that we have training sessions here on campus. They are only offered every so often and often times do not realize you need it until you start trying to use the material and then it is three weeks before the next session is going to be offered, and I do not have time to wait three weeks. I am just going to have to muddle through and figure something out because I cannot tread water for

three weeks and wait to get hopefully enough training to cover everything I do.

You end up figuring out the back door avenues or just do it the manual way. That is a bit of an impediment, but maybe that is just laziness on my part.

Dale said,

I had to learn all its 'eccentricities' over time, mostly by calling support or doing Google searches.

This statement indicates a lack of knowledge of existing training sessions.

Doesn't meet needs. Three of the participants felt a factor consists of the system not meeting their needs. Many of these needs exist around the quiz component and its inability to accept numeric answers. Participants also felt having to grade long answer and short answer type questions was difficult. One participant stated it was not a well-designed system. Becky stated,

One thing I tried to use was doing calculations, but it was like I had to input the formula and if I wanted them to pull the formula from their notes I could not put in a varying answer.

Sara agreed stating,

I have tried to use it to test but it is not very user-friendly especially when you have some quantitative feedback, and they do not use the right grounding rules. So they could put 100.2, and the answer is 100 and it is wrong. You have to list all infinite possibilities and it is just not working well. So I have to grade them manually through the computer. I do not do that if I can avoid it. Otherwise, I have to do multiple-choice.

Dean also agreed stating,

Specifically the disadvantages if you want to make a quiz that is free response it is real difficult to get it to grade on its own even on something that you would think would be very definitive. I am asking to do a calculation. But if there are tolerances on rounding errors or which resource students may use for a particular constant. They might say Pi is 3.14 or might say Pi is 3.14.159.

Three participants expressed the system is not easy to use or is not intuitive.

Kim said,

It is just hard for us because it is not intuitive.

Dean was in agreement stating,

Yeah the most obstacles are that there are so many features that it was daunting.

Dale concurred stating,

I feel like the learning management system is poorly designed and not intuitive. I had to learn all its 'eccentricities' over time, mostly by calling support or doing Google searches.

Disinterest. Two participants expressed other faculty members just do not have the interest to use the system and just have not used it or have a staff member use the system for them. Sam and Sara were asked why other faculty members did not use the learning management system and Sara stated,

They just have not done it.

Before Sam began using the system he solicited help from a co-worker. When conducting an exam and soliciting help Sam said,

I know that he used it and that everything is electronic. Again, directly if I have questions I would go to him and then he checks them out and fits it into his exam.

As long as Sam had his co-worker there was no need to learn the system.

System changes. The university conducting system changes was a factor for one participant. The university was on a previous system for five years and then changed to the current system. The other changes have been upgrades to the current system. When Becky asked what factors influenced her adoption of the learning management system Becky stated,

I guess the main thing is you develop content for one system in the university, and then they switch to another system. You can not transfer all the work you did from one system to another, but you invest a lot of time in it.

Technical support. Three participants expressed problems with technology or the inability to find technical support when needed. The participants found this frustrating and a barrier to consistent use of the learning management system. Becky said,

Sometimes I need to call for help if I have a problem. But usually the answer can be found.

Kim suggested computer issues by saying,

Then sometimes it does not work, it goes out, or it freezes, or someone cannot login. When I have a bunch of students, and half are raising their hands, I need a little help.

Dean suggested Internet failure saying,

Sometimes that can be a barrier. If you have limited Internet connectivity, that could be a hassle. So now you have all this course material that you downloaded, and you might not have good Internet access or if you have Internet access out that day, then you do not have the material available.

Summary for Research Question 1

Time and training emerged as key factors in adopting the learning management system. Time was an expected factor. As indicated, these faculty are experts in their field but are expected to teach a class in addition to their daily duties of research, running clinics, and working in hospitals. However, while there is a large block of time involved in creating a course in the learning management system it does save the faculty time once the course is created. I also expected training would be a factor in adoption of the learning management system. While there are several different training options available, it is difficult to meet everyone's schedule and needs.

Other factors that emerged were:

- Does not meet needs
- Disinterest
- System changes
- Technical support

Several faculty indicated the system did not meet their needs. In particular, the system did not meet needs when putting in quiz questions involving the need for calculations or varying answers. This difficulty could be solved with extra training for those faculty members. There are also faculty members who express disinterest in using the learning management system. The faculty who lack interest in using the learning management system may never move to using the system. System changes are also a factor to not using the system. All technology at some point will require upgrades to the system. Resistance can be related to the extent of the upgrades taking place. A participant expressed a difficulty when changing between different systems. The inability to find

technical support when needed was a barrier of several participants. They indicated if they had an issue during an exam or class it was difficult to find immediate help. There are only two staff members that administer and serve as tier two support for the seven colleges. However, each college has at least one staff member assigned to serve as a tier one support contact plus the help desk is available for tier one calls. A summary of the factors and their participant selection percentages are listed in Table 5.

Table 5

Participant Factors

Factor	Considered a Factor	Considered a Factor (%)
Training	6 out of 6	100%
Time	5 out of 6	83%
Doesn't Meet Needs	3 out of 6	50%
Technical Support	3 out of 6	50%
Disinterest	2 out of 6	33%
System Changes	1 out of 6	17%

Research Question 2

What measures do late adopters suggest to increase technology adoption among faculty in a comprehensive academic medical center?

The data analyzed for research question two came from questions six and seven from the interview with participants. Open-ended questions focused on how to overcome these factors with them and their colleagues who have not yet adopted the learning management system. Measures to eliminate lack of adoption were not given for all factors.

***Question 6:** Tell me how you overcame any obstacles that existed.*

***Question 7:** Tell me what you feel could be done to help other faculty who have*

not adopted to overcome that factor.

Time Measures. Again, time is an issue for these faculty members. They have many other duties with teaching a course as an addition to their typical duties. Five participants suggested measures for the factor of time. Measures for the barrier of time varied among the participants. The measures consisted of having help from others, using the course from past faculty members, or different ways of monitoring. Some participants did agree the system became easier over time. Becky suggested ways to monitor such items as discussion within the system saying,

Well possibly just like we have email open all the time while we are at work, we could have the learning management system open while at work and monitor it.

You could respond to the discussions on a certain time of the day.

Two participants suggested after the initial course is setup it continued use saves time.

Kim said,

That is very helpful to have stuff already created. Even though I will probably change something. It is nice because I will go back and print off the whole lecture section or whatever is on there. It helps me remember what order I have things in.

I may change things up depending what is going on.

Sara also stated it saves time in the long run saying,

When we first started it seemed a lot to build a course. For me, it became easier when I started teaching online courses and building everything into a course. Just doing the contents and the learning management system was easy.

Sam initiates the help of their staff saying,

When it comes to the learning management system, usually someone puts in my

lectures for me, so I have not gotten involved in that as well.

Dean uses a prior faculty member's existing course to save time saying,

Fortunately, I inherited a class that was already put online and so I muddled through it and learned how to edit and change things that I did not like. When I built my class this past semester from scratch I found it was a better because I did not like some of the architecture that the other person had done.

Training measures. All participants offered measures to eliminate lack of adoption for the training factor. Many of the measures offered for training were different ways and times to conduct the training sessions including varied times, video sessions, and visual handouts. Becky stated they use learning management system cheat sheets saying,

We each added to our little cheat sheet.

Kim likes having a visual, step-by-step, paper guide or video stating,

I am a person who is pretty visual, but I have to have a handout. I would do well if I have a step-by-step guide. I cannot hear and then remember it that well or see it once and then know how to do it. It is just not that familiar to me. Some of it maybe, but some of it is not. I am always the type of person that likes to have a reference to go back and look at. If I have a handout where I can sit down and go through it than that for me is probably best. If I am using the learning management system and watching training I cannot go along with it. I like to have a guide or something I can refer back to that I do not have to pull up online.

Sara suggested multiple and varying times or recording the training stating,

I think having multiple times for training sessions. Sometimes they were not at

convenient times. Or a recorded version that you could pick up later really helps.

A lot of times they were at lunch times or during the afternoon clinic that we could not possibly go. I needed the information. I could get a copy or watch it.

Sam suggested having an experienced peer helping inexperienced faculty by saying,

To have someone who has experience using a PC will help you with your presentation and putting the information together for the students. That type of thing or what I am missing that would help in this process. That is sort of what I feel. I do not know all the details, and that is something that I feel I have probably missed in some way.

Dean suggested asking other experienced users or using the help menu in the system by stating,

What I have done is gone to other people who use the system and ask them how they have done it. So I end up doing it piece by piece. Even if you are familiar with navigating the Internet and clicking on things to navigate, you can figure it out. You can use the help menu to figure some things out. Asking people to do the main features and just keep it simple and not try to do extravagant things.

Dale wants to see more on-site training at the other campus locations by saying,

More on-site training; I often feel like large training sessions that slowly go through the entire system can be tedious and do not recognize different skill levels. If we had the resources, more individualized training would be great.

Disinterest. Measures offered for those who are disinterested include modeling from experienced faculty members. Sara suggested,

I think it takes people seeing what you are doing or other colleagues from other

departments saying we already did this course, and it works out. I have almost got some of mine convinced to use it.

Summary Research Question 2

Measures for time include having others enter content and improved ways of monitoring students. Participants agreed that with continued use, the system became easier to use. Also, once the information was in the learning management system, it saved time in the long run. Some faculty members used courses created by faculty who preceded them. While these measures are good, it is important the information within the system keeps up with current curriculum and trends.

Training measures included having “cheat sheets”, handouts, varied training times, and videos to show steps to using tools within the system. Handouts and videos are a great tool for faculty who are visual learners and do not have time to attend training sessions. There are faculty who need someone to offer them hands-on help; for these faculty attending an actual training session is best. Offering varied times for faculty would allow them the ability to attend another session if one time is inconvenient. A solution offered for disinterest included continuous use and modeling by other faculty members.

Participants did not suggest a measure to every factor. There was one suggestion of having experienced faculty model the use of the system with hopes of leading those with disinterest to eventually adopt the system. Disinterest is a difficult factor to solve. Many times these faculty members will never adopt a new technology.

Other questions in the interview were meant to determine the participant’s demographics and their feelings regarding technology use. While these users are

considered late adopters within their respectful colleges, it helps the researcher to know their actual level of technology use and what technology they use.

Question 1: Tell me what skill level you consider your technology use. This question was to determine what the participants consider their technology skill level. Five out of six considered themselves to be mediocre users with one being a high skill level user. The skill level was also dependent on the programs being used. Becky stated that she uses technology such as PowerPoint, the learning management system, and audience response systems in the classroom by stating,

Well I use it quite a bit. As far as PowerPoint, the learning management system, and an audience response system.

Kim considers her skill level as medium depending on the system being used.

My skill level is probably, depending on the system, medium.

Sara considers her skill level moderate only using systems required by saying,

Moderate. I can learn systems once I am taught; I am not one that experiments on my own.

Sam is a minimal user only using programs loaded on the computer.

I would say mine is minimal. I use the programs that are on the computer.

Dean also considered himself middle-of-the-road,

Just middle-of-the-road; I operate a smart phone I do not do lots of apps. I know how to use the Internet and search.

Dale was a heavy technology user,

Fairly high, I've been using personal computers since the early 1980s.

Question 2: Tell me about the technology you use in the classroom and how do

you use it. This question helped to determine what types of technology the participants are using in the classroom. Many of the healthcare faculty use other technology programs such as electronic medical record software, medical research hardware and software, and patient simulation software. These software programs are more specific to their daily work requirements as a healthcare worker, and they are more apt to use them. Kim works with some technologies and specifically mentioned software for electronic medical records.

There is always more I would like to know how to do, and I am working with the learning management system, Axiom, and a new system we are using with a senior level course called eClass.

Sara uses some hardware systems in their classroom,

I use the projection system. I will use videos occasionally usually the ones that are on CD. There will be things that we might pull from master clinician, but it is video clips. I utilize some media player and the Elmo system for projection. Most of those are all in the classroom.

Sam uses mostly PowerPoint saying,

The major use for me is using the PowerPoint slides for presentations. I may have a little bit of animation on them, but that is probably the major extent of my contribution in terms of the technology.

Dean is a user of the advanced medical research technologies.

I do use advanced instrumentation for research and analytical experimentation. As far as everyday computing I get my dose of technology with the instruments that I run. I use Microsoft Office Suites except for Access.

Dale uses some software and web technologies to create class videos.

I use the learning management systems, Camtasia to make video lectures, YouTube to host videos, PollEverywhere for in-class polling.

Question 3: *Tell me the impact you think technology has on students in the classroom.* This interview question helped to determine the participant's views on the impact of technology on students. They were asked to describe appropriate and inappropriate technologies in the classroom. Many believed technology had a positive impact on students giving them the ability to search and have access to the Internet. A few participants believed technology did have an inappropriate impact on the students. Those that did have a response, considered phones and surfing the Internet inappropriate during class time. Faculty also felt face-to-face case studies with an actual patient was more beneficial than having a video session. Having the actual patient present allows for a more in-depth study. Just one quote is chosen per participant. Becky feels most technology is appropriate,

I think just about everything could be appropriate. I have been to meetings where the audience response system is used through the telephone where you get automatic responses.

Kim finds the Internet useful as long as social media or other programs do not distract students,

Access to the Internet in general because it is very handy. Suppose I am saying something about a condition and I want to look it up, a student can look it up for me. The learning management system is the only one I use in the classroom.

Sometimes students or faculty will pull up a clip from YouTube to make a point

in a lecture or emphasize something. I just think having access to the Internet is very helpful as long as students are not messing around on it.

Sara believes classroom clickers are useful and feels some students are intimidated by technology,

One that I did not try that my other colleagues did was the audience response clickers. They did not seem to find them beneficial because of the size of our classes. Some students may be intimidated using technology and not have what they need to participate. Also, are they following their PowerPoint or are they searching the Internet?

Sam believes students miss interaction during face-to-face case studies,

Probably the negative would be the student having the opportunity to ask questions in the immediate time that a case study was going on.

Dean does not like texting during class,

It absolutely will send me over the edge if someone is texting in class.

Dale has recommendations for proper technology use in the classroom,

Any use that serves the following: students acquire more advanced skills; classroom experience becomes more enjoyable; and the speed and efficiency of learning increases.

Question 4: *Tell me the advantages or disadvantages of using a learning management system with courses in the classroom.* This question was used to determine the participant's view of the learning management system and its advantages and disadvantages. Many of the participants felt the ability to have anytime, anywhere access to content was an advantage. Other advantages include the ability to store online content

for extended times and cost savings of not using paper products. Just one quote is chosen for each participant. Becky stated an advantage as,

It makes it everything available to the students. All the handouts, PowerPoints presentations we can upload. I like using the dropbox. I have been able to have homework downloaded to the dropbox. Also checking if students are plagiarizing. That has been useful primarily if they are plagiarizing each other in the homework and graded items.

Kim suggested another advantage,

The fact that I can go back and pull something up from two or three years ago. Especially with accreditation coming up, I am probably going to have to pull up course evaluations. I do not always print that stuff and put it somewhere. I can just keep it archived there.

Cost savings was an advantage for Sara and Dale. Sara said,

Also use through the learning management system online test and that for me has been beneficial and cost saving. I do not have to print or use Scantrons.

While Dale stated,

A great advantage is saving on copying and paper by posting files online. This also applies to quizzes and exams. Also, the ability to maintain a question database and to analyze exam statistics is very helpful.

Sam suggested an advantage and disadvantage was posting lectures,

I assume they view my lectures because there is a small number that are there.

Dean suggested technology problems as a disadvantage,

If you have limited Internet connectivity that could be a hassle. So now you have

got all this course material that you've got downloaded, and you might not have good Internet access or if you have Internet access out that day, then you do not have the material available.

Summary

This chapter began with a discussion of each college, their functions and demographics. A section follows this discussion on how data was collected from the participants. Data was collected from six participants labeled as late adopters by conducting interviews and document analysis. There was one participant from each college except for the College of Nursing. The data analysis section reviewed the steps used in analyzing the data and gave a summary of each case interview. The factors that emerged during data analysis consist of time, training, doesn't meet needs, ease of use, disinterest, system changes, and technical support. Participants also offered measures to help overcome the factors that emerged. The evidence of trustworthiness discussed threats to this study and how those threats are addressed. These threats include transferability, dependability, credibility, and confirmability of the information and analysis. This chapter concluded with a section on the results. This results section discussed how each research question is addressed in the interviews. It also indicated the participant responses to the research questions asked during the interview. The next chapter will look at the interpretation of these results.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this qualitative interview study was to determine the factors involved in adopting learning management technology by faculty in colleges labeled as comprehensive academic medical centers. My goal was that determining these factors help faculty who have not yet adopted learning management technology improve classroom management, increase collaboration, and increase the cost effectiveness of the learning management system. While there are some studies on faculty adoption of technology, I found none related to a comprehensive academic medical center. I chose a qualitative methodology to allow an in-depth look at factors inhibiting faculty adoption of the learning management system and how institutions and faculty might overcome these factors. I conducted face-to-face interviews one participant from each of the colleges comprising the medical center. Following the interviews, I conducted a document analysis to verify the factors.

This chapter will offer an interpretation of the findings, identify limitations of the study, present recommendations, explore implications, and arrive at a conclusion. The interpretation of findings section will focus on the results of the data collected through interviews and document analysis. In the limitations section, I discuss how the study's limitations were overcome. The recommendations section presents recommendations for future studies. In the implications section, I discuss this study's impact for social change. Finally, I conclude with a summative conclusion section.

Interpretation of Findings

The study is based on Rogers' (2003) diffusion of innovations theory. Rogers

(2003) defines diffusion as “the process in which an innovation is communicated through certain channels over time among the members of a social system” (p. 5). Rogers’ theory informed my construction of several research questions that I used to guide this study. According to Rogers (2003) there are five different adopter categories: innovators, early adopters, early majority, late adopters, and laggards. All participants in my study were faculty members who were identified as a late adopter in his or her respective college. Rogers (2003) defines late adopters as more skeptical of technological change, and usually adopt after the average adopter. They are typically among the last third to adopt technology and may finally adopt it because of peer pressure. Interpretation of this data is presented according to the information analyzed from the interview questions of each participant.

Responses to demographic interview questions indicated the majority of participants considered their technology skills to be at a medium level, and one considered their level to be high. These responses seemed generalized to the types of technology with which the faculty are familiar. Some were familiar with smart phones and some with medical technologies such as electronic medical records, medical research hardware and software, and patient simulators. It is expected that a faculty member would feel their skill level higher when using medical technologies because they are more knowledgeable at using them on a daily basis.

Types of technologies used in the classroom also varied by participant. These technologies included medical technologies, Microsoft Office products, projection systems, Elmo’s, YouTube, polling software, and the Internet. Participants were asked in question three about their view of the impact of technology on students, and appropriate

and inappropriate technology use in the classroom. Many felt technology is good as long as it is not disruptive to the class or to the students' learning. One participant did make a strong point regarding the appropriate use of technology, claiming that technology should not be used in the classroom just to be using technology. Harris & Hofer (2011) suggest technology should be used only to enhance and support the curriculum that exists in the course

The fourth question for demographic information was used to elicit responses regarding the advantages and disadvantages of the learning management system. Advantages participants cited include money savings, and disadvantages include lack of classroom attendance by students. Among the examples of money savings were the savings on paper use and savings not having to buy Scantron sheets for testing. However, faculty felt students were not attending their class times because they could view everything on the learning management system. The participants saw the student's lack of class attendance as a disadvantage.

Research Question 1

This section will review research question one which examined the factors that prevent the faculty from adopting technology in a comprehensive academic medical center. Two of the perceived attributes of how innovation is diffused through a society are compatibility and complexity (Abdullah, 2005; Rogers, 1995; Schroll, 2007). Compatibility is defined as the degree to which the innovation meets past experiences, values, and the needs of the adopter. Complexity is the degree of difficulty or use of an innovation (Rogers, 2003). Trialability is the degree to which an innovation is experimented with before adoption, and is another attribute seen in the factors found in

this study. All outcomes can be attributed to the compatibility and complexity of the technology; particularly, in regards to time and training as top factors to adopting the learning management system. Other factors that participants cited as reasons for not adopting new technology included, disinterest, system changes, a sense that it does not meet their needs, and a lack of technical support.

While faculty at the university are experts in their field as medical doctors, clinicians, researchers, they have little time to spare with their duties as educators. Time constraints thus emerged as a factor to adopting the learning management system. Participants expressed concerns regarding time in terms of the time it took to learn the system, the time it takes to monitor system use by students, and the time it takes to set up the course. Lack of time does follow trends of other studies of higher education. Technology use is seen as pertinent by the World Health Organization who stated the use of technologies in the medical sector could help solve health care issues and improve the quality of life (Myers, 2010). Candler (2007) stated in the colloquium on educational technology:

The advent of multimedia technology, the World Wide Web and the ubiquitous nature of networked computers, have transformed educational technologies from esoteric legacy applications used by a few pioneering faculty to mainstream applications integral to the medical school educational enterprise. (p. 3)

Other studies have indicated that time is also a factor in higher education institutions. The trends discussed at the 2020 Vision of Faculty Development Across the Medical Education Continuum conference proved that time is a factor with medical faculty, and indicated that medical faculty need to be lifelong learners to keep up with

technology trends, the emergence of eLearning, and the university's adoption of new technologies to keep competitive with its peers (Robin et al., 2011). Not only do faculty need to keep up with the emergence of new health trends, but also with the emergence of new technologies. Studies by Joseph (2007) and Patzer (2010) also indicated time as a factor to using a learning management system. Although their study did not focus on adoption of a learning management system, Tannan (2012) determined time as one of the factors to adopting electronic health records. While time is a factor, faculty need to understand the consequences of not adopting a technology within a university. A study by Kowalczyk and Copley (2013) indicated the attitude of the instructor to eLearning and its tools are critical to the students learning experience. Delf (2013) also indicated that eLearning makes economic sense in medical universities and targets individuals who would otherwise not have the ability to complete a degree.

I also found that training was a prevalent factor to learning management system adoption by faculty. Faculty felt that the training they were offered was not scheduled at convenient times. While faculty did consider themselves to be at a medium skill level for technology, some faculty indicated this level was used with medical technologies and not the learning management system. Joseph (2007) indicated faculty who are not tech savvy require more persuasion in the adoption process. In my analysis of documents indicating training dates and attendance, I found that there were 25 live training sessions held, and 167 attendees from the 7 colleges within the medical center participated in 2014. These numbers represent a decrease of 15 training sessions and a decrease of 13 attendees for 2014. However, there was an increase in per training attendees from 4.5 in 2013 to 6.68 in 2014 (Table 6). There were some one-on-one training sessions conducted that were not

logged for future reference. Training was typically offered during the noon hour for all faculty and staff. I found that scheduling information about the training sessions was not well communicated to the faculty members. Many times the staff did not forward the information on to faculty in the colleges. These numbers represent a small percentage of faculty trained with a campus of 1500 faculty members indicating that training could well be a factor for other faculty.

Table 6

Training Attendance 2013 and 2014

<i>Year</i>	<i>Number of Trainings</i>	<i>Number of Attendees</i>	<i>Average Attendees Per Session</i>
2013	40	180	4.5
2014	25	167	6.68
Difference	-15	-13	+2.18

Less prevalent factors include disinterest, does not meet needs, system changes, ease of use, and technology support. Studies reviewed in the study did not indicate anything about disinterest in using the learning management system, but this did seem to be a factor to faculty adopting the system. They simply lack the interest in using the learning management system regardless of any positive results it may have on them as faculty and students. Some faculty members felt the system just did not meet their classroom needs and the system was not easy to use. Baldwin (1998) suggested constant changes to technology could be detrimental to faculty and the amount of time they need to learn the new technology. System changes that have taken place with the current learning management system have all been service pack updates excluding one major update. The major update did include a new interface that did require some faculty to

relearn the system. A study by Patzer (2010) indicated professional support as a key factor in successful online programs in higher education. While professional support was not a factor in this study, technical support could be considered a component of professional support. Each college does have access to tier one support for the learning management system plus the help desk. There are also two tier two support administrators for all seven colleges within the university.

Research Question 2

This section will review research question two that examined what measures could be introduced to increase the use of technology in a comprehensive academic medical center. Another element of diffusion, communication channels, can be seen in many of the measures offered by the faculty. Communication channels are defined as “the process by which participants create and share information with one another to reach a mutual understanding” (Rogers, 2003, p. 18). Communications channels consist of information groups, organizations, social systems, and subgroups.

Not every participant identified a measure for all the factors; however, all had identified measures to be taken for time and training. The factor of time is a problem within many higher education systems including this university. Measures offered for the factor of time included having help from other faculty, using a previous existing course, and different ways of monitoring the students in the system. Using early adopters to model the positive aspects of time could be beneficial to late adopters. While there is a large time requirement for learning and setting up a course in the learning management system, time is saved after course set up has been completed. A study by Ruiz et al. (2007) indicated a shift from a teacher-led classroom to a student-centered classroom

could increase a teacher's time thus increasing student success. Many universities, as well as this university, understand time is an issue and are trying to identify measures to improve these factors. Johnson, et al., (2014) indicated higher education is reacting to the issue of time by hiring more adjunct professors. Hiring adjunct instructors can impact the university in a couple of ways. It can take part of the load off full-time faculty and shift that to adjunct faculty thus increasing time. However, this can also increase the cost to the university to hire adjunct faculty. The university would need to determine the cost of time versus the cost of additional faculty.

Training is a concern within most higher education institutions. One of the challenges to eLearning expressed in the 2014 New Media Consortium Horizon Report of Higher Education was low digital fluency among faculty members (Johnson et al., 2014). "The American Library Association's Digital Literacy Task Force defines digital literacy as the ability to use information and communication technology to find, evaluate, create, and communicate information" (Johnson et al., 2014, p. 22). While many of the adopters considered their technology level to be medium, they may not have been using this definition of digital fluency. If they were focusing only on their ability to use the technology tool, then they may have missed the importance of understanding how to make meaningful use of the tool in the classroom.

Faculty members within this study seemed to rate their skills at a medium level depending on the technology used. A medium level rating would indicate they have a moderate amount of technology savvy. Increased training in the learning management system could increase their skill with using and understanding the system. McCarthy & Samors (2009) also indicated one of the key factors was professional support for faculty

members. Options offered for increased training were offering different times and tutorial videos. Tutorial videos could be a beneficial training tool for faculty. Currently, there are only two trainers for the seven colleges in the university. These trainers conduct other duties besides training, so videos could be an aid to increasing training options. There are staff members in each college that offer learning management system support, but they are limited by other duties in their positions and do not conduct university-wide training.

Disinterest seemed to be a difficult factor to resolve because it is difficult to change mindset when there is a lack of interest to proceed. The faculty members could attribute disinterest to a lack of vision. The one suggestion for disinterest focused on modeling the use in hopes of persuading others to adopt. Rogers (2003) indicated that interpersonal relationships are conducive to change attitudes toward adoption of technology. A study by Baldwin (1998) posits,

Information on success stories with technology and role models to emulate may be an essential part of this conversion process. Likewise, mainstream faculty need technical and professional support (for example, from colleagues, deans, department heads, instructional designers, computer specialists) to overcome their resistance to risk-taking with technology (p. 14).

Peer mentoring, modeling, and professional support are all tasks that can help to overcome non-adoption due to faculty disinterest.

Limitations of Study

Limitations of this study include the researcher as a student, the size of the study and the length of the study. Because I was a student, the length of the study is initially short and the size is limited to one faculty member per college. I was also an employee at

the university, and this could have affected how the faculty member responded in the interviews. There was a higher chance of errors because I was a student.

To help reduce some of these limitations, various procedures were implemented. To adjust for the limitation of inexperience as a student I worked with a committee that mentored me through the process. To accommodate for the employment factor confidentiality statements were given to all participants at the beginning of the interview. I also indicated to participants that the interview was on a volunteer basis, and they could choose to withdraw at any time without repercussions. Triangulation was also used by conducting interviews and document analysis to help validate the collected data. Participants were sent a written report of the data, member checking, to help validate the information.

Recommendations

This study is just one study of a comprehensive academic medical center regarding faculty adoption of a learning management system. The lack of technology adoption in the health industry can lead to costly failures, delays and workforce issues (Myers, 2010). There are three other universities considered to be comprehensive academic medical centers in the United States. This study could be expanded to include more interviews of more faculty members and could also include other comprehensive academic medical centers. Data could also be gathered to determine students' feelings toward a learning management system. This data would help to determine if the learning management system is useful and meaningful for students. This study would also allow for a larger participant pool and include other similar colleges. Prolonging the study would also be beneficial to help gather and analyze data.

A study could also be conducted to look at the quality of the courses. Quality can be measured by using the Quality Matters Rubric (Quality Matters, n.d.) as a framework for measuring quality. The rubric consists of 8 general standards and 43 specific review standards used to assess the design of online and blended courses (Quality Matters, n.d.). Since many courses are conducted online using the learning management system quality becomes imperative. The quality must be comparable to that of face-to-face courses. It is also important to not overload the course with too much information. The Quality Matters Rubric (Quality Matters, n.d.) helps to determine these factors.

Another recommendation could focus on the sustainability of those adopting a technology. “Sustainability is the degree to which a program of change is continued after the initial resources provided by a change agency are ended” (Rogers, 2003, p. 376). Rogers (2003) posits once a technology is adopted, sustaining that adoption is crucial. Studies could focus on those who have adopted to see how long they have been using the learning management system and those who used and have abandoned those efforts. Determining what factors influenced sustainability or the lack of sustainability could help stakeholders make determinations for the future.

Studies could also focus on early adopters within the university. Early adopters are considered to be innovators (Rogers, 2003). Faculty members as early adopters can be critical to persuading additional faculty to adopt the technology (Joseph, 2007). This study would help to determine a network of faculty members to persuade further adoption among late adopters or laggards within the university. Another interesting study could be to determine if the personality traits are in regards to the different adopter categories in the health sector versus typical higher education institutions.

Implications

Implications for positive social change exist for faculty, students, and the university. Myers (2010) posited in her study that the lack of learning management system adoption by faculty in the health industry could lead to costly failures, delays, and workforce issues. The purpose of this qualitative interview study was to determine the factors to adopting a learning management system with the faculty of a comprehensive academic medical center. The possible positive effect on social change exists by improving classroom management, increasing collaboration, and increasing the cost-effectiveness of the learning management system. The 2014 New Media Consortium Horizon Report of Higher Education reported that eLearning leverages students skills, allows for increased collaboration, equips students with digital skills, offers flexibility, ease of use access, allows for integration of multimedia technologies, and addresses individual student needs (Johnson et al., 2014). Use of the learning management system helps with classroom management by using the learning management system as a tool with the faculty and students. Faculty can use the system as a place to post lectures and documents enabling students to view this information anywhere, anytime. The system can also be used for assessments. The system grades most of the assessment and allows the student to receive their grade and feedback promptly. Audio or video can be used by faculty to allow for more personalized feedback. These uses help improve the learning management system and make classroom management more efficient.

Faculty does not always have time to address every student in a large classroom, and not all students feel comfortable speaking up in class. The increases in the medical sector require faculty to have more students in their classrooms. The ability for faculty to

collaborate with students and importance of students collaborating in groups is imperative in the learning process. When students enter into the medical field, they will be working with teams. The system allows for better collaboration with faculty and students by using discussion boards and blogs. Those students who do not want to speak up or do not have a chance to speak up can have a voice through the use of the learning management system. In this way, classroom management becomes more efficient and the learning environment is improved.

Universities spend large amounts of money on the use of technologies such as learning management systems. It is the faculty's responsibility to be good stewards of public funds by ensuring the system is not only being used but being used properly. Using the system also allows for a cost savings of paper usage and outdated technology such as Scantrons.

The study also contributes to positive social change in that it provides information for use and reference in implementing a learning management system to support learning and teaching in comprehensive academic medical centers nationwide. The study has shown the factors that exist at one comprehensive academic medical center and these factors and measures to eliminate them can be helpful for other medical universities considering adoption of new technologies. Being aware of these factors and measures to eliminate them can be helpful to avoid them in the future. The study has also shown why these technologies are important in aiding faculty in the classroom and students in their studies. Use of the system with faculty improves their time management and classroom management allowing more time with students. Students are also able to collaborate more with other students and faculty. During times when students and faculty are not able to be

in class for times such as inclement weather, the learning management system allows a class to be carried on virtually. Usually in higher education there are not makeup days, this prevents class time from just being missed.

Conclusion

Students are technology savvy and seeking colleges that can meet those needs. As technology use continues to increase with students, it will remain important to determine the factors and measures to increase the adoption of technology and the systems that are being used in universities and colleges. Unless faculty begin adopting technologies this gap will continue to widen making instructional programs irrelevant. This study looked at one system in one university to determine these factors and measures to eliminate lack of adoption. These factors and measures can be leveraged to increase adoption rate among faculty and increase the technology use in colleges and universities. While these factors and measures are pertinent to this university they will be different for each college. Taking the time to engage with faculty is key to determining those needs and their measures.

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Appendix A: Interview Questions and Protocol

You have been chosen for this interview because someone feels you would be beneficial in determining the factors that exist regarding the adoption of learning management systems. The purpose of this qualitative interview study is to determine the factors in not adopting learning management technology of faculty in colleges labeled as comprehensive academic medical centers. All interviews will be recorded and kept highly confidential. Participants will be asked to review a transcript of the interview.

Date:

Name:

Questions for the interview will be open-ended and will start with the following basic questions and probing questions:

1. Tell me what skill level you consider your technology use.
 - a. Have you always been at this level or have your skills improved? How have they improved?
 - b. Have you used technology in previous jobs? Where and in what ways?
2. Tell me about the technology you use in the classroom and how do you use it.
 - a. How long have you used this technology?
 - b. What pros or cons do you have about the use of technology?
3. Tell me the impact you think technology has on students in the classroom.
 - a. What types of technology are appropriate for the classroom?
 - b. What types do you feel are appropriate for outside the classroom?
4. Tell me the advantages or disadvantages of using a learning management system with courses in the classroom.

- a. How do you use the system in the classroom?
- b. How do you use the system outside the classroom?

These questions will give an idea of the current use and attitudes toward technology and the learning management system. To answer the first research question regarding what factors exist the participants will be asked the following questions:

5. Tell me about major obstacles affecting your use of the current learning management system?
 - a. Tell me why you think this obstacle existed.

The second research questions will be answered by asking the following interview questions:

6. Tell me how you overcome any obstacles that existed?
7. Tell me what you feel could be done to help other faculty who have not adopted to overcome these factors?

Appendix B: Introduction Script for Interview

I am studying the factors that exist regarding the adoption of learning management systems. The purpose of this qualitative interview study is to determine the factors to adopting learning management technology of faculty in colleges labeled as comprehensive academic medical centers.

The interview should last no longer than one hour. I will be recording the interview simply to avoid missing any information. I will also be taking notes throughout the interview. Please be sure and speak clearly, so you will be clear on the recorder.

All interview responses will be kept confidential. This means none of your information, including personal information, will not be shared in any public reports. Remember you do not have to answer anything you do not wish to answer and you can end the interview at any time.

Do you have any questions?

Are you willing to participate in this interview?

Appendix C: Confidentiality Agreement

CONFIDENTIALITY AGREEMENT

Name of Signer:

During the course of my activity in collecting data for this research: “Factors of Adopting Learning Management Systems With Medical Faculty” I will have access to information, which is confidential and should not be disclosed. I acknowledge that the information must remain confidential, and that improper disclosure of confidential information can be damaging to the participant.

By signing this Confidentiality Agreement I acknowledge and agree that:

- a. I will not disclose or discuss any confidential information with others, including friends or family.
- b. I will not in any way divulge, copy, release, sell, loan, alter or destroy any confidential information except as properly authorized.
- c. I will not discuss confidential information where others can overhear the conversation. I understand that it is not acceptable to discuss confidential information even if the participant’s name is not used.
- d. I will not make any unauthorized transmissions, inquiries, modification or purging of confidential information.
- e. I agree that my obligations under this agreement will continue after termination of the job that I will perform.
- f. I understand that violation of this agreement will have legal implications.
- g. I will only access or use systems or devices I’m officially authorized to access and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.

Signing this document, I acknowledge that I have read the agreement and I agree to comply with all the terms and conditions stated above.

Signature:

Date: