

USING DIFFUSION OF INNOVATION THEORY TO
EXPLAIN THE DEGREE OF FACULTY ADOPTION OF
WEB-BASED INSTRUCTION IN A THAI UNIVERSITY

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CHAPTER I

INTRODUCTION

The spread of communication technology and the Internet have contributed to changes in many fields including higher education (Margolis, 2004; Mayers, 2001). One of the visible impacts of the technological development in communication and information is the growing student enrollment in postsecondary education and the expanding number of colleges and universities (Thomas, 2004).

Hanna (2003) also pointed out that with the rapid growth of young populations in many areas of the world, higher education institutions are under pressure to respond with new and creative ways of teaching. Online learning is emerging as a new paradigm in teaching to deliver courses at colleges and universities. Harasim (2000) stated that the 21st century begins with a paradigm shift in attitudes towards online education. She further postulated that online learning is evident in the new modes of course delivery. Lynch (2004) agreed with this point. She insisted that the most notable impact on colleges, universities and industry has been the adoption of online learning. Moreover, online learning and related tools are starting to evolve rapidly with the growing market and intense competition for online education (Aggarwal, Turoff, Legon, Hackbarth & Fowler, 2008).

In recent years, there are many names for online learning activities (Khan, 2005), including distance education, online teaching, e-learning, web-based learning, web-based instruction, and so on. In this study, the term web-based instruction (WBI) will be used to mean an innovation approach that involves the Internet and web-based technologies to deliver education to remote students (Aggarwal & Legon, 2008; Khan, 1997).

In relation to a paradigm shift in web-based education, higher educational institutions have moved from being campus-focused to be a web-based college or university. Abeles (2004) mentions that postsecondary education has reached a transition point to become virtual. This is consistent with Odin (2004) who views that although there will still be many “brick-and-mortar” campuses, their classes will be a combination of web-based and classroom instruction. The universities which can combine face-to-face pedagogy with web-based pedagogy will do very well in the globalization of higher education (Inayatullah, 2004). Accordingly, both academic and non-academic institutions are offering and in the process of delivering web-based courses (Khan, 2005). A large number of colleges and universities in US, for example, offer courses or part of courses via the Internet (Coombs, 2005).

According to the fifth annual report on the state of web-based learning in the U.S. higher education by Allen and Seaman (2007), more than two thirds of all higher education institutions offered some form of web-based learning. The number of web-based students had increased by 9.7% over the previous year. Students taking at least one web-based course in Fall 2006 represented almost 20% of total enrollment in higher education. Moreover, about 70% of the universities who responded to the study expected that student demand would grow.

Delivering web-based courses is not exclusive in the western world; it is also appearing as a new trend of teaching and learning in Asia. According to a study done by Charmonman (2006), universities and colleges in member countries of Association of South-East Asian Nations (ASEAN) including Thailand were offering web-based instruction or web-based degree programs. In Thailand, the shift from traditional teaching and learning to web-based instruction is happening (Nagi, Anaraki & Suesawaluk, 2007). Nagi et al. (2007) further suggest that Thai higher education needs to incorporate web-based instruction in their teaching and learning system.

Statement of the Problem

Web-based instruction continues to proliferate because of its substantial benefits to students, instructors, and institutions; therefore, higher educational institutions invest a lot in web-based education. Oakley II (2004) mentioned the value of web-based instruction to various stakeholders. In terms of its benefits to students and instructors, the rise of delivering web-based courses is prominent because it can respond to the increasing number of students, and allow more flexibility to teachers and learners in terms of time, location and access to teaching and learning (McGorry, 2003; Odin, 2004). Moreover, higher education institutions gain a vast amount of money from delivering web-based courses. As Saba (2003) asserts that web-based education are now estimated to be a multibillion-dollar industry. Because higher educational institutions recognize a great return on investment in offering web-based instruction, universities invest heavily in web-based education (Khan, 2005).

Despite the benefits of web-based instruction as an option for teaching and learning, many faculty members are not converting face-to-face instruction to web-based

mode. Most of the faculty members still have not integrated web-based instruction into their teaching (Odin, 2004). Maguire (2005) also concurs that despite the growth of web-based learning offerings and enrollments, many faculty members are still hesitant to teach web-based courses. According to Allen and Seaman's report (2007) one major problem regarding the use and the success of the web-based instruction continues to be faculty resistance to web-based education. A similar situation happened in Thailand. Sombuntham and Theeraroungchaisri (2006) reported that the problem in development of web-based instruction was instructors. Specifically, faculty did not pay much attention to produce web-based content and put learning media into web-based system.

Diffusion of innovation theory proposed by Rogers (1995) would explain why university faculty incorporate or ignore web-based instruction. According to Rogers (1995), rate of adoption, a speed at which members of a system adopt an innovation, can be predicted by five innovation characteristics: relative advantages, compatibility, complexity, trialability, and observability. Each of these characteristics will be explained in the section 'Theoretical Framework'. Wilson and Stacey (2003) contend that the diffusion of innovation perspective dominates much in the literature related to the use of information and communication technologies in the shift to online delivery. Meanwhile, the success of teaching online course lies with faculty involvement (Lynch, 2004; Wolcott, 2003). It is, therefore, worth conducting this study to research and report web-based instruction use and faculty perceptions of involvement in web-based instruction in the selected university using the lens of Rogers's theory of diffusion of innovation.

Purpose of the Study

The purpose of this study was to explain the use of web-based instruction by faculty and their perception of web-based instruction. Viewed from the lens of Roger's diffusion of innovation (1995), this study examined and reported faculty' usage of web-based instruction and attributes that have impact on faculty's decision to move to web-based instruction at a selected university.

Research Questions

To explain faculty's usage of web-based instruction and why faculty members decide to incorporate web-based instruction which is a current trend in higher learning, this study was conducted to answer the following questions:

1. How is web-based instruction manifested among faculty at the university?
2. What are faculty perceptions of web-based instruction in the university?
3. How, if at all, does Rogers's diffusion of innovation—five attributes of innovation, explain faculty perceptions of web-based instruction?
4. What other realities about faculty perceptions of web-based instruction, which are not explained through the diffusion of innovation theory, are revealed?

Theoretical Framework

Rogers's Diffusion of innovation has been influential (Wolcott, 2003) and used for researching complex trends and patterns of innovation adoptions (Wainwright & Waring, 2007). In this study, Rogers's diffusion of innovation (1995) is helpful for gaining insights into faculty perceptions and decision making about web-based instruction.

According to Rogers (1995), diffusion of innovation is viewed as a social change. Diffusion is defined by Rogers as “the process in which an innovation is communicated through certain channels over time among the members of a social system” (p. 5). The core of Rogers’s theory lies in four main elements of adopting an innovation. These elements include 1) innovation, 2) communication, 3) a social system, and 4) time. Together with four main elements mentioned above, Rogers (1995) also classifies adopters into five groups: 1) innovators, 2) early adopters, 3) early majority, 4) late majority, and 5) laggards. Rather than discreet, independent classifications, Rogers (1995) explains the adoption classification is on a conceptual continuum from innovators to laggards. This conceptual continuum will be explained in more detail in Chapter Two.

Diffusion is seen as a migration of a new technique, idea or product from the source of innovation to the users or adopters over a period of time. His theoretical framework explains how an innovation is adopted by new members of a social system, and how other members engage, accept, and reject the innovation. He also demonstrates variables impacting on rate of adoption of an innovation as outlined in Figure 1 below.

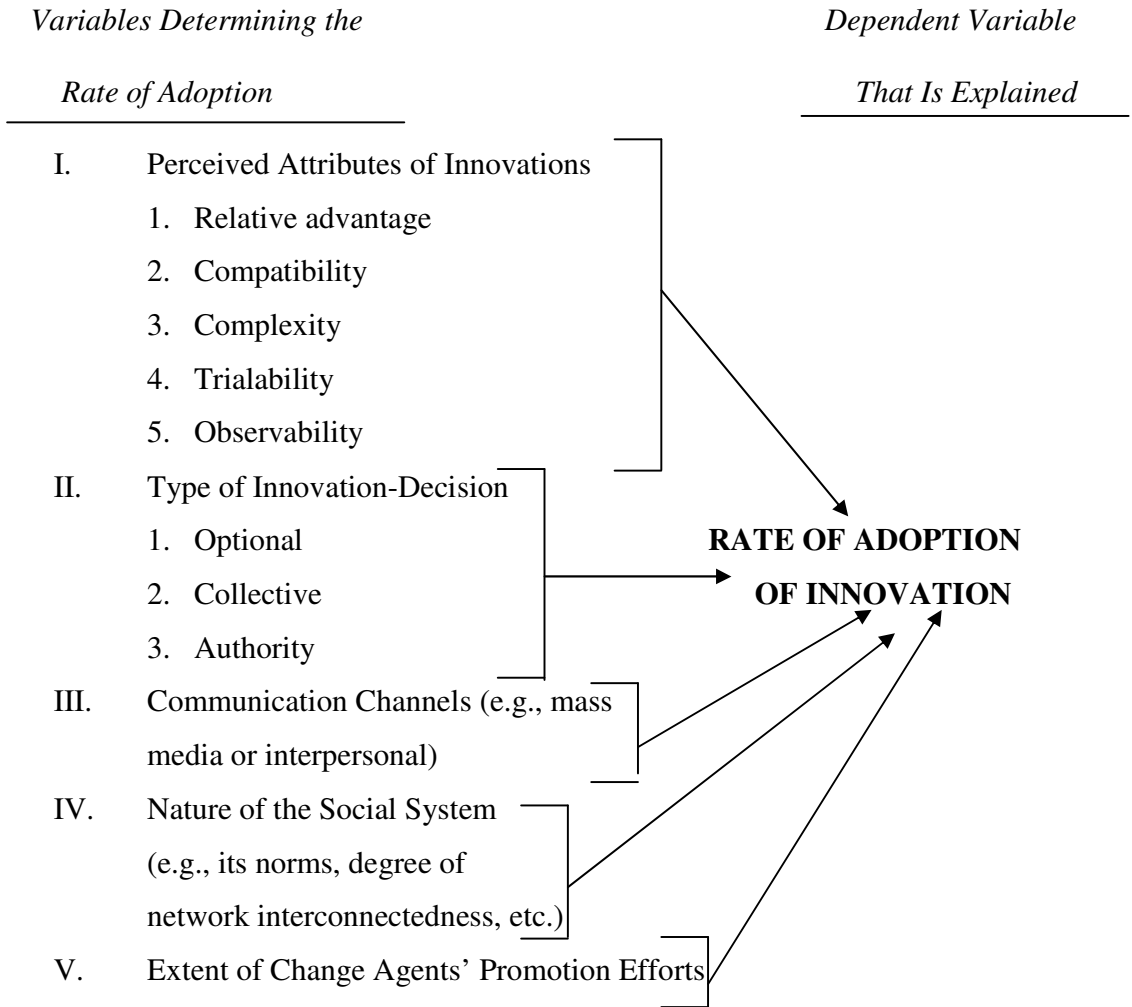


Figure 1. Variables determining the rate of adoption of innovations

From “Variables Determining the Rate of Adoption of Innovations” by E. M. Rogers, 1995, *Diffusion of Innovations*, p. 207.

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Rogers proposes that the rate of adoption and decision to adopt an innovation is influenced by five attributes of innovation. These characteristics are 1) relative advantages, 2) compatibility, 3) complexity, 4) trialability, and 5) observability. Chances of adoption can be increased depending on these five attributes of innovation. With regard to relative advantages, these advantages refer to the extent to which innovations are viewed as superior to the ideas of an old form. Compatibility is determined by being consistent with potential adopter's needs, prior experiences, values, and beliefs. Complexity is used to explain the degree to which an innovation is difficult to use, understand, or apply. The period of time when adopters spend to test the innovation is called trialability while the visibility of the innovation's usefulness and its effects determines observability.

In relation to faculty participation in web-based instruction, five innovation attributes are helpful to examine how those five characteristics shape faculty's decision to adopt WBI and the rate at which faculty adopt it (Wolcott, 2003). Moreover, previous research indicates that five essential characteristics of innovation as stated above are the most important attributes of innovations to explain the rate of adoption (Rogers, 1995). Therefore, this study focuses on these five perceived attributes of innovation to investigate and explain faculty's usage of web-based instruction and their perceptions of web-based instruction.

Procedures

A qualitative research through a case study was conducted to gain better understanding of university faculty's usage of web-based instruction, and faculty perceptions of web-based instruction in a university in Thailand. Anderson (1998) states

that education research is the system process to discover how and why people in educational settings behave as they do. Through a qualitative research valuable information and insights can be gained (Richards, 2003).

A case study was used in this study because of its advantages. A case study is the preferred research strategy when “how” and “why” questions are posed (Yin, 1994). Case study is employed when the aim of the study is to provide a detailed description of the units such as institutions, programs and events (Richards, 2003).

Data Needs

I conducted the study to obtain the following data:

1. The scope of faculty’s usage of web-based instruction
2. Faculty’s perceptions of characteristics that cause them to incorporate or reject web-based instruction
3. Other characteristics influencing faculty’s decision to adopt web-based instruction, which might reveal and are not explained through Roger’s theory of diffusion of innovation

Data Sources

Data were collected by sources of evidence. Semi-structured interviews, observations, and documents were used to gather data. The sample was selected purposively because of “*information-rich cases*” for study in depth (Patton, 2002). To protect the identity of the institute, the university was named as Thai Southern University (TSU). The target population of this study included all faculty members teaching in the first semester in the Academic Year 2008 in the Faculty of Liberal Arts, TSU. The sample of this study included faculty who were teaching, or co-teaching at least one web-

based course in the first semester of the Academic Year 2008 or who had taught, or co-taught at least one web-based course in the past. They were referred to as adopter faculty members. In this study, seven adopter faculty members were interested and willing to be participants in the interview sessions.

Data Collection Strategies

The methodological triangulation employed in this study was as follows:

Interviews

Berg (1995) states that the interview method offers the best opportunity for more thorough and accurate communications of ideas between the research and the respondent. Coombes (2001) adds that the interview would allow a personal insight into the feelings of participants which could not easily be captured in any other way. The questions of semi-structured interviews in this study were developed based on the purpose of the study, literature review, and five attributes of innovation: 1) relative advantages, 2) compatibility, 3) complexity, 4) trialability, and 5) observability. Moreover, the advisor of the researcher took the role of a peer debriefer, who gave feedback to these questions. All seven adopter faculty members were asked the same series of questions which can be seen in Appendix A.

Observations

Marshal and Rossman (1999) insist that observation is fundamental and highly important in all qualitative inquiry. Through observation, the research describes complex actions and interactions in natural settings. In this study, observations were conducted in two settings: web pages on the Course Management System (CMS), and face-to-face classrooms. Activities done on a suite of online learning tools or features such as course

information, news, documents, assignment, and web board needed observation. However, CMS was user password protected. So participant permission to access his/her course was necessary. Two participants permitted me to observe the activities done on the features of their web pages on CMS in their elective courses. Two participants allowed me to observe web pages on CMS of a prerequisite course and a compulsory course. Web pages on CMS observations were done each web page one time a month, on the second week of July, August, and September 2008. Similarly, based on the participant permission, I observed three faculty members' face-to-face classrooms, one time for each adopter faculty during the period between July and September 2008.

Documents

Documents are another source of data for this study. The data derived from documents were used in the same manner as data obtained from interviews or observations (Erlandson, Harris, Skipper & Allen, 1993). In this study, administrative and educational documents including both internal and external documents were collected and analyzed.

Data collection strategies or methods described above were used in this study because of the overall purpose and advantages summarized in the table below.

Table 1

Data Collection Strategies or Methods Used for Data Collection

Methods	Overall purpose	Advantages
Interviews	To gather qualitative information that cannot be observed.	To get deep understanding of what is in the interviewee's mind.
Observations	To take the reader to the setting.	To directly record what people do, as distinct what they say they do.
Documents	To supplement interviews and observations.	Not to disturb the setting. To get historical information.

Adapted from Kelsey, 2005; Patton, 2002

Data analysis

In this study, the data collected were analyzed qualitatively. For documents and field notes, the data were organized into binders with the same theme. The field notes taken during the observation were also analyzed along with the verbatim transcriptions of the interviews. For interviews, emerging themes were grouped to determine attributes affecting faculty's decision to adopt of web-based instruction. The analysis process used was content analysis. Each interview was examined to find any similarities and differences of responses. During the coding process, the common responses, comments and suggestions from faculty were grouped for recurring themes. After that, any theme

that emerged was categorized and compared with five attributes of innovation: 1) relative advantages 2) compatibility 3) complexity 4) trialability and 5) observability.

Significance of the study

Information obtained from this study contributed to a better understanding of faculty's usage of web-based instruction and their perceptions of web-based instruction. The knowledge attained can add to the data base for further research, practice, and theory as stated below:

Research

Of the studies published on web-based instruction, most of the research is based on studies in other countries. Moreover, most studies done on university instructors' adoption have focused on quantitative method (Reid, 2006). Thus, much more qualitative research should be focused on understanding factors which influence faculty members' decision to adopt a new technology. This study which used qualitative approach allowed me to probe deeper and fuller understanding of the context since in-depth interviews can provide insight into faculty members' views (Coombes, 2001). Therefore, a gap is filled when the findings of this study are revealed. In addition, the literature of research on web-based instruction, especially from the eastern perspective, is added.

Practice

In Thailand web-based instruction is an issue that Thai higher educational institutions must be concerned in order to compete with neighboring countries (Nagi, Anaraki & Suesawaluk, 2007). In this study the instructors' experiences of participating in web-based instruction were revealed. If the university aims to expand its web-based instruction, the issues that are directly related to faculty members' perceptions of web-

based instruction must be addressed. Therefore, factors affecting their decision to participate in web-based instruction can be used as a baseline description for administrators to encourage faculty members to move from their traditional ways of teaching to Internet based teaching delivery.

Theory

Rogers's diffusion of innovation has been used as a theoretical framework in different fields in the western context to explain the rate of adoption of innovation. In particular, five basic characteristics of innovation are employed as indicators to predict what factors have an impact on an individual's decision to adopt or to refuse a new idea or practice. It is therefore necessary to test this framework's usefulness to understand the adoption of an innovation in the eastern setting, Thailand in particular.

Assumptions

It should be noted that I am being employed as an instructor at the Faculty of Liberal Arts, TSU in which this study was conducted. My role in this study had both advantages and disadvantages. For advantages, I had relationships with all the participants in the study and this could help gain a deeper understanding of how and why the adopter faculty members use web-based instruction during the interview sessions. While this is helpful, unknowingly, my personal bias may be introduced in this study. Specifically, I am also involved in using web-based instruction as a part of my teaching. Before conducting this study, I assumed that web-based instruction is growing in TSU, and will be a part of teaching and learning mode in TSU because of its benefits and university policy. There would be a variation in the use of web-based instruction, depending on the nature of the subjects. Some courses, however, might not need to adopt

web-based instruction since the instructors require interacting with students in the face-to-face classrooms. Therefore, there would be a variation in types of web-based instruction use. I also assumed that perceptions of adopter faculty members towards web-based instruction use may be positive. Another assumption of this study was that all the participants would carefully and truthfully express their views and perceptions on web-based instruction.

Limitations of the study

Limitations of this study were apparent since the beginning of the study. The participants of this study were confined to instructors who have adopted web-based instruction as a means for teaching at the Faculty of Liberal Arts at TSU. Perspectives and perceptions from faculty members who do not adopt web-based instruction were not included in this qualitative research. Attributes that influenced the decision of faculty members not to adopt web-based instruction were from adopter faculty members' experiences only.

Definitions of Terms

To minimize misunderstanding of the terms used in this study, the following definitions were addressed:

Adopter Faculty Members: Faculty members who were teaching, co-teaching or had taught or co-taught web-based instruction in the first semester of the Academic Year 2008 or who had taught, or co-taught at least one web-based course in the past.

Asynchronous: Online learning environment or conversation that does not occur in real time. The users are not online or interact at the same time. (Henderson, 2003)

Blended learning: Learning that integrates technological advances offered by online delivery with traditional face-to-face class activities. (Bowles, 2004; Thorne, 2003)

Course management system (CMS): A software system that allows students and instructors interact with different features on web pages. (Meerts, 2003)

Innovation: A practice, an object, or an idea that is perceived new by a member of a social system. (Rogers, 1995)

Synchronous learning: Learning that takes place in the real time. The instructors and students are simultaneously present, even when they are in different locations. (Henderson, 2003)

Web-based instruction (WBI): An innovation approach that involves the Internet and web-based technologies to deliver education to remote students. (Aggarwal & Legon, 2008; Khan, 1997)

Summary

Colleges and universities are facing the mainstreaming of web-based education and the use of web-based instruction. The challenge is to support faculty to convert from the traditional mode of teaching to the new type of teaching in higher learning. The purpose of this study was to explain the adoption and use of web-based instruction in higher education as it is an educational innovation. Additionally, this study examined faculty perceptions of the implementation of the Internet education. The interviews, observations, and documents were used as data collection strategies to conduct this study. Analysis of the data systematically determined the emerging themes. Rogers's diffusion of innovation provided a framework for a discussion of those themes.

Chapter One introduced the background, problem statement, purpose, research questions, theoretical framework, methodology, significance of the study, assumptions, limitations of the study, and definitions of terms. Chapter Two presents a literature review for developing the context of the study and the theoretical framework to view the context. Methodology of the study is explained in Chapter Three. Chapter Four comprises the presentation of data. Chapter Five is composed of analysis and interpretation of the findings. Chapter six concludes with the results derived from the study and discusses what the findings could mean for future research.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this case study was to identify the current status of web-based instruction used by the faculty at a university in Thailand, and to describe causes why faculty members at university level respond to web-based instruction. The review of the literature covers several topics that are included in this study.

Web-based Instruction in Higher Education

In recent years, there are many names for online learning activities (Khan, 2005), including distance education, online teaching, e-learning, web-based learning, web-based instruction, and so on. Therefore, it is pertinent to discuss definition of these terms.

Definition

Bork (2005) holds a view that common distance learning today is called e-learning. E-learning can be defined as a learning experience involving delivery or transaction of knowledge through electronic means (Bowles, 2004). Khan (2005) restates electronic means in his explanation that e-learning can be viewed as delivering well-designed, learner-centered, interactive, and facilitated learning environment to anyone, anyplace, anytime by utilizing the attributes and resources of various digital technologies along with other forms of learning materials.

With regard to online learning, Engvig (2006) shortly defines online learning as Internet-enabled learning. Similarly, Shank and Sitze (2004) explain that online learning is learning which is done through a network such as the Internet or an intranet. According to Lynch (2004), online learning can be synchronous, where the students and the instructor communicate in real time, using web-based technology such as a chat room. It can be also delivered asynchronously, where the students and instructors contribute to the class at the times that are convenient to them. These two modes of online learning: synchronous and asynchronous, become easier because Course Management System (CMS) is used as a tool to access class materials. Jolliffe, Ritter and Stevens (2001) note that like all forms of learning, web-based learning is described as the delivery of and access to learning materials over an electronic medium using a Web server, a Web browser, and Transmission Control Protocol/Internet Protocol (TCP/IP).

Besides the terms mentioned above, blended or hybrid learning also emerges. As moving from traditional education to delivery of courses online, blended or hybrid learning is appearing (Aggarwal, Turoff, Legon, Hackbarth & Fowler, 2008; Bowles, 2004; Khan, 2005; Morrison, 2005; Romiszowski, 2005). Blended learning will become a norm in the 21st century (Aggarwal et al., 2008). Thorne (2003) explains that blended learning is an integration of the technological advances which are offered by online learning to the interaction and participation in the classroom session. Similarly, Bowles (2004) clarifies that blended or hybrid learning involves computer-based instruction or online programs to support face-to-face classes. Blending of electronic with traditional learning does not occur in isolation; it is an effective supplement to traditional learning methods (Bowles, 2004).

From the discussion, it is evident that the terms distance learning, e-learning, online instruction, web-based education, and blended or hybrid courses have a shared characteristic. That is, those are a form of teaching and learning delivery. Specifically, Internet connection via network computers and web-based technology such as CMS or web pages are used as a medium or tool to provide and facilitate teaching and learning. Thus, these terms will be used interchangeably in this study.

At present, the numbers of universities giving courses or part of courses online is strongly growing every year (Coombs, 2005). Moreover, the rise of the Internet and larger e-infrastructure has made universities transform themselves and participate in higher education industry of online offering (Abeles, 2004). Thus, a review of history of web-based instruction is appropriate.

History

The possibilities for learning online have risen rapidly due to the introduction of the personal computer in 1981. At the initial stage, though online learning did not occur, the efforts were to develop computer-mediated instruction (CMI) or computer-assisted instruction (CAI). However, these educational technologies were designed for learners to be self-study exercises, and they did not offer opportunity for students to interact with other students or teachers (Lynch, 2004).

In the early 1990s, the World Wide Web (WWW), the Internet, and computers were recognized and accepted as impressive devices for communication (Lynch, 2004) that were capable of interacting electronically, and searching through database (Jones, 2002). Moreover, the cost of using the WWW as a delivery system for multimedia was low (Brooks, 1997). Therefore, the advent of Internet technology which was introduced

in the 1990s brought about the implementation of online instruction in higher education (Bowles, 2004; Hao, 2004; Lynch, 2004). However, true “online” learning started to take its current shape when the first Web browser was marketed in 1994 (Shank & Sitze, 2004).

The University of Phoenix was an online pioneer to offer courses via the Internet (Jones, 2002). Rudestam and Schoenholtz-Read (2002) mention that the University of Phoenix online uses Microsoft Outlook Express to provide electronic classes and offers both bachelor degree and master degree programs as well as corporate certificate programs. Another pioneer online university is Jones International which was established in 1995. Jones University is the first all online university to gain regional accreditation (Olsen, 1999).

In the mid 1990s, the virtual education visions emerged from the governors of several states in the western United States. The governors first discussed their idea at the Western Governor’s Association’s annual meeting in June 1995. They aimed to use virtual university as an alternative concept for U.S. higher education to extend opportunities to more citizens, and reduce the costs of increasingly expensive traditional higher education. Consequently, a vision for a combination of technology and face-to-face modes evolved (Jones, 2002).

By the late 1990s, a variety of web tools was created and these tools allowed students, faculty, and administrators to be able to record, send, and receive information from any location at any time (Jones, 2002). Moreover, tools such as Top Class, Web Course Tool (WebCT), and Blackboard are used to augment courses or reduce meeting in face-to-face class (Novitzki, 2000). These software packages help instructors manage and

develop the course easily and enable students to participate in online environment (Cook, 2005; Klobas & Renzi, 2000; Warren & Holloman, 2005).

From what indicated above, it is clear that technology forces drive web-based education to spread. Another key factor that fuels the rise of online university is market forces. Lynch (2004) mentions that nowadays traditional colleges and universities around the world offer both under-graduate and graduate courses and entire degree programs online. Online market is attracting universities around the world to jump in (Lynch, 2004) because of great return on investment (Khan, 2005). Many traditional universities enter the arena of online learning business (Abeles, 2004; Khan, 2005). This means that higher educational institutions are facing competition not only from online for-profit institutions, but also offshoots from traditional universities (Abeles, 2004). Therefore, many higher educational institutions have already adopted the strategy of investing in implementing programs to survive in the competitive environment of the higher education industry (Margolis, 2004). In addition, Abeles (2004) notes that it is this time period that postsecondary institutions must change and transform the structure and mode of teaching to survive in a global market.

Together with technology and market forces, consumer demand also accelerates higher educational institutions to expand online teaching. Aggarwal and Bento (2000) highlight that the traditional university moves to new electronic environment because of pressures from students. One reason is that the increasing numbers of students are seeking higher education (Lynch, 2004). Therefore, in response to the increasing student enrollment in higher education and workforce, which must update its skills and increase knowledge, web-based instruction is a way to solve the problem of delivery of classroom

instruction (Jones, 2002; Lynch, 2004). The students also expect some type of web-based support for the learning environment (Jolliffe, Ritter & Stevens, 2001; Wolcott, 2003).

From what discussed above, a teaching revolution in higher education has occurred (Hao, 2004). As Morrison (2005) expresses that when the world is evolving, teaching and learning paradigm must evolve with the world. In terms of a paradigm change in teaching and learning in higher education, Harasim (2000) insists that a new paradigm of learning is evident in the new modes of teaching and learning delivery. Accordingly, higher education is in the process of moving from face-to-face course using objectivist, and teacher-centered pedagogy to online and hybrid courses using digital technologies to support constructivist and student-centered pedagogy (Hiltz & Turoff, 2005).

Adult Learning

With regard to the paradigm shift of pedagogy stated above, Engvig (2006), however, posits that it is important to cling to andragogical rather than pedagogical principles. The term andragogy is related to a system of ideas, concepts and a set of assumptions about adult learners. The andragogic model is an alternative to pedagogy and referred to learner-centered education. Malcolm Knowles developed an adult learning theory in his book entitled *The Adult Learner: A Neglected Species* published in the early 1970s (Engvig, 2006). Knowles, Holton III, and Swanson (1998) defined six concepts of andragogy as follows:

1. Adult learners need to know why they need to learn.
2. Adult learners have a self-concept of being responsible for their own decisions, and their lives.

3. Adult learners bring life experiences to the educational setting.
4. Adult learners enter educational settings when they are ready to learn.
5. Adult learners are life-centered in their orientation to learning—they learn what will help them perform tasks or deal with problems in their live situations.
6. Adult learners are best motivated by internal factors.

The andragogical model asserts six assumptions in adult learning process. Often, helping learners overcome inhibitions, behaviors, and beliefs about learning is required. Therefore, to facilitate the use of andragogy while teaching with technology, technology must be used to its fullest (Fidishun, 2000). Moreover, to deliver web-based courses, the roles of instructors in online teaching and learning environment differ from the traditional ones (Berge, 2005). That is, the course instructor's roles are not of a lecturer, but that of a facilitator, mentor, and coach (Aggarwal & Bento, 2000).

From the discussion, it is obvious that higher educational institutions have reached a transition point (Abeles, 2004). A new paradigm of teaching and learning is created (Khan, 2005). Specifically, in the 21st century, online education has begun as a new paradigm in learning and teaching (Harasim, 2000). The paradigm of teacher roles and student role do change (Cappola, 2005; Turoff, 2006). Moreover, the trend of online learning is here to stay and the market of delivery web-based courses will be expanded (Morrison, 2005; Seidel, 2005). In the following section, the growth of e-learning is discussed.

Growth of Web-based Instruction

Concerning the rise of web-based instruction, a university is changing from being academy-focused to being customer/student-focused, from being campus-focused to being virtual (Inayatullah, 2004). The rapid growth of new for-profit institutions is the transformation of traditional higher education model (Thomas, 2004). Engvig (2006) affirms that the number of for-profit online learning companies increased dramatically, and those not using the Internet as an educational tool were seen as laggards. Therefore, online learning or e-learning is now part of offered courses in higher educational institutions (Shanker & Hu, 2008).

Statistics continues to show an increasing number of online courses and enrollment rate. Of all international markets, America has been perhaps the fastest growing market of web-based degree and certificate programs (Carr-Chellman, 2005). In 1992 web-based learning was used in fewer than 10 US states. Today all 50 US states have significant efforts in delivery of online courses (Lynch, 2004). According to the report of National Center for Education Statistics (2002), traditional colleges and universities or not-for-profit grew around 11% over the 1990s while for-profit institutions grew 461 percent or from 53 institutions in 1990 to 263 in 2001. The fifth annual report on the state of online learning in the U.S. higher education of Allen and Seaman (2007) revealed that online learning enrollment grew by 21.5% during the fall 2002 and the fall 2006. The same report noted that the number of online students had more than doubled since the first survey in 2002.

It is also expected that online courses or blended courses will continue to grow. From Lynch (2004)'s point of view, it is predicted that in 2025, 160 million people will

demand education. Online delivery of education is viewed as an important means to meet this growing need for higher education, and provide educational opportunities to large numbers of people. It is projected that by 2010 the vast majority of courses in higher education will have some online components (Lynch, 2004). Moreover, the higher education landscape will look quite different in 2020 than it does today (Morrison, 2005). Morrison further explains that it does not mean the instructors will be replaced by a computer, but web-based components can be used to support and enhance learning, and create new ways of discovering and applying knowledge.

It is apparent that a shift from the traditional mode to web-based instruction in higher education explodes in the western world; however, the door is also open in Asia. Jung (2007) indicates that online learning is emerging throughout the Asian region. Asia has also been a key target market for many universities from Australia and U.S. With the development of information and communication technologies (ICT) in Asia, traditional universities have started online courses or programs, and new online universities have been established (International Telecommunication Union report, 2004). In Thailand, web-based instruction in universities is evolutionary as it is throughout the world (Nagi, Anaraki & Suesawaluk, 2007). An overview of web-based instruction in Thailand is depicted in the following section.

An Overview of Web-based Instruction in Thailand

Thailand is under the National Information and Communication Technology (ICT) Policy 2001-2010, known as IT2010. The National ICT Master Plan includes the five E's: e-Society, e-Education, e-Government, e-Commerce, and e-Industry (NITC, 2002). Additionally, The Royal Thai Government is intended to reform higher education

and this is driven under the ICT Master Plan for Higher Education (2002-2006). The National ICT Master Plan, the Education Act, which was launched in 1999 (modified in 2002), has also had impacts on Thai education including the use of computer and the Internet to promote the effectiveness of teaching and learning (Sombuntham & Theeraroungchaisri, 2006).

The Royal Thai Government has a strong policy to reform all levels of education in Thailand by using ICT. In response to the policy, Commission on Higher Education (CHE), which is responsible for higher education development policies and plans, set a project called Thailand Cyber University (TCU) in 2005. According to the TCU's mission, this project aims to assist all the higher education institutes to deliver distance learning via the Internet in order to expand educational opportunities. This project also aims at ensuring that all online courses are of high quality and meet government standards (Sombuntham & Theeraroungchaisri, 2006).

Universities in Thailand have moved to be e-universities. Rattakul and Morse (2005) mention that many government departments and universities in Thailand are implementing e-learning. A study conducted by Sombuntham and Theeraroungchaisri (2006) showed that most of Thai universities had e-learning system service and policy to develop an e-learning system. However, Siritongthaworn and Krairit (2004) point out that the primary method to deliver courses in universities in Thailand is still face-to-face. E-learning is used as a supplementary tool to classroom-based teaching. Siritongthaworn and Krairit (2006) hold a view that this is identical to blended learning which refers to traditional classroom teaching combined with online learning activities (Khan, 2005). For the future of e-learning in Thailand, Nagi, Anaraki and Suesawaluk (2007) indicate that a

competitive market of higher education is increasingly putting pressure on Thai universities to evaluate their current teaching-learning paradigm. They suggest that Thai universities rapidly migrate from their traditional ways to embrace the e-learning paradigm.

As noted above, web-based instruction has been established as a part of the universities' daily routine both in the western and eastern world. The growth in the number of courses offered online has been documented as indicated above. The outburst of current trend of online education around the world lies in its benefits which are discussed in the next part.

Benefits of Web-based Instruction

The benefits of web-based learning are realized by various constituents, including students, faculty, and educational institutions (Oakley II, 2004).

The Benefits of Web-based Instruction to Students

Relating to the benefits to students, accessibility, location independence, and flexibility are foremost. Jolliffe, Ritter and Stevens (2001) contend that “there is demand for a 21st century education that is independent of time and space” (p. 4). No matter where students are, they could work on the course just about anywhere they have computer access (Engvig, 2006; Jolliffe, Ritter & Stevens, 2001; Odin, 2004). Engvig (2006) agrees that learners can get paper and articles, and the discussion in the forum at any place in the world where they have Internet access. It is free from traveling to campus. Moreover, in the learning process, online learning enables teaching and learning to be student-centered; students can control their own learning, learn at their own pace, and learn independently. Most importantly, students are allowed “to create an interactive

learning environment” (Odin, 2004, p. 155). That is, interaction among the learners, the instructor, and the content of the course as well as an active learning community can be promoted by using online debate. Jolliffe, Ritter and Stevens (2001) have a similar view in that the number of interactions between learners and facilitators can be increased.

The Benefits of Web-based Instruction to Faculty

Delivery of courses online is of great benefits to university faculty members in many ways. Tetiwat and Igbaria (2000) propose that faculty members can benefit from web-base instruction due to greater ease of monitoring students and communicating with them through the communal bulletin boards. Interactive web-based teaching allows instructors to achieve a better management of the course (Bodomo, 2008). Oakley II (2004) points out that faculty are more closely with the students in online courses; getting to know the students better. Moreover, instructors can exchange knowledge and new research with other academics without social and cultural barriers. While Perreault, Waldman, Alexander, and Zhao (2002) mention that some institutions provide online instructors with extra payment to teach online courses, many faculty members involve in teaching online courses primarily because of professional development (Grant, 2004).

The Benefits of Web-based Instruction to Institutions

Higher educational institutions realize a number of direct benefits. One top reason for offering online course is getting students from outside the institution service area (Schiffman, Vignare & Geith, 2007). A New market of students attracts universities around the world including countries in the developing world to enter online market (Lynch, 2004) because the education which is delivered via the Internet is profitable (Khan, 2005; Saba, 2003). Engvig (2006) confirms that online learning is a billion dollar

industry. For Khan (2005), two types of benefits in e-learning include 1) tangible or hard benefits, and 2) intangible or soft benefits. He further explains that tangible or hard benefits are of dollar value. For example, an institution can save travel expenses if the course is delivered online. For intangible or soft benefits, it is not about money, but cross-cultural communication skills by students which get improved because of taking an online course. Concerning dollar value, Rea, White, McHaney and Sanchez (2000) also mention that the distribution of documents electronically can greatly reduce the cost of photocopying while students will still receive the same document. This is consistent with Tetiwat and Igarria (2000) who view that institutions can reduce the cost of on-site facilities, such as classroom, meeting rooms, buildings and operations because students can access information using web-based technology. Similarly, Oblinger and Rush (2003) note that when online education can replace face-to-face instruction, there is cost saving on travel and living expenses.

Due to great benefits of web-based education as stated above, more and more universities share online learning market (Abeles, 2004; Davis, 2005). Many colleges and universities have begun replacing brick and mortar campuses with interactive sessions on the Internet, and using digital libraries, and network computers and other information technologies (Margolis, 2004). Odin (2004) also contends that university's investment in instructional technology to become online university has gone up tremendously over the years. Khan (2005) also mentions that higher educational institutions are investing heavily in the development and deployment of the online program, and institutions are asking their instructors to convert their traditional courses to online courses.

Owing to heavy investment in online education, administrators put pressure on faculty members to participate in web-based instruction (Khan, 2005; Wolcott, 2003). Wolcott (2003) views that mounting pressure is from administrators to jump into online learning business. Most faculty members, in contrast, have not responded to university's expectation (Allen & Seaman, 2007; Bower, 2001; Maguire, 2005; Odin, 2004; Wolcott, 2003). In particular, a large number of faculty members in higher education choose not to teach web-based courses. They insist on teaching only face-to-face courses. The next topic discusses resistance to use web-based instruction by higher educational faculty.

Resistance to Use Web-based Instruction by Higher Educational Faculty

Faculty involvement is a key to any good online course (Lynch, 2004); however, the major obstacles to use the new technology involve people within institution (Berge, 2005). Romiszowski (2005) agrees that in the process of attempting to accept new technology, the failure does not result from inherent weaknesses or inadequacies in technology, but rather from errors by people in the institutions. This is because almost all teachers are suffering from 'change burnout' (Dickinson & Steward, 2001).

With regard to change, Morrison (2005) explains that changing demographics and technology in higher education requires the change in the mindset of faculty members. Migrating from classroom-based classes to online classes can be a precarious process for instructors (Conrad, 2004). Therefore, issues that may serve as obstacles to adoption of e-learning should be explored (Khan, 2005). The following part is a discussion about issues of concerns why faculty members at university levels are not attracted by the latest wave of instruction. Those concerns include time demand and workload; technology; loss of interpersonal interaction; role change; and lacking quality.

Time Demand and Workload

Investment of more time, effort and energy to deliver online courses than to teach face-to-face courses results in instructors' resistance to web-based instruction. Coombs (2005) indicates that online teaching is time intensive and takes more time and work than the traditional course. This is consistent with Romiszowski and Chang (2001) who argue that delivery of online courses is more time consuming than traditional courses. To implement web-based courses, the teachers have to work much more than they are accustomed to in the face-to-face courses (Mallinen, 2001; Romiszowski, 2005) because of additional challenges such as preparing the entire course ahead of time, mounting all materials to the websites, and dealing with a heavy email load throughout the term (Davis, 2005). Furthermore, one of the most time-consuming aspects of teaching online courses is giving feedback and grading (Engvig, 2006). Aggarwal and Bento (2000) also contend that responsible online instructors may need to become a 24-hour help-desk where students seek help on any topic.

Many studies have revealed that faculty members acknowledge increased workload and need more time to prepare for delivery of online courses than face-to-face courses. For example, Hartman, Dziuban, and Moskal's study (2000) indicated that time demand for teaching online courses was severe. Similarly, Akdemir (2008) found that designing online courses required more time than classroom-based courses. The National Education Association (NEA) study (2000) showed that 53% of faculty members spend more hours per week preparing and delivering their online courses than they do for a traditional one. The same report also revealed that despite spending more hours on teaching online courses, most of them did not get course-load reduction and additional

compensation. Thomson (2003) reported that increased workload for instructors were perceived as a major deterrent to participation in teaching online courses. In addition, the heavier workload took time from activities which are more highly regarded by the institution, specifically doing research and publication. Moreover, Shea (2007) noted that compensation for course development, revision, and teaching was inadequate. The experienced online teachers identified that the inadequate compensation for greater work than classroom teaching was their top demotivator to teach online courses. Pachnowski and Jurczyk (2003) found that though required time for preparation decreased after teaching the online courses a second time, instructors still needed resources and training to manage their time and to prepare online courses.

Technology

To implement web-based courses, technology is a great fear of faculty members. Rogers (2000) argues that teachers having a low level of technology competency are not willing to adopt instructional technology in their teaching. Instructors who have only traditional teaching experiences may have problems adapting to the new environment of web-based teaching and learning environment (McCormack & Jones, 1998; Robinson & Yu Borkowski, 2000). Being more skilled with computers and the Internet might be a big step for them to find extra time to learn and use new computer programs for teaching (Mallinen, 2001). Particularly, faculty members who are pushed with inadequate preparation feel that they are left to struggle on their own (Jolliffe, Ritter & Stevens, 2001). Moreover, failure of technology can lead faculty members to frustration (Rea, White, McHaney & Sanchez, 2000).

According to different studies, faculty members are resistant to web-based instruction because of technology. Chen (2003) found that one of the inhibiting factors to adopt web-based instruction at a public university in the Northeast was lack of technology expertise. In a study conducted by Fisher (2003) and Martin (2003), technical support was also identified as a top concern of faculty members to adopt online courses. Further, Shea (2007) concluded that one of the demotivational aspects of online delivery was associated with computer skill levels of faculty members. The results suggested that instructors who had lower computing skills were less motivated to teach online college courses. Lack of opportunity to experiment with the technologies of online teaching was also reported as a demotivating factor for less experienced instructors.

As mentioned above, the demand for web-based instruction continues to grow. However, as the need for online learning increases, the staff support for computing and for online teaching decreases (Coombs, 2005). Khan (2005) suggests that institutions should make special support to get instructors' acceptance to use e-learning. In particular, faculty members and staff who are involved in e-learning should receive proper training and resources to teach effectively. Teachers need to become more skilled with computers and network (Mallinen, 2001) because without the instructional system design support for teaching online courses, faculty find themselves with labor intensive design (Gibson, 2005). Thus, both instructors and learners need to be trained to understand fully to be successful in computer-related environment (Jolliffe, Ritter & Stevens, 2001).

As stated above, technical support and training is of crucial importance to incorporate online teaching. However, Berge and Muilenburg's study (2001) reported that it was difficult for faculty members to keep pace with technological change. Many

instructors pointed out that they lacked the knowledge and skills to design and teach distance learning courses. In addition, their organizations did not have support staff to assist with technical problems, to develop distance learning course materials, or to provide distance learning training. Sahin and Thomson (2006) mentioned that lack of support and training were important barriers to adopt instructional computer use by the faculty members in the College of Education (COE) at an Anatolian university in Turkey. This indicated that instructional computer support for COE faculty members was needed. Shea (2007) found that unfamiliarity with effective online teaching, lack of opportunity to observe and experiment with the technologies of online teaching before engaging in it appeared to put less experienced instructors off from online teaching.

Loss of Interpersonal Interaction

The absence of interpersonal interaction in web-based learning and teaching environment cause significant resistance to deliver online courses. A university without walls destroys the idea of a university as a gathering place where scholars and students engage in learning and doing research (Margolis, 2004). According to Engvig (2006), body language is missing in online classes. Moreover, online learning environment lacks direct interaction among students or between students and instructors. This is consistent with McDermott (2004) who is fully aware of and resistant to online learning danger. He emphasizes that it is a significant threat to traditional teaching. Online learning lacks socialization or face-to-face interaction. He points out that teaching without interpersonal embodiment is a move away from who we are and how we experience ourselves as human beings. He believes that online learning has been gradually destroying classroom community since it is very different from traditional learning.

There is a link between loss of interpersonal interaction and faculty members' concerns revealed in the research. Hartman, Dziuban, and Moskal' s study (2000) revealed that in the online environment, instructors were concerned over the decreased face-to-face student contact. Similarly, according to a study conducted by Shea (2007), online instructors who had taught online courses one or two times noted that their desire to teach online decreased because face-to-face interaction was absent. Berge and Muilenburg (2001) studied barriers to distance education which can be clustered in ten categories. One of those ten groups was social interaction and quality. Concerning social interaction, participants in distance learning courses felt isolated because of lack of person-to-person contact. Both faculty and students were sometimes uncomfortable with student-centered approach and collaborative learning activities since the traditional social structure of the classroom changed.

Role Change

Fear of role change is described as one of the reason for university faculty members not to participate in web-based instruction. Dirr (2003) confirms that one concern of faculty members is that distance education might be leading to a new learning paradigm and role change for the faculty. One of the emerging roles of online faculty members is the break-down of teacher-learner hierarchy (Berge, 2005). Similarly, Engvig (2006) asserts that to teach online courses instructors must encounter two major shifts: 1) a shift from an objectivist paradigm to a constructivist paradigm, and 2) a shift of power away from the professor to the students. The instructors' role will change from sage on the stage to guide on the side. Palloff and Pratt (2001) remind online instructors that they need to let the control of the course and empower students to take responsibilities for the

learning process. It is, however, difficult for faculty members to change their roles when teaching online courses (Engvig, 2006).

According to a study conducted by Hartman, Dziuban, and Moskal (2000) faculty members perceived that their control as a teacher in the classroom was lost when teaching online. Berge and Muilenburg's study (2001) revealed that faculty members feared that online learning may decrease the need for teachers. From the faculty perspective, they felt that their job security was threatened.

Lacking Quality

A major concern over the delivery of online courses is inferior quality when compared to face-to-face courses. Many prestigious universities may attract students and tuition dollars from all over the world only by their name recognition and names of well-known faculty members (Rea, White, McHaney & Sanchez, 2000). However, most instructors who are about to deliver online courses for the first time are still concerned that textbook and materials might not reflect their views of the key points (Engvig, 2006). Although a good online course is much more than the content of a subject area (Lynch, 2004), many online courses are just imitation of what happens in classroom-based courses (Bork, 2005). Moreover, the power of the computer is not used to assist learning. Lynch (2004) has a similar idea in that many online courses or programs are not very mature. Therefore, the actual quality of those courses or programs may vary from school to school and from instructors to instructors.

Several research indicated concerns related to course quality. In the study conducted by Hebert (2003), course quality was cited as the first concern of all respondents. O'Quinn and Corry (2002) found that faculty who had not taught online

before had a great worry over the quality of the courses delivered online. This is similar to Schifter's study (2000) which revealed that among faculty members who had no experiences in delivery of distance learning, course quality was one of their major inhibiting factors to adopt online instruction. Conrad (2004) also indicated that a big issue of faculty members launching online instruction for the first year was their doubts over the effective delivery of course content. According to NEA study (2000), traditional faculty expressed their top concerns over quality of education if the outcome would occur. In the same study, distance learning faculty indicated that their traditional courses in the same subject did a better job than their distance learning courses for the following 5 goals: addressing the variety of student learning styles; strengthening students group problem solving' skills; developing student interactivity; improving verbal skills; and helping students deliver better oral presentation. Shea (2007) found that less experienced instructors felt that online course might be of inferior to classroom-based courses.

Another concern related to course quality is academic honesty. Engvig (2006) discusses that many instructors who have never taught online course before are worried about cheating. Similarly, Aggarwal and Bento (2000) point out that a typical concern for online courses is the ethics of an exam. That is, the possibility of cheating in web-based learning is easier than that of face-to-face learning. A study done by Hartman, Dziuban and Moskal (2000) showed that faculty members saw the honesty issue of testing and assessment as a problem. Nearly half of traditional faculty members (41%) reported that it was likely that students would cheat in online courses (NEA, 2000). In Martin's study (2003), over 70% of the faculty respondents indicated that cheating was a threat to the quality of online courses.

As mentioned earlier, online teaching is one alternative technology that has been developed to augment traditional learning and teaching in higher education (Hiltz & Turoff, 2005; Tetiwat & Igbaria, 2000). Faculty members are also expected by their institutions to teach online courses (Wolcott, 2003). According to Cook (2005), when faced with institutional pressures and technological change, faculty members are struggling with questions, anxieties, and fears about how they will teach with online technologies. They also wonder how they will shift from their face-to-face classroom to unknown online class. Moreover, they are uncertain about the support they will receive while making a move. Therefore, understanding the innovation implementation process will help us understand some of the underlying reasons why online learning succeed or fail, and how universities decide on policies that directly affect online courses delivery (Engvig , 2006).

Everett Rogers is one of the world's most recognized researchers in the field of innovation (Mahony & Wozniak, 2005). Mann (2006) contends that Rogers's Theory of Diffusion is one of the well-known frameworks of technological innovations. His theory which categorizes individuals and rate of technology adoption can be used to study web-based teaching and learning. Diffusion of innovation theorized by Rogers is presented as a conceptual framework to help explain what shape faculty members' decision to involve in or resist to web-based instruction when it is introduced to their teaching delivery.

Theoretical Framework: Diffusion of innovation by Rogers

This part focuses on the theory proposed by Everett M. Rogers as a theoretical framework to provide insights and identify the reasons why individuals do or do not

involve in teaching web-based courses. First, background of diffusion of innovation is presented.

Background

According to Rogers (1995), the history of the diffusion of innovations can be dated back to the beginning of the 19th century. The root of diffusion research was Gabriel Tarde, a French sociologist, psychologist, lawyer, and judge. To Tarde, the diffusion of innovations was a basic and fundamental explanation of human behavior change. However, empirical studies of diffusion happened after forty years with the study done by Bryce Ryan and Neal Gross.

Another root was a group of anthropologists in England and in German – Austria. The view point of each school was similar. That is, social change in a given society was a result of the introduction of innovation from another society. The diffusionists also claimed that all innovations spread from one original source. The dominant viewpoint now is that any social change is caused by invention and diffusion. Indirectly, the idea of the diffusion of innovations was to influence Bryce Ryan and Neal Gross.

In 1943, Bryce Ryan and Neal Gross, sociologists, published the hybrid corn diffusion study which was about adoption of a new type of corn seed among Iowa farmers. The study made researchers realize that it is a communication process. Then, the diffusion research approach was expanded to examine diffusion process in a variety of fields including education, anthropology, public health, marketing, geography, and rural sociology. Rogers (1995) concludes that diffusion research began as a series of scientific area; however, in recent years it has emerged as single, integrated concepts and generalizations.

Rogers's theory of adoption of technology, Diffusion of innovation, was originally written in 1960 in a different technological world to the present (Wilson & Stacey, 2003). Engvig (2006) indicates that Rogers has spent a lifetime analyzing and developing the process of diffusion. Based on Diffusion of innovation, Rogers (1995) identifies that diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). In other words, diffusion of innovation is a process of how, why, and what rate new ideas and technology spread through a society. According to Rogers (1995), diffusion is a special type of communication which is concerned with the spread of message. The diffusion of innovation process is composed of four main elements. These four main elements are discussed in the following part.

Four Main Elements of Diffusion

Four main elements in the diffusion of new ideas or technology include innovation, communication channels, time, and a social system.

Innovation

An innovation is defined by Rogers as "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (p. 11). If an idea seems new to the individual, it is regarded as an innovation. Moreover, "newness" of innovation may be expressed in terms of knowledge, persuasion, or a decision to adopt. However, innovation can create uncertainty in the mind of adopters when a new idea is introduced. Adopters want to be sure that the innovation is superior to the previous practice. Further, the same innovation may be desirable for one adopter in one situation, but undesirable for

another potential adopter in a different situation. Individuals' rate of adoption can be explained by five characteristics of innovations as follows:

Five Characteristics of Innovation

1. Relative advantage expresses to what extent a new thing is better, more effective or advantageous than the existing one. If adopters perceive relative advantage of an innovation, the rate of adoption will be more rapid. The degree of relative advantage can be measured in economic terms, social prestige, convenience, usefulness in accomplishing goals, quality of work outcomes, and satisfaction.

2. Compatibility is related to being consistent with the existing values, past experiences, and needs of potential adopters. Compatibility includes individual, group, and organizational goals, needs, culture, and structure. It is concerned with the agreement or differences between group's traditional work patterns and the work patterns required by the innovation. If the innovation is not consistent with the values and norms of a social system, the innovation will not be adopted as rapidly as the one that is compatible.

3. Complexity is the extent of how difficult the innovation is for an adopter to understand and use an innovation. The innovation which is perceived simpler to understand and use will be adopted more rapidly than innovations that require new skills and understandings. In contrast, when a practice or product is perceived as difficult to understand, learn, or use, it will not be adopted.

4. Trialability is the degree to which an innovation may be experimented with a limited basis. If new ideas can be tried on, the adoption will occur more quickly than the innovations that are not divisible. Uncertainty in the minds of adopters who are

considering to adopt an innovation will be less if it is trialable. Trialability includes the level of effort needed and risk involved in observing and participating in small scale demonstrations of the system, including easily recovering, or undoing operations using a system, and the costs involved in reversing the decision to adopt.

5. Observability refers to the degree to which the results of the innovation are visible to others. Observability also includes a result of demonstrability, for example, the ease of telling others the consequence or results of using an innovation. If individuals see the results of the innovation more easily, they are more likely to adopt that newness. Visibility stimulates peer discussion of a new idea. An innovation that is relatively less observable will diffuse more slowly.

The rate of adopting depends on five characteristics listed above. Individuals will adopt a new practice, idea or object more rapidly when it indicates an advantage over the one that preceded it; when it is compatible with existing need, experiences, and values of adopters; when it is not difficult to understand and apply; and when it can be first experimented before adoption; and when the results can be seen easily.

Communication Channels

Communication is “the process by which participants create and share information with one another in order to reach a mutual understanding” (Rogers, 1995, p. 35). An individual can reduce the degree of uncertainty in their minds by obtaining information. The matter is in the message content exchange. Basically, the process of communication involves four elements: an innovation, an individual that has knowledge or experience using the innovation, another individual that does not yet have any

experience with innovation, and a communication channel that connects the two individuals.

According to Rogers (1995), “a communication channel is the means by which messages get from one individual to another” (p.18). Rogers groups communication channels into two: mass media, and interpersonal channels. Mass media channels include a mass medium such as radio, television, newspaper and target to large populations, and so on. Mass media channels are often the most rapid and more useful in informing audience knowledge about an innovation. Conversely, interpersonal channels involve face-to-face exchange between two or more people and they are useful in persuading an individual to accept a new idea. Rogers notes that when making innovation decisions, most people are not evaluating an innovation on the basis of scientific research, but by subjective evaluation of individuals who have adopted the innovation.

Time

The third element in the diffusion process is time. In diffusion process, the time dimension is involved in

1. the innovation-decision process that an individual passes from first knowledge of an innovation to forming an attitude, to a decision to adopt or reject, to implementation and use of the new idea, and to confirmation of this decision.
2. the relative time—earliness/lateness of an individual that an innovation is adopted when compared to other members of a system.
3. an innovation’s rate of adoption in a system, usually measured as the number of members of the system who adopt the innovation in a given time period.

Social System

A social system is referring to “a set of interrelated units” (p. 23) that an innovation diffuses through. The members or units of a social system may be individuals, people, informal groups, and organizations. A system has structure, which is defined as the patterned arrangements in a system. The ways in which a social system influences diffusion include norms—behavior patterns, opinion leadership—an individual who is able to influence other individuals’ attitudes or behavior, a change agent—an individual who attempts to influence clients’ innovation decision, an aide—a less professional change agent, and consequence—the changes that occur to an individual or to a social system as a result of the adoption or rejection of the innovation.

Besides four main elements mentioned above, Rogers (1995) also outlines adopter categories, the classifications of members of a social system on the basis of *innovativeness*: the degree to which an individual adopt new ideas faster than other members of a system. The continuum of innovativeness can be parted into five adopter categories: 1) innovators, 2) early adopters, 3) early majority, 4) late majority, and 5) laggards.

The innovators are the first to try out new products and process. Innovators: Venturesome. The innovator plays a gatekeeping role in the flow of new ideas into a system. They must be able to cope with a high degree of uncertainty about an innovation at the time of adoption. Also, the ability to understand and apply complex technical knowledge is needed. Early adopters: Respect. They serve as a role model for other members of a social system. They are respected by among the members of the system. Potential adopters look to these early adopters for advice and information about the

innovation. Early majority: Deliberate. They do not take the first step to adopt the innovation, but they do accept it. They take time to fully adopt the new idea. Late majority: Skeptical. They adopt new ideas just after average member of a system. They are not willing to adopt the innovation. The reasons for them to adopt are pressure from peers who motivate adoption. The uncertainty must be removed before they feel that it is safe to adopt. Laggards: Traditional. They are the last in a social system to adopt the innovation. They tend to be suspicious about the new ideas. Resistance to innovations may be rational from their point of view. They must be certain that a new idea will not fail before they can adopt.

From what mentioned above, it is clear that all four main elements consist of different factors that have an impact on an individual's decision to adopt an innovation. Rogers's theory has been used as the theoretical framework in numerous settings such as public health, agriculture, sociology and anthropology, and business (Reid, 2006). His theory has become a framework used frequently in publications and discussion correlated to introducing new technology (Wilson & Stacey, 2003). It is worth reviewing research that built upon and extended Rogers's theory of diffusion of innovation.

Research Related to Diffusion of Innovation

The studies which are framed in the literature of Rogers's theory of diffusion of innovation are as following.

Mahony and Wozniak (2005) used Rogers's theory of diffusion of innovation in a reflective case study to explore the College of Health Sciences (CHS) eLearning Resource Center and Staff Support Project at the University of Sydney. The university established strategic and operational plans aimed at mainstreaming support for the use of

information and communication technologies (ICT) in teaching and learning. The project commenced in June 2004 and concluded in March 2005. Materials on the website along with the comments by the early adopters and designers of the materials were gathered. A focus group with academic staff was used to collect data. Concerning five attributes of innovation, the study revealed that strategies for making a very strong and visible case for relative advantage lacked most. In addition, trialability was not well considered. Both characteristics had direct impact on the engagement of potential adopters. They concluded that Rogers's theory could be used both in planning at the commencement of an e-learning professional development project and as an evaluative tool.

Through a case study of 710 online faculty teaching at thirty-three institutions in the State University of New York, Shea, McCall, and Ozdogru (2006) examined higher education faculty adoption of the Multimedia Educational Resource for Learning and Online Teaching (MERLOT). To assess levels of use and satisfaction with MERLOT, data from three sources including the data from log files of users of the MERLOT website; survey data from narrative responses from online faculty, and data from ten-part questionnaire were employed. Data analysis revealed that the most committed online instructors were significantly more likely to adopt MERLOT. Faculty who did not adopt MERLOT suggested that they had materials already and did not see the need or benefit of additional resources-reflecting relative advantage. For compatibility, it may be more practical to target the innovation to more experienced faculty who already exhibited greater understanding of and faith in technology-mediated instruction. The results indicated that complexity of online teaching represented a barrier to adoption. Regarding trialability, the respondents understood the potential of MERLOT, but had not been able

to utilize the resource yet. Many faculty members appeared unaware of the innovation and need more information- reflecting the issue of observability.

In 2006, Masalela completed her doctoral degree at the Northern Illinois University on “Contextual motivational and deterrent factors of faculty participation in online learning at the University of Botswana”. The study investigated factors that influenced faculty members’ decisions to participate in online learning at the University of Botswana (UB). In qualitative inquiry through a case study, there were fifteen participants. They were grouped into two categories: adopters and non-adopters. Seven adopters were faculty members who taught one or more courses online while seven non-adopters did not teach any online courses. The sample also included one administrator of the Educational Technology Unit. The three instruments used to collect data were interviews, documents, and observations. The results of the study revealed that the adopters were intrinsically motivated to teach online courses. In contrast, non-adopters expressed personal needs and extrinsic motives for participation. Both groups recognized potential benefits of online learning. Non-adopters indicated barriers to teach online courses including lack of access to computers to students, limited number of smart classrooms, large classes, lack of time to learn and integrate technology, students’ poor technological skills, technical support, and lack of online learning policy. Related to five characteristics of innovation, relative advantage, compatibility, complexity, and trialability were important attributes influencing the rate of teaching online courses at the UB. The researcher concluded that lack of policy, reward structure, release time, and faculty needs could deter faculty members from teaching online courses at the UB.

Framed by Rogers's diffusion of innovation theory, Sahin and Thomson (2006) aimed to explore instructional computer use by faculty members in the College of Education (COE) and to implement Rogers's diffusion of innovation at Anatolian university in Turkey. A paper questionnaire was distributed to 157 full-time COE faculty members. It was concluded that the faculty members reported high levels of computer use and expertise in the Internet, word processing, and e-mail. However, they had low levels of computer use and expertise in instructional computer applications in general. Barriers to adopt instructional computer techniques included low levels of computer use and expertise in instructional computer applications in general. The results confirmed the characteristics of Rogers's adopter categories. With five attributes of innovations—relative advantage, compatibility, complexity, trialability, and observability—faculty members' uncertainties about instructional computer technologies might be reduced. Furthermore, it was suggested that an action plan should take advantage of faculty members' positive computer attitudes and collegial communication to help them move to the higher level of use and expertise in instructional technologies.

Based on Rogers's diffusion of innovation, Lee and Chang (2008) explored the diffusion of m-learning, the process of learning enabled by the use of mobile devices such as Smartphone, and iPods, in China and Taiwan. With a series of online survey and mobile websites, it was indicated that m-learning had opportunities as well as threats. It was also found that key factors that influenced the diffusion of m-learning were mobility anytime anywhere, supports of collaboration, personalized relationship, convenient and promptly access, and younger generation's interests.

By looking at the diffusion of innovation proposed by Rogers (1995), Prammanee (2003) presented how the Thai government adopted the Internet into their educational systems. The researcher concluded that in Thailand, policymakers, for example the Ministry of Education, acted as opinion leaders who decided to adopt or reject the Internet to education across the country. He also mentioned that the Thai government was trying to prepare the whole country to face the new information technology era. He further explained that the policymakers were a change agent who influenced clients' invention-decision. Therefore, they were responsible for making decisions on the integration of the Internet into the education system in Thailand.

Tetiwat and Huff (2003) investigated the factors influencing Thai educators to deploy online education. An in-depth interview was used as an instrument to gain data from 22 Thai educators who used or managed online courses in 12 Thai universities. The researchers based their analysis of data on three adoption theories: the diffusion of innovation, the technology acceptance model, and the theory of planned behavior. The findings revealed that the five most influential factors included availability of technology; cost of computer technology, and Internet access; accessibility to technology; compatibility, and relative advantage. Other factors were the user's attitudes towards information technology, the behavioral beliefs concerning student demand, complexity of online education, trialability, and institutional policies.

Summary

The reviewed literature shows that online learning is a growing trend in the 21st century and is used as an educational tool by universities around the world. Although great benefits of web-based instruction are recognized, ample evidence in the literature to

constraints to the involvement of faculty members is prevalent. Concerning faculty members participation, Rogers's diffusion of innovation theory (1995) is used as a theoretical framework to examine the issues why faculty adopt or refuse the innovation, web-based instruction in particular. Moreover, this conceptual framework would help frame the research, influence the kind of information to gather, and kind of questions to ask in the study as well as analyze the information collected. Chapter Three discusses the methodology and data collection procedures which were used in this study.

CHAPTER III

METHODOLOGY

This chapter depicts the qualitative research methodology and data collection procedures that were used to complete this study. Information presented in this chapter is outlined below:

- Methodology
- Population and Sample
- Data Collection
- Data Analysis
- Ethical Considerations
- Trustworthiness
- Summary

Methodology

The primary aim of this study was to qualitatively examine university instructors' use of web-based instruction and their perceptions of web-based instruction in a Thai university through a case study. With regard to qualitative research, Marshall and Rossman (1999) note that qualitative research is grounded in the lived experiences of people. This is in line with Coombes (2001) who explains that qualitative research

helps to gain a better understanding of the experiences. According to Creswell (1998), qualitative research is chosen because of the need to present a *detailed view* of the topic, and to study individuals in their *natural setting*.

There are many different types of qualitative research, and one of the most important types is case study (Johnson & Christenson, 2000). Merriam (1998) argues that case studies, especially qualitative case studies, are prevalent throughout the field of education. Case study is preferred when “how” or “why” questions are posed, when the inquirer has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin, 1994). Moreover, a case study will enable the researcher to produce detailed descriptions of a phenomenon, to develop possible explanation, or to evaluate the phenomenon (Gall, Borg & Gall, 1996).

With regard to different types of case studies, Yin (1994) defines three types of case studies including 1) exploratory case study, 2) descriptive case study, and 3) explanatory case study. The exploratory is a case study done to define the questions and hypotheses of a subsequent study or determine the feasibility of the desire research procedures. While the explanatory case study explains which causes produced which effects, the descriptive case study presents a complete description of a phenomenon within a context. In this case study, I collected and interpreted data by myself. So, my role as a researcher should be discussed.

Researcher

I, the researcher of this study, work as an instructor in the Department of Languages and Linguistics, Faculty of Liberal Arts, Thai Southern University (TSU), in Thailand for nine years. I teach Foundation English and an elective course, English for

Agriculture. The courses I teach serve undergraduate students. Apart from teaching, I have responsibilities as a committee member, and doing some academic service projects in local communities. I am interested in doing research related to web-based instruction since this is a current trend of teaching and learning at the university level. Additionally, it is an added dimension to the faculty's role that is required by the university.

I have had some experiences with web-based instruction. I have used in-house web-based Course Management System (CMS) software called Virtual Classroom (VCR) to deliver part of my English for Agriculture course online. This experience has given me a view of implementing web-based instruction as part of faculty's instruction. From my experience, I have a slightly positive attitude toward web-based instruction. Moreover, since I was the primary instrument in conducting a qualitative research (Erlandson, Harris, Skipper, & Allen, 1993; Patton, 2002), this could give bias to the study in one way. Therefore, in order to avoid my bias which is a significant issue in doing a qualitative research, I used methodological triangulation: interviews, observations, and documents, through a case study approach, to collect data. The details of multiple sources were discussed in the section of data collection.

Population and Sample

This study was designed to be conducted at a university in the southern part of Thailand. To protect the confidentiality of the participant, Thai Southern University (TSU) was named throughout the study. According to the needs of the region and country, TSU plays an increasing role in providing academic services and assist the economic and social development in the surrounding communities, especially in the southern region. Because I, a government employee, work as an instructor at TSU, TSU

was selected as the site for the study due to the dimension of convenience. The sample was conveniently selected based on time, money, location, availability of sites or respondents, and so on (Merriam, 1998).

Along with convenient sampling, purposive sampling is preferred in qualitative research (Erlandson et al., 1993; Merriam, 1997; Patton, 2002). Patton (2002) posits that the logic and power of purposive sampling was *information-rich cases* for study in depth. One can learn a great deal about issues that are crucial to the purpose of the research. In the purposive sampling, Erlandson et al. (1993) propose that I make two basic decisions: firstly, who and what to study to answer the basic research questions; secondly, who and what not to investigate in order to narrow all possible sources. Meanwhile, Hatch (2002) points out that the researcher needs the participants who are willing to allow him/her to watch them acting in their natural environments and/or talk with them about their actions and intention.

From the discussion above, purposive sampling strategy, thus, was applied. I selected the Faculty of Liberal Arts because the Faculty of Liberal Arts showed a variety educational foundation courses and language courses provided to undergraduate students. Additionally, the instructors in the Faculty of Liberal Arts were observed to have the ability to address the basic research questions. In this study, the sample of population included faculty who were teaching, or co-teaching at least one web-based course in the first semester of the Academic Year 2008 or who had taught, or co-taught at least one web-based course in the past.

Data Collection

Once the researcher selects the sites or people, decision about the most appropriate data collection approaches are needed (Creswell, 1998). Since qualitative data capture and communicate someone's experience of the world in the researcher's words (Patton, 2002), triangulation, using different or multiple sources of data, methods, investigators, or theory, is perhaps the best way to collect data (Erlandson et al., 1993). In a case study, data collection must be drawn on multiple sources of information such as observations, interviews, documents, and audio-visual materials (Creswell, 1998; Lichtman, 2006; Patton, 2002). Erlandson et al. (1993) explain that different sources should be used to focus on equivalent sets of data because the greater the convergence obtained through triangulation, the greater the confidence of observed findings.

Based on the discussion above, data were collected and gathered using three different methods that included interviews, observations, and documents. Each of these is discussed below.

Interviews

For a case study one of the most important sources to collect data is interviews (Yin, 1994). Marshall and Rossman (1999) argue that to focus on individual lived experience, the researcher can rely on the interview strategy. In relation to in-depth interviews, Wengraf (2001) explains that in depth means to get a deep understanding of how little one knows about something. So, the focus of using the interview is to gain what is in and on the interviewees' mind (Patton, 2002). Erlandson et al. also (1993) point out that the key figures in an interview are respondents.

A semi-structured interview, which was guided by basic questions (Erlandson et al., 1993), was used in this study. Wengraf (2001) suggests that prepared questions are designed to be open enough for the interviewers to improvise subsequent questions. One advantage of using semi-structured interview is that interview guidelines provide consistency from one interview to the next (Merriam & Simpson, 1995). Berge (1995) indicates that the questions help assure that important topics which were probably overlooked by the interviewee will be reduced. Additionally, while the written questions help guide the researcher, semi-structured interviews also allow for additional comments to be noted and explored (Coombes, 2001).

Observations

Observation is a fundamental and highly important foundation in all qualitative inquiry. Through observation, the research describes complex actions and interactions in natural settings (Marshall & Rossman, 1999). Observation methods are beneficial in that they offer the researcher an “insider’s view”—a chance to see what people actually do and say (Coombes, 2001). Moreover, observing offers endless possibilities for learning humans’ interactions (Lichtman, 2006). Erlandson et al. (1993) assert that observation can be compared to taking a picture of the setting with a wide-angle camera lens. The researcher records what are detailed, nonjudgemental, concrete descriptions of what have been being observed (Marshall & Rossman, 1999) or what they believe is important (Johnson & Christensen, 2000) during and after making observation in their field notes. Additionally, Erlandson et al. (1993) suggest the “critical incident technique” as a tool for recording data. Observing and taking extensive field notes without specifying the details in advance (Johnson & Christensen, 2000) was used as a data source in this study.

Documents

Documents were another source of data in this study. Erlandson et al. (1993) note that the data derived from documents can be used in the same manner as the data obtained from interviews or observations. Mertens (2005) asserts that usefulness of the document review lies in getting comprehensive and historical information that already existed. Moreover, the greatest strength of the review of documents is that it can be conducted without disturbing the setting (Marshall & Rossman, 1999). Erlandson et al. (1993) list different kinds of documents including “historical or journalistic accounts, works of art, photographs, memos, accreditation records, television transcripts, newspaper, brochures, meeting agendas and notes, audio or videotapes, budget or accounting statements, notes from students or teachers, speeches, and other case studies” (p. 99).

Since the participants in this study and I are academic staff in the Faculty of Liberal Arts, I needed to obtain permission from Head of the Department of Languages and Linguistics, and Head of the Department of Education Foundation to conduct this study. After their permission was obtained in the third week of June 2008, I identified adopter and non-adopter faculty members using the records of Faculty of Liberal Arts, and Planning Division. E-mail was used as a means to invite all adopter faculty members to participate in this study. This means allowed me to send the same invitation at one time. I explained the nature of the study and asked them to participate. Each received the invitation via e-mail account, a loop for faculty members in the Faculty of Liberal Arts, during the fourth week of June 2008. Within that week, five faculty members informed me that they agreed to participate in this study. However, a sufficient number of

respondents were not obtained. Then, another follow-up was e-mailed during the first week of July. Two more faculty members e-mailed back. They were willing to share their perspectives by expressing their stories and experiences of web-based instruction use. Totally, there were seven adopter faculty members who were willing to participate in this study, and agreed to have a conversation with me.

In this study, a set of questions was constructed based on the purpose of the study, the research questions, extensive literature review, and five attributes of innovation framed by Rogers's Diffusion of innovation. Specifically, I aimed at eliciting faculty members' usage of web-based instruction and their perceptions of web-based instruction, causes to become involved in web-based courses, and motives to utilize only classroom-based delivery.

Before the interview session, interview questions were piloted with one faculty member who was not the participant of the study. The interview questions were understandable. But the sound in the tape recorder was low and some parts were missing. The problem was about the recorder. So I set the recorder again, and put it as near to the interviewed participants as possible when recording.

After the participants agreed to be interviewed, I made an appointment by phone and e-mail. To maximize privacy and minimize distractions, each interview was done in the respondent's office at his/her convenient time. Before the interview, each participant was given a consent form. I also asked the participants for permission to audio record all the interviews in order to maintain accuracy. The interview sessions were conducted in Thai in order to ensure understanding between the researcher and interviewees. Steps taken in the interviewing were done with great care in order not to influence the

respondents' answers, and to avoid leading the respondents to make statements to support the research purpose and questions. Moreover, the same sets of questions and the same sequence of interviews were offered. The interview questions can be seen in Appendix A.

Lichtman (2006) suggests that the researcher pay attention to, and keep notes about physical surrounding and the person he/she is interviewing. Therefore, I made field notes to document observations, thoughts, and feeling during and after each interview session. The interviews lasted from 37 minutes to 50 minutes. After the interviews were transcribed, the tape scripts were sent back to the participants to check clarity, consistency, and possible misinterpretation.

The observations were conducted in two settings: web pages on the Course Management System (CMS), and face-to-face classrooms. CMS training workshop was not observed because no CMS training workshop was organized at the Faculty of Liberal Arts in the first semester of the Academic Year 2008. Since the log-in passwords to access web pages on CMS were needed, the number of participants in this session, CMS observations in particular, depended on their permission. In this study, four adopter faculty members that used CMS, web-based software system that had features to facilitate web-based teaching and learning to deliver their instruction permitted me to observe their web pages on CMS. Two web pages were elective courses while the other two were a prerequisite course and a compulsory course which required team teaching. Each of these participants logged in the web pages on CMS and let me observe the activities on each web page on the third week of July, August, and September 2008.

For face-to-face classroom observations, three classes were observed with the permission of adopter faculty members; during August and September depending on

his/her convenient time. My role in these two settings was a non-participant observer or an “onlooker” (Patton, 2002). I just observed what happened in the setting and took field notes. Field notes were taken during and immediately after the observations not with video equipment, but with pen and paper. My role in this session of face-to-face class was a participant observer—my activities were known to the participants. An advantage of this approach is that the researcher could request permission to collect and record data as needed (Johnson & Christensen, 2000).

For documents, administrative and educational documents, including both internal and external documents, were collected. Internal documents covered university annual reports, press releases, policy papers, self assessment reports, meeting minutes, websites, course materials, course descriptions, syllabi, and other records. External documents included government policies, the Educational Reform Act, the National Information and Communication Technology (ICT) Master Plan, Thai Cyber University website, and other records.

Some documents were in paper while some were electronic. Those that could be accessed were gathered first. The websites of TSU, the Faculty of Liberal Arts, and Thai Cyber University were accessed and analyzed. Also, I collected other documents that would contribute to the study including course descriptions, syllabi, course materials, self assessment reports, meeting minutes, etc.

To summarize, data collection strategies that I employed to complete this study are shown in the table below.

Table 2

Summary of Data Collection Strategies

Data sources	Number of participants or types of documents	Criteria to select participants	Tools used
1. Semi-structured interviews	seven participants	- faculty teaching, or co-teaching at least one web-based course Note: All seven participants were willing to participate in this part	- semi-structured interview questions - tape recording - transcribing - field notes
2. Observations			
2.1 Web pages on CMS	2.1 four web pages on CMS	- participants permission before accessing web pages of their courses	- field notes
2.2 Face-to-face classroom observations	2.2 three face-to-face classroom observations	- participants permission before observing their face-to-face classes Note: Four/Three participants were willing to participate in this part	
3. Documents			
3.1 internal documents	3.1 annual reports, syllabi, etc	- related to the study	- none
3.2 external documents	3.2 government policies, and websites, etc		

Data Analysis

Marshall and Rossman (1999) explain that the analysis of qualitative research is the process to bring order, structure, and put interpretation on collected data. Data analysis of qualitative research is best described as an ongoing process, not a one-time event (Erlandson et al., 1993). For case studies, Patton (2002) insists that case studies can be content analyzed. He further elaborates that the core meanings which are found through content analysis are often called patterns or themes.

For analysis of interviews in this study, each of the interviews was transcribed by the researcher to get verbatim transcripts. For data analysis, the transcripts were coded, analyzed, and categorized for emerging and recurring themes. So the same themes that emerged from each interview were put into the same categories. Along with the interview transcripts, field notes and analysis of documents, were analyzed to find similarities or differences in the theme. They were later put into the same categories. This study was framed by Rogers's (1995) diffusion of innovation theory to guide data collection and data analysis, as well as the interpretation of the study. Therefore, five perceived attributes of innovation: relative advantage, compatibility, complexity, trialability, and observability, were used as a lens to code categories, sort data, and assist in conceptualizing themes. Emerging themes were then explained to determine the significance of five characteristics of innovation outlined in Rogers's diffusion of innovation theory. Moreover, other emerging themes that did not match those five attributes were also explained as other realities that are not depicted in Rogers's theory.

Ethical Considerations

Consideration of research ethics is an integral part of the implementation of any research study (Erlandson et al., 1993; Johnson & Christensen, 2000). Erlandson et al. (1993) mention that safeguards for the respondents must be provided. Marshall and Rossman (1999) agree that the qualities that make a successful qualitative researcher are revealed through sensitivity to the ethical issues.

In this study, I took responsibility to ensure that all participants that were involved in the study were treated in a high ethical manner. In terms of informed consent, all participants had signed a consent form before the interviews, web pages on CMS observations, and classroom observations. They received information about the purpose, and the nature of the study in which they participated. Moreover, I made every effort to make sure that the participants' privacies and basic rights were protected up to the required level. Anonymity and confidentiality were also ensured. In relation to anonymity, the coding names were protected by pseudonyms during the process of analyzing, interpreting, and reporting data. The researcher removed any specific references such as name, place, age, etc. that might identify a particular interviewee. Security of data was also protected by a locking cabinet, and the researcher's personal computer with a password at home and the office.

Trustworthiness

In qualitative research, the primary instrument to gather data is the researcher him-or herself (Erlandson et al., 1993; Hatch, 2002; Marshall & Rossman, 1999). This is consistent with Patton (2002) emphasizes that the researcher is the instrument of both data collection and interpretation. Qualitative inquiry is criticized for being too

subjective. Therefore, the researcher must find ways to control the biases in a way that do not inhibit the flow of relevant information (Erlandson et al., 1993). They further indicate that because a researcher is most often attacked with subjective observations, he or she must be concerned with trustworthiness which enables a naturalistic study to make a reasonable claim. There are different ways of building a true value of trustworthiness including credibility, transferability, dependability, and confirmability as discussed below.

Credibility

There are different techniques that make naturalistic research produce more likely credible findings and interpretations (Erlandson et al., 1993; Lincoln & Guba, 1985). In this study, three activities including triangulation, peer debriefing, and member checking were employed to assure credibility.

Triangulation

The triangulation which I utilized was to seek out several different types of sources to provide insides about the same events or relationships. Triangulation leads to credibility by using multiple sources of data (Erlandson et al., 1993). Gathering data from different sources is done to avoid one-sided view (Coombes, 2001). Similarly, LeCompte and Preissle (1993) emphasize that triangulation will help prevent biases and enhance clarity of finding. In this study, interviews with adopters were used as the primary method to collect data. Meanwhile, other sources of data including documents, web pages on CMS observations, and face-to-face classroom observations were used for purposes of triangulation as well. Therefore, trustworthiness in this study was established by different means of data collection.

Peer Debriefing

Erlandson et al. (1993) note that the researcher need time to step out of the context of what is studied to review perceptions, insights, and analyses with professionals who help debrief the researcher and provide feedback that will refine, and redirect the process of study. In this study, professionals who possessed appropriate understanding of the nature of the study included the researcher's advisor, and study committee members.

Member Checking

According to Lincoln and Guba (1985), the member checking is the most crucial technique for establishing credibility. Member checking occurs "when data, analytic categories, interpretations, and conclusions are tested with members of those stakeholding groups from whom the data were originally collected" (p. 314). In this study, the transcript of each interview was sent back to the respondents to confirm and agree to the correctness of the researcher's recording.

Transferability

Since the naturalistic researcher attempts to describe the intricacies of the context being studied in great detail (Erlandson et al., 1993), the description of the result will not be replicated anywhere. However, to facilitate transferability, thick description and purposive sampling are suggested (Erlandson et al., 1993). In this study, purposive sampling was applied to achieve the purpose of the study. Since this study was conducted at the Faculty of Liberal Arts, TSU, the results of this study should not be generalized to other Faculties or institutions. However, if the reader was brought vicariously into the context or the scene was created in the reader's minds by "thick description", the

judgment about transferability are allowed (Erlandson et al., 1993). It is, therefore, possible to replicate this study though the findings may not be the same.

Dependability

Dependability is reflected in reliability, “a study’s (or instrument’s) consistency, predictability, stability, or accuracy” (Erlandson et al., 1993, p. 33). Erlandson et al. (1993) further note that reliability depends on replication, the assumption that repeated application of the same instruments to the same subjects under the same conditions will yield similar measurement. To check dependability, they suggest audit trail, possibility for external check.

In this study reliability of the interview questions was carried out by a pilot study. The researcher piloted the interview questions with one faculty member who taught web-based instruction. Each participant was asked the same series of interview questions. To strengthen the reliability and accuracy of the results, a tape-recorder was used to record the interview. Verbatim of interviews, descriptions, and records of observation were phrased as correctly as possible to reduce threats to reliability. Also, the analysis of the results was sent to the participants to check clarity, consistency, and possible misinterpretation.

Concerning validity, Lincoln and Guba (1985) insist that there can be no validity without reliability. For validity, Yin (1994) suggests that the quality of a case study design lies in construct validity, internal validity, and external validity. With regard to construct validity, this study established the use of methods triangulation (interviews, observations, and documents). For internal validity, a series of interview questions were constructed based on five attributes of innovation to witness what causes faculty member

decisions to accept or ignore web-based instruction. Moreover, the themes derived from interviews, observations, and documents would be matched with those five attributes. In relation to external validity, which is related to generalization of study's findings, Yin (1994) contends that a theory must be tested through replications in a second or third context.

Confirmability

In the naturalistic inquiry, the data can be tracked to their sources of raw data—interview notes and document entries (Lincoln & Guba, 1985). Erlandson et al. (1993) suggest that confirmability is communicated through an audit. In this study, all the interviews recorded on the audio tape, transcripts and field notes are still stored and can be reviewed to show that the data and interpretations of the study are based on the events rather than the researcher's personal constructions (Lincoln & Guba, 1985).

Summary

The primary purpose of this study was to use Rogers's (1995) diffusion of innovation to analyze faculty member use and their perceptions of web-based instruction. This study employed three methods: interviews, observations field notes, and documents, to collect the needed data in order to reveal what causes faculty to move from traditional teaching to web-based instruction. In Chapter Four, an analysis of the data is presented.

CHAPTER IV

PRESENTATION OF DATA

In this chapter, data obtained from different sources including document, observations, and interviews are presented. The chapter is organized in a way that allows readers to visualize the setting and context of this study. The first section gives an overview of the unit of analysis, and subsequent sections offer a narrative portrait, which includes Faculty of Liberal Arts, key participants, examples of classrooms and activities, web-based instruction use and its benefit to the Faculty of Liberal Arts, training, challenges and concerns, as well as preferred use of web-based instruction.

The Unit of Analysis

The unit of analysis for this study was the Faculty of Liberal Arts at a Thai university. In order to protect the confidentiality of all the participants, the university is named as Thai Southern University (TSU). In the educational context of Thailand, there are national universities scattered throughout every part of the country. Founded in 1968, TSU is one of the national universities located in the southern part of Thailand. During its 40 years of establishment, different academic disciplines have been expanded. Not only bachelor's and master's degrees are offered, but also doctor's degrees in selected fields are launched. According to the Planning Section (TSU, 2009), the number of students enrolling in TSU is increasing every year.

According to its mission (TSU, 2009), TSU endeavors to serve the southern region, as well as the entire nation. TSU direction development is to become one of Asia's leading universities with the main objectives of producing graduates, providing academic services to community and involving in preservation of national heritage in arts and culture, all through a research based platform. Another goal of TSU is to become a research intensive university. TSU also strives to become an exemplary e-learning university in Thailand. It is clearly reflected in one of TSU mission's statements (TSU, 2009):

To create academic context which is widely opened and easily accessible for acquisition of knowledge, in a variety of dimensions, formats and platforms whose contents are diversely and comprehensively integrated in order to develop local human resources into a society of learning and wisdom.

Faculty of Liberal Arts

In the Academic Year 2008, TSU had a total of 25 faculties (or departments), and one graduate school. The Faculty of Liberal Arts was purposively selected for collecting data in the form of document analysis, observations, and interviews. According to its website (TSU, 2009), the Faculty of Liberal Arts consists of two departments, Departments of Languages and Linguistics and Department of Education Foundation. The Department of Education Foundation offers core courses and general education courses covering three main areas: humanities, social sciences, and physical education for undergraduate students from all the faculties. The department of Languages and Linguistics provides language training to both undergraduate and graduate students from

all academic disciplines on campus. Not only English is offered, but French, Japanese, Chinese, Korean, and Malay as well.

The two departments are resided in gray buildings which are joined by a walkway. Those two buildings are named administrative building and classroom building. There is one parking lot adjacent to the administrative building and another one is located under the classroom building. Administrators, faculty members, staff and students work and study in gray, four-storey buildings. The classrooms are on the second, third and fourth floor of the classroom building. On the fourth floor of the classroom building, there is one Self-Access Learning Center. The administrators' offices are housed on the second floor in the administrative building. The faculty's offices are also located in this building, but on the third and fourth floor. Their offices are grouped according to the discipline and departments. In each faculty's office, local network is connected. They can access the Internet whenever they want. Each of the participants owns or rents a personal computer, and can access the Internet in his/her office. Some have a printer in his/her own office. Wireless network is also available in the Faculty of Liberal Arts. If students need to surf the Internet, they sit at wooden tables that are scattered around the first floor of the administrative and classroom building. They sometimes use wireless network connection there late at night.

Key Participants

Concerning academic staff, I encountered both male and female faculty members who have different kinds of characteristics, views and opinions. There were 76 academic staff members including government officials, university personnels, and employees. Three levels of academic staff were found in the Faculty of Liberal Arts. Those levels

were lecturer, assistant professor, and associate professor. Participants who agreed to have conversation with me to complete this study included seven faculty members. To protect privacy and confidentiality of all the participants, pseudonyms are identified as follows.

Aj-1 – A lecturer, with eight-year of teaching experience. *Aj-1* teaches at the undergraduate level. One course that he/she is teaching is delivered adopting Course Management System (CMS).

Aj-2 – A lecturer, with six-year of teaching experience. He/she earned a master's degree in Applied Linguistics. Integrating CMS for two courses, he/she delivers courses for undergraduate students.

Aj-3 – A lecturer, with three-year of teaching experience. He/she is interested in doing classroom research. *Aj-3* is involved in using CMS to launch two undergraduate courses.

Aj-4 – A lecturer, with six-year of teaching experience. He/she has /his/her master's degree in Applied Linguistics. He/she adopts CMS as a part of a compulsory course.

Aj-5 – A lecturer, with eight-year of teaching experience. Teaching undergraduate students, he/she adopts CMS for one elective course.

Aj-6 – A lecturer, with two-year of teaching experience. While he/she is offering courses for undergraduate students, he/she integrates CMS into two of his/her courses: one compulsory course and one elective course.

Aj-7 – With more than 20 years of teaching experience, he/she is doing a large amount of research in his/her field and teaching at both the undergraduate and graduate levels. *Aj-7* delivers all of his/her courses with CMS.

These seven participants were classified as adopters—faculty members who were teaching, or co-teaching at least one web-based course in the first semester of the Academic Year 2008 or who had taught, or co-taught at least one web-based course in the past.

Examples of Classrooms and Activities

Located on the second, third and fourth floor, there are two types of classrooms: typical classroom and language labs. Every typical classroom and language lab is equipped with air conditioners. With regard to language labs, there are four labs on the fourth floor of the classroom building. The labs are not only used as an instructional place for language courses, but if the labs are available, they are also open for students to practice speaking and listening skills during the weekday. Another computer lab is on the first floor, seating 30 students. It opens Monday to Saturday, 8.00 a.m. to 10.00 p.m. This language lab on the first floor is referred to as the ELLIS Room (English Language Learning and Instruction System). ELLIS is a software program supported by the Stock Exchange of Thailand. The software program is used for students who register in a Fundamental English course to practice and develop listening and speaking skills through dialogues and conversations in everyday life.

Pertaining to a typical classroom, any courses from the two departments can be delivered. The classroom walls are painted white with blue curtains, but with no other decorations. With bare floors, the classrooms range in size from large, seating 200

students, to small, serving 30 students. The majority of the classrooms contain an average of 40 fiber chairs with attached desk and there is a whiteboard, and an instructor's desk in front of the room with a microphone, a pull-down projector screen, and an overhead projector on the overhead rolling cart. Most of the rooms on the fifth floor are furnished with computers. However, on the second and third floor, some classrooms are equipped with a set of computer, a LCD projector, and an opaque projector. Only one classroom on the third floor, which seats approximately 45 students, is set with a computer. All classrooms set with computers are available for the Internet access. Normally, students are not allowed to use the computer set in the classrooms. All typical classrooms, the language labs, and equipment staff are under the responsibility of three technology staff members whose offices are located on the fourth floor.

Classroom Activities through the Observations

With regard to classroom observations, I had observed three face-to-face classes. The class conducted by *Aj-6* took 50 minutes three times a week. The elective course took place in a classroom that could seat 45 students. There is a door on the left and several windows with blue curtains on the right. The teaching equipment in this room consists of a whiteboard, a pull-down projector screen, a microphone, an overhead projector on a rolling cart. All the students faced the same direction—the instructor who mostly stood in front of the classroom near the teacher table. The fiber chairs with attached desk were close. These chairs were set in rows, about 10 chairs a row. *Aj-6* could not walk to the back row. Using English as a medium of instruction, *Aj-6* did not use a microphone. He/she had eye contact with students, and sometimes wrote on the whiteboard. The management of this traditional class was not delivering a lecture.

Students were assigned to read a passage before attending the class. So, *Aj-6* asked students questions to elicit the answers from them, and sometimes he/she called students' names one by one. Before the class was up, *Aj-6* mentioned a web page on CMS, saying, "Next week before coming to class, don't forget to prepare to present Thai festivals. The details and examples will be posted on by Friday." Based on my web pages on CMS observations, those materials mentioned in *Aj-6*'s face-to-face classroom were uploaded on Thursday, August 15th, 2008.

The other two classes which were delivered by *Aj-1* and *Aj-4* were one of the compulsory courses which required many faculty members from the department to teach. Based on the course syllabus, students needed to attend a class one time a week. Each class took about one hour and 40 minutes. For students registered for this course, visiting a website <http://lms.TSU.ac.th/> was also required. That is, students needed to do quizzes online and submit their homework and assignments via this website.

The classrooms that I observed could each accommodate 150-200 students. Both classrooms had the same layout. There are two doors in front, and two on the right hand side. Several windows are on the opposite side of the doors. Lecture chairs are placed in rows, about 15 chairs a row. Those chairs are close to each other. There is an aisle for the instructor to walk around and visit students during class activities. The teaching equipment includes a screen, a set of computer, a microphone, an LCD projector, and an opaque projector.

During my classroom observations, the first row of lights on the ceiling was off. The first row of the chairs was available. Students, however, preferred not to sit there. They chose to sit from the second row to the last row. If a student came to class late, he

or she looked for a seat in the back row. All the students faced to the instructors who sat at the table in front of the classroom. *Aj-1* sat at the table most of the time while *Aj-4* sometimes sat at the table, and sometimes stood near the screen. Both instructors mostly used Thai as a medium of instruction. Sometimes the instructors visited the students in the back rows when they did class activities. Both instructors used the microphone all the time while giving a lecture. The lecture was mainly from the commercial textbook. The classroom activities were done according to the teaching plan.

Both instructors used the PowerPoint presentations to explain reading parts, vocabulary, and grammar points in the textbook. Most students brought the textbook with them to the class. While the instructors explained the content of the subjects using the PowerPoint presentations, the students looked at the screen, noted down what was projected onto the screen, and wrote down the instructors' explanations. When the instructors asked the questions, mostly the students in the first three rows answered his/her questions. Although the teaching and learning was conducted in a big classroom, both instructors got participation from the students maintaining eye contact. Sometimes they called students' names to keep them alert.

Nearly the end of the class, *Aj-1* accessed the Internet and visited <http://lms.TSU.ac.th/> to point out the features on the web pages that students needed to be concerned about. He/she demonstrated the students how to do quizzes and to submit their vocabulary log via the Internet. He/she emphasized the way to submit homework and assignment by saying, "Don't forget to submit the vocabulary log of chapters 1-6 through this website. It's a must. The due date is before the midterm exam."

While *Aj-1* mentioned about doing quizzes and submitting assignments or homework, before the time was up, *Aj-4* visited the same website as *Aj-1* did and mentioned about reviewing a lesson from uploaded materials by stating the following, “If you can’t follow the lesson, you can review all of these from the website at your convenient time. These PowerPoint presentations will be uploaded on the website after the big classes were done.”

Web-based Instruction Use and its Benefit to the Faculty of Liberal Arts

TSU has been prepared to be an e-university by providing students with different kinds of electronic or online information including online registration, student e-mail, registration sub-division, job search, online transcript certified documents request, e-library, and virtual classroom. The Computer Center takes responsibility for setting up of the computer infrastructure of TSU, managing and developing the TSU networks, and engaging in software development and computer training activities.

CMS Used in the Faculty of Liberal Arts

In terms of software development, specifically the Course Management System (CMS) adopted in TSU, the Computer Center is in charge of two CMS: Virtual Classroom (VCR) and Moodle. According to the Planning Section (TSU, 2009), there were 20 courses offered CMS for learners at the Faculty of Liberal Arts in the first semester of the Academic Year 2008 (June to October, 2008). A total of 20 courses, 19 courses were delivered for undergraduate students, and one course was for a graduate level. Four courses adopted Moodle while the rest of the courses used VCR.

Concerning VCR, an in-housed software called Virtual Classroom, it is developed to respond to the idea to push TSU to be an e-university as well as to respond to the

increasing number of students. In the initial stage, since 2004, the Faculty of Engineering was in charge of developing and launching VCR as a means to deliver a new mode of instruction. This software is automatically linked to every subject that is open for registration in each semester in TSU. The features of VCR include one stop service, course information, news, assignment, document, webboard, student list, move materials and video.

At TSU, Moodle is also adopted. According to Moodle website, the word Moodle was originally an acronym for Modular Object-Oriented Dynamic Learning Environment. It is an open course management system which allows educators to design, manage, and develop the software package to promote internet-based courses. Universities, schools, and companies use this open source for free since it can be loaded from its website. On course management system page, it offers important features including my courses, upcoming events, administration, people, topic outline, messages, and activities: forums, glossaries, quizzes, and resources.

CMS as a Blended Approach

When I asked the interviewed participants about web-based instruction, they all indicated that they adopted CMS as part of their teaching. *Aj-2* shared, “Most of my courses are face-to-face mode, and I also take a blended approach using VCR or Moodle as a supplementary tool in either all or partial instruction of my courses. I view that it’s a useful tool.” *Aj-7* stated that “I can call this kind of teaching and learning a blended approach since I augment my traditional class with online mode of teaching and learning.” *Aj-3* further added that “mostly, I deliver my instruction face-to-face, and I offer VCR to students as a partial of my instruction.”

CMS as a Voluntary Work

When I further asked if TSU forced them to integrate VCR or Moodle into their courses, *Aj-3* explained, “We’ve a choice of our own. For me, I’m interested in using VCR because I would like to find some new things and excitement in my teaching.” *Aj-2* commented:

Of course, TSU expects from faculty members to adopt CMS. The administration doesn’t force us, but, of course, TSU tries to push the instructors to make a move and use VCR as a part of their teaching more. However, if I myself don’t see any benefits of using it, I won’t take it as a part of my teaching.

Aj-3 who started incorporating CMS into his/her teaching since VCR was introduced cited, “I’m myself interested in CMS, and I have implemented VCR since the first semester I joined TSU. I view that CMS is beneficial; therefore, I’ve adopted it to my instruction.”

CMS as a Professional Development

With regard to the benefits of CMS, *Aj-6* pointed out professional development, “I started from a Fundamental English course. My interest developed when I saw my friends use it, so I exposed myself to it. It’s an important part in my professional development to be an instructor in a digital age.” Meanwhile, *Aj-2* reported:

To have interesting documents, links to related sites, and other resources, you have to think and plan a lot. It’s a good opportunity to develop myself. I need to find useful and helpful resources for students. I search and read. Then it’s a way to help improve and develop my thinking system and management as well.

This similar idea was hold by *Aj-4* who explained:

It [CMS] is a very powerful tool. I need to provide my students with course syllabus, different kinds of materials, multimedia, or related links. So I need to find out updated documents. That makes me read and search more. Believe it or not? My computer skills also improve.

CMS as a Means to Help Students Become an Independent Student

Another benefit of CMS emerged from *Aj-7* how mentioned, “I always seek a way or an approach I like in my teaching, especially, an approach which helps students to become an independent learner.” He/she further added:

VCR helps promote a learner-centered approach because students are able to take responsibility for their learning. The role of the instructors nowadays is changed. We can’t be a traditional teacher. It isn’t updated to be like that. As a teacher, we need to provide a lot of materials, especially reading texts for students to read more and more.

In accordance with *Aj-7*, *Aj-4* argued:

Accessing CMS teaches students to be independent and it is an approach of learner-centered because students are able to take responsibility for their learning. They can study by themselves any time they want. And they can develop these skills and use them with other courses, or even when they graduate and work.

CMS as a Means to Get a Scholarship

One interviewed participant expressed his/her idea about getting a scholarship as one factor that drove him/her to involve in CMS. He/she posited:

I feel good to be one of the instructors who uses VCR. It looks fashionable.

However, another thing that stimulated me to develop VCR is getting a scholarship from university and the Faculty. It will be recorded that I have got a grant from university. I'm quite proud of it.

Based on the announcement about CMS scholarship, any faculty members who are interested in developing CMS for their courses will get a grant of 15,000 Thai baht. *Aj-6* proposed for the university grant to develop her course using VCR. In October, 2008 she completed her project and got the full amount of money in return.

CMS as a Force from Students

While *Aj-6* invested his/her time and effort because of a scholarship, *Aj-5* reported, "What influenced me to do something with VCR are my students. They were born in the computer age, so they expected me to have information sources on VCR." He/she further pointed out:

The students ask me to deposit the material on VCR. They said that in other courses that they register the instructors of those courses provide the course materials, links, and other multimedia on CMS and they could load the documents from there. We must accept that it's a new trend of teaching and learning.

The request from students can also be seen from classroom observations. For example, Mr. Poom, a student registered for the course taught by *Aj-6*, said, "Teacher, would you please upload the extra exercises and answer keys on the VCR? It's easier for us." Ms. Paratree, another student, added, "When we have time we can load them and check the answers from the keys. I like to do it at night." Concerning a request from students, *Aj-5* said during the interview, "When students ask you to have something on CMS, as an

instructor, how can you refuse them.” What *Aj-5* mentioned was in line with *Aj-7*’s explanation. She clarified, “My students told me that they access VCR of my subject but they don’t find uploaded documents. This show that students access VCR more than the instructors. They request me to upload documents.”

CMS as a Desire to Find a New Interesting Mode of Teaching

As *Aj-5* and *Aj-7* were in agreement on drive from the students, *Aj-5* reported that “CMS interests me because it’ll take me to be a part of web-based instruction trend. Since I first adopted it, I’ve used it as a part of my teaching.” *Aj-7* also identified the necessity to learn how to use computer and combine the Internet with teaching at the present time, “Because now we are in the computer age, it’s impossible to refuse computer, or it’s impossible that you can’t use computer or, not surf the Internet.” *Aj-6* had a similar idea. He/she shared with me a perception of being an instructor in a computer age, expressing, “The Internet is a source of information. And now you are in the computer age, so you can’t run away from it. Teaching and learning via the Internet is a new trend. VCR is useful.” Moreover, *Aj-3* stated, “I need to learn how to manage my teaching. I need to learn a new technology. It’s a part, important part of instruction nowadays, I think. It also helps improve my image of being a teacher in the information age.”

CMS as a Need to Learn New Technology

In concern with adopting a new technology in teaching, all participants that I observed face-to-face classes incorporated VCR into their teaching and learning instruction. Three of them, however, shared that Moodle was also integrated into a prerequisite course and a compulsory course that included many faculty members to teach. They pointed out that they needed to learn how to use Moodle. Through my web

pages on CMS observations and course syllabus, it was found that Moodle was adopted as a software program to create a learning management system. During the conversation, two interviewed participants gave the following comments. *Aj-1* said:

Actually, this is my first semester in this Academic Year [2008] to use Moodle as part of my teaching. Based on course improvement, this course [Fundamental English] is implemented face-to-face and students need to submit assignment and do online quizzes, so I need to learn how to operate them. Otherwise, I can't manage this course.

Like *Aj-1*, *Aj-3*, had a similar view. He/she mentioned the following:

According to the course syllabus, the instructors are supposed to access the web pages of Moodle to check students' names, homework or assignments, news, and answer the questions that students might ask. So the instructors must know how to use the computer, access the Internet, or operate the web pages of CMS.

CMS is Used to Submit Homework and Assignments

In terms of submitting work via CMS as *Aj-3* mentioned, *Aj-1* stated that CMS was a useful tool for submitting homework, and assignments. He/she noted:

It's very convenient for both students and instructors. For students, before the due date and time, students can submit homework any where or any time they want.

For the instructors, we can download students' work and assignments from Moodle later in our office when we have no class.

From my web pages on CMS observations, students submitted the assignments, specifically vocabulary logs of Unit One to Six, via VCR until July 25th, 2008 which was the due date. *Aj-6* also expressed in the interview that "students could submit homework

at midnight if they want.” This is evident when I observed web pages on CMS. It was found that the time that the last student submitted his/her assignment via VCR to Aj-6 was around 11.30 p.m. of the due date.

CMS is Used to Upload Course Materials and Quizzes

In addition to submitting homework, course materials were posted on web pages on CMS. It was evident from my web pages on CMS observations. A prerequisite English course, which needed ten instructors, can be an example. According to the course syllabus, students enrolling in this course are automatically members of the course since the beginning of the semester. During the first two weeks of the semester, the class meeting or teacher interaction is done. The instructors provide students with handouts, materials and demonstration of the ways of how to access the learning management system, and the ways of how to be a self-taught learner. There is no face-to-face class for this course. Students could log on the web pages to do the activities at any place where they could access the Internet and at any time they prefer. The students can study the lesson at their house, computer labs or a place where the Internet is connected. Aj-4 informed in the interview, “Learning doesn’t occur in the face-to-face class only. It can be taken outside the wall of the classroom as well.” Based on web pages on CMS observations, it was revealed that a stream video in which seven lecturers explain grammar points including nouns and pronouns, sentence structure, adjectives and adverbs and tenses, had been posted since the first week of June 2008, to the end of the semester.

Another example is a Fundamental English course. Although this course was launched in the traditional class, it also integrated Moodle. One of the features in Moodle that was always used throughout the semester was topic outline. The PowerPoint of each

unit, which was presented in the face-to-face classroom, and answer keys for self-study exercises were uploaded every week. For example, the first week of June, 2008 the PowerPoint Presentation of the lesson “How to use a dictionary” was uploaded. The PowerPoint presentation of “Our University” was on the Moodle in the second week of June, 2008. In the third week of September, 2008, the PowerPoint presentation and answer keys of Chapter 13 were posted. From the interviews, *Aj-2* shared her idea, “One benefit of VCR or Moodle is that the documents and PowerPoint presentations are always available for the students. They can access it any where or any time.” *Aj-1* pointed out, “Students could access the material any time they want or wherever they have connection to the Internet. They also do online quizzes as many times as they want at their convenient time before the due date.” *Aj-3* further added, “I post the materials on VCR, so the students can load them any where, any time they want.” When materials were uploaded on web pages on CMS, *Aj-4* indicated, “When the materials are on document features, students can access them 24 hours. They don’t need to travel to campus or to see the instructor to ask for printed materials.” About printing documents, *Aj-7* explained, “Posting course content and materials on web pages helps reduce cost of paper. The department could reduce the expenses of paper since students must be responsible for those documents themselves.”

CMS is Used as a Communication Means

In addition to submitting homework and assignments, posting course materials on CMS, and doing quizzes online, all interviewed participants mentioned that they could communicate with students. For example, when the instructors cancelled their class

because they were away for a conference or meeting, students had visited VCR and had something to do with it. *Aj-2* suggested:

When there is a national holiday, or when an instructor has an urgent meeting, one can assign students to do some homework or assignments. You can tell them to load the documents, read the instruction, and submit their work via VCR. It's a convenient way that students and the instructors can still be in the environment of teaching and learning though one is away from campus. And students have something to do while there is no face-to-face class. I could also give them feedback although I'm out of campus.

This was also revealed from my web pages on CMS observations. On the news feature of VCR, *Aj-5* posted on September 12, 2008, "The class on Wednesday September 3rd, 2008 is cancelled. Please come back to the class again on Monday September 8th, 2008.

Download the attached files, do as instructed and don't forget to prepare a group work for the class."

Besides utilizing the features of course information, assignment, document, and news on VCR, webboard is also used. The webboard feature was mentioned in the traditional classroom. *Aj-4* stated in his/her class, "If you have any questions, you can leave them in the webboard. I'll check and answer those questions." From web pages on CMS observations, the webboard was used as a means to communicate. *Aj-6* cited:

In classroom, many students never ask me any questions, but in the webboard they are positive to post a question or give comments and opinions. When I reply, they feel like I'm with them in the webboard. I believe that students and teachers have more interaction through the webboard.

Aj-3 noted during the conversation with me that through CMS, communication and student participation were improved; particularly, shy students who are frightened to participate in a face-to-face classroom became active. In addition, *Aj-2* said, “Many shy students who never ask any questions in face-to-face classroom, post questions in the webboard.”

Based on my web pages on CMS observation, in the second week of June, Mr. Joe, a student in a Fundamental English course, asked about how to register for ELLIS program. *Aj-2* posted the details of registration to study ELLIS program. *Aj-2* also warned students not to come to class late. There were some replies to this issue appeared in the webboard feature. Mr. Chin said, “Thank you, teacher.” Ms. Lin replied, “I have done that.” Mr. Andy accepted, “I haven’t done it yet. I’ll register tomorrow. Thank you teacher and my friends.”

Communication between students and students can also be found from my web pages on CMS observations. For example, Mr. Lee, a student in an elective course of *Aj-5*, asked, “My friends, would you please tell me the time and place to take the final exam? Thank you.” Then Miss Kim, one of Mr. Lee’s classmates replied, “The final exam is on September 26th, 2008 at 5 p.m. Room LA 401.” And Miss Linda, another student enrolled in this course, said, “Thank you my friends. Study hard.” Mr. Min posted, “I know that my friends can do your best. Good luck. See you there.”

Training

Training workshops were organized at both the university level and faculty level. At the university level, the Computer Center of TSU is in charge of training academic faculty members to use it appropriately. For the Faculty of Liberal Arts one staff working

for the Technical Unit of the Faculty is directly responsible for training academic faculty members to use educational technologies, VCR and/or Moodle effectively and appropriately. He also helps faculty members set up classroom equipment and solve any technical problems about equipment stuff when sometimes it is not working.

Attending a Series of Training Workshops

From the conversation, all of the interviewed participants acknowledged that their technological competence was intermediate, and they had no experiences as online students. All participants pointed out that they were interested in attending a training workshop. For example, *Aj-3* said, “When a training workshop is announced, I’m myself interested in taking part of it.” While *Aj-3* mentioned her own interest, *Aj-6* reported:

When seeing my colleagues completed the training, and are using VCR for their courses, it motivated me to try one. By seeing and asking them about those experiences, I see that it worked well, and useful. So I asked them about the workshop and it interested me.

According to the records of workshop organized at the Faculty of Liberal Arts and the Computer Center, each participant had attended more than one workshop. All of the participants had more than six hours of training. *Aj-2* stated, “I have voluntarily attended many times, about four or five times, both VCR and Moodle workshop training. It offers an opportunity to find if there are some new techniques added. It’s fun. Moreover, I can improve my computer skills.”

In the training workshop, the faculty members are trained to operate different features on CMS, the way how to upload the course materials such as PowerPoint presentations, exercises, websites, to announce updated news, or to communicate with

students through CMS. The majority of the participants informed that their involvement in CMS adoption resulted from attending a series of training workshop. *Aj-1* explained, “Attending a workshop is voluntary. I’m willing to attend the workshop training. After I’d attended the first workshop, I tried operating VCR.”

Free of Complexity

About the software program, the evaluation results of the training workshop in the second semester of the Academic Year 2007 showed that the training was practical and hands-on. The features on VCR were flexible to interact with. Based on the conversation, all interviewed participants admitted that it was not complex. For example, *Aj-7* cited, “I found it’s easy to get the system to do what I want it to do.” *Aj-5* also stated:

The program itself is not too frustrating. Although the first time I tried, I was not familiar with it. It takes time and effort to learn how to use them. Later when I use it more and more, it becomes easier. I can expect how the system behaves.

Aj-3 mentioned:

Overall, I find the system easy to use. I enjoy using it. The features on CMS can be operated without too much effort and frustration. To operate each feature on CMS is not much different. I can do it. Just click and click on them.

Aj-6 also expressed:

Typically, the features on VCR are not complex. I operate them easily. It’s like when you do things when you surf the Internet. However, sometimes, when I have any technical problems with a feature that is not frequently used such as the video feature in VCR and I forget how to upload the video onto it, I call the technician and ask for some help.

However, the interviewed participants emphasized that they also learned more when they used them. *Aj-2* stated, “The features on VCR are quite familiar. So it’s not too difficult to recover from the mistakes when trying them.” *Aj-4* further discussed:

After attending the workshop, I’ve learned how to operate the features through trial and error. When I encounter any technical problems or forget to do something, I often ask my colleagues for some help. If they can’t, I call the support staff to help.

Challenges and Concerns

From the statements in conversation, it was revealed that all the participants were not scared that web-based instruction would replace the instructors’ roles. For example, *Aj-1* noted, “Although there are web pages on CMS for students to do some activities online, they need an instructor in a classroom. My students confirm that an instructor is needed and it’s necessary to listen to teacher’s explanation in a traditional class.” *Aj-2* and *Aj-5* held a similar view in that even though there were web pages on CMS, CMS couldn’t replace the teacher’s roles. This is because the instructor was actually person who prepared the materials, manage, and operate the course.

Workload and Time Demand

During the conversation, when I further asked the participants whether involving with CMS added more workload, all of them did not complain about time demand. For example, *Aj-2* expressed:

Basically, what an instructor needs to do is to facilitate and manage classes. I don’t have to be their baby-sitter. What I need to do is prepare materials and resources for students. It’s a part of my job. I don’t think it’s an extra work.

Aj-6 agreed, “I teach undergraduate classes and I am supposed to prepare for my classes, so I don’t think it’s a big burden. I just click on the features to have them on VCR. In contrast, I view that my computer skills improved since I am involved in CMS.” *Aj-4* concurred:

Generally, it takes time at the beginning stage to learn how to operate VCR.

However, without CMS, I have already constructed the PowerPoint presentations since I always present my lessons using those PowerPoint. So, when CMS’s appeared, I just upload them on the web pages on VCR or Moodle after I have completed each chapter in class. Then in a later semester after I’ve improved those materials, I click, and move them onto CMS. It doesn’t take much time.

Technical Breakdowns

Together with advantages, all participants mentioned some problems. For example, *Aj-3* commented, “Sometimes the system is very slow. When I want to upload or download documents, students’ assignment or other things, it could take an hour. *Aj-2* expressed her frustration, saying, “During browsing, there are some technical problems such as server breaking down and slow networking or sometimes, the Internet disconnects.” A similar experience happened to *Aj-6* who lamented:

If computers or the local connection are not functioning properly, it wastes time.

When sometimes it’s not working, or the speed is slow and I try to exemplify some points to the students, it takes a while for things to run.

Students Access and Familiarity with Computers

Concerning students’ unfamiliarity with computers, *Aj-6* cited, “Not every student

is familiar with computers. Some don't know how to use computer well." *Aj-4* provided some suggestions, citing, "Students also need a training of how to access and use CMS. Not every student has experiences with using computer when they were high-school students." However, from *Aj-3*'s perspective, he/she was concerned about number of computers for students, "The computers may not be inadequate for students. Some don't have their own computers, so they need to go to the library, the Internet café, or the Computer Center."

Nature of Courses

I asked the interviewed participants why some faculty members did not shift to the use of CMS. In the response to this question, nature of courses was mentioned. *Aj-2* cited, "Some courses of languages would be difficult to be delivered online, for example, a writing course or speaking and listening course. It requires a lot of face-to-face participation, and interaction. Students need a close supervision." Similarly, *Aj-7* emphasized:

It depends on the nature of each course whether it needs to be online or not. Some physical education courses may not need CMS. To practice in the track and field is well enough for these courses. So the instructors don't think that it is necessary to have web pages on CMS.

Lack of Interpersonal Interaction

Aj-4 had a different view. He/she commented, "Some faculty members believe that they need to be in a classroom to give lecture and students need to attend class. Moreover, they might feel safer to teach face-to-face classes. They use what are familiar to them." *Aj-6* pointed out about love of teaching in a traditional classroom, expressing:

I think that many activities we do the classroom can't occur via the Internet.

Many who don't adopt CMS may feel that it lacks interpersonal communication that goes on in the classroom. And something that you do in the traditional classroom can't happen through CMS. For example, students and instructors can't do listening and speaking, oral presentation, or role-play through the websites.

Technological Skills

Beside what stated above, interviewed participants also mentioned technological skills. *Aj-1* said, "Some don't integrate VCR as a part of their teaching because they lack confident and computer skills to develop and use VCR." *Aj-2* added, "Faculty members who are not incorporating CMS as a part of their teaching may not understand it. They may get tired of sitting in front of computer for a long time." *Aj-3* further informed, "When a person who is not familiar with the program can't do something, they may stop using it because it takes time and add more workload for them." *Aj-5* agreed, saying:

If they [faculty who did not adopt CMS] need to learn new technology, they teach as it is. If those faculty members lack computer skills, they would find it's difficult to begin. They may be confused and don't want to continue developing CMS for their courses. And if they want to continue dealing with it, that means an increased workload for them.

Preferred Use of Web-based Instruction

In terms of CMS used, *Aj-7* stated that "I would prefer seeing the instructors use CMS more and more." He/she pointed out that CMS could play an important role in the teaching and learning environment due to the tremendous increase in the number of students each academic year. He/she further suggested that CMS was suitable for a large

class. He/she, however, did not agree with using CMS as a course management system online for the whole course.

All the interviewed participants suggested that to accelerate CMS adoption ongoing training workshop was still necessary. For example, *Aj-1* expressed:

Training workshops are still needed. It's a chance for faculty members to develop skills. CMS involvement can be increased since we gain updated techniques to make CMS becomes more interesting. However, university needs to provide us a good infrastructure.

With regard to infrastructure, all participants agreed that they needed the network and the Internet connection that work properly. *Aj-3* reported, "We should not have any difficulties downloading certain things during working hours if university aims to push faculty members to shift to CMS more and more." *Aj-2* commented, "If there is a problem of inadequate computer for students, slow network, and the Internet connection, how could we become an e-university." *Aj-5* added, "Our system is slow sometimes. This is a problem for us. We need a very good and faster one."

In addition, all participants raised the issue about having more support staff to help improve the course online. For example, *Aj-3* stated that "If we have more technicians, it would save our time to do other work such as conducting a research. *Aj-4* made a comment, "We should involve in CMS more than just posting materials on web-pages. Technicians could help us more in terms of an interesting design and exciting presentations. We need more technicians. Actually, we need an Information Unit." *Aj-6* stated, "If there is a team or any support staff who do these technical works for us, the faculty members who have less computer skills would turn to CMS more."

Summary

This chapter presented the facts gathered from the interviews, observations, and documents. The seven participants involved in using CMS as part of his/her teaching mode. The trend found in this study included examples of classrooms and activities, web-based instruction and its benefit to the Faculty of Liberal Arts, training, challenges and concerns, as well as preferred use of web-based instruction. The voices of those seven faculty members were reflected in the form of direct quotes to convey the expressions of the participants in the discussion of the use of CMS in a Thai university. The description in this chapter gave a portrait of the context, setting and the environment of web-based instruction use. Using the lens of Rogers's theory (1995), I will analyze the presented data in the next chapter.

CHAPTER V

ANALYSIS OF DATA

The previous chapter presented the facts about the use of Course Management System (CMS) in a Thai university. The gathered information is based on interviews with faculty members who adopt CMS, observations, and document analysis. This chapter provides analysis of the case study based on Rogers's theory (1995), focusing on the five basic characteristics of innovation: relative advantage; compatibility; complexity; trialability; and observability. In order for the reader to get a holistic picture of the innovation, the first section deals with how web-based instruction is manifested in the Faculty of Liberal Arts. Then, I will detail how Rogers's five attributes explain this manifestation.

Manifestation of Web-based Instruction Use

In order to respond to a growing number of students and the current trend of teaching and learning paradigm in the Internet age, Thailand Southern University (TSU) set a goal to be an e-learning university. To reach this goal, TSU chose to have its own system by experimenting and developing the online services of its own. One form of online service was e-learning or web-based instruction. Since 2004 the CMS including VCR and Moodle, has become a new practice that is an alternative to classroom-based courses. TSU made an investment and played supportive and encouraging in increasing the rate of CMS adoption in

the social system, TSU in particular. To provide learning opportunities for TSU with CMS, a series of training workshops on e-learning and web-based were organized, and faculty members were invited to attend the workshops. At the university level, faculty members were in support by the Computer Center of the university. In the faculty of Liberal Arts, the support staff was assigned to be responsible for helping faculty members train, develop, and solve technical problems when implementing CMS.

A gradual, apparent change began to take place at TSU. This change was much like Rogers's (1995) notion of diffusion, which is defined as "the process in which an innovation is communicated through certain channels over time among the members of a social system" (p. 5).

At the Faculty of Liberal Arts, one software package used to offer web-based instruction was Virtual Classroom (VCR)—an in-house software, initially developed by the Faculty of Engineering. VCR was not solely adopted throughout the Faculty of Liberal Arts. Another software package called Moodle—a free course management system was also used. CMS was adopted as a part of compulsory courses as well as elective courses. Of the 20 courses incorporating CMS, four courses adopted Moodle.

There was one prerequisite English course which Moodle package used as a CMS to facilitate teaching and learning online for both students and instructors. This course was delivered without traditional on-campus classes. A learner self-taught approach was the key management component of this course. Without a requirement to attend a traditional class, students could work at their own time; place and pace via the web pages on CMS to do all the activities required to complete the course. One faculty member

stated, “Learning doesn’t occur in the face-to-face class only. It can be taken outside the wall of the classroom as well.”

For other courses, rather than using CMS as a primary teaching delivery, this new practice was utilized as a tool to enhance teaching and learning environment. Teaching and learning still took place in face-to-face classes. The instructors conducted their sessions every week throughout the semester. Students attended the class to listen to what an instructor explained. In a campus-based classroom, the instructors appeared to deliver traditional lecture focusing on the use of PowerPoint presentations, or played a role of discussion leader to deliver the content materials. From the experiences of the faculty members who adopted CMS to their teaching mode, all of them identified that face-to-face classes and web-based instruction were not conducted in a complete isolation. They mixed the two modes. This means that web-based instruction in TSU, the Faculty of Liberal Arts in particular, was not a principal mode of teaching delivery. What discussed above is an indication of CMS role as a supplementary tool in teaching and learning pedagogy.

The CMS that manifested in the Faculty of Liberal Arts was very similar to Thorne’s (2003) notion of blended learning, which is the integration of the technological advances offered by online delivery and the participation in the face-to-face session. One of the faculty members that I interviewed clearly stated, “I can call this kind of teaching and learning a blended approach, since I augment my traditional class with online teaching and learning.” Although all participants had no experiences as an online learning student, they were enthusiastic and had a strong will to incorporate CMS as a part of their teaching and learning mode. One faculty member reported, “CMS interests me because

it'll take me to be a part of e-learning trend. Since I first adopted it, I've used it as a part of my teaching." In addition, they showed optimism about web-based instruction use. One participant expressed his/her positive views of using CMS by stating, "I view that CMS is beneficial; therefore, I've adopted it to my instruction."

TSU put money in this new realm of teaching mode, and introduced CMS to faculty members. Thus, TSU expected from faculty members to use CMS as part of teaching delivery. However, the expectation was communicated without force. One faculty member mentioned, "The administration doesn't force us, but, of course, TSU tries to push the instructors to make a move and use VCR as a part of their teaching more." At the Faculty of Liberal Arts, it was apparent to me that since the beginning the CMS introduction, faculty members participated in web-based instruction voluntarily. One faculty members mentioned, "I have implemented VCR since I joined TSU. I view that CMS is beneficial; therefore, I've adopted it to my instruction."

To persuade and support faculty members to be familiar with CMS and shift to use CMS, the administration invested money in two encouraging methods. One was done by providing opportunities for faculty members to attend a series of CMS training workshops. In addition, the support staff was responsible for training, helping faculty members develop, and solve technical problems when CMS was implemented. The other method was prevalent in granting a scholarship for faculty members to develop CMS. When faculty members took these opportunities, they were expected to incorporate CMS as part of their teaching in return to the university or the Faculty of Liberal Arts investment.

With regard to the training workshops, faculty members did not only attend workshops organized by the Faculty of Liberal Arts itself, but also the ones organized by the University Computer Center. This was a good chance for faculty members who were willing to try a new practice. Attending a training workshop was a voluntary work. One faculty member reported, “I have voluntarily attended many times, about four or five times, both VCR and Moodle workshop training.”

The grant for a scholarship for CMS development was offered by both university and the Faculty of Liberal Arts. If faculty members proposed for the grant and it was approved, they would get money in return when they finished developing the course with CMS.

Although all participants had no experiences as web-base instruction students, faculty members had experienced implementing CMS ranging from one year to five years. Since the initial stage the adoption of CMS was voluntary. A compulsory course, and a prerequisite course which required team teaching were blended with CMS, and some faculty members chose to mix it with their elective courses. It depended on their personal preference. However, based on a compulsory course development, a team of faculty members who taught this course needed to learn how to use CMS, Moodle in particular, as part of their teaching and learning.

In supplement traditional classroom, faculty members interacted with the features on CMS. The common features on CMS, either VCR or Moodle, were used to deposit materials, news, or quizzes, gather homework or assignments from students, and communicate with students. Taking a supplementary role, one of the CMS features which was clicked on was document feature on VCR or topic outlines on Moodle. The

instructors used the features to deposit course materials and related websites for students. One interviewed participant stated, “One benefit of VCR or Moodle is that the documents and PowerPoint presentations are always available for the students.” For some courses, downloading course materials or the PowerPoint presentations were optional for students. They participated in this part in case they wanted to review the lessons. The indication of the option is evident in one of the faculty members’ statement. He/she said, “If you [students] can’t follow the lesson, you can review all of these from the website at your convenient time.” For doing quizzes online, students could do as many times as they wanted.

With regard to gathering homework or assignment, “It’s very convenient for both students and instructors. For students, before the due date and time, students can submit homework any where or any time they want”, one faculty member cited. Submitting homework through assignment feature was a mandatory task. One faculty member identified clearly in the classroom, “Don’t forget to submit the vocabulary log of chapters 1-6 through this website. It’s a must.”

Concerning communication, faculty members took advantage of web pages on CMS by posting messages to announce the updated events or news. One faculty member, for example, posted that the class was cancelled. Moreover, they thought that student participation was improved. One faculty member indicated, “In classroom, many students never ask me any questions, but in the webboard they were positive to post a question or give comments and opinions.” The communication through the webboard, however, occurred outside of class. And communication online was two-way communication between the instructor and students. Communication was also evident among students.

Students or the instructors left the message. The others who visited the webboard later replied to those questions, or gave some comments on the issue. This is prevalent that out-of-class communication was limited to only asynchronous web-based instruction. The results of this study are in line with a study done by Siritongthaworn and Krairit (2006) who found that web-based instruction use in Thailand was beneficial in three ways: a course depository, homework submission, and communication outside of class.

As mentioned above, faculty members adopted CMS to their learning and teaching mode as blended learning pedagogy, having positive views towards adopting CMS. It is worthwhile explaining what affect faculty members' decision to adopt CMS and the rate at which it was adopted. With regard to a shift from traditional-based course to blended learning mode of faculty members, five main characteristics of innovation including relative advantage; compatibility; complexity; trialability; and observability were used as a framework in this study to explain CMS use and faculty perceptions. In the following section, I will discuss findings which are related to each characteristic of innovation proposed by Rogers (1995).

Rogers's Five Attributes of Innovation

According to Rogers (1995), five perceived characteristics of an innovation that accelerate the rate of adoption include relative advantage, compatibility, complexity, trialability, and observability. Findings related to each attribute are discussed below.

Relative advantage

Diffusion scholars have found one of the strongest predictors of an innovation's rate of adoption is relative advantage. Rogers (1995) explains that relative advantage refers to the benefits a member of a social system considers when deciding if the

innovation is a better alternative than the existing idea or practice. The greater degree a member of a social system perceives the innovation's relative advantage, the more rapid its rate the adoption in a social system will be. He also indicates that the degree of relative advantage may be measured by subdimensions, which include the factors of economic profitability, social prestige, convenience and satisfaction. Therefore, the data will be analyzed based on the subdimensions generalized by Rogers.

Economic profitability was reflected in terms of costs associated with printing course contents and materials. Since the course content materials were posted on the CMS web pages, students would download those depository materials, and be responsible for paying for their own copy of materials. The faculty did not have to prepare and spent money on printed sheet of paper, and thus, reduced cost in printing course materials. This was beneficial to the Faculty of Liberal Arts as one faculty member confirmed, "Posting course content and materials on web pages helps reduce cost of paper."

Another motivation for many members of a social system to adopt an innovation is to seek social status or prestige (Rogers, 1995). One faculty member said, "It also helps improve my image of being a teacher in the information age." Rogers (1995) also indicated that to gain social status, imitating the innovation behavior of others is important. From the findings, one faculty member incorporated CMS because his/her colleagues had integrated it. He/she emphasized that, "when seeing my colleagues completed the training and are using VCR for their courses, it motivated me to try one" This is evident that adopting CMS was a visible innovation and showed that faculty members who adopted CMS as a means to augment a traditional practice were likely to be status motivated.

Relating to convenience, most frequently cited reasons that motivated faculty members to use CMS was its flexibility and accessibility to both students and instructors. The main goal of developing CMS was to serve students' demand. Additionally, current teaching and learning were not confined within the campus. Students could access resources even when they were far away from campus, or their houses were located in the remote areas. This mode of teaching put students into a new teaching and learning environment where they could access materials any where, any time. One faculty member indicated that, "When the materials are on the websites, students can access them 24 hours." Students could choose the place, and time they would either access course contents and materials that were deposited for them or submit homework. They also made progress at their own pace in different locations when listening to instructors' video or doing online quizzes. For instructors, they could work in their offices or their houses connected to the Internet and upload the materials or download the work of students later at their convenient time.

Moreover, CMS was used as a substitution for face-to-face classroom session when the instructors were absent. One faculty member expressed her preference, "It's a convenient way that students and the instructors can still be in the environment of teaching and learning though one is away from campus." In addition, faculty members stated that even when they were outside brick and mortar classrooms, communication among instructors and instructors as well as among students could be continued and even improved. "Through webboard, the instructors were still able to keep in touch with students. When I reply, they feel like I'm with them in the webboard. I believe that

students and teachers have more interaction through the webboard”, one faculty member cited.

Concerning satisfaction, CMS responded to faculty members’ desire to develop themselves both in terms of professional growth and technology use. This professional growth notion was reflected in one faculty member statement: “It’s a good opportunity to develop myself. I need to find useful and helpful resources for students. I read and search. Then it’s a way to help improve and develop my thinking system and management as well.”

One reason faculty members developed their technology skills was to renew their excitement in teaching by incorporating new technologies into their courses. One faculty member noted, “I’m interested in using VCR because I would like to find some new things and excitement in my teaching.” Additionally, many faculty members who had intermediate competence confessed that their computer skills were improved after involving CMS use. “I view that my computer skills improved since I am involved in CMS.” Moreover, though faculty members agreed that it took time and effort at the first time of shifting from traditional classroom to CMS adoption, they were positive about time saving in later semester.

Another important issue about satisfaction found in the data was enhanced learning. CMS was viewed as a beneficial tool for the students. Faculty members reported that CMS stimulated learners to participate in the learning process more. One faculty member included, “Many shy students who never asked any questions in face-to-face classroom, posted questions in the webboard.”

CMS stimulated students to have personal responsibility for their own learning, served and better prepared students to become independent learners. One faculty member emphasized, “VCR helps promote a learner-centered approach because students are able to take responsibility for their learning.” Moreover, CMS promoted lifelong learning. This is prevalent in one of the faculty members’ statement: “...and they can develop these skills and use them with other courses, or even when they graduate and work.”

Rogers (1995) posits that incentive is another key factor in accelerating the rate of adoption of innovation. Incentives can be direct or indirect payments. The main function of an incentive is to increase the degree of benefits of the innovation.

From the findings, offering incentive affected at least one faculty member’s perception. He/she stated that “another thing that stimulated me to develop VCR is getting a scholarship from university and the Faculty.” When he/she considered the grant of scholarship supported by the university and the Faculty of Liberal Arts, it affected his/her decision to adopt CMS. He/she developed CMS partly in order to obtain a stipend of 15,000 baht.

Rogers (1995) also mentioned positive versus negative incentives. The incentive found in this study was not a negative one. In contrast, it was positive in that it was not a penalty but it rewarded a person who adopted CMS. The amount of money was directly paid to him/her. Rogers refers to this as a “delayed incentive,” because money was paid directly to the faculty member only after he/she had completed developing VCR and incorporated it into his/her course.

Relating to a relative advantage, Rogers (1995) proposed that the diffusion of an innovation is a process of uncertainty-reduction. That is, an individual needs to seek

information about the benefits of a new practice or situation to decrease uncertainty through the innovation-decision process. A member of a social system wants to know that a new idea or practice is advantageous and supersedes the existing idea or situation. Rogers also generalized that there is a positive relationship between relative advantage of an innovation and its rate of adoption.

From the analysis of data, at the Faculty of Liberal Arts, all participants perceived that web-base instruction in the form of blended learning pedagogy did provide benefits for students, instructors, and institution. Moreover, they perceived that the relative advantage was positive. Therefore, the discussion above indicated that the first basic characteristic of innovation has a strong relationship between adopters' decision and relative advantage which is defined as the degree to which "an innovation is perceived as being better than the idea it supersedes" (p. 212).

Compatibility

Another attribute of an innovation that is important for explanation of the rate of adoption is compatibility, or the degree of consistency of the innovation with potential adopters' existing values, past experiences, and needs (Rogers 1995). A practice or idea that is more compatible or fits more closely with the individual's life situation is adopted faster than one that is not consistent with an individual's life. An innovation can be compatible with the following factors: sociocultural values and beliefs, previously introduced ideas, and/or needs.

With regard to compatibility with values and beliefs, the faculty members placed a value on the current trend of teaching and learning as a shift from classroom-based teaching to web-based instruction. It was reflected that "we must accept that it's a new

trend of teaching and learning.” Moreover, some participants posited that the role of the instructors and students were changing. One faculty member emphasized, “The role of the instructors nowadays is changed. We can’t be a traditional teacher. It isn’t updated to be like that.”

The adoption of innovation, however, can be blocked if the new idea or practice is incompatible with existing values or beliefs. From the point of view of interviewed participants, some faculty members did not shift to web-based instruction since they had adhered to a traditional classroom. They believed that they needed to be in a face-to-face classroom. Students needed to attend class to receive a lecture, or interpersonal communication. They felt that stand-up lecture delivery was compatible with their value of instructor presence. They also felt comfortable with teaching in a face-to-face classroom environment and believed communication should be face-to-face and the interaction between students and instructors was best in a face-to-face teaching mode. They also felt the traditional class was necessary in creating closeness between instructors and students. They still preferred students to come to class to talk, to discuss, and participate in class rather than use a feature such as webboard on the web pages on CMS.

Regarding compatibility with previously introduced ideas, previously adopted idea or old practice are the main mental tools that can speed up or retard the rate of adoption of innovation. An individual may not deal with a new idea or practice if they encounter something that they are not familiar with what they have known. The rate of adoption of a new practice is affected by the old idea. Faculty members adopting CMS considered that since the Internet is an open source of information, they could take

advantage of its benefit and use it as part of their teaching mode. As they reported that they were intermediate users, it meant that they had technical skills and were familiar with using computer, sending e-mail, and surfing the Internet. Thus, when CMS which is a new mode of teaching delivery online was introduced in TSU, they felt the relationship to existing practices. The new mode of teaching was compatible with computer skills that the individuals were used to. Thus, they could connect CMS to their existing skills. Moreover, they related CMS to traditional teaching, and transformed the traditional practice into technology for e-learning. For example, CMS allowed them to have a chance to provide related links for students, post materials on web pages, download students' assignment, and communicate with students through webboard. They did not perceive that web-based instruction would replace the role of the instructors. In contrast, CMS was deployed to enhance learning.

However, those who did not adopt CMS might think that using CMS was different from what they were accustomed to in their face-to-face classroom. Some faculty members who did not adopt CMS might have negative experiences with it, especially when they were hindered by technical problems. To post course materials, download students' work or assignments from the websites took more time than when students submitted paper work to them. This led to heavier workload. So they rejected to adopt CMS as part of their instruction. When they did not see the relationship between traditional mode of teaching and CMS, since the initial stage of use, it deterred them from transforming to the Internet-based teaching and learning.

In concern with compatibility with needs for the innovation, it is the degree to which it meets or fulfills what one needs. This dimension of compatibility is perceived as

meeting the needs of a member in the social system. Faculty members adopting CMS felt that rather than just using a textbook, whiteboard or giving lecture in a face-to-face classroom, they needed to find some interesting things to do in their teaching. One faculty member cited, "I'm interested in using VCR because I would like to find some new things and excitement in my teaching." They considered that the activities heavily done on textbooks or exercises in class were inadequate. There was a need to present a traditional Thai classroom with integration of new technology and the Internet. One faculty member mentioned, "It [CMS] is a part, important part of instruction nowadays."

Rogers (1995) also insisted that potential adopters may not recognize that they need a new practice until they are aware of the new practice or its consequences. The adoption occurs when they find that needs are met. From the findings, those who did not move to a new mode of teaching might perceive that they did not need it. They conceived that only traditional class was adequate. CMS was not necessary for them. Thus, they delayed their decision since they did not need it at the present time.

This perception resulted partly from the type or nature of course content. For example, it was very hard to teach writing, listening speaking or sports via CMS. For these courses, the instructors needed to interact directly with the students. One faculty member who adopted VCR cited, "It depends on the nature of each course whether it needs to be online or not. Some physical education courses may not need CMS." The perception of nature of the courses was also emphasized, "students and instructors can't do listening and speaking, oral presentation, or role play through the websites", one instructor insisted.

From the analysis of data, faculty members were motivated by the consistency of CMS with their values and beliefs in teaching e-students; with a traditional Thai classroom and technical skills. Therefore, what discussed above supported the presence of the second basic characteristic of innovation as Rogers generalized that compatibility is the degree to which “an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters.” (p. 224).

Complexity

Another basic characteristic is complexity which is referred to “the degree to which an innovation is perceived as difficult to understand and use” (Rogers, 1995, p. 16). If the innovation is simple to understand or use, it will be adopted more rapidly than a practice that requires new skills or understandings.

From the findings, all faculty members were individuals who had had experiences with technological gadget such as computers and had surfed the Internet before CMS became available. So when CMS was introduced to them, and they had a chance to try them, they did perceive CMS as easy. At the beginning, they confronted an innovation which was new to them. However, eventually, CMS became more user- friendly. One faculty member cited, “Although the first time I tried, I was not familiar with it. It takes time and effort to learn how to use them. Later when I use it more and more, it becomes easier.”

From the participants’ perspectives, the features of VCR were simple. CMS was not too difficult for them to understand and use. Different features could be operated. Ease of use which was important when adopting an innovation was reflected by one faculty member’s statement “Overall, I find the system easy to use. I enjoy using it. The

features on CMS can be operated without too much effort and frustration.” However, when adopter faculty members implemented CMS, and they encountered technical problems, they solved this problem in many ways. These included learning through trial and error, obtaining help from colleagues and asking the support staff to cope with complexity of the technical problems. This is reflected in one of the faculty members’ statement, indicating, “When I encounter any technical problems or forget to do something, I often ask my colleagues for some help. If they can’t, I call the support staff to help.”

In contrast to faculty members who were technical gadget lovers, some faculty members insisted on a traditional class because their technological competency was novice. They might feel frustration during the session of training or implementing. When they had to process the software program to run and edit different features, they were baffled when trying to get through the CMS. According to participants’ perspectives, one adopter faculty member noticed that, “If those faculty members lack computer skills, they would find it’s difficult to begin. And in the training, or when they implement it, they may be confused and don’t want to continue developing CMS for their courses.” When they perceived complexity of CMS, they decided to reject them. It was an important negative force that affected their decision to shift to CMS.

Rogers (1995) asserts that complexity is negatively related to the rate of adoption of innovation. From what mentioned above, some did not adopt CMS because it seemed to be complicated for them to undertake. And they might undergo a period of frustration during the training workshop, or the period after they completed the training workshop. On the contrary, when the ease of use was perceived by an individual, they decided to

draw themselves into the arena of CMS. It is therefore apparent that adopter faculty members did consider that CMS was free of complexity to use. Accordingly, CMS was more likely to be adopted.

Trialability

According to Rogers (1995), trialability refers to the degree to which an innovation may be experimented before adopting. An idea or practice that can be tried on will generally be adopted more quickly than ones that are not tested. The uncertainty in the mind of a member of a social system will be less when a chance of experiment is open for the individuals who consider adopting it. So, one way to give meaning to that new practice is the personal trying-out. When they find out how it works under one's own conditions, they dispel uncertainty and adopt it.

At the Faculty of Liberal Arts, faculty members were persuaded, encouraged, and supported by the university and Faculty to implement CMS. Organizing a series of training workshops was a strategy used to provide a chance for faculty members and to promote CMS. Each interviewed participants grasped the chance to try CMS in the training workshop. All of them had more than six hours of training. Some took more than one chance. One faculty member stated, "I have voluntarily attended many times, about four or five times, both VCR and Moodle workshop training"

Rogers (1995) also suggested that more innovative individuals, who were interested in new technology, do not need a precedent to follow. This can be found in one of the adopter faculty members who reported, "I'm myself interested in CMS, and I have implemented VCR since the first semester I joined TSU." However, for some adopters, their decision to adopt an innovation results from peers who have already adopted the

innovation. It is a kind of vicarious trial for them. That is, they learn from their peers first and later move themselves to a period of their own personal trial. This generalization is evident, emerging from one adopter faculty member who insisted, “My interest developed when I saw my friends use it, so I exposed myself to it.”

In reference to experimentation, two patterns of trialability were found in this study, including experiment in training workshops and in hands-on experience. Regarding the training workshop, faculty members learned how to operate on different features such as uploading course materials, posting news and replying to students in the webboard. During the workshop sessions, faculty members tried practicing the features on CMS under the supervision of the support staff. When they experimented with CMS, they learned and received information from the workshop both in theory and practice. With regard to hands-on experience, when they incorporated CMS in their course, they learned by trial and error as well. One faculty member included, “After attending the workshop, I’ve learned how to operate the features through trial and error.” Therefore, to be in part of web-based instruction, they used CMS under the assistance of the technology staff member and peers.

It is evident from the data that the workshops organized by the Faculty or the Computer Center were important to faculty technology adaptation. CMS was expanded because faculty members had a chance to personally try-out the innovation in a nonthreatening atmosphere and have hands-on experience. Thus, Rogers’s (1995) notion of trialability was very important in acceleration the speed of CMS adoption.

Observability

The last basic characteristic of Rogers (1995) is observability, which is the degree to which the visible results of an innovation are observed or communicated by other individuals. The easier an innovation is for a member of a social system to see its results or to describe to others, the more rapidly they are to adopt it.

With regard to training, when a series of training workshops were launched, faculty members were aware that CMS, VCR and Moodle in particular, were provided for them. The indication of CMS observability was showed in faculty members' continuous attendance in a series of training workshops. In the training sessions, they had an opportunity to observe technical staff demonstrations regarding how to operate the features on CMS. They could clearly observe how this technology could benefit them, which in turn had an effect on their decision to adopt CMS.

As discussed in the section of trialability, faculty benefited from the practical nature of training and experiences. They could clearly witness the advantages, and many mentioned that they exchanged the information about CMS with the support staff as well as peers. Rogers (1995) suggested that peer discussion of a new practice is stimulated by such visibility because friends, colleagues, or neighbors of a potential adopter request the information about innovation or innovation-evaluation. One adopter faculty member clearly mentioned that he/she took part in web-base instruction because he/she acquired his/her colleagues' experiences who were involved in web-based instruction use. He/she contended, "When seeing my colleagues completed the training, and are using VCR for their courses, it motivated me to try one."

Another example that CMS was visible to faculty members in the Faculty of Liberal Arts was seen in a team-taught course. Faculty members who teach a compulsory course had to take responsibility for dealing with Moodle in order to be in accordance with other instructors who teach the course. One faculty member stressed, “Based on course improvement, this course [Fundamental English] is implemented face-to-face and students need to submit assignment and do online quizzes, so I need to learn how to operate them. Otherwise, I can’t manage this course.”

It is clear from the analysis that there is an interrelationship between faculty members’ decision to shift to blended learning and observability identified by Rogers as one of the basic characteristics of innovation speeding up the rate of CMS adoption. The results of this study are consistent with the study done by Masalela (2006), who believed that the four favored attributes (relative advantage, compatibility, complexity, and trialability) of an innovation provided insights into how web-based instruction was adopted by the participants.

From what discussed above, five attributes of innovation associated with web-based instruction use by adopter faculty members at the Faculty of Liberal Arts are evident and can be seen in many dimensions. The following figure depicts the CMS adoption by the participants working in the Faculty of Liberal Arts in relation to Rogers’s theory.

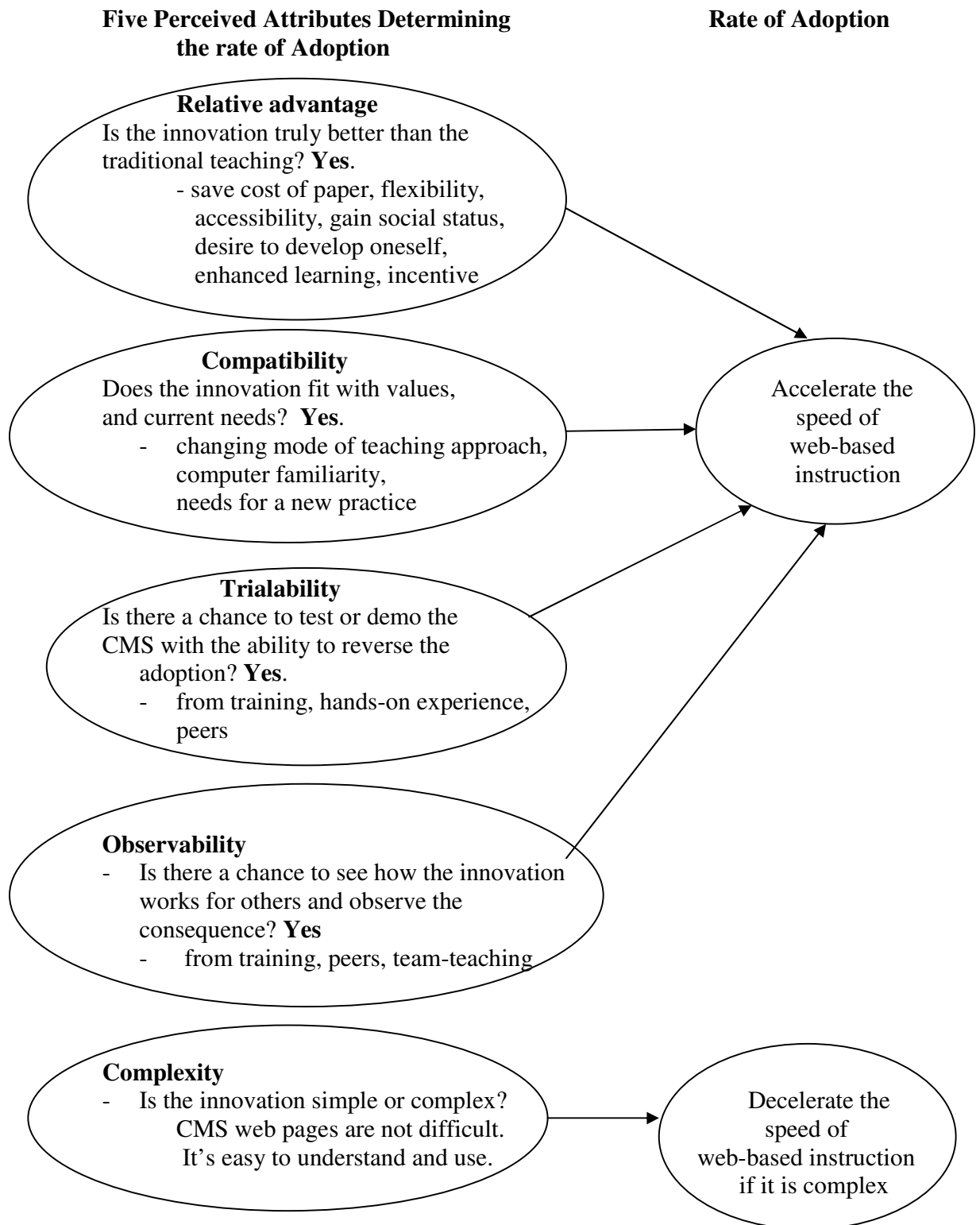


Figure 2. Web-based Instruction Use by the Participants in the Faculty of Liberal Arts

Summary

The results and analysis of this study revealed that four basic attributes of innovation perceived as having relative advantage, compatibility, trialability, and observability speed up its rate of adoption. In contrast, complexity decelerates the adoption. Potential adopters are more likely to adopt a practice that is much more beneficial, compatible, trialable, observable. It is evident from the analysis of data that faculty members based their decision to shift from a Thai traditional classroom to blended learning pedagogy on these five basic attributes generalized by Rogers (1995). Rogers's diffusion of innovation was very useful in describing what factors are important in accelerating or decelerating the speed of web-based instruction in a Thai university. In the next chapter, summary of the study, conclusions, and recommendations is presented.

CHAPTER VI

SUMMARY, CONCLUSIONS, BENEFITS & RECOMMENDATIONS

Summary of the Study

Profound changes in higher education results from the spread of communication technology and the Internet (Margolis, 2004). One of the impacts of the Internet on colleges, universities, and industry is web-based instruction (Harasim, 2000). It is apparent that higher education has reached a transition point to become e-university (Abeles, 2004). Consequently, colleges and universities in the western world, US for example, deliver web-based courses (Coombs, 2005).

In Thailand, as it is throughout the world, web-based instruction is evolutionary, and has become an important tool for Thai universities to respond to the proliferation of students. Additionally, forces of globalization of higher education and competition from neighboring countries put pressures on Thai universities to rapidly move from traditional ways of teaching to web-based instruction (Nagi, Anaraki & Suesawaluk, 2007).

However, the development of web-based instruction was hindered partly because the instructors still fixed their teaching mode on campus-based courses (Sombuntham & Theeraroungchaisri, 2006). Why do certain faculty members move from a traditional delivery to web-based instruction when many other individuals do not?

Through the lens of Rogers's (1995) diffusion of innovation theory, the purpose of this case study was to explain the use of web-based instruction by faculty members and what affected their decision to shift to web-based instruction. The following research questions were set to achieve the purpose of this study:

1. How is web-based instruction manifested among faculty at the university?
2. What are faculty perceptions of web-based instruction use in the university?
3. How, if at all, does Rogers's diffusion of innovation—five attributes of innovation, explain faculty perceptions of web-based instruction?
4. What other realities about faculty perceptions of web-based instruction, which are not explained through the diffusion of innovation theory, are revealed?

Data needed in this study were the scope of faculty's usage of web-based instruction, faculty members' perceptions of factors that caused them to accept web-based instruction, and other characteristics influencing faculty members' decision to adopt web-based instruction. The participants in this case study included seven faculty members who were teaching, or co-teaching at least one web-based instruction course in the first semester of the Academic Year 2008, or who had taught, or co-taught at least one web-based instruction course in the past in the Faculty of Liberal Arts, TSU, a university in Thailand.

To collect data, triangulation method was employed. To gather the necessary data for this qualitative analysis and report, multiple method including semi-structured interviews, observations: classroom observations and Course Management System (CMS) on web pages observations, and document analysis were utilized. The data were then analyzed qualitatively. In the process of data analysis, Rogers's (1995) theory, five

basic characteristics of innovation in particular, was used as a lens to explore factors that motivated or deterred the rate of adoption of web-based instruction. In this case study triangulation, peer debriefing, member checking, transferability, dependability, and confirmability were employed to establish trustworthiness.

Summary of the Findings

To conclude the findings of the study, four primary research questions that guided this case study are discussed below:

1. How is web-based instruction manifested among faculty at the university?

Based on the goal of TSU to become an e-university, the shift from a traditional face-to-face course to web-based instruction occurred. Resulted from TSU's effort and investment in web-based instruction, the Course Management System (CMS), Virtual Classroom (VCR), and Moodle in particular, was visible in TSU. Seven faculty members attended workshops to learn how to use CMS. After trying on CMS and found that CMS was not complex to use and understand, it was accepted to be part of teaching and learning by faculty members. This aptly described the process of diffusion of an innovation proposed by Rogers (1995).

The participants used features on CMS as resource depository, online quizzes, homework gathering box, and out-of-class communication. However, for most courses teaching delivery was mainly conducted in a face-to-face classroom. The primary method of teaching was still campus-based instruction delivery. This means that CMS was not used solely, but adopted as a supplementary tool to enhance classroom-based instruction. In other words, blended learning pedagogy was manifested in TSU, the Faculty of Liberal Arts in particular. However, although TSU stimulated faculty members to become web-

based instructors, discrepancy between institution' expectation and faculty members' participation in web-based instruction was found. One explanation for this phenomenon was that Thailand is in a transitional period to web-based instruction. Moreover, the Thai teachers' role as a sage on the stage is being gradually replaced by more interesting and interactive web-based instruction (Nagi, Anaraki & Suesawaluk, 2007).

2. What are faculty perceptions of web-based instruction use in the university?

Seven adopter faculty members perceived a change in the social system, the Faculty of Liberal Arts, TSU in particular. Web-based instruction was a voluntary work. They perceived optimism about web-based instruction use. They had a favorable view toward the use of CMS because they considered web-based instruction an effective method. They were not scared that web-based instruction would replace the instructors' roles. They believed that CMS do give them benefit. The advantages of CMS included saved cost of paper, flexibility and accessibility, a desire to gain social status, and to fulfill professional growth and technology, students' enhanced learning and responsibility, and an opportunity to get a scholarship. Moreover, they adopted CMS because it was compatible with their beliefs in the changing mode of teaching and learning, the familiarity with technology, and needs to integrate the Internet to traditional teaching delivery. In addition, seven participants who had technical competency valued the ease of CMS after they had a chance to experiment with CMS both in a training workshop and when implementing. At the same time, there were vicarious trials for them: learning from peers. Finally, the software and training workshops provided by university and the Faculty of Liberal Arts, made CMS visible to faculty members. They also

observed that their colleagues change to CMS and they had a chance to exchange information about CMS with their peers.

With regard to concerns, although the participants themselves did not mention their lack of technological skills, time demand and workload, they pointed out that these issues were non-adopters' barriers to the use of web-based instruction. In addition, they were concerned about nature of courses, infrastructure such as slow network, limited technical support, students' access to computers and student readiness to be in the web-based instruction environment.

Faculty members' decisions to move from traditional mode of teaching to web-based instruction were affected by five basic characteristics of an innovation generalized by Rogers (1995). These five characteristics help explain the individual's decision to adopt a new practice. Since those attributes are related to the third research question, I will discuss them below.

3. How, if at all, does Rogers's diffusion of innovation—five attributes of innovation, explain faculty perceptions of web-based instruction use?

A variety of reasons why the faculty members shifted to blended learning pedagogy was reflected in the evidence from the interviews, observations, and document analysis. Five attributes of innovation that had an impact on an individual's decision included relative advantage, compatibility, complexity, trialability, and observability. From the analysis of data, it was revealed that these five basic characteristics proposed by Rogers (1995) are interwoven. Thus, I will discuss each one respectively, and discuss the attributes that are interrelated.

Relative advantage, referring to the benefits a member of a social system considers in the innovation is the primary characteristic that affects seven adopters' decision about CMS. All participants felt that there would be added benefits to adopt CMS. The benefits of CMS were reflected in four main areas: economic profitability, social prestige, convenience, satisfaction, and monetary incentive. For economic profitability, it was beneficial to the Faculty of Liberal Arts in terms of reduced cost of paper.

For social prestige, it was about behavior imitating. With regard to convenience, flexibility and accessibility to CMS were advantageous to both faculty members and students. Concerning satisfaction, along with computer and technological skills, the participants perceived that their desire for improving their profession was fulfilled through the use of CMS which was a current trend of teaching mode. Another factor pointed out was the faculty satisfaction to provide students with a teaching and learning approach which helped students to learn independently. The last factor of relative advantage revealed in the study was money which was paid directly to an individual who proposed for the grant.

With regard to compatibility, the degree of consistency of the innovation with potential adopters' existing values, past experiences, and needs, the participants placed their beliefs on the transformation of the traditional teaching to an independent learning. This is interwoven with what mentioned in the attribute of relative advantage, satisfaction in particular. That is, faculty members did believe that web-based instruction was beneficial to students as a teaching and learning approach which helped students become more active.

Another point that this attribute also merges with the attribute of relative advantage can be seen in compatibility and satisfaction, desire to develop technology skills. For compatibility with previously adopted practice, faculty members had intermediate level of competency, so they felt that it was consistent with their existing skills, and was not too difficult to integrate the Internet and web-based instruction to their teaching. However, some who were novice at computer skills thought that CMS took time and added more workload. Thus, they refused to adopt CMS because of lack of technological or computer skills.

About compatibility with needs for the innovation, the participants felt that they needed more activities to be done rather than just following the textbooks in the face-to-face classroom. This is also interwoven with faculty members' satisfaction to seek for an interesting and exciting teaching method.

The third attribute is complexity, the degree to which an innovation is perceived as difficult to understand and use. The software system was not too difficult for faculty members to operate. So their rate of adoption was speeded. On the contrary, some who were not keen on using computer entrenched in traditional teaching method. It is clearly that the attribute of complexity is interwoven with the attribute of compatibility, previously introduced practice in particular, in terms of existing computer skills. For previously introduced practice, Rogers (1995) mentioned that if individual encounter what they are not familiar with, they refuse to accept that practice.

Regarding trialability, referring to the degree to which an innovation may be experimented before adopting, faculty members had a chance to try on CMS both when they were in the training workshop and when implementing it. Moreover, they learned

how to operate on different features from their peers, and technicians. After personal trying-out in the training workshop, faculty members found that the system was not frustrating. They continued using it. This indicated the relationship between trialability and complexity. If the complexity is reduced, the trialability is increased.

The last attribute is observability, the degree to which the visible results of an innovation are observed or communicated by other individuals. CMS use was visible because the training workshops were organized and faculty members decided to try CMS. Faculty member also discussed the availability of CMS with their peers. Rogers (1995) indicated that one factor that affected faculty members' decision to adopt an innovation is peer discussion. Thus, the observability attribute is interwoven with trialability. One faculty member mentioned that their decision to step into the use of CMS resulted from peers. This point is also interwoven with relative advantage, gaining social status in particular. When an individual saw that his/her colleagues employed CMS, he/she imitated that behavior.

Four attributes of innovation including relative advantage, compatibility, trialability and observability are positively related to the decision to adopt an innovation. In contrast, complexity is negatively related to the rate of adoption (Rogers, 1995). From what discussed in research question three, four attributes of innovation including relative advantage, compatibility, trialability and observability were positively related to the decision to adopt CMS as part of the participants' teaching. In contrast, complexity was negatively related to the rate of adoption. Moreover, some attributes are interwoven: the attribute of relative advantage, changing mode of teaching approach, is interwoven with the attribute of compatibility; the attribute of compatibility is interwoven with

complexity; complexity is interwoven with trialability; observability is interwoven with relative advantage; and the observability attribute is interwoven with trialability.

4. What other realities about faculty perceptions of web-based instruction, which are not explained through the diffusion of innovation theory, are revealed?

In this study, one reality which is not mentioned in those five attributes of an innovation was revealed during the study. It is worth mentioning that a driving force that pushes faculty members to employ CMS is students. This stance is in line with a force that drives web-based instruction to spread, which is the consumer, students in particular. Aggarwal and Bento (2000) posit that because of pressures from students, a university move from traditional institution to be e-university. Moreover, students in the digital age are expecting web-based support for the learning environment (Solliffe, Ritter & Stevens, 2001; Wolcott, 2003).

From this study it is apparent that seven participants believed that students were altering from being traditional students to e-students. Therefore, they responded to the students' request to use CMS as part of their teaching by uploading course materials and quizzes, asking students to submit their homework and assignments via the website, and utilizing webboard as a means to communicate with students.

Conclusions

Based on the findings of this study, the following conclusions are derived by the researcher:

1. The understanding of how and why adopter faculty members use web-based instruction is beneficial for faculty and university and would accelerate the rate of web-based instruction.

2. The adoption of web-based instruction gives faculty members an additional tool to enrich teaching and learning. It does not emerge to replace the role of the teacher. Therefore, if a university could address those attributes affecting the rate of adoption, non-adopters might adopt web-based instruction.

3. In order to reduce barriers to the rate of web-based instruction use, it is important for a university to look through faculty members' concerns as well because faculty members are the key to the success of web-based instruction delivery.

Benefits

The findings of this case study will provide a better understanding of faculty's usage of web-based instruction and their acceptance of or resistance to web-based instruction. The knowledge obtained can add to the data base for further research, theory and practice as stated below:

Research

I do believe that the findings of this study validate Rogers's (1995) generalization of five basic characteristics that have an impact on an individual's decision to adopt an innovation. Web-based instruction is still a relatively new and developing field, and little qualitative research has been done on the adoption process of university instructors (Reid, 2006). Similarly, from the literature review in Chapter II, most of the research on web-based instruction is based on studies in other countries. This study can help fill the gap by adding an eastern perspective to web-based instruction research. Further, most studies have been quantitative and used survey instrumentation. This study used a qualitative approach, which adds rich description to the body of literature.

Practice

Though online education will not completely replace classroom-based instruction, it is here to stay (Shanker & Hu, 2008). In this study, seven university faculty members have an opportunity to express their points of views on what is attracting them to the new mode of teaching. Also, the administrators need to know the barriers to the adoption. The findings can be useful for universities in the implementation of a plan, to speed up the rate, and to expand the use of web-based education in the future. Administrators can learn from these findings experiences and plan their programs for the 21st century (Aggarwal, Turoff, Legon, Hackbarth & Fowler, 2008). If the university wants the faculty to participate more in using new technology, the information obtained would help administrators to plan the strategy to support faculty to strive more in the current mode of teaching. Specifically, the strategic plan to increase the rate of using web-based instruction in the university can be developed and enhanced. For example, the participants pointed out that the university should organize ongoing training workshop, increase the support staff, set a Technology Unit, improve the infrastructure, and prepare students to be ready for web-based instruction.

Theory

Diffusion of innovation (Rogers, 1995) is used as a lens for explaining how the characteristics of an innovation have an impact on decision of faculty to adopt or refuse it. This theory also offers an opportunity for practitioners and researchers in different fields to clarify the usefulness and application of Rogers's diffusion of innovation theory. The five perceived attributes affecting the participants' decision provide a clear path to examine and explain the use of web-based instruction in a selected university in Thailand.

Therefore, this study is conducted to test Rogers's theory to understand the adoption of an innovation in the eastern context. Also, this research provides contributions to the field of web-based instruction using Rogers's lens.

Recommendations

To advance the impact of factors that motivate or deter adopter faculty members' decision to adopt an innovation in the university, some recommendations for further research are noted as follows:

First, since the participants of this study included only adopter faculty members working in the Faculty of Liberal Arts in TSU, they were a certain group of faculty members at the university. The findings of the study may not be generalized with faculty members who are in different fields or subject areas in TSU. Thus, replication of the present study should be conducted with faculty members who are in different fields or subject areas. Moreover, non-adopters should be included in the study. The results of the study will provide TSU with better understanding of the factors motivating and inhibiting the adoption of a new technology. Those necessary data will help TSU better encourage faculty members to adopt web-based instruction and expand usage of web-based instruction throughout the university.

Second, since web-based instruction is a current trend of teaching mode in Thailand, the replication of this study should be done on different education levels in Thailand. The results of such study will provide useful information for policy makers to encourage and motivate the instructors to adopt this new kind of teaching and learning more.

Third, additional studies are recommended in order to continue to assess the effectiveness of the blended learning experience. Other studies that would inform this topic include:

1. Since one of the main goals of web-based instruction is for students, a case study conducted on the students could provide in-depth data about their perceptions of blended courses.
2. This study focused on faculty members only. It would be helpful to study the other members of university including support staff and administrators.
3. Since this study is a qualitative method, it will be beneficial to the body of literature if a study will be done using mixed method: survey and qualitative instruments.
4. This study was conducted using the lens of Rogers's (1995) theory of diffusion of innovation to explain the context and phenomenon. However, to obtain data from different perspectives, educational research such as technology and its integration like web-based instruction can be examined by other frameworks such as learning theory, change theory, and theory about culture.

Final Statement

Working as an instructor in TSU, and as a researcher who values the satisfaction of using web-based instruction and has a chance to conduct a case study, I do believe that faculty members and students must utilize technology and integrate it into a traditional mode of teaching. However, we, instructors and administrators, need to ask ourselves why new technology is included in our mission, why we invest a lot of money, time, and energy to do that. It is not just to be in trend. However, whatever we do we should

enhance learning for the sake of our students to become independent learners and survive in the technology and information age.

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APPENDICES

APPENDIX A

Interview Questions

1. What advantages and disadvantages do you perceive in using web-based instruction as a part of your teaching?
2. How is web-based instruction compatible with your teaching philosophy?
3. What are some challenges that you encountered in your web-based instruction experience?
4. How did you learn to use web-based instruction?
5. How does web-based instruction relate to your other teaching responsibilities?
6. What are your concerns about using web-based instruction?
7. In your opinion, why do some faculty adopt web-based instruction, but why don't some faculty adopt web-based instruction?

APPENDIX B

Institutional Review Board Approval

Oklahoma State University Institutional Review Board

Date: Friday, June 13, 2008
IRB Application No ED0896
Proposal Title: Using Diffusion of Innovation Theory to Explain the Degree of Faculty Adoption of Web-based Instruction in a Thai University

Reviewed and Processed as: Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 6/12/2009

Principal Investigator(s):

Usa Intharaksa Edward Harris
Faculty of Liberal Arts, PSU, 308 Willard
Hat Yai, Songla 90112THAIL, Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

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

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

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

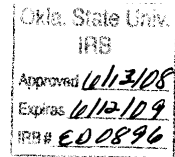
Sincerely,



Sheila Kennison, Chair
Institutional Review Board

APPENDIX C

Faculty Consent Form



FACULTY CONSENT FORM

- Project Title:** Using Diffusion of Innovation Theory to Explain the Degree of Faculty Adoption of Web-based Instruction in a Thai University
- Investigator:** Usa Intharaksa, (Graduate student at Oklahoma State University)
B.A. (*English*), Srinakharinwirot University (1993)
M.A. (*Applied Linguistics*), Mahidol University (1999)
- Purpose:** As a faculty member working in the Faculty of Liberal Arts, you are invited to participate in a research study being conducted at Prince of Songkla University, Hat Yai Campus, Thailand. This study is designed to explain the use of web-based instruction by faculty and what causes faculty to adopt or not to adopt web-based instruction as a part of teaching. The information sought will be your thoughts, perceptions, beliefs, values, feelings, and experiences about web-based instruction use.
- Procedures:** As a faculty member, if you decide to participate, you will be asked to get involved in individual interview which will last around 35-50 minutes to discuss web-based instruction use. The individual interview will be audiotape recorded. The interview will be in a location agreeable to both the researcher and participant. It is hoped that the interview will be organized in each participant's office. Additionally, the researcher may observe your face-to-face classes, web pages on CMS, and a CMS training workshop. Information about faculty's usage of web-based instruction and perceptions of web-based instruction use are sought. The responses from the, interview, web pages on CMS observation, classroom observations, and CMS training workshop observation will in no way affect your regular teaching.
- Risks of Participation:** There are no known risks associated with this study which are greater than those ordinarily encountered in daily life.
- Benefits:** The primary benefit to be expected is helping to comprehend why faculty members integrate or refuse web-based instruction as a part of faculty teaching. It will be a piece of information for policy makers to consider how to expand the adoption of web-based instruction.
- Confidentiality:** Any information that is obtained in connection with this study and that can be identified with you will remain confidential. The data will be stored in the researcher's personal storage flash drive which will be locked up where the researcher only has access. In written results,

participants will be given a different identity to protect them from any personal information being disclosed. The audio tape and hard copies will be destroyed no more than 1 year following completion of the study.

Compensation: There will be no any compensation for participation in this study.

Contacts: If you have any questions, I can be reached at Department of Languages and Linguistics, Faculty of Liberal Arts, Prince of Songkla University , Hat Yai, Songkhla, 90112, telephone number: 074-286-794, e-mail: u-sa.k@psu.ac.th or you may contact Prof. Ed Harris, Advisor, 308 Willard Hall, OSU, Stillwater, Oklahoma 74078, telephone number: 405-744-7932, e-mail: ed.harris@okstate.edu. If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, Oklahoma 74078, telephone number: 405-744-1676 or irb@okstate.edu.

Participant Rights: Participation is totally voluntary. Your decision whether or not to participate will not prejudice your future relation with Prince of Songkla Univesity, Hat Yai Campus. Also, if you decide to participate, you are free to discontinue participation at any time without any reprisal, penalties, or consequences of any kind.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form has been given to me.

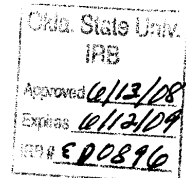
Signature of Participant

Date

I certify that I have personally explained this document before requesting that the participant sign it.

Signature of Researcher

Date



VITA

Usa Intharaksa

Candidate for the Degree of

Doctor of Education

Dissertation: USING DIFFUSION OF INNOVATION THEORY TO EXPLAIN THE DEGREE OF FACULTY ADOPTION OF WEB-BASED INSTRUCTION IN A THAI UNIVERSITY

Major Field: Applied Educational Studies/College Interdisciplinary

Biographical:

Personal Data:

Born in Tharua, Ayutthaya, Thailand on August 1, 1971, the youngest daughter of Prasert and Yupa Keenardputta.

Education:

Graduated from Saraburi Witthayakom School, Saraburi, Thailand in 1989. Received Bachelor Degree of Arts in English from Srinakharinwirot University, Mahasarakham, Thailand in March, 1993. Obtained Master Degree of Arts in Applied Linguistics from Mahidol University, Bangkok, Thailand in September, 1999. Completed the requirements for the Doctor of Education in Applied Educational Studies/College Interdisciplinary at Oklahoma State University, Stillwater, Oklahoma in July, 2009.

Experience:

Employed as an instructor of English, Faculty of Liberal Arts, Prince of Songkla University, Hat Yai, Songkhla, Thailand, 1999-present, Assistant Head of the Department of Languages and Linguistics, 2000-2002.

Name: Usa Intharaksa

Date of Degree: July, 2009

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: USING DIFFUSION OF INNOVATION THEORY TO EXPLAIN THE
DEGREE OF FACULTY ADOPTION OF WEB-BASED
INSTRUCTION IN A THAI UNIVERSITY

Pages in Study: 158

Candidate for the Degree of Doctor of Education

Major Field: Applied Educational Studies/College Interdisciplinary

Scope and Method of Study:

Using the framework of Rogers's (1995) Diffusion of Innovation Theory, the purpose of the study is to examine the use of web-based instruction and faculty perceptions of web-based instruction in a Thai university. In this study, interviews with seven participants were used as the primary method to collect data. Meanwhile, other sources of data including documents, web pages on Course Management System (CMS) observations, and face-to-face classroom observations were used.

Findings and Conclusions:

The findings of this study revealed that at TSU, a blended learning approach was used in web-based instruction. Seven participants held an optimistic view towards the practice of web-based learning as a supplementary tool to enhance a traditional mode of teaching and learning. Web-based instruction benefited faculty members, students, and the university.

The results of the study showed that four attributes of innovation—relative advantage, compatibility, trialability, and observability—accelerated the rate of web-based instruction use. Another attribute, complexity, is negatively related to the rate of adoption in that if technology is difficult to understand and use, it will be refused. However, from the findings, the Course Management System (CMS), which was used for web-based instruction, was not complex to use. Thus, faculty members did adopt CMS as a part of teaching and learning. These five basic characteristics of innovation were interwoven throughout the teaching and learning process.

The participants were concerned about the workload and time demand for non-adopters, infrastructure, and students' access and familiarity with computers and web-based instruction. Moreover, they suggested that ongoing workshop training, support staff, and a Technology Unit were also needed.

ADVISER'S APPROVAL: Dr. Edward Harris
