ABSTRACT

DIFFUSION OF INNOVATION: A CASE STUDY OF COURSE MANAGEMENT SYSTEM ADOPTION

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The purpose of this study was to examine the processes of evaluation, selection, adoption and diffusion of a course management system (CMS). This study incorporated two institutions, each having six participants. The participants were placed into three categories: faculty, staff, and administration. Each participant was either a faculty member, who was also an early adopter of the institution's CMS, a staff member, or an administrator. Each participant was involved in part or all of the evaluation, selection, adoption and diffusion processes.

The outcome of the study indicated that the participation of these individuals helped the institutions evaluate and select their CMS. In addition, the study indicated that each institution arrived at their decisions through different evaluation and selection processes. University #1 consisted of a committee to evaluate and select their

system, while University #2 comprised members of the Technology Department and utilized the input of faculty members to help select a system. The findings also recommended that the participation of these individuals influenced others to adopt the system. Each university, however, provided different incentives to entice the adoption of these systems.

The study recommends that institutions with the resources might be more suitable to adopt open-source systems than smaller institutions without adequate resources to maintain these systems. Furthermore, the research suggests that additional studies are needed to analyze how many small institutions are using open-source systems and to what extent are they using these systems.

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DIFFUSION OF INNOVATION: A CASE STUDY OF COURSE MANAGEMENT SYSTEM ADOPTION

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DEDICATION

To my aunt Marcie for her support

In memory of my aunts, Bernice Wooley and Beaulah Iverson

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PREFACE

Researcher's Background

My introduction to course management systems (CMS) began in the summer of 2000 as a student in an instructional technology course. The objective was to develop a prototype of an on-line course, utilizing a selected CMS or web-based authoring tool. I chose Blackboard, one of many CMSs, because it took very little time to learn and featured a user-friendly interface. As a faculty member in the Communication Department, I chose to develop an on-line version of a broadcast programming course I taught in the fall semester. As I uploaded course materials (syllabus, documents, and other files) onto Blackboard, I realized I would need to upload video samples, so I sought the advice of various technology administrators concerning packaging these materials for placement onto the Blackboard site. Unfortunately, I found they were aware of the CMS concept, but the university had not subscribed to any proprietary vendor.

Ironically, the institution was considering adopting a CMS and encouraged faculty to participate in the process. With my coincidental introduction to CMS's and the timing of the institution's decision to adopt a CMS, I became interested in developing a dissertation topic that involved the process of evaluation, selection,

adoption, and diffusion of a CMS and examined the experiences of stakeholders who participated in the process of analysis, selection, adoption, and diffusion of a CMS.

Since my introduction to the Internet in 1994, I have become increasingly aware of its impact on learning. I strongly believe distance education has evolved beyond classroom settings, instead relying heavily on CMS and Internet-based applications. The use of CMS continues to grow and as a researcher I have a vested interest in following its growth and continuing to research its impact on learning environments.

As a researcher, I became consciously aware of University #1's and University #2's decisions to select a CMS. However, my awareness of their decision and the understanding of the process did not influence their participation in this study. With my knowledge and understanding of the CMS evaluation and selection process, I have a biased opinion, yet my opinion did not influence the outcome of this study.

CHAPTER 1

INTRODUCTION

In the last decade, the field of distance education has grown and changed dynamically (Gunawardena & McIsaac, 2004, p. 369). During the early 1990s, many institutions of higher education re-tooled their distance education courses by offering access to instructional materials via the Internet. Technological advancements also changed interaction between the instructor and learner, altering the communication process.

Over the last thirty years, distance education has grown to reach a wide range of clientele (Bates & Poole, 2003, p. 126). For example, computer-mediated communication (CMC) offers around-the-clock access to instructional materials via the web, and provides access to course content including the development of pedagogical web-based applications such as e-learning (electronic learning) or web-enhanced learning, characterized by "the creation of education and learning arrangements where the Internet plays an important role in the delivery, support, administration, and assessment of learning" (Kirschner & Pass, 2001, p. 350).

The success of e-learning depends upon the use of technology such as laptop computers, wireless networks, and wireless tools (phones, PDAs, etc.), and as these tools become more accessible due to decreasing costs and widespread availabilities, it

will ultimately enhance a learner's abilities to effectively organize learning content. These technologies associated with e-learning enable new pedagogy and provide alternative ways to teach and learn.

With the growth of tools to enhance e-learning pedagogy, more college campuses have integrated computer-based technology into courses. For example, software technology tools such as course management systems (CMS) are utilized by instructors to enhance e-learning (Waterhouse, 2005, p.5). CMSs help to facilitate e-learning by incorporating instructional features such as course-related announcements, course syllabi, course outlines, projects, messages, asynchronous/synchronous chat capabilities, and access to e-mail accounts while handling various administrative course management functions.

The development and use of CMS began in the early 1960s. At that time, computerized learning systems were developed as a means to provide access to interactive learning modules. One early system was PLATO (Program Logic for Automated Teaching Operations), originally built by scientists at the University of Illinois. PLATO helped to launch tools for online interaction, including a means of posting messages and creating forums, communicating through email and chat rooms, creating interaction through remote screen sharing, and playing online games (http://en.wikipedia.org/wiki/PLATO). Many years later, the concept of online education grew and became enriched through organizations such as CALCampus, the Computer Assisted Learning Center (CALC). Founded in 1982 in Rindge, New Hampshire, as a small, offline computer-based adult learning center, the CALCampus

philosophy was similar to the model of today's online education, in that CALCampus sought "to provide affordable, quality instruction to individual learners through the use of computers" (Morabito, 2008, p.1). Organizations and companies such as CALCampus helped launch today's CMSs, which include tools such as Blackboard Learning Systems, Moodle, Angel Learning Management Systems, eCollege, and Sakai. In addition, virtual universities were created to attract students who may not be able to attend traditional colleges and universities due to various reasons. A list of institutions includes California Virtual Campus, Ohio Learning Network, Michigan Virtual University, Minnesota Virtual University, Phoenix University Online, Walden University, Western Governors University, and University of Maryland University College. Acceptance and use of course management tools is illustrated in Figure 1.

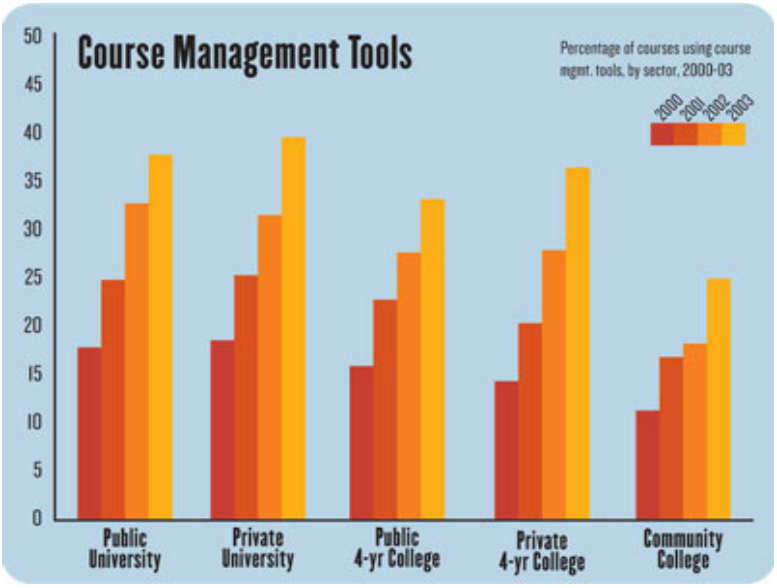

Figure 1. Course Management Tools 2000-2003 (Green, 2003).

The blend of audiences utilizing CMS includes faculty, students, staff, and administration. Educational institutions recognize this as a very important tool for distance education delivery, but each institution is different in that some may have standardized systems while others allow the use of systems chosen or developed by individual users or departments. In addition, the value of course management systems has increased in recent years partly due to the ability to reach a wider audience. According to a 2003 survey conducted by the Campus Computing Project:

> … 33.6 percent of all college courses now use course management tools, up from 26.5 percent in 2002, 20.6 percent in 2001, and almost double the level in 2000 (14.7 percent). The survey data also reveal that over half (51.4 percent) of the survey respondents report that their institution has a strategic plan for deploying course management tools, compared to 47.5 percent in 2002. More than four-fifths (82.3 percent) of the participating institutions have already established a "single product" standard for course management software, up from roughly three-fourths (73.2 percent) in the 2001 survey and 57.8 percent in 2000. (Green, 2003, p. 4)

Statement of the Problem

Institutions evaluate, select, and adopt a CMS, but little research has been done to clarify the processes and experiences of participants involved. Most research emphasizes CMS adoption (Morgan, 2003; West, Waddoups & Graham, 2006) and present models to explain technology adoption (Burkman, 1987; Hall & Hord, 1987; Rogers, 2003).

Institutions are also concerned with the rising costs of maintaining systems that provide online course management only. Furthermore, many institutions still use

separate systems that handle institutional functions (i.e., financial, registration, etc.). The cost of maintaining both has many institutions considering a single integrated system.

Most CMS vendors address the integration issue by providing a system that has a feature called documented application program interface (API) that allows the integration of CMS with the institutional student information system (SIS). Unfortunately, it provides only the ability to integrate, not the actual program to perform the integration, which means either designating the institution's programmers to perform the task or purchasing professional services (Shelton & Saltsman, 2005, p.128). Accordingly, choosing a CMS is a difficult decision-making process for technology administrators (Jafari, 2000, p.55). And furthermore, until vendors begin to offer services similar to campus portals, institutions face the challenge of analyzing and selecting the right system to fit their needs, or choosing to develop their own.

Purpose of the Study

This study examined the process undertaken by two institutions that selected a course management system and provides insight into participant experiences during the selection process. This study includes additional literature that supports the process and experiences of participants involved in selecting CMS. In addition, this study provides an in-depth analysis of the processes and the experiences of participants during the evaluation, selection, adoption and diffusion of a CMS.

Research Questions

The diffusion of innovation theory was used to explain the processes of evaluation, selection, adoption and diffusion of a CMS. The following research question was the focus of this study:

What are the factors that guide the decisions in selection and use of a CMS within two small liberal arts institutions?

The following subquestions were used to guide this study.

1. What were the issues leading to the need for a CMS?
2. What kinds of procedures were used in the evaluation process?
3. What were the roles of the administration, staff, and faculty in the evaluation and selection processes?
4. How was the CMS selected by the organization?
5. How is the CMS being used in the organization?

Significance of the Study

This study provides an in-depth analysis of the processes and the experiences of participants during the evaluation, selection, adoption and diffusion of a CMS. Moreover, this research attempts to raise the consciousness of key decision makers to become more aware of issues related to these processes. With institutions considering the adoption of homegrown or open-source CMS, decision makers will also find this study useful for planning the selection and implementation of these systems. In

addition, with institutions considering the adoption of technological innovations, particularly CMSs, this study adds to the literature concerned with the evaluation, selection, adoption and diffusion of these innovations, as well as literature related to the concept of technological change within institutions.

Definition of Terms

For the purpose of this study, the following terms were used:

Adoption is seen as the decision to make full use of an innovation (Rogers, 1995, p. 21).

Course management system (CMS) refers to web-authoring tools that integrate technological and pedagogical features of the Internet and the World Wide Web into a single, template-based authoring system to facilitate the design, development, delivery, and management of web-based courses and on-line learning environments (Dabbagh, 2002, ¶ 5). This concept is also referred to as a content management system.

Computer-mediated communication (CMC) is any form of communication between two or more individuals who interact and/or influence each other via computer-supported media (i.e., instant messaging, e-mail, chat rooms, etc.).

Diffusion is defined as the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995, p.5).

Electronic learning (e-learning) refers to using instructional strategies enhanced by technology (Waterhouse, 2005, p.3).

Innovation is defined as an idea, practice or object that is perceived as new, whether or not it is objectively new as measured by the lapse of time since its first use or discovery (Rogers, 1995, p.11).

Organization of Chapters

This dissertation is organized into five chapters. Chapter One is an introduction to this study, which includes the background, the statement of problem, purpose of this study, the significance of this the study, and definition of terms. Chapter Two summarizes the literature related to this study including a discussion of the diffusion of innovation theory and other related models. Chapter Three contains a description of the methodology used in gathering and analyzing data. This chapter also includes a description of the organization of data. Chapter Four describes the findings within this study and concludes with a cross-case comparison of findings. Chapter Five summarizes a discussion of the theoretical framework used in the design of the study, and offers recommendations and suggestions for future research.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

The purpose of this literature review is to propose a conceptual framework to help identify factors related to the process of evaluating, selecting, adopting and diffusing a CMS. This chapter is divided into several literature areas including a discussion of course management systems, the diffusion of innovation theory, and examples of models related to change, adoption, and diffusion within a decision-making process.

Course Management Systems

Course management systems are software systems used by students to interact on-line through synchronous and asynchronous communication methods, by accessing course materials, and communicating with others (Dugas, 2005, p.11). In the mid-1990s, several university and commercial CMSs were launched either to be used fully online or as supplemental systems for traditional face-to-face instruction (Harrington, Gordan & Schibik, 2004, ¶ 4).

The popularity, as Britto (2005) proposes, is seen as a simplistic manner in which content is created and delivered online and provides the opportunity for students to communicate either asynchronously or real-time, without needing knowledge of programming and web development skills (p.70).

In addition, Sunil (1998) suggests that CMS's can be used to put text, graphics, video, and audio files onto a web site (¶ 7).

Pedagogy and Design of CMS

Many studies about CMS highlight the importance of pedagogy, design, and use. For example, Dabbagh and Schmitt (1998) examined the pedagogical re-engineering of a course designed for traditional learning and concluded that the technological components of the web-based authoring tool enabled instruction that was not previously perceived as possible in a traditional mode (p. 109). McGee, Suter, and Gurrie (2005) agree that the system determines pedagogy and interaction, and is tool driven (p. 155). In contrast, Ullman and Rabinowitz (2004) argue that university teachers approach using a CMS with a "pre-existing mental model of how to use technology and using it to reinforce traditional teaching styles" (p. 2).

Other studies indicate the design of on-line CMS's may have an effect on learning. Yip (2004) and Basile and D'Aquila (2002) point out that students are comfortable in courses that use CMS. But in contrast, Oliver (2001) believes that while a CMS helps faculty to distribute information, it does not take advantage of the Internet's ability to provide active learning (p. 49). Koszalka and Ganesan (2004) add

that course developers are provided with tools that help facilitate information sharing and communication amongst users; but that does not guarantee that the learner will meet the learning expectations (p. 245). In essence, these studies indicate that students may feel comfortable using a CMS but it may not have an effect on their learning capabilities.

Faculty Use of CMS

A few studies have been conducted to analyze the use of a CMS by faculty. Morgan (2003) addressed this by surveying 730 faculty members and instructional staff within the University of Wisconsin educational system, focusing particularly on adoption. Morgan (2003) concluded that most faculty adopt a CMS mainly for users to access content on-line (course syllabi, announcements, etc.), in hopes to help decrease the time needed to provide feedback, and to facilitate more communication between instructor and student (p.75). In 2005, a similar study was conducted by the University System of Georgia to assess how institutions in the system were using instructional technologies, particularly CMS. Research questions originally used in the Morgan (2003) study were slightly altered to reveal information directly related to faculty use of instructional technologies within the University System of Georgia. Results of this study indicated that nearly half of USG faculty were using a CMS and nearly two-thirds increased their use of a CMS over time. In addition, two-thirds of the users indicated using a CMS increased the engagement of students in their learning (Gastfriend & Finnegan, 2005). In 2006, The Campus Computing Project conducted a

national survey of information technologies in United States higher education. Results revealed a small percentage of private and public institutions were using open-source CMS. The study indicated 10.2% of private institutions had adopted Moodle, while 5.5% of public institutions and 3.9% of private institutions were using Sakai. Green (2006) adds that while open-source systems are in their infancy, more institutions would become adopters as information technologists share their experiences with others (p.3). This trend also indicates more research is needed to address concerns about what type of information is included in an institution's decisions to adopt these systems, and how these institutions arrived at their decisions to adopt an open-source system.

Additional studies related to CMS use also reveal how these systems are being used. For instance, Ansorge and Bendus (2003) and Woods, Baker, and Hopper (2004) all agree that faculty use CMS to transmit documents to students. However, additional research also indicates adoption and use may be affected by faculty concerns. For example, McQuiggan (2006) employed the Stages of Concerns (SoCO) Questionnaire (Hall, George, & Rutherford, 1998) to describe university faculty innovation concerns and perceptions that influence the adoption of a CMS. The research focused on distinguishing the adopters and non-adopters perceptions of using a CMS, based on four sets of constructs: individual characteristics, individual concerns about the CMS, individual perceptions about the CMS attributes; and individual communication channels (McQuiggan, 2006, p. 1164). The study found a significant difference between the adopters and non-adopters in that the adopters' perceptions indicated

using the CMS reflected a higher level of advantage compared to previous pedagogical practices. The study also indicated that adopters identified using a CMS as more compatible with their teaching styles, felt a sense of ease to learn and use the CMS, and exhibited a willingness to see it demonstrated and try it before using it. In contrast, the non-adopters did not use technology and felt using a CMS was incompatible with their face-to-face interaction with students (McQuiggan, 2006, p.1165).

Although these studies suggest pedagogical design and motivation may influence use, and that faculty may exhibit concerns when adopting a CMS, unfortunately there is still a void in literature to help explain the processes of evaluation, selection, adoption and diffusion. There is, however, a growing amount of literature that helps explain the adoption and diffusion of technology, including the diffusion of innovation theory (Rogers, 1995, 2003) as a theoretical framework for many research studies.

Diffusion Theory

A proliferation of literature has been generated to explain the adoption and diffusion of technology including Zaltman and Duncan's (1977) resistance/adoption model; Hall and Hord (1987) concerns-based adoption model (CBAM); and Burkman's (1987) user-oriented instructional development process. However, Roger's (1995, 2003) diffusion of innovation theory is most relevant to describing the evaluation, selection, adoption, and diffusion process, using a combined explanation

of theories including the innovation decision process and perceived attributes of an innovation.

Diffusion Research

Diffusion research can be found in various fields of study: education, sociology, public health, communication, anthropology, industrial engineering, geography, general economics, public administration and political science (see Rogers, 1995, p.42). Rogers sees this as a convergence of intellect, which comprises a cross-disciplinary approach (p.39). Everett M. Rogers has been credited as the author whose studies have led to many investigations of diffusion. Rogers credits his inquiries to Ryan and Gross's (1943, 1950) research on the diffusion of hybrid corn, featuring a qualitative analysis of the amount of time it took Iowa farmers to adopt the innovation of hybrid corn seeds. The outcome evolved into a research paradigm and research methodology that represents the present academic template of Diffusion of Innovation theory (Rogers, 1995, p.54).

Explanation of the Diffusion of Innovation Theory

Diffusion of innovation theory has been applied in many areas such as instructional technology, electronic publishing, and media literacy programs and has assisted in developing models and theories to explain the process of adoption and diffusion.

The process of diffusion involves communication between change agents to encourage the adoption of an innovation by an individual, organization, or other adoption unit through social systems. Diffusion also includes the awareness and knowledge of an innovation, and focuses on examining attitude change, decision making, and implementation of the innovation (Sutherland, 2003, ¶ 6). The real challenge is to identify and implement the correct change (Oliver, 1996, p.7).

The concept considers three main components: the innovation, the diffusion process, and adoption. The innovation is defined as "an idea, practice or object that is perceived as new, whether or not it is objectively new as measured by the lapse of time since its first use or discovery (Rogers, 2003, p.12). Diffusion is defined as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p.5). Adoption is seen as "the decision to make full use of an innovation as the best course of action available" (p. 21).

Rogers (1995) adds that newer alternatives motivate users to further investigate information about an innovation because of the uncertainty created (p.xvii). This process allows the flow of communication to continue until each party involved adopts or rejects the innovation. Rogers describes this form of acceptance or rejection as homophily or heterophily. Homophily occurs because individuals share the same interests or belong to the same groups; heterophily occurs when two or more individuals are opposite in nature. Thus, when similar individuals identify with the technology, acceptance occurs; however, heterophily (rejection) occurs when the parties are of different educational or social status and consequently do not speak the

same language (1995, p.19). Respectively, either could lead to success or failure of adoption of an innovation.

Adopter Categories

Other factors of the diffusion of innovation theory include characteristics of an innovation and adopter categories. Rogers classifies adopters of innovations into five categories: innovators, early adopters, early majority, late majority, and laggards. In relationship to technology adoption, these categories correspond to times in which users identify a technology and begin to adopt the technology. The characteristics relates to the relative advantage of the innovation and the degree to which it is perceived to be better than what it supersedes; compatibility and consistency with existing values, past experiences and needs; complexity and difficulty of understanding and use; trialability, the degree to which it can be experimented with on a limited basis; and observability, the visibility of its results (Clarke, 1999, ¶ 5).

Adopter categories portray participants as venturesome, respectable, deliberate, skeptical, and traditional. Rogers (1995) gives an example of the adopter categories as an analogy of a bell curve which begins at one extreme with some people willing to try the innovation, and ending with people who reluctantly take the time to review and accept the innovation (Rogers, 1995, p.262). This behavioral pattern is described as innovativeness, a bottom-line type of behavior in the diffusion process, as illustrated in Figure 2 (Rogers, 1995, p.262).

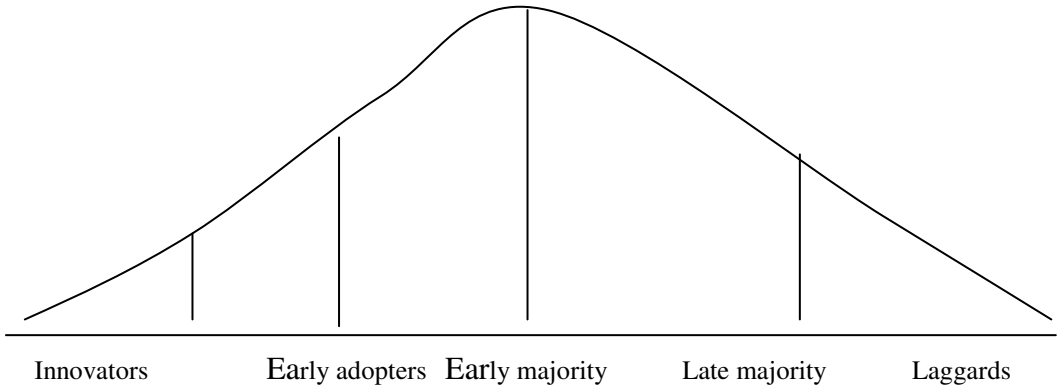

Figure 2.

Diffusion of Innovation Framework

Four main elements comprise the Diffusion of Innovation framework: (1) the innovation and perceived attributes, (2) communication channels, (3) time, and (4) a social system (Rogers, 1995, p.11). The first element, the innovation, addresses the significance of the innovation in terms of: (a) how early adopters differ from later adopters, (b) perceived attributes concerning relative advantages which affect the rate of adoption, and (c) an explanation of when adopters begin to use the innovation (Rogers, 1995, p. 12). The second element, communication channel, develops the means by which the message of the innovation gets from one individual to another. The third element, time, considers three things: (a) the innovation decision process in which individuals are introduced to the innovation and then choose to adopt or reject the innovation, (b) the early or later time in which the individual adopts an innovation, and (c) the number of individuals who adopt an innovation in a period of time. The fourth element, social system, involves a "set of interrelated units that are engaged in

joint problem-solving to accomplish a common goal" (Rogers, 1995, p. 23). This includes individuals, informal groups, organizations, and subsystems. These four elements of the Diffusion of Innovation framework (Figure 3) comprise what Rogers describes as a model of the innovation decision process.

Innovation Decision Process

The innovation decision process consists of five stages: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation, and is characterized as a process that occurs while individuals participate in a series of actions related to decisions (Rogers, 1995, p. 162). Knowledge occurs when individuals are aware of the innovation and gain understanding of its functions. Persuasion is when individuals or decision-making units exhibit favorable or unfavorable behavior toward the innovation. Decision indicates when the individual or unit decides to adopt or reject the innovation. Implementation occurs when the individual or unit decides to use the innovation. Confirmation occurs when decision makers confirm or reject their decision to adopt the innovation (Rogers, 1995, p.162). The characteristics of this model emphasize a way of seeking and processing information about an innovation and motivating individuals to possibly reduce anxieties towards adopting an innovation, thus creating a greater understanding. Rogers validated these findings based on his research on the Iowa study (Beal & Rogers, 1960), which found that respondents

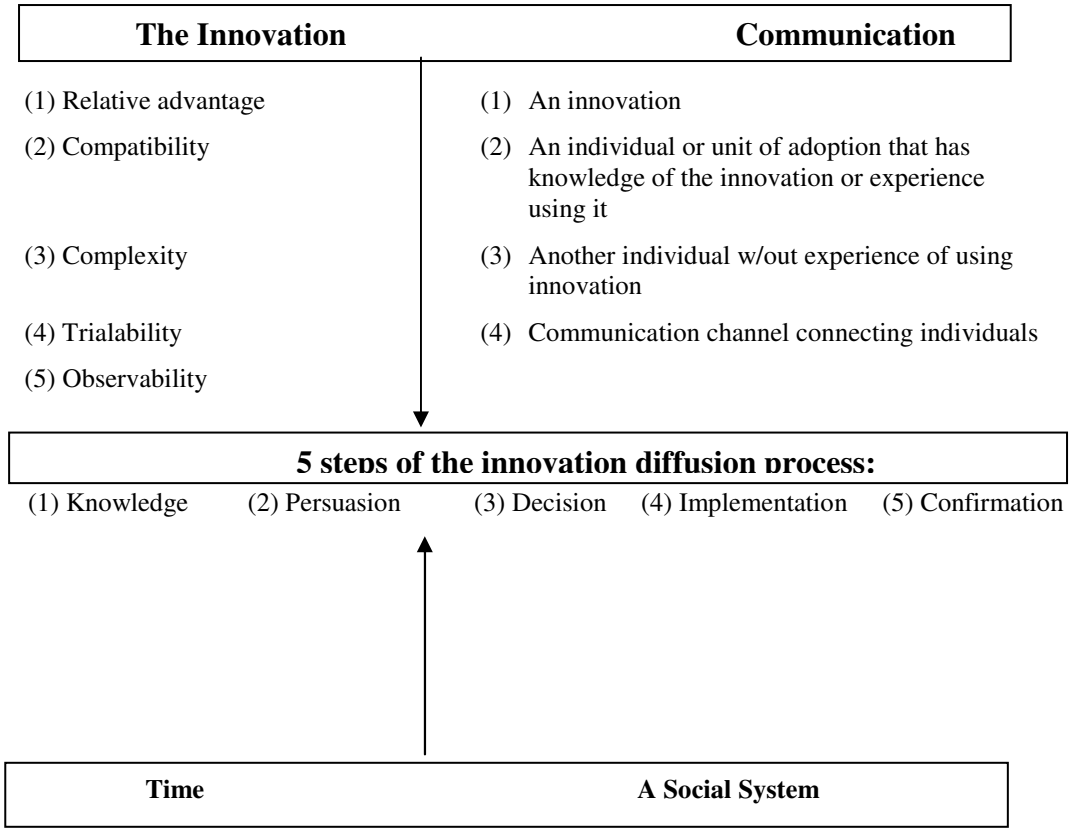

Figure 3. diffusion of innovations framework (based on Rogers, 1995).

indicated going through these stages, and also similar findings reported from other studies, e.g., Wilkening (1956), Mason (1962), and Singh and Pareek (1968).

Rogers (1995) adds that the change of strongly held attitudes usually occurs through interpersonal channels and becomes more important at the persuasion stage in order to implement change within the innovation decision process (p.203).

Models of Diffusion

Other decision-making models related to diffusion include: Zaltman and Duncan's (1977) resistance/adoption model, Hall and Hord (1987) concerns-based adoption model (CBAM), and Burkman's (1987) user-oriented instructional development process. These models stress various aspects of the adoption-diffusion process as described by Roger's. The following section will review each model and the rationale for the use of Rogers's model is offered.

Zaltman and Duncan Resistance/Adoption Model

According to Zaltman and Duncan (1977), an innovation is the "change object and change is the alteration in the structure of a system that requires or could require relearning on the part of the actors in response to the innovation" (p. 12). Like Rogers's innovative decision process, Zaltman and Duncan's resistance/adoption model include eight stages of the decision-making process: perception, motivation, attitude, legitimation, trial, evaluation, adoption/rejection, and resolution. The process begins with the introduction of the innovation and perceived needs for it by the

adopter. Motivation occurs when the individual is overcoming resistance to the innovation and changing existing habits to embrace the innovation. The attitude stage develops three components: cognitive, affective, and behavioral beliefs of the innovation, including the retention and reinforcement of beliefs throughout the decision process. Legitimation transpires when the adopter seeks reinforcement for an action being considered. Trial consists of a personal test of the innovation; evaluations point out the pros and cons of the innovation and is usually important before the adoption stage. During the adoption/rejection stage, an individual normally makes a commitment or may even reject the innovation due to satisfactory or unsatisfactory outcomes. The final stage concludes with resolution, which reduces dissonance and evaluates the change fully (Zaltman & Duncan, 1977, p. 237).

Comparison of Rogers's and Zaltman and Duncan's Models

Zaltman and Duncan's model reflects two stages similar to Rogers's, as illustrated in Figure 4.

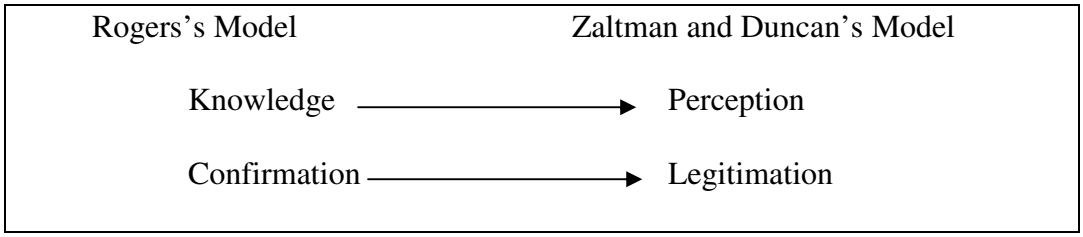

Figure 4. Comparison of Rogers's and Zaltman and Duncan's models.

Knowledge and perception indicates the need for change has been communicated and an innovation has been identified for adoption, whereas confirmation/legitimation occurs after the innovation has been evaluated and a decision has been made. The conflict in these stages suggests that motivation and attitude were not described as complete stages like Rogers's persuasion and decision, but were perceived as *feelings* by the individuals on how much control they had over how the innovation affected them. Resolution was not applicable to Rogers's framework because rather than implementation and confirmation, it seeks discontinuance, usually leading to rejecting an innovation after the innovation has been previously adopted.

Rogers's model allows an individual to advance through stages of the decision-making process based on the end result being implementation and adoption, whereas Zaltman and Duncan see the decision process ending with the choice of adopting an innovation and later rejecting it. Zaltman and Duncan's model indicates that the decision to adopt can be achieved, but as Rogers demonstrates, implementation must occur in order for the innovation to be utilized.

Concerns-Based Adoption Model

The concerns-based adoption model (CBAM) originated through research conducted at the Research and Development Center for Teacher Education at the University of Texas in Austin in the early 1970s. Specifically developed with the concerns of teachers in mind as they adopt and implement educational innovations, the

CBAM model represents an explanation of how change facilitators interact with individuals and groups to intervene in actions that affect teachers' use of new programs and practices (Hall & Hord, 1987, p.16). Three dimensions of the CBAM model are used as diagnostic tools to facilitate use of the innovations, programs, and practices: Stages of Concerns (SoC), Levels of Use (LoU), and Innovation Configurations. These dimensions represent key aspects of the change process as experienced by individuals (Hall & Hord, 1987, p.13). The first dimension, Stages of Concerns (Figure 5), involves seven different stages that range from self-type concerns, which are teacher-focused, to task-related concerns addressing logistics and scheduling in regards to the use of an innovation, to impact which represents benefits and consequences of use (p. 13). These stages include: (0) awareness,

(1) informational, (2) personal, (3) management, (4) consequences, (5) collaboration, and (6) refocusing (p.60). The first stage has little impact because no concern or involvement is indicated. It then moves to informational, which begins a general awareness and interest in the innovation, including learning more about the innovation and it's requirements for use. The personal stage indicates the individual is uncertain of demands of the innovation and has questions about his or her role in the use of the innovation while management includes issues of scheduling and organizing use and identifying available related resources. Consequence entails the outcome of use by the students and the changes involved to increase use of the innovation, and the final two stages, collaboration and refocusing, consider cooperating with others in regards to

using the innovations and exploring benefits or possible changes and replacements to improve tasks related to the innovation.

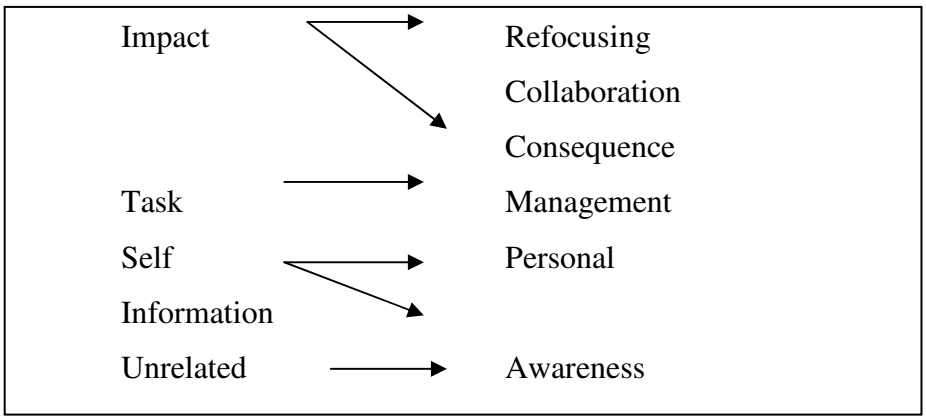

Figure 5. Stages of Concerns about the innovation (taken from Hall & Hord, 1987, p. 60)

Levels of Use

The second diagnostic tool involves Levels of Use. These levels represent a behavioral approach that indicates eight stages at which an innovation is being used: (0) nonuse, (1) orientation, (3) preparation, (4) mechanical use, (5) routine, (6) refinement, (7) integration, and (8) renewal (Hall & Hord, 1987, p.84). The purpose is to describe how the user moves from little or no knowledge of the innovation (nonuse), to introduction (orientation) preparation, mechanical use, and developing routine use. At this point, the individual has developed a full awareness of the innovation and is prepared to make changes in its use (refinement), to combine ways

of using it (integration) and to seek modification of the innovation (renewal) for increased use.

Similarities and Differences in the CBAM and Rogers's Models

The CBAM model explains how an innovation is being used by an individual and at what stage it becomes part of routine use, whereas Rogers's model emphasizes the decision-making process to implement an innovation. Both models demonstrate similar outcomes. For example, awareness and knowledge are both stages of introduction to an innovation, and informational, personal, and persuasion all indicate some form of use and influence from the change facilitator and further analysis of the innovation. Management, consequence, and decision are phases in which the individual identified the impact of the innovation by users; however, Rogers's model suggests a decision to adopt the innovation has been made rather than focusing on consequences. The final stages, collaboration and refocusing, are identical to Rogers's model (implementation and confirmation) because each indicates the innovation is being fully utilized.

Although these models indicate similarities (Figure 6), differences point to concerns related to the innovation and the decision-making process. The CBAM model lacks explanation of how an innovation is being adopted, whereas, Rogers's model demonstrates how the decision process works and possible effects of implementing an innovation. Furthermore, the CBAM model identifies an individual's behavior during a level of use of the innovation, which does not reflect the outcome of

Rogers's innovation decision process, which is to reach the decision to adopt and implement the innovation. In the end, as the CBAM model indicates, an individual may exhibit behaviors associated with a level of use during the adoption process, but not all individuals move through the adoption-diffusion status until comfortable with the innovation, thus reducing the success of the innovation diffusion process.

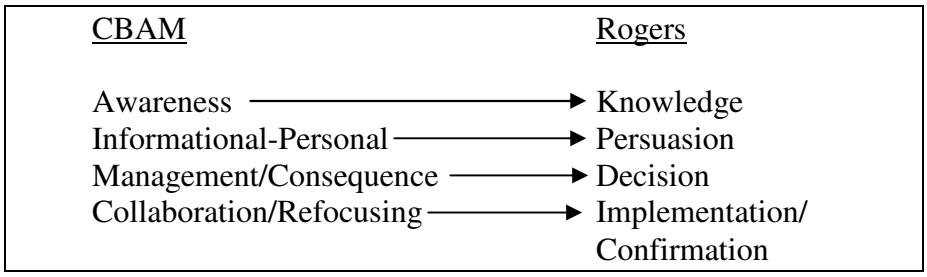

Figure 6. Similarities of CBAM and Rogers's models.

User-Oriented Development Process

Burkman (1987) reinforced Rogers's view that adopters of instructional design products go through five stages as they pass through first knowledge of a product to using it (knowledge, persuasion, decision, implementation, and confirmation). However, Burkman indicates that there are two problems related to the utilization of these products: (a) convincing individuals to adopt and properly implement instructional materials and (b) convincing organizers to adopt products and getting instructors to use them properly (p. 435). With this in mind, Burkman developed a model supporting Rogers's innovation decision process, described as the user-oriented development process. This process includes five steps: (1) identify the adopter, (2) measure the adopter's perceptions of the innovation, (3) develop a user-friendly

product, (4) inform the adopter about the innovation, and (5) provide user support (p.440). The model first identifies who will be affected by the innovation, and then measures the perception of the adopter towards the innovation, including identifying attributes that are perceived to be important. In the third step, the designer focuses on developing a product based on values considered important to the adopter, including perceived criteria that would ultimately lead to adoption. The final steps inform the adopter of the innovation's valued attributes and provides post-adoption support. Burkman adds that attributes and characteristics of the innovation (relative advantage, compatibility, complexity, trialability, and observability) are key components that help determine the perceptions of the potential adopters related to the instructional product (p.442).

Although both models are based on the innovation decision process, each model has a different agenda. First, Burkman's model was developed for instructional designers to analyze ways in which their innovations can be adopted. It is concerned with identifying strategies that would give an innovation the edge when it comes to a decision to adopt. Burkman's model is useful when utilized in the innovation decision process as a means to inform the adopter of the advantages relative to the innovation (knowledge and persuasion) but falls short of explaining how the model lends itself to the process of diffusion and implementation. In essence, Rogers's model presents a holistic picture of the innovation decision process including the end result of implementation and confirmation, whereas Burkman only considers the designer and perceived values to the adopter. And although Burkman's model exhibits

characteristics related to the innovation decision process, it falls short in explaining how the model contributes to the entire decision-making (selection), adoption, and diffusion (implementation) process.

Change Process

The concept of change is defined as "any planned or unplanned alterations in the status quo, including organizational change intended to influence an organization or larger system, an organism, situation, or process" (Lippitt, 1973, p.37). Change efforts are often used to change attitudes, change behaviors, or to change attitudes and behaviors (Zaltman & Duncan, 1977, p.26).

The three key elements in the change process involve change agents, change objects, and change target systems. Rogers (1995) defines a change agent as "an individual who influences clients' innovation-decisions in a direction deemed desirable by a change agency, usually professionals with university degrees in a technical field" (p.27). Change objects are the innovations involved, and change target systems are units which the change agent is trying to alter (Zaltman & Duncan, 1977, p.29).

Historically, educational change consisted of innovations related to the development of curricula, implementing a process, incorporating ideas, and utilizing textbooks (Hord, 1987, p.16). But over the years, it has transitioned to include technology. Once seen as part of modern classrooms and curriculums and primarily teacher-student based (Surry & Ely 2001), the educational technology change process

now consists of the stages of adoption, diffusion, implementation, and institutionalization. The following is a discussion and a comparison of models as a contributing factor to the adoption and diffusion process.

Rogers's Model as a Conceptual Framework

The models described, Zaltman and Duncan's (1977) resistance/adoption model, Hall and Hord (1987) concerns based adoption model (CBAM); and Burkman's (1987) user-oriented instructional development process, all add to the literature related to decision making and the process of diffusion. However, Rogers's framework emerged as most related to this study. The resistance/adoption model overlapped Rogers's model, providing an explanation of stages useful for the beginning and end process of decision making, but failed to offer solutions for implementation. The CBAM model delivered an explanation of stages of concerns related to adopting an innovation but was targeted mostly to teachers and their concerns for adopting an innovation. The user-oriented instructional development process contributes information about the perceptions of potential adopters, but is not directly concerned with the outcomes described in the innovation decision process.

Since this research is concerned with the evaluation, selection, adoption, and diffusion of a course management system, Rogers's framework seemed appropriate as a conceptual framework and is most relevant to the central question involved in this study: "What are the factors that guide the decisions in selection and use of a CMS within small liberal arts institutions?"

Furthermore, Rogers's innovation decision framework is a reflection of the process of decision making and the process of change, as is the case when selecting a CMS. And not only is Rogers's framework useful in helping to explain the process of selecting a CMS, but also other technological innovations, as evidenced in the models described and other studies related to the innovation decision process. Liao (2005) examines the adoption and contribution of a web-based course management system at a college campus. West, Wauddoups, and Graham (2006) describe the experiences of instructors as they are persuaded to adopt a CMS and integrate it within their teachings, and Eineke (2004) analyzes the adoption and implementation of online professional education strategies by corporations.

Summary

This chapter reviewed literature related to course management systems, the diffusion of innovation theory and relevant models associated with the development of this theory. The diffusion of innovation theory is used to explain the process of adoption and diffusion while other models such as Zaltman and Duncan's (1977) resistance/adoption model; Hall & Hord (1987) concerns-based adoption model (CBAM); and Burkman's (1987) user-oriented instructional development process all contribute to Rogers's explanation of the diffusion of innovation theory.

Rogers's model, however, reflects a clearer explanation of the evaluation, selection, adoption and diffusion of a CMS. Further research is needed, however, to

provide additional literature to help explain the evaluation, selection, adoption, and diffusion of technological innovations.

CHAPTER 3

METHODOLOGY

This study utilized the diffusion of innovation theory described by Rogers (1995/2003) as a framework to examine factors related to the process of evaluating, selecting, adopting and diffusing a course management system. This study specifically focused on participants' experiences related to the adoption and diffusion process of an innovation, specifically, a CMS.

Rationale for Methodology

This study describes the experiences of participants during the decision-making processes of evaluating, selecting, adopting and diffusing a CMS within their institutions. A qualitative case study method is specifically used as:

> a form of research undertaken on the premise that someone who is typically of a target population can be located and studied. In case studies, the individual's history within an educational setting can be traced, growth patterns over time can be shown, functioning in one or more situations can be examined, and responses to one or more treatments can be measured. (Hittleman & Simon, 2006, p. 303)

In this study, two institutions were included to examine and compare the process of evaluation, selection, adoption and diffusion of a CMS within an organization over a period of time. In addition, qualitative inquiry was used to

intertwine the relationship of the researcher and what is being studied, and highlight the meaning of the social experience being studied (Denzin & Lincoln, 2005, p.8). The data in this study encompass the description of participants while evaluating, selecting, adopting and diffusing a CMS. This approach allows the reader to hear and interpret the voices of the participants in the text (Hatch, 1995, p.128).

Research Methodology

Researchers use qualitative studies to examine actions in a natural setting and look for factors that might provide insight into those situations (Vockell & Asher, 1995, p.213). In order to describe the experiences of participants involved in the selection and adoption of a CMS, this study utilizes interviews to provide a holistic picture of the process. Merriam (1998) describes this as "an end product of a case study, which is an intensive, holistic description and analysis of a single instance, phenomenon, or social unit" (p. 27).

Research Design

This research is designed to answer the central question: What were the factors that guided the decisions in selection and use of a CMS within two small liberal arts institutions? In this study, a multiple case study approach was used. Two institutions were chosen and data from each institution were collected and analyzed separately. This approach allows data to be compared to find consistencies and inconsistencies between the cases. Overall, it provides an in-depth description from the participants'

perspectives as they reflect on their involvement and experiences of evaluating, selecting, adopting, and diffusing a CMS.

Description of Participants

To identify possible participants within two small liberal arts institutions, a phone call was made to the Director of Technology of seven institutions within the Chicagoland and Northwest Indiana surrounding areas, to explain the purpose of the study. These directors were asked to participate in the study as an administrator along with identifying other possible participants (a combination of faculty and staff members). This communication focused on two criteria: selecting faculty, staff, and administrative personnel who participated in choosing a CMS and identifying early adopters of technologies, particularly individuals who adopted the institution's selected CMS. The directors then forwarded names of possible participants and their e-mail contact information. E-mails (see Appendix A) were sent with an attachment (see Appendix B) to the suggested participants of each institution. These individuals were asked to respond to the e-mail only if they were interested in participating in the study. Two institutions each generated confirmation e-mail responses from five or more participants, while two other institutions generated three responses. The remaining three institutions generated only one or two responses. Since this study was designed to include at least six participants from each institution, five of the seven institutions with four or fewer respondents were then eliminated from participating in the study. Next, upon receiving confirmation e-mails from the institutions with six

respondents each, follow-up phone conversations were conducted to assess their availability to participate in the study. As a result, the two institutions were then selected to participate based on their availability of participants as described in the criteria.

The participants were selected using a purposive sampling procedure, which allows researchers' to choose whoever is available, and use judgment when selecting a sample based on prior information (Fraenkel & Wallen, 2000, p.114).

Following this recommendation, two small private liberal arts institutions located in the Midwest with comparable enrollment ranging from 2,000 to 4,000 students were selected to participate. These institutions were chosen based on proximity (within the Chicagoland and Northwest Indiana areas), similarity (private institutions), and type of student body (primarily an undergraduate campus with a small number of commuters). In addition, the participants of these institutions qualified for this study based on their direct participation in choosing their institution's course management system.

University #1 was founded in 1859 as a Lutheran institution. At the time of the study, University #1 had a current student body of nearly 4,000 students who came from most states in the nation and more than 40 countries around the globe. They pursued majors in more than 70 fields of study in five colleges, a graduate division and a law school.

University #2, founded in 1837 by the Methodist Church, is a private, selective, coeducational, residential campus with approximately 2,400 students, at the

time of the stud, and a faculty-to-student ratio of 10:1. The institution offers over 40 undergraduate Bachelor of Arts degree majors in the arts, humanities, sciences and social sciences. In addition, three degree options are offered within the School of Music.

Six participants from each institution were selected from the categories of faculty, staff, and administration. Selected participants were chosen to provide different perspectives based on their direct experiences with evaluation, selection, adoption, and diffusion of their current CMS. Each participant was asked to describe their roles and experiences during the evaluation, selection, adoption and diffusion processes of their institution's CMS.

The faculty members from University #1 are referred to as Jim and Nancy. Jim was a tenured chair of his department, as was the case with Nancy. Staff members are referred to as Ruth, Janice, and Bob. Ruth was a full-time staff member and adjunct faculty in English. Janice was a technology support person, and Bob was a network administrator. The administrator, referred to as Al, was the Director of Technology.

University #2 faculty members are referred to as Dan and Judy. Dan was a tenured faculty in Biology and Judy split her responsibilities as a faculty member, and Coordinator of Technology in Music. The staff members are referred to as Ron, Cathy, and Cynthia. Ron was formerly a technology specialist and Blackboard coordinator, and has moved on to another institution; Cynthia moved into that position. Cathy was the Associate Chief Information Officer of the Technology Division. The administrator, referred to as David, was the Director of Technology.

Data Collection, Procedures, and Sources

To address ethical issues, all participants were informed of the intent of this study through a written consent form (Appendix C). Participants were also assured of their confidentiality upon written confirmation. After receiving the signed consent forms (Appendix C), phone and face-to-face interviews were arranged and conducted over a three-month period. Documents from University #1 (i.e., request for proposal cover letter and request for proposal) (Appendix E) were gathered as secondary sources and used to develop questions for interviews, particularly related to their experiences of evaluating the CMS. A survey (Appendix F) was collected from University #2 and included in the discussion and recommendations in Chapter Five to address how University #2 planned to evaluate and upgrade or discontinue their existing CMS.

Data Analysis

To ensure the consistency and validity of collected data, this study utilized a technique Miles and Huberman (1994) describe as a cross-case comparison. A cross-case comparison is done by forming types of groups and analyzing cases within those groups to seek common patterns or configurations (Miles & Huberman, 1994, p.174). First, a single analysis of each case was conducted, and then all data were compared from the selected cases. This approach is recommended to increase generalizability, to discover processes and outcomes across many cases, to interpret how each case is significant to the study, and to develop more detailed descriptions and explanations

(Miles & Huberman, 1994, p.172). This study also utilized a method called triangulation. Triangulation involves assessing printed documents, interviews, and observations as qualitative data to confirm findings (Lancy, 1993, p.20). Triangulation helps to minimize problems with internal validity (Merriam, 1998, p.204). Validity refers to the authenticity or truthfulness of the data (Neuman, 2003, p.185).

In this study, multiple data sources were used to triangulate findings. For example, the RFP (Appendix E) developed by University #1 was used to ask participants of University #1 specific questions concerning their experiences during the evaluation processes. The RFP also helped to generate responses from participant interviews related to the selection processes. In addition, member checks were conducted to establish credibility. Member checks involve describing the outcome of data with participants to clarify findings. This is done to enhance the validity and authenticity of data. Member checks were incorporated by first reading over the data collected from each participant at University #1 and University #2 and picking out key information such as dates and incidents emerging from the data. To verify dates and clarify experiences as described within the data, a follow-up phone interview was conducted with all participants.

Organization of Data

A handheld audio recording device was used to record the interviews. These interviews were then downloaded into a voice-editing software program and exported as an audio Wave format file. The voice-editing program then allows the user to

designate folders to organize and place audio files within their respective folder. In order to organize the Wave files, these files were given participants' names and placed into their respective faculty, staff, and administration folders. These interviews were transcribed using HyperTranscribe, a computer-assisted qualitative transcription program by ResearchWare. I chose this software program because it facilitates the use of various forms of media files such as AVI, WAVE, MPEG, and QuickTime video formats to manually transcribe into RTF (rich text files) and documents. This program was particularly useful because of its visual coding feature, which highlights re-occurring words and phrases so that the user can identify patterns and place them into categories and themes.

After transcribing the interviews, a coding framework was generated according to the research question and subquestions: What are the factors that guide the decisions in selection and use of a CMS within two small liberal arts institutions?

1. What were the issues leading to the need for a CMS?
2. What kinds of procedures were used in the evaluation process?
3. What were the roles of the administration, staff, and faculty in the evaluation and selection processes?
4. How was the CMS selected by the organization?
5. How is the CMS being used in the organization?

The subquestions were used to guide the study and provide a thick description of the experiences of participants using data collected concerning issues, procedures, roles, and description of how the CMS was selected and used within each institution.

The coding framework included the following headings: evaluation, selection, adoption and diffusion. This was done to identify and classify themes that emerged within each part of the framework.

Coding

The next step incorporated a system called "coding" used to render and organize information about people, places, or events in a case setting (Creswell, 2003, p. 193). The coding process used the code and retrieve function found in the HyperResearch Qualitative Data Analysis Software (QDAS). This software is useful for separating text into segments or chunks, attaching codes to the chunks, and finding and displaying all chunks with a given code and placing common themes into similar categories.

First, the transcribed data from each category (faculty, staff, and administration) were assigned the coding framework of elements: evaluation, selection, adoption, and diffusion.

The data collected within each coding framework element was then analyzed to search for keywords used as themes (Appendix G) throughout each case.

Analysis of Coded Data

After reviewing codes generated from the CAQDAS program, the transcribed data were reviewed a second time to incorporate a process called inductive analysis, highlighting patterns, themes, and categories (Patton, 2002, p.453). The themes

(Appendix G) emerging from each category of participants (Faculty, Staff and Administration) were placed in each corresponding framework of elements (Evaluation, Selection, Adoption, and Diffusion). Next, a comparative approach was used for a cross-case comparison of data from participants in both institutions. To do this, each category (Faculty, Staff, and Administration) in the framework of elements was analyzed separately and then compared across each case. For example, data from University #1 under the Faculty heading (evaluation, selection, adoption and diffusion) was compared to the data from University #2 under the same heading. The data were then analyzed to search for different descriptions in experiences and common themes, particularly during each phase (evaluation, selection, adoption, and diffusion). This was done to describe the differences and similarities found between data sets and provide a thick description of the cases involved. Next, participant narratives from each category (Faculty, Staff, and Administration) were placed in reference to the subquestions and then presented in a descriptive narrative (Chapter Four).

Summary

This chapter covered the methodology of this study, research design, and the collection, analysis, and organization of data. Chapter Four provides a description and analysis of data, generated from the framework of elements.

CHAPTER 4

FINDINGS OF THE STUDY

This chapter discusses the findings within this study. The data were organized using a framework of four main elements: evaluation, selection, adoption, and diffusion. The study included six participants each from two institutions (two faculty members, three staff members, and one administrator). The findings are presented within the four main elements. Each element presents findings from the participant's perspective, guided by the research question and organized by subquestions.

Research Question

What are the factors that guide the decisions in selection and use of a CMS within two small liberal arts institutions?

Following Miles and Hubermann's (1994) suggestion, the findings from each case are discussed separately, followed by a cross-case comparison discussion of findings.

Part I: University #1

Evaluation

Each of the individual groups (Administration, Staff and Faculty) will be discussed separately after each research subquestion. In addition, a summary of each framework element (evaluation, selection, adoption and diffusion) will conclude the discussion of each sub-question.

What Were the Issues Leading to the Need for a CMS?

In the early 1990s, University #1 focused its commitment to education on face-to-face communication. The first form of an on-line communication tool incorporated the use of a server and web browsers such as Netscape and Internet Explorer to place files on the Internet. Participants of University #1 indicated that the institution did not support these tools because University #1 at that time focused on delivering courses via face-to-face.

While attending a conference, Nancy, a department chair in Education, was introduced to the concept of a CMS. With an interest to utilize technology to improve her pedagogical practices, Nancy introduced the concept to others, which led to the development of a small group of faculty interested in using technology in their courses. In 1999, one of the faculty members received a grant to purchase the first adopted system, TopClass, designed by WBT Systems. Not many of the faculty community in University #1 adopted TopClass, and there was very little effort to

support, manage, or coordinate workshops on how to use the system. The institution recognized this and eventually developed a committee to evaluate, select, and recommend a new system to serve the needs of the faculty and the institution. Also, a cover letter and a request for proposals (RFP) (Appendix E[1]) were sent out to vendors in the spring of 2000 to announce the institution's intentions to purchase a new system. That process led to the adoption of Prometheus, developed by faculty members of George Washington University.

An e-mail (Appendix D) was sent to faculty to announce the adoption of Prometheus in February of 2001. But in 2002, Blackboard acquired Prometheus and the institution again chose to select a new CMS, which led to developing a second RFP (Appendix E). The institution eventually settled on Blackboard and began placing all courses offered by the institution on Blackboard. Faculty then had the choice of using Blackboard either to develop a full on-line course or as a supplement to face-to-face instruction. In addition, to move beyond traditional face-to-face instruction, the university offered additional financial incentives during the summer, a time in which most faculty members have more time to dedicate to develop on-line courses. The goal was to then offer the on-line course in the upcoming academic year.

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[1] There were two RFPs sent to vendors. The first was created in 2000, and the second in 2002. Both RFPs contained the same information, the 2002 RFP was slightly modified with updated information.

What Were the Roles of the Administration, Staff, and Faculty in the Evaluation and Selection Processes?

Administration. When University #1 decided to transition from TopClass into another CMS, Al, the head of the Technology Department, was given a directive from the provost's office to evaluate a new system. Al was the only administrative staff member to participate in the evaluation process. Al commented that during the first evaluation process, both Prometheus and Blackboard were evaluated, with Prometheus being selected as the new CMS.

> In the fall of 1999, the provost's office appointed a task force to see what CMS we should have here. But there were a number of people weighted to the faculty, not administration, on the task force. It is my feeling that when we select a system we should see what is viable for the institution. You look at it like a marriage, a long-term investment with a lot of faculty putting effort into it. There were concerns with support, networks, servers, etc. We went through that process and it was interesting that one vendor, Prometheus, seemed to meet the needs of the faculty because they were a faculty-oriented vendor.

However, University #1 was notified by Blackboard concerning the takeover of Prometheus, which made some faculty members unhappy. Thus, another evaluation and selection process began.

> When Blackboard took over, people were not happy. They liked Prometheus, and you knew they were going to drop Prometheus. It was introduced through an e-mail that they [Blackboard] were going to take over. We began looking at open-source systems like MIT that was free but you had to have support, and there were things missing like a grade book and faculty were not willing to give up that pedagogical feature. Practically immediately we decided to do the RFP over again….One of the things the committee did was to have a study group that was instrumental in re-issuing the RFP. But the evaluation was more intensive and some who submitted responses lost advantages over time.

> It was a very similar process. One of the things asked for was the ability for conversion from Prometheus to the new system. We dealt with that issue as aggressively and effectively as possible.

Staff. Bob, a staff member of University #1 Technology Department, played a small role in the evaluation process. He reflected upon his role: "I was part of technical support and in charge of fielding questions from the committee concerning technical issues and requirements."

Janice, also a staff member of University #1 Technology Department, participated on the committee because her job responsibilities called for a user support person to train faculty, staff, and students to use software. Janice had no prior experience with a CMS and trained herself to use TopClass. Janice described her role in the evaluation process as an end-user and described the software as user-friendly:

> We all had an equal say and everyone had their own specialty area. It was a mixture of interests, and we looked at the technical end of how we were going to serve everyone. I was looking at the back end on how to present this to faculty and how user-friendly it was to get it on board.

Faculty. Jim, a faculty member and chair of his department, considered the evaluation process for Prometheus as a group-oriented *task,* not a process. Jim explained his role in the evaluation process:

> I saw my role as two-fold. I had a course running and if we had to change software, I wanted the best one that would accomplish the objectives and be easy to use. Second, I was a committee person as an early adopter. But at the same time I knew the university was not buying it for me, they were buying it for all of the faculty.

Nancy, also a faculty member and chair of her department, was one of the first to initiate discussions concerning CMS. Nancy described her role in the evaluation process:

> I was a leader at first but a behind-the-scenes leader because I was aware of how many people on campus would use it and connect with our classes. The thing I was concerned with was what pedagogical things could it do to help me as a faculty member that I wanted to accomplish?

Ruth taught a course for the English Department and described her participation in the evaluation process as a "volunteer" on the committee for the Prometheus evaluation process.

> I volunteered on the committee, and I was interested in it. At that point I was teaching a course for the English Department and I thought it would be nice to have some say on the CMS since the previous CMS was unsatisfactory and chosen by others. Because my job involved working with software as it relates to teaching, it seemed like a good thing to be on the committee.

Ruth described the evaluation procedures as a long, yet dedicated process:

> I remember it was a long and torturous process and I was not prepared doing this type of research. I had not been in any group where people work out any request for proposals. I thought you chose some company that other institutions used and you send out an RFP, but I did not realize how complex the RFP had to be. I realized it was a much bigger task than I had anticipated. I was impressed with how dedicated the members were, particularly faculty members. It surprised me how they took an interest in some of the things we were looking for.

Summary

Each participant played a critical role in the evaluation process. For example, Jim, Nancy, and Ruth all provided a faculty perspective and their personal experiences of using Prometheus and Blackboard. Jim was concerned with how easy the system was to use, while Nancy focused on pedagogical features. Bob and Al both offered technical and administrative support. Janice, however, viewed the experience as an end-user and wanted the system to be user-friendly. Overall, each participant's unique contributions played an important role in the evaluation process.

What Kinds of Procedures Were Used in the Evaluation Process?

Administration. Al, the administrator, discussed some of the procedures used to evaluate each system:

> The faculty took the first initiative. They prepared an RFP for course managment systems. We looked at a lot of sources and compared the major systems. We looked at features within the CMS and put together an RFP and posted it on the web. Four or five revisions were done before it was issued about a year later because we wanted to be sure all needs were reflected and the proper people had input. It was a very collaborative effort to put together the RFP and evaluate the responses.

Staff. Bob, a staff member, became a member of the committee through job-related responsibilities as one of the university's web masters and web administrators. Bob had previous experience with placing the prior system (TopClass) on the server and participated in evaluating the technical requirements and support issues for the new CMS. Bob recalled the process as overwhelming, yet needed:

> The RFP was edited and sent out to about 9-10 vendors. TopClass, WebCT, Prometheus, and Blackboard were key players. We had to look at system requirements and see if we had to upgrade, what hard drive space was needed, and also, we evaluated if we could integrate mail into the system, and was there a calendar integrated into the system.

Bob described the second evaluation process, which led to selecting Blackboard, as being easier because the previous RFP provided a blueprint to start the evaluation process. Bob indicated the process took less time:

> The RFP was not a new process. We took the old one and tweaked it based on new technology concerns. We sent out the RFP based on a deadline, and we would see what's available and check out other schools to see what's out there. We ended up evaluating Blackboard because the transition process was easy, the professors liked it, and it met systems requirements, etc. My plan was the same, but I had thoughts of here we go again, but it was necessary. With Prometheus we got more people on line and with Blackboard we could get to the next level. In addition, we knew that Blackboard ran Prometheus for about a year before our RFP went out.

Faculty. Jim was the chair of his department. Jim described the evaluation task that led to Prometheus as fairly easy:

> They [the university] wanted us to evaluate and pick the one that was most promising, so we had a meeting where we chose websites and looked at information about each vendor's CMS. Then the university asked these vendors if they were interested in picking us up as a client. Next, they sent out these questions called an RFP and each had to respond and answer all the questions the administration and faculty had about their CMS. We then met with the vendors and looked at the products, asked them questions and tried to load our content onto their systems to see how it worked. It was a unique and thorough process and we knew that it was going to be expensive.

Jim considered the Blackboard evaluation process as easier, having previously participated in the Prometheus process.

> In order for the venders to answer questions, people in the room had to be people who could ask the questions. At that stage, the university used a committee of people who were experienced because others would have been lost.

Nancy, a tenured faculty member in the Department of Education, became part of the committee because of her personal interest in teaching with technology and being challenged to look for ways to incorporate technology in classes. When describing the evaluation process of the first CMS (Prometheus), Nancy indicated:

> I thought it was a great process because we had an awful lot of research with books, and then we had to rate these by spreadsheets, 250 pages of components we had to look at and then the data was presented to the group. It was a lot of work and I felt good about the work put into it. Many sections I could not understand because they were technical issues I had no idea about and I was not concerned with.

Summary

Similar procedures were used to evaluate both Prometheus and Blackboard. An RFP was generated to solicit vendor responses in both evaluation periods, and Al, an administrator, considered the RFP an integral document used in the evaluation procedures. Jim and Nancy, both faculty members, indicated each evaluation process appeared easy. In addition, as Bob recalled, in order to evaluate each system, costs had to be considered.

Selection

How Was the CMS Selected by the Organization?

Administration. Al represented University #1 as the administrator, Bob participated as a staff member, and both Jim and Nancy participated as faculty members. Al, the head of the Technology Department, viewed selecting Prometheus as a clear process:

> Blackboard was offering several options for five thousand dollars a year, but it was light; Prometheus was twenty-five thousand dollars, and the faculty was sold on Prometheus. Blackboard offered options that were higher prices like thirty thousand dollars, so on the surface Prometheus looked good. The faculty liked Prometheus, in part because it was designed by faculty.
>
> However, the institution expressed more caution when selecting Blackboard. Most were familiar with the selection process and being a year and half before, so there weren't many changes except the things faculty recommended. The committee did not want to just go with Blackboard, but they were in agreement. I then passed the decision along to the Teaching and Learning Technology roundtable, the provost's office, and the finance office.

Staff. As the system administrator, Bob indicated that the decision to select Prometheus leaned heavily on initiatives such as cost and technical support:

> It was a top-down selection and we had some initiatives to select from such as cost and compatibility. The final selection of Prometheus technically dealt with compatibility with upgrading easily and backing up the system.

When the sale of Prometheus was completed, Bob recalled the differences in communication patterns, which affected the decision to select Blackboard:

> There was quite a bit of difference in support, such as contacting one person when it was Prometheus, but now Blackboard has a bigger staff and you have to go through a couple of people to get things done. Now the problem is that the technical support people go through a revolving door and as soon as we get comfortable, someone leaves. I pretty much dealt with the same Prometheus people the entire time.

Bob was also concerned with how easily the CMS could be rolled out. The other concerns were costs and support, how expensive it would be to maintain a system, including how many extra employees would need to be hired and would there be continuous support by the company.

Faculty. The selection process for Prometheus was slightly different from Blackboard. Jim, a department chair, indicated that the Prometheus selection was more of a process:

> We all got to vote in the end, and asked which one did you want? We all concluded our choices and Prometheus was the outstanding one, with pro/cons. The technology Department was looking at support, the university was looking at costs, and we were looking at faculty issues such as would it help us to teach easier.

The Blackboard process became easier because of the experiences learned from the previous process.

> As I became more familiar with the process, and began to talk with the vendors, I learned more about CMS's. So I started improving my own ability to look for important things that I knew would affect me and I had a big interest in this. We all did because whatever system we chose, if there were reservations any of us had, we needed to get this in the open and needed to hear the answer from vendors.

Nancy, a tenured faculty chair in the Department of Education, indicated her experience with the Prometheus selection process was time consuming and positive:

> This was an institution-wide decision now and they wanted more faculty to get involved using a CMS. It was a long process if you did not like attending meetings, but my voice was heard because I had a vote. A pretty positive selection process because faculty were the ones to use it. I think voting was done separately through spreadsheets and it became a consensus.

Blackboard presented a few problems during selection process, but the procedures were similar. Nancy indicated that the experience of working with the committee was exhaustive and tiresome, yet pleasant: "It was another long process but we had to make the decision on Blackboard."

Analysis of the Evaluation and Selection Process

University #1 had the opportunity to select a new CMS twice within a two-year period. That led to a rigorous process of evaluating and selecting a second and then a third system. Faculty committee members described the second process as easier, having previously selected another system, while the staff and administrators viewed the process as a "process" but also added that revising the RFP helped make the process easier each time. Bob suggested that one of the deciding factors leaned toward the costs of each system. Jim suggested most of the committee members were comfortable with the pedagogical features each system had to offer. Overall, each participant felt comfortable contributing to both evaluation and selection processes

because they were able to work with practically the same committee and had gone through the same process previously.

Adoption and Diffusion

How is the CMS Being Used in the Organization?

Administration. Al participated in the adoption and diffusion processes as the administrator while Janice participated as a staff member. Jim and Nancy both participated as faculty members. Al, the administrator of the Technology Department, discussed how the university community began to adopt Blackboard:

> We had a fair number of faculty members who adopted Prometheus. The major thing that helped adoption was incentives from provost's office such as on-line course development, and then you get a mass of people using it and students begin asking other instructors why don't they use this and one faculty mentors the other, so it spreads faster.

Al, the head of the Technology Department, suggested the diffusion process was not as difficult as anticipated: "As far as the faculty was concerned it was doing well and we thought they had shortcomings that could be fixed."

Staff. Janice, a Technology Department staff member, described the adoption process of Blackboard as challenging because many of the faculty exhibited caution to moving to another CMS after using Prometheus:

> To get them on board with a second software was not easy. Some did not want to learn because they were concerned if this was bought out, they did not want to learn new software.

Bob recalled the adoption and diffusion processes of Prometheus created a sense of fear amongst faculty members. However, the Blackboard processes were an easier transition because of the previous experience with Prometheus.

> One of the issues was that the utility was not in place to move TopClass to Prometheus, so that was an anxiety the professors experienced. It was messy and was not easy to do. We walked on eggshells for a while. However, the training helped us to move people from each system. With Blackboard, it was easier because we had tools to transfer courses, the installation was easier…same system requirements, ease of use, and transitioning courses. Blackboard was installed within 3 days, which is normally a two-week process.

Bob commented that the support provided by Blackboard made it difficult to create strategies for diffusion when compared to the Prometheus process:

> George Washington University still wanted to run Blackboard after the acquisition, but our contacts were severed with George Washington and went to Blackboard. There was quite a bit of difference in support.

Janice, a user support staff personnel, recalled the diffusion of Blackboard was a cautious move and created some hesitation amongst faculty to adopt Blackboard:

> I'm used to software being bought out and phased out frequently, but faculty was not used to this. To get them on board with Blackboard was not easy. Some did not want to learn because they were concerned if this was bought out, they did not want to learn new software.

To adjust, Janice created a "team" of heavy users and encouraged them to showcase their courses to others in order to influence adoption. In addition, the administration offered gift certificates to participants who attended the workshops, and stipends were provided as an incentive to design summer courses on-line.

> My job was to figure out how to stay on-line with summer courses and retrain faculty that had been using Prometheus, plus add more faculty. I ended up going to my hard hitters, my big "8" users who used it well…The big "8" represented all five colleges, and it was a mentor for each building on the campus. I taught the big "8" first and asked them to evaluate my instructions because it helped me write instruction better. They got their courses up first, I then opened instructions to others, and asked them [the big "8"] to come in one by one to be a guest speaker so they could share their course with other faculty that were being trained, it was a win-win for everyone. The institution also provided stipends to create courses on-line, offered training sessions with a 25-dollar certificate for participating, and provided lunch during training sessions.

Faculty. Jim, as a department chair, approached the Prometheus adoption phase with caution:

> I remember I was nervous because I run into problems and would have to ask the Prometheus support center what to do and I would have to create work around this. There were periods where Prometheus would collapse and I had to go back to using the university web server. That's why I kept files in the old-fashion way.

Jim explained that adopting Blackboard was an easier process, with very little caution.

> In some ways I have more control in Blackboard. I did not have any issues with Blackboard and could do it in my sleep. But you have to watch out for when you want things to appear.

The experience of adopting both Prometheus and Blackboard was different for Nancy as a chair of the Department of Education. As one of the early adopters, Nancy became a trainer, thus she experienced the adoption process from a trainer's perspective rather than an adopter.

> I had a different view of the adoption process. The university had training sessions but there was reluctance amongst faculty to attend. I was one of the trainers. The workshops were held in the summer and tailored to the users.

Jim also participated in the adoption and diffusion processes as a trainer.

> I don't think it was mandatory but we had workshops to learn. They were sign-up workshops if you were interested and when a few of us became more knowledgeable, they asked us to demonstrate the courses.

Summary of the Adoption and Diffusion Process

Al saw the adoption and diffusion processes as uneventful. Unfortunately, Bob and Janice described the processes differently. Bob had some difficulty contacting Blackboard personnel, and Janice felt the faculty exhibited a lot of caution to move from one system to another. Also, Jim approached adopting Prometheus with caution but felt comfortable with Blackboard, having gained more experience using a CMS. Workshops and incentives were not a part of the Prometheus process; however, offering incentives to attend workshops helped the adoption and diffusion of Blackboard. Fortunately, it was helpful for both Jim and Nancy to wear two hats as a trainer and a user, in order to influence others to use the system. Nevertheless, all participants learned from their experiences adopting Prometheus and approached adopting Blackboard with less caution.

Part II: University #2

Each research subquestion will be analyzed separately. Each coding framework will be discussed separately, including an analysis of data from each participant.

Evaluation

Issues Leading to the Need for a CMS

The first on-line CMS system was a class discussion tool called Discus, designed as a means for faculty and students to communicate on-line. Approximately 35 faculty members adopted the system. As these faculty members became more sophisticated with on-line discussions, some expressed their frustration with wanting to do more using technology. Ironically, while attending a conference, Ron, a former employee of the Technology Department, was introduced to other CMSs and began learning a system called Web Course in a Box. He used that CMS to design a Spanish course on-line.

> In 1997, I went out to Arizona State University as an intern in the Scope Program and helped them use a tool called Web Course in a Box. I built a web base page to train them and after I returned to campus, we had a request to develop a Spanish course, so I did it with Web Course in a Box. My experience led to researching CMS's to see what other schools were doing.

Judy, a faculty member in Music and a staff member in the Technology Department, recalled Discus as a discussion tool, which eventually outgrew its usefulness, and created problems for faculty to deliver documents to students.

> We found it [Discus] was not adequate to help faculty to push out documents and collect them. I remember not using it because it was a limited systems and hard for people to use.

Dan, a faculty member in Biology, had been using Discus and was now looking to enhance discussions in his course:

> The goal was to use biology in different applications of science. The technology center was a place where faculty could go and accomplish pedagogical things with new technology and there were people who were pushing you to what you wanted to do and developing ways to accomplish it.

More faculty members had similar interests, so as a result, the Technology Department began looking at what other institutions were using. In 1998, a grant was allocated to begin a yearlong process to evaluate and select a system. WebCT, E-College, and Blackboard were chosen as three of the leading vendors to evaluate.

After evaluating several systems, the institution adopted Blackboard as a pilot CMS. The Technology Department acknowledged that some faculty members had some experience using a CMS but had little time to design courses. Thus, the Technology Department instituted an effort to connect the faculty who were using discussion tools with the faculty who were interested in creating a full on-line course. The experience was unique because the university had established a relationship with colleagues from another liberal arts institution that had adopted Blackboard and had a

number of people using the system. That institution collaborated with University #2 by providing Ron, a former employee of the Technology Department of University #2, an account and administrative access to their system during their evaluation period. A year later, the university adopted Blackboard as the institution's CMS.

What Were the Roles of the Administration, Staff, and Faculty in the Evaluation and Selection Processes?

Administration. The process began similar to that of University #1, and David, the head of the Technology Department, described how the institution engaged in the evaluation and selection process:

> There was an RFP that included not a very detailed proposal but it talked about our educational aspirations and looking for a CMS that will help instructors accomplish XYZ and not specify things like servers. We focused on pedagogy and presented the RFP from an instructional standpoint rather than a technical standpoint.

David, the only administrator of University #2 to participate in the study, and the head of the Technology Department, saw his role as one of the initiators to bring a CMS to campus:

> I had the opportunity to see all of the CMSs (WebCT, Blackboard, etc.) prior to the evaluation process and came to the table with the philosophy that the web was an important resource for instructors. We initially did a one-month pilot in the winter term with Blackboard, but it turned out to be a disaster because it could not connect to our campus and we decided to buy a test server, so we tried it again in the spring.

Staff. Ron, a former employee of the Technology Department, recalled his role during the evaluation period. Ron first networked with other liberal arts institutions to see what they were using and then began setting up Blackboard as a pilot CMS on the University #2 system and also on the system of another liberal arts institution. "We first set up Blackboard and conducted workshops, and at the same time, we created 15 test courses on another institution's system to let the faculty evaluate."

Faculty. Dan, a faculty member in Biology, had consistently networked with the Technology Department to discuss ways in which he could use technology in his courses. Dan recalled:

> I brought to the Technology Department what I wanted to accomplish. I asked if there was a product that would allow me to accomplish different tasks. I was looking for a means of improving teaching in Biology.

What Kinds of Procedures Were Used in the Evaluation Process?

Administration. David, the head of the Technology Department, participated in the evaluation process as an administrator. Ron was not included as a staff member; however, Cathy did participate because of her job description. Judy was the only faculty participant. David, the head of the Technology Department, described the process as challenging because of issues related to support:

> It was about a year-long process in which we had faculty members coming in to get a feel of the features provided and how effective the tools would be. One of the key issues we were unhappy with was the support and reliability of Blackboard.

> We felt strongly about adopting a system that was reliable and that could be quickly fixed because you could not afford to lose time in class.

Staff. Cathy, a member of the Technology Department, described how the process incorporated the input of faculty:

> We found a few faculty members whom we partnered with to evaluate Web Course in a Box, and it was a learning experience with the 3-4 faculty people. We found that it was a really young tool and it was not very useful, so Blackboard became prominent.

Judy remembered the Blackboard representatives were aggressive in their presentations, and emphasized that the Technology Department leaned favorably to Blackboard:

> I remember that Blackboard was being aggressive about getting colleges and I remember them [the Technology Department] being very favorable about the Blackboard presentation, and economically it was more feasible, as it seemed to serve the different needs in its basic version at the time.

Faculty. When reflecting on the responsibilities of being a combined faculty and technology person, Judy recalled looking at the process in a reverse role:

> I actually think I did it in the reverse; we talked to faculty of what they needed, it was all about what they wanted to do in their classroom, so my perspective was different because it was pedagogical such as remembering some people wanted images or other needs and how well it was going to fit with faculty.

Judy also recalled attending a presentation by a colleague, which helped her to evaluate Blackboard:

> I remember that a colleague from another liberal arts institution came to campus to talk about Blackboard. I remember her presentations and that she linked functions of Blackboard with instructional philosophy, like content presentation, and it was a pedagogically oriented presentation. It told me that Blackboard was thinking pedagogically as well as technically and it was appealing to me.

Selection

How Was the CMS Selected by the Organization?

David, an administrator, and Cathy, a staff member, were the only participants in the selection process. David discussed how Blackboard was selected and funded:

> The university is fortunate with financial resources because the information resources group had money from year to year to spend. This included finding out what faculty needed, so it was not a president or provost decision, it was from a discretionary budget. We selected Blackboard because they looked liked they were going to be around. It was not a cost issue because we brought into the low level of Blackboard.

Staff. Cathy, a member of the Technology Department, reminisced about how the final selection was made:

> We looked deeper and the price was right and we thought it was going to be useful and at that point we enlisted several faculty members and identified Blackboard as the replacement for Discus.

Summary of the Evaluation and Selection Process

The evaluation and selection process was slightly different for University #2. Faculty members became interested in using a CMS, which led to bringing vendors on

campus to present their systems to the institution. Faculty were also invited to workshops to test Blackboard and discuss their evaluation of the system. In addition, the evaluation process was ongoing as Blackboard was tested for a year.

Adoption and Diffusion

How Is the CMS Being Used in the Organization?

Administration. David, the head of the Technology Department, participated in the adoption process as both an administrator and faculty member. David discussed from an administrative standpoint, some of the problems encountered in adopting the system:

> Support was an issue because it took a lot of time to contact someone when the system was down. I learned a single point of contact was the way to go, so I assigned a centralized help desk, and they knew who to call to solve the problem.

In addition, David also taught a History course, and described how other faculty members embraced adopting the Blackboard system:

> I was one of the faculty members talking about what I was doing with History courses. When the instructors saw what I was doing, others seemed to follow, or a professor would talk about what they would be doing. For example, one English professor used to be a lecturer and now Blackboard allowed him to bring the class into discussions to expand the way he taught and it allowed students to come to class better prepared.

Staff. Ron was involved in the adoption process before leaving the institution. He recalled how the faculty began to adopt Blackboard:

> Most faculty jumped on wholeheartedly, and others did not want to change, so we took extra time with them to explain things. The growing student workers helped them by explaining how to put syllabus, chat, etc., onto Blackboard.

Cynthia became involved after taking over Ron's position. She recalled the process used to entice faculty to adopt Blackboard:

> From a faculty perspective we got it up and going and targeted the people who were using Discus in the early first semester and came back in the fall and phased out Discus. We did not migrate a lot of faculty until we got the Discus people over and made a cheat sheet to go along with the training to help them move along and then once we had them rolling we started a showcase event during lunch with a faculty member that has been doing things and that begins soliciting interest from other faculty members. The key characteristics were that we selected it and adopted a tool and made it available and described what it would do and had them make the decision to use it.

The biggest task for Cynthia was to create a strategy to approach the adoption process, as if she had been involved all along.

> My strategy was to get together as a team and figure out the things we needed to work out, what issues we had for support, what we could provide them and who was going to provide support from the first level to the third level, also sitting down and making policies that worked with the goals of the university. You did not want to provide something for the students and faculty that is going to go against what the department is doing or what the institution is all about, so it had to balance with the vision of what the future would look like.

Faculty. Dan remembered how Blackboard helped him to improve his pedagogy in his Biology courses:

> The first class I used Blackboard in was paperless, which was interesting both for the instructor and the students. It demonstrated that when students are engaged in the topic they are willing to spend a lot of time outside of the class posting information and dialogues.

As a technology administrator, David was in charge of overseeing the diffusion process. David suggested the process was a challenge and it helped to learn about the issues and address them in a timely manner:

> We created accounts for every course on campus whether you used it or not. We also provided support, but other faculty members, the early innovators, also helped get others to use it. In addition, we created the tools to help faculty members talk about what they needed to accomplish, so all talked with each other and got them excited about this.

Ron, a former employee of the Technology Department, described his experience of rolling out Blackboard to the faculty:

> When we started to roll out Blackboard, it was a four-prong approach: training, policy (administrative, how to back up things, course ID numbers, etc.), support, and marketing (promote it to the faculty). I remember I would write weekly or biweekly updates so that the faculty could keep up with all of the four levels and also keep the players informed of what they were doing.

Staff. Cynthia, a Technology Department staff member, discussed how workshops were incorporated into the diffusion process:

> We did workshops and showcases, and from the maintenance side we created course shells for every course and enrolled all students and instructors so that they can use it if they wanted to. That made it easy because they did not have to request a Blackboard course, they could start using it. And shared folders for classes were also part of that.

Orientations were also provided to students as requested by instructors. Cynthia added that students appeared to be more advanced and rarely needed an orientation. However, it helped the confidence of the faculty to request a workshop before using Blackboard in their courses.

> We would provide classroom-setting training for students as an introduction and over time they did not need this orientation and we recognized they did not need training, so we would do this as needed. It made the faculty person feel comfortable. As students became more familiar with using Blackboard, the orientations became very minimal, and we found they just needed help with things like digital drop box, logging on, etc.

Judy, a faculty member in Music and also a technology staff member, recalled the diffusion process as sometimes troublesome:

> After adoption we had a lot of trouble with support, it would go down randomly because we had the basic model. I remember a couple of calls we made asking them what we can expect when it went down… it was just a response time.

Judy also recalled how the technology staff incorporated workshops for faculty:

> We organized events such as Friday at 6, when we would get together and eat food, and trained them [faculty] on Blackboard. The summer sessions were week-long trainings and we did on demand, which meant going to classes.

Faculty. Dan, a faculty member in Biology, had problems placing files onto Blackboard and expressed concerns about packaging files and the time it took to prepare materials for courses:

> The one problem I had was that if you generated a document outside of Blackboard, it would ask you what was the file, and if the student cannot access it, you had to make sure the application (Word, etc.) was available on the computers where the students were accessing this. It also made it difficult to integrate video and sound clips. There were some limitations, but it opened doors. Also, the front end loading takes a long time to assemble everything and get it into a package to where the students can access things; that time frame takes more time than generating paper copies or handouts.

On the other hand, Dan felt Blackboard was a useful tool for his courses:

> It worked too well; it took a tremendous amount of time on the faculty part because the students expected responses within a significant amount of time and expected a posting from us. It became clear that we needed to come to an understanding when they should expect responses, but it took up a lot more time than we expected, despite it was three of us and only 16 students, meeting twice a week.

Summary of the Adoption and Diffusion Processes

University #2 experienced problems with support from Blackboard and found that they needed answers as to why the system would randomly malfunction. Judy described that process as troublesome while David offered solutions. Dan, a Biology faculty member, had problems with sending and packaging files and became concerned with the time it took to prepare content for a course. In addition, Cynthia found ways to entice faculty to adopt Blackboard, which included a luncheon for faculty to showcase courses they had developed. To enhance the diffusion process, all

courses were populated with Blackboard so that faculty could easily adopt the CMS and training was provided upon request. Overall, the adoption and diffusion process was easier as faculty became comfortable using Blackboard.

Cross-Case Analysis

Evaluation and Selection

University #1 was first introduced to the concept of a CMS when a faculty member attended a conference and became intrigued with the idea of newer ways of enhancing pedagogy through technology, particularly using a CMS. University #2 had been using an on-line discussion tool (Discus); however, a staff member also attended a conference, and became aware of CMSs.

The process for both institutions began by generating an RFP to solicit bids from vendors. University #1 developed its RFP only after the decision was made to select the second and third CMSs. University #2, however, developed an RFP when the decision was made to select a pilot CMS. In comparison, University #1 had more opportunities to utilize an RFP for their evaluation and selection process, and since each participant was already familiar with the process, University #1 was able to include additional information that further represented their needs. University #2 did not have this opportunity, but since it was an on-going evaluation period, the institution was able to ask questions and add information as needed.

University #1 participant roles differed in the evaluation and selection process from that of University #2. The participants of University #1 were all part of a

committee made up of both faculty and staff members, with a specific task to evaluate and select a CMS. Each participant had equal input into the process, and was encouraged to express their concerns. Each participant came to the committee with a particular interest in using a CMS. For example, Jim, a department chair, utilized Netscape to create web pages. He then migrated to TopClass in order to utilize a system that would better manage his course materials. Nancy, also a department chair, consistently used technology in her courses and identified the use of a CMS as a way to challenge her to become a better teacher. Both decided to participate on the committee so that they could have input in choosing the institution's CMS. All staff participants of University #1 were employed as support personnel and were equally responsible for selecting the right system that would serve the overall needs of the faculty and institution, including pedagogical support, technical support, and budget.

University #2 participants were either faculty members or technology support staff and their roles varied. The faculty participants' main role was to evaluate the system and at the same time develop pilot courses. For example, Dan, a faculty member in Biology, was interested in utilizing a CMS to distribute content on-line and to have a place for students to post daily discussions. Judy, a faculty member, combined her time in the Music and Technology Departments. Dan and Judy both participated in the evaluation and selection process because of their interest to incorporate specific content for discussion and evaluation on the web utilizing a CMS.

The roles of the staff members varied and all did not participate concurrently. For example, Cynthia entered the process after the system was chosen and was

charged with creating strategies to enhance the adoption and diffusion processes, while others, such as Ron, participated in the beginning and were able to have input into the selection process. David and Judy, however, participated during the pilot selection phase and actually selected the CMS. In addition, Judy, a staff member, and David, an administrator, were also faculty members, thus, their roles featured both evaluation of the systems as a faculty member and selection strategies as end-users.

University #1 participants viewed this process as time consuming, yet easier the second time because participants all felt they were comfortable working with one another and thought it was easier to work with the same group over a long period of time. Having participated in several evaluation and selection processes, University #1 had many chances to revise the process. In contrast, University #2 approached the process quite the opposite, incorporating the entire experience as an evaluation and selection phase over a period of one year, and viewed the experience as an on-going process.

In reference to concerns, both institutions expressed issues with costs and support. University #1 had more time to address these issues with vendors. University #2 regrettably had to evaluate long-range costs and support issues over a period of only one year and include these issues in their decision-making process. Overall, both institutions chose Blackboard because of its entry level costs and features, and also its stability in the CMS market.

Adoption and Diffusion Processes

University #1 had three opportunities to experience the adoption and diffusion process whereas University #2 had only one. Each time, University #1 increased the number of faculty using the CMS. For example, the first adopted CMS, TopClass, was introduced through early adopters and featured no workshops. The second and third CMSs (Prometheus and Blackboard) included incentives for faculty to attend workshops, which increased the number of users over time. University #2 also conducted workshops to entice their faculty to adopt Blackboard. This included inviting guest speakers from other liberal arts institutions to showcase what they were doing in their courses and offering the same opportunity to their faculty. Providing these workshops as incentives allowed both institutions to increase the number of users in their own ways.

Participants at University #1 also experienced the adoption process with mixed emotions. Jim, a department chair, approached the Prometheus adoption with caution because he experienced problems with the server going down. Nancy, also a department chair, experienced the opposite, as she engaged herself in the role of a trainer. Bob, a systems administrator, felt the adoption and diffusion process of Prometheus was a relief because he did not have to manage TopClass, the first adopted CMS, and Prometheus at the same time. Al, the head of the Technology Department, considered the adoption and diffusion process of both Prometheus and Blackboard as a success because the committee learned from their experiences with selecting

Prometheus, and later the university added incentives for faculty to participate in workshops, thus supporting adoption.

University #2 participants experienced the adoption and diffusion process in a unique manner. For example, Dan, a Biology faculty member, recalled the issue he had when adopting Blackboard was that many times Word documents would not open because the program was not loaded on all computers to which the students had access. Dan felt it was difficult to use the system if the students could not access the files. Judy recalled issues of support from Blackboard slowed down the diffusion process. David, head of the Technology Department, incorporated strategies such as think tank sessions for faculty to talk about ways to use Blackboard, which helped others to consider adopting the CMS. Accordingly, the entire process was incorporated within one academic year in which participants viewed the adoption and diffusion process as a yearlong unique experience.

Although each institution experienced the adoption and diffusion process differently, both seemed to express issues concerning the use of their selected CMS. Since University #1 had more experience with the process, it became easier to create strategies over time. However, the approach of University #2 allowed for more interaction in less time and demanded a quicker adoption and diffusion process. Overall, each institution benefited from their experiences and input from faculty and staff.

Summary

This chapter described the experiences of participants while being engaged in the process of evaluation, selection, adoption and diffusion of the CMS chosen by their institution. Both cases presented two distinct versions of the process, with similarities and contrasts found in each case. Based on these findings, the diffusion of innovation theory is offered in Chapter 5 as a theoretical explanation of the experiences of these participants. Further recommendations and suggestions are also offered for future studies of this nature.

CHAPTER 5

DISSCUSSION AND RECOMMENDATIONS

Chapter 5 includes a discussion of Rogers's diffusion of innovation theory as a framework for this study. The theory is applied to explain the processes of evaluation, selection, adoption and diffusion discussed in this study. In addition, this chapter also suggests potential recommendations for future studies.

Introduction

In recent years, distance education technologies such as course management systems have inspired opinion leaders to advise decision makers of the advantages and disadvantages in their use. The findings of this study indicate opinion leaders communicated the need for change, provided information and advice, and influenced the opinions of others associated with University #1 and University #2 to evaluate, select, adopt and diffuse a CMS.

The following is a discussion of the diffusion of innovation theory, which provided the theoretical implications of this study as a framework to analyze the process of evaluation, selection, adoption, and diffusion of a CMS.

Discussion of the Diffusion of Innovation Theory

As defined earlier, diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p.11). The four key elements of diffusion are: (1) the innovation, (2) communication channels, (3) time, and (4) the social system. The four elements help describe the rate of time by which the innovation is adopted. These four elements served to help explain the processes of evaluation and selection of CMSs observed in this study.

Evaluation and Selection

The first element, an innovation, does not have to be new but is perceived by an individual as being new (Rogers, 2003, p. 12). In this study, the innovation is a CMS. Members of both institutions gained knowledge of course management systems while attending a conference. Nancy, a department chair in Education of University #1, introduced others to the concept:

> I came back from the conference and explored what I was reading about course management systems, and I did not connect at that time with the College of Education faculty concerning the concept of a CMS. So I looked for people who were also interested in using a CMS.

Ron, a former employee of the Technology Department of University #2, was also introduced to the concept at a conference and began making others aware of the concept:

> My experience opened up to researching CMS by seeing what other schools were doing. I started to correspond with liberal arts colleges in central Indiana and basically introduced myself and asked what they were using.

The purpose of introducing the innovation is to stimulate a response and identify favorable or unfavorable attitudes towards the innovation. Rogers (1995) distinguishes two types of information with respect to innovations that may stimulate a response: (1) software information and (2) innovation evaluation information (Rogers, 1995, p. 14). The first, software information, stimulates responses such as "What is the innovation?" and "How does it work?" and reduces uncertainty about the cause-effect of achieving the outcome. The second, innovation evaluation information, concerns "What are the consequences, advantages and disadvantages?" Both institutions expressed concerns during their evaluation and selection processes that reflect software and innovation evaluation information issues. University #1 developed an RFP (Appendix E) that emphasized concerns about the innovation (Prometheus and Blackboard) and how it works, in order to decrease uncertainties of choosing the CMS. University #2 also expressed concerns throughout their evaluation period and conducted workshops to emphasize the advantages of using Blackboard. Ultimately, each institution chose their CMS upon feeling comfortable to "incorporate the new innovation into their existing practices" (Rogers, 2003, p. 168).

The second element, communication channels, involves the means by which the message is conveyed to an individual or individuals in order to reach a decision to adopt an innovation. This process is usually comprised of four essential elements: (1)

an innovation, (2) an individual or unit that has utilized the innovation, (3) another individual or unit without knowledge of the innovation, and (4) a means of communicating and linking the innovation to both units (Rogers, 2003, p. 18). During the evaluation processes, both University #1 and University #2 utilized communication channels to involve individuals in the evaluation and selection of their CMS. These participants were made aware of the issues concerning the CMS through interpersonal (face-to-face) communication. Rogers (2003) states:

> Most people depend mainly on subjective evaluation of an innovation that is conveyed to them from other individuals who have already adopted the innovation.

Hence, each institution relied upon communication from individuals who were familiar with using the CMS to inform and persuade others to evaluate and adopt the system.

The third element, time, follows a linear progression from the introduction of an innovation through its adoption or rejection. The time dimension is incorporated in diffusion through the innovation decision process, in which an individual passes from knowledge of an innovation, to adoption or rejection. This includes a measurement of the relative earliness or lateness when an individual adopts an innovation and observation of an innovation's rate of adoption in a system (Rogers, 2003, p. 20). Time is one of the most important elements of the decision-making process. In this study, many individuals were involved and it took a considerable amount of time to evaluate their input and decide whether to adopt the CMS.

The fourth element, social systems, is "interrelated units that are engaged in joint problem solving to accomplish a common goal" (Rogers, 2003, p. 23).

The structure of each system determines the type of communication patterns. For example, University #1 consisted of a committee to select their CMS. The patterns of communication were direct interpersonal channels such as committee meetings and e-mails, allowing decision-making processes to be more consistent. On the other hand, University #2 did not develop a committee; to a certain extent, they relied upon individuals who provided information as needed. Thus, the structure of each system could facilitate or impede the process of diffusion (Rogers, 1995, p.25). In this study, the structures of University #1 and University #2 and the processes used to communicate did not impede their decision making. The communication processes did, however, emphasize communication structures, that facilitated each institution's process of diffusion (Rogers, 2003, p.24).

Adoption and Diffusion Processes

To further explain the process of adoption and diffusion, this study utilized Rogers's (2003) innovation decision process. The following is a theoretical discussion of the innovation decision process and its relationship to this study.

The Innovation Decision Process

Rogers (2003) states that the innovation decision process is used to gather information about an innovation and reduce uncertainties about its advantages and disadvantages (p. 172). The innovation decision process consists of five main steps: knowledge, persuasion, decision, implementation, and confirmation.

Knowledge

Rogers (2003) proposes that the innovation decision process begins with knowledge of an innovation when an individual or decision-making unit becomes aware of an innovation or idea and begins to understand its functions and use (p. 171). This stage includes certain behavioral patterns by an individual that may influence the communication messages in which the innovation is introduced. In the case of University #1, Nancy, a department chair in Education, discussed her knowledge of course management systems with other members of the faculty. That communication helped to facilitate the knowledge and awareness of the technology to other faculty members. Likewise, Ron, a former Technology Department staff member of University #2, also communicated the knowledge of course management systems to other members of the institution, which also resulted in awareness of the technological innovation. Thus, members of each institution communicated knowledge of the innovation, which influenced the way in which the innovation was introduced within their social system.

Persuasion

The next phase in the innovation decision process is persuasion, which allows an individual to exhibit an attitude (favorable or unfavorable) about the innovation. This stage also incorporates forward planning in which individuals look at the advantages and disadvantages of how the innovation would affect their use (Rogers, 2003, p.174).

Rogers (2003) states:

> All innovations carry a degree of uncertainty for an individual who is typically unsure of the new idea's functioning and thus seeks social reinforcement from others of his or her attitude towards the innovation. (p. 175)

Al, the head of the Technology Department of University #1, describes how individuals were persuaded to use Blackboard:

> The major thing that helped adoption was a mass of people using it, and students asking other instructors why don't they use this. Also, one faculty would mentor the other, to help it spread faster.

Cathy, a member of the Technology Department of University #2, described persuading faculty to use Blackboard:

> Letting the faculty know that Blackboard was available without being pushy was a concern. We had a lot of training sessions for technical ways to use Blackboard and a lot of one-on-one consultation with faculty. We also had other discussions for concerns and suggestions, and we conducted two week-long workshops in January and May.

Both institutions used their own strategies to persuade faculty to use Blackboard. University #1 faculty mentored other faculty members in order to persuade them to use Blackboard. On the other hand, University #2 did not want to push the technology on faculty; rather, they offered training sessions and one-on-one consultation to persuade faculty members to use Blackboard. In the end, each institution was able to persuade faculty members to adopt Blackboard.

Decision

A decision is made in the innovation decision process when decision makers "engage in activities that lead to a choice to adopt or reject the innovation" (Rogers, 2003, p. 177). Also, a decision can be made to adopt an innovation that could later be discontinued and replaced by another innovation. University #1 announced its decision to adopt Prometheus through an e-mail correspondence (Appendix D), but it was later discontinued because the company sold it and replaced Prometheus with Blackboard. Al, the head of the Technology Department of University #1, described the decision to replace Prometheus and adopt Blackboard:

> When Blackboard took over, people were not happy. They liked Prometheus, and you knew Blackboard was going to drop Prometheus. Blackboard also looked like they were not going to make money on the five thousand dollar package, so they were going to try to migrate people to the thirty thousand [dollar] package. Unfortunately for us, we had very little choice.

University #2 experienced different circumstances while making their decision to adopt Blackboard. Cynthia, a staff member in the Technology Department,

provided a comparison of making the decision to adopt Blackboard as a course management tool for the distance education format, as opposed to larger schools with distance education programs in place:

> A lot of bigger schools have a distance education program, whereas we do not. We provided a classroom environment with Blackboard to support the distance education format as opposed to a distance education structure. It is two different angles.

Accordingly, each institution reached their decision to adopt Blackboard differently. University #1 adopted Blackboard to replace Prometheus because of its discontinuance. On the other hand, University #2 adopted Blackboard to support the distance education format instead of developing a full distance education structure. Thus, University #1 made their decision to adopt Blackboard because they needed to replace their existing CMS, whereas University #2 decided to offer a distance education format, and adopted Blackboard as their CMS tool.

Implementation

Implementation usually follows knowledge, persuasion, and decisions and occurs when an innovation has been put to use. Consequences and uncertainty generally persist in this phase. For example, University #1 adopted and implemented Prometheus but later choose to adopt Blackboard. University #2 adopted Blackboard, and later expressed their concerns when Blackboard raised their costs to acquire additional features.

David commented on the university's decision to continue using Blackboard:

> The cost did rise, but there were good arguments to stay with Blackboard. You have to look at the trade-offs of time invested by faculty to develop their courses. So the question was: Do you abandon the current system for a new one, and invest more into transporting their courses into a new system?

As a result, University #2 decided to keep Blackboard, regardless of costs. Rogers (2003) adds that implementation peaks when "a point is reached in which the new innovation is institutionalized as a regular part of the adopter's operations" and is considered the end of the implementation phase (p.180). However, a form of re-invention may take place that allows the innovation to be reconfigured to adapt to behavioral changes and use of the innovation. Hence, implementation of an innovation is an important step of the innovation decision process, which could lead to alteration or elimination of the innovation. In this study, University #1 discontinued the use of TopClass, and upgraded to Prometheus. And when Prometheus was discontinued, Blackboard was chosen as an upgrade. University #2, likewise, decided to eliminate the use of Discus as a class discussion tool, and replace it with Blackboard. Thus, when University #2 designated the discontinuance of Discus as a class discussion tool, Blackboard introduced a newer use of the innovation as a CMS.

Confirmation

In this stage, individuals seek reinforcements for using the innovation. This stage includes: recognition of the benefits of using the innovation, integrating the innovation into a daily routine, and promoting its use to others (Rogers 2003, p. 199).

The administration of University #1 offered stipends as incentives to attend workshops, enticing faculty to recognize the benefits of using Blackboard. These incentives also helped to promote and encourage others to incorporate Blackboard in their daily use. University #2 also featured workshops to highlight the benefits of using Blackboard. In addition, the Technology Department worked closely with faculty to identify ways to incorporate Blackboard into their daily routines. Overall, both institutions confirmed their decisions to adopt the CMS, and exhibited no conflicting messages.

Summary of the Innovation Decision Process

Each University engaged in the innovation decision process differently. For instance, University #1 participants were comprised of a committee to evaluate and select each CMS. Thus, their decision was a collaborative effort. Each participant became knowledgeable about Prometheus and Blackboard through other committee members, persuaded members of the institution to select these systems, made a collaborative decision to adopt these systems, and implemented plans to diffuse these systems.

Participants of University #2, however, engaged in the innovation decision process as individual members of the Technology Department, and members of the faculty. Each participant was accountable for communicating the knowledge of Blackboard to others as well as the advantages of using the innovation. In both cases, individuals from each institution possessed knowledge of course management

systems, and passed this information on to others, who had little or no knowledge of the innovation.

In contrast, communication channels within each institution followed different paths. University #1 had a small network of technology users within their social system, particularly the early adopters, who used Prometheus. Others began using Prometheus as well, when knowledge of the system passed through interpersonal communication channels such as e-mail and personal interaction. Also, the institution noticed a rise in users, when more faculty members began to adopt Blackboard as knowledge of that system began to spread.

In contrast, University #2 provided an introduction to course management systems through their Technology Department. Workshops and demonstrations were utilized as interpersonal communication channels.

In both cases, all participants held similar beliefs and shared their experiences with others. Also, persuasion occurred within both institutions, when participants attended workshops to observe how other faculty members were incorporating course management systems in their courses. These workshops ultimately led to others adopting these systems. After the selection and adoption of these systems, both institutions engaged in the diffusion process, which led to implementation and confirmation that the institutions would keep Blackboard as the adopted CMS.

Research Question

This study was designed to answer the central question: What are the factors that guide the decisions in selection and use of a CMS within two small liberal arts institutions? Each institution will be discussed separately to summarize the factors that guided their decision-making processes.

University #1

The first CMS, TopClass, was purchased through a grant, received by a faculty member. A short time later, other faculty members began generating interest in acquiring another system, which led to adopting Prometheus. Blackboard later replaced Prometheus, but during each process, a committee of faculty, staff, and administration, consistently contributed their input.

One of the factors guiding their decision to adopt Prometheus was the cost to purchase and maintain the system. Other factors included whether the system could handle pedagogical tasks such as importing files. The committee also considered features each system provided, such as grade book functions and a discussion tool. When Blackboard was selected to replace Prometheus, in addition to the aforementioned, the committee expressed concerns about the ability to transfer their existing courses from Prometheus to Blackboard. Therefore, support became another deciding factor in the selection of Blackboard. Al, the head of the Technology Department of University #1, explained how these factors were considered:

> Blackboard offered some things that come with the system, and some you had to add on. Some things Blackboard offered have been more successful than others, like grade book and chat features, but that was a small part of the decision.

University #2

University #2 engaged in their evaluation and selection process over a period of one year. Some of the factors guiding their decision were pedagogical features and support, while cost was not a concern. The input of faculty also helped to guide the institution's decision. Many were concerned with purchasing a system that would work with all disciplines on campus as well as purchasing a system that was easy to use. David, the head of the Technology Department of University #2 adds, "They wanted something simple to use, similar to a word processor, and easy to transfer materials on-line." Overall, the institution settled on Blackboard because it seemed to fit pedagogically with faculty needs.

Implications of this Study

To gain an understanding of the processes of evaluation, selection, adoption and diffusion of a CMS, this study focused on Rogers's (2003) diffusion of innovation theory. The results of this study supports Rogers's innovation decision process, in which knowledge of an innovation, if communicated over a period of time within a social system, can influence the outcome of the adoption of that innovation. The innovation decision process explains how these stages relate to the evaluation, selection, adoption and diffusion processes discussed in this study. For example,

knowledge of an innovation occurs during the evaluation process in which adopters becomes aware of the needs of the innovation and evaluate the innovation accordingly. Persuasion occurs when individuals form favorable or unfavorable attitudes towards the innovation, and lean towards the selection of the innovation. Decision reflects the individual's choice to adopt the innovation. Implementation occurs when the adopter puts the innovation to use, and confirmation seeks to reinforce their decision and engage in the diffusion process (Figure 7).

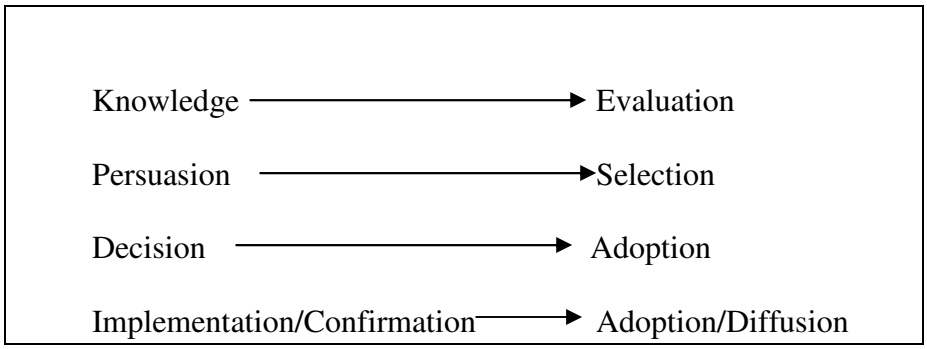

Figure 7. Five steps in the innovation decision process

This study also suggests that the processes used to evaluate and select a system may affect the outcome of adoption. In both cases, each institution engaged in the process at their own pace, and used different resources to achieve their goals to select and adopt a system. For instance, University #1 developed an RFP to help guide their evaluation and selection processes, and used a committee to collect input. University #2, on the other hand, provided access to Blackboard on another institution's system, which allowed participants an opportunity to evaluate Blackboard and provide feedback during the evaluation process.

Accordingly, the stakeholders involved played an important role in the evaluation and selection processes and ultimately influenced the outcome of adoption and diffusion.

Recommendations Related to Study

This study included the experiences of administrative, staff, and faculty participants. However, one limitation of this study was that it did not include the impact of future technological innovations on course management systems.

Course management systems are continuing to evolve. Their uses have far outgrown placing documents on the web for retrieval, into advanced utilizations of e-learning applications. While engaging in the evaluation and selection processes of course management systems, institutions should consider current and future trends in technology. Cynthia, a staff member in the Technology Department of University #2, proposed:

> The students coming in see technology as not something to learn, it is something they have grown up with, and part of their daily routines, like i-pods and laptops, so it's something we need to be aware of, especially the expectations of the students.

Current ways to utilize a CMS, such as posting blogs and podcasts, are some of the newer pedagogical practices and trends in education. Thus, with newer innovations and new-found pedagogical uses of CMSs, vendors like Blackboard would have to build on existing products to adapt to current and future technological environments. And likewise, institutions would have to develop strategies to evaluate and select

systems, in accordance to current and future technological innovations and pedagogical practices.

Recommendations to Institutions

E-learning technologies have flourished over the past decade. And as information technology departments continue to plan, evaluate, select, and adopt CMSs, many will debate whether to develop their own systems, choose a vendor-based system, or acquire an open-source system. Open-source systems are course management systems offered with a free to use license agreement, developed by individual users or a community of users (Waterhouse, 2005, p.7). Participants in a 2007 campus computing survey indicated:

> Almost three-fifths (57.3 percent, compared to 51.9 percent in 2004) agree that "Open-source will play an increasingly important role in our campus IT strategy." However, less than a third of the survey respondents (27.6 percent, compared to 28.9 percent in 2004) agree that Open-source "offers a viable alternative" for key campus administrative or ERP applications such as student information systems, campus finance systems, or personnel/human resource software. (Green, 2006, p.3)

These statistics state that open-source systems continue to grow among college campuses. Open-source systems offer several advantages and disadvantages. One advantage of open-source systems, in comparison to a vendor-based system such as Blackboard, is that there is no cost to purchase the software. However, the debate over support persists. Since open-source systems are usually supported and maintained by a community of users, institutions would have to consider the long-range costs of

maintaining systems (i.e., staffing, system maintenance and upkeep, and server specifications). Institutions adopting open-source systems would need resources that would allow funds to be allocated for staffing and system maintenance. Bob, a staff member in the Technology Department of University #1, pointed out, "From a financial standpoint, you save from fees, but the staff has to be bigger."

Institutions with the financial resources to adopt an open-source system should consider three options. First, the institution must analyze their financial commitment to maintain an open-source system. This includes hiring a system administrator, technical personnel to maintain the system's infrastructure, training staff, and providing a fully functional help desk. This also includes implementing, at the least, a five-year plan to allocate funding as needed.

Second, institutions should examine how they plan to use an open-source system. For example, Lynn University in Boca Raton, Florida, with an enrollment of 2,400 students, adopted uPortal as an open-source system to help coordinate all student-oriented systems (Villano, 2006, p.1).

What is not known, however, is whether Lynn University has a similar administrative, faculty, and staff structure as University #1 or University #2. And furthermore, research and statistics are lacking to indicate the costs Lynn University absorbed and benefits, if any, of adopting the uPortal system. Hence, reasons for adopting an open-source system, and resources allocated to do so may be available for one institution but may not fit as an option for other smaller institutions.

Next, when deciding to adopt a new system, institutions should conduct a survey, such as the one University #2 designed (Appendix F), to assess their on-going faculty and institution wide needs for a CMS. This survey could be used to help the institution evaluate their current system, and decide whether to discontinue or continue its use, develop their own system, or adopt an open-source system. In addition, an RFP should be created, such as the one University #1 developed (Appendix E), to evaluate vendors' responses to the RFP in accordance to the institution's needs. Unfortunately, creating an RFP would not be an option if the institution decided to adopt an open-source system because open-source systems are not bid on like vendor-based systems. Alternatively, if an institution does not have the resources to adopt an open-source system, they should consider the adoption of a vendor-based system, such as Blackboard. And although costs would be a factor, the institution would have access to the vendor for answers to issues related to costs and maintenance.

Recommendations for Future Research

While institutions continue to evaluate e-learning pedagogical needs, additional literature is needed to offer an approach and solutions to help them evaluate and select a CMS. Since this study utilized two small liberal arts institutions, other institutions would find this study useful, particularly if their administrative structures appear parallel or if their needs fit the descriptions within this study. In particular, small liberal arts institutions will benefit from further research that highlights plans to evaluate, select, and adopt a CMS.

Overall, there is a lack of qualitative studies emphasizing the processes of evaluation and selection of a CMS. A qualitative study such as this would add to the literature concerning the adoption and diffusion of innovations and would be valuable to decision makers planning to adopt a CMS and other educational technologies. Qualitative research is also needed to assess the benefits of small liberal arts institutions adopting open-source systems. And further qualitative studies could also identify how small liberal arts institutions are implementing and using other educational technologies. Furthermore, this study could be designed as a quantitative study to identify how many liberal arts institutions have planned or are planning to evaluate and select a CMS and how these systems are being used.

Additionally, postevaluation studies should be done to assess the following considerations. First, a study to assess the real costs of operating a system after it's been adopted, would benefit institutions planning their operating expenses over a period of years. Next, a study indicating the cost of abandoning a system would help institutions understand the costs, if any, to discontinue use of their CMS. Research is also needed to reveal costs to support the evaluation of systems, and if there would be an increase in price for additional users. For example, if institutions adopt a system with the intention of serving 2,000 users and over a period of two years that number increases to 3,000, a study to address the expenses incurred, if any, to increase the number of users, would be helpful for institutions to plan for additional funding towards capital expenditures.

Studies are also lacking to indicate which systems students prefer to use, what systems are actually being used, and how these systems are being used by students. And finally, studies are needed to evaluate the costs of operating open-source systems compared to vendor-based systems like Blackboard. Decision makers would greatly benefit from these types of studies, particularly if they are weighing the advantages and disadvantages of adopting open-sources vs. vendor-based systems.

Conclusions

In conclusion, e-learning applications such as course management systems, whether vendor-based or open-source platforms, will continue to drive technological advancements in education. Inevitably, institutions will continue to rely on future developments of e-learning applications, and as technologies change, institutions will be forced to adapt and provide practical and logical solutions.

I believe in the next ten years open-source systems will become a norm in the CMS landscape. And while course management systems are currently the trend in distance education technology, the future represents enormous possibilities.

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APPENDICES

APPENDIX A

INTRODUCTION E-MAIL TO PARTICIPANTS

Date: Wed, 25 Jan 2006 13:05:57 –0600
From: “Phillip Powell” <ppowell@valpo.edu>
Message-Id: <1138215957-456.00057.00312-smmsdV2.1.3@mailhub.valpo.edu>
X-SMMS-Source: 152.228.140.135
To:
Subject: Research Study

Hello,
My name is Phillip Powell. I am a graduate student at Northern Illinois University. I’m currently looking for participants for a study which involves the process of evaluation, selection, adoption and diffusion of a course management system. I would like to speak with you more about this opportunity if you or individuals within your institution may fit the criteria of the study. Attached is a formal document for your review only. It is intended to give you some background information of the study only. I would greatly appreciate a response to this e-mail indicating a phone number and the best time to contact you.

Thank You
Phillip Powell

APPENDIX B

EXPLANATION OF RESEARCH STUDY

My name is Phillip Powell. I am a doctoral candidate at Northern Illinois University in the Department of Educational Technology Research and Assessment. I am contacting you in reference to your participation in a study to be used as data in completion of a dissertation for a doctoral degree in Instructional Technology.

The purpose of this study is to examine the processes undertaken by institutions that selected a course management system and to provide insight into participant experiences during the selection process. The knowledge gained from this study may help to recommend future research related to evaluating and selecting technology, and also provide information particularly useful for small liberal arts institutions considering the selection of a CMS.

You will be asked to respond to interview questions, containing items pertaining to the evaluation, selection, adoption and diffusion of your institutions course management system, which should take about one hour to complete. These questions will be audio recorded and kept in a locked safe to secure the identity of participants. There are no anticipated risks, however, if you feel uncomfortable during or after the interview process, the researcher will be available to talk with you and, if you wish, offer you a referral to a counseling agency.

All of the information obtained from your participation will be kept confidential. Your consent form will be kept separate from the data and the data will not be available to anyone other than the researcher conducting the study.

You are reminded that your participation is voluntary. This means that you can choose to stop at any time. If you have any questions or concerns related to your participation in this study, please contact Phillip Powell at 708-229-0409. Any questions about your rights as a research participant can be addressed to the NIU Office of Research Compliance (815-753-8588).

Background on Study:

In recent years, the value of course management systems have increased partly due to the ability to reach a wider audience. A 2002 survey conducted by the Campus Computing Project suggests at least one-fifth of college courses were utilizing CMS's and three-quarters of higher education institutions have adopted a CMS, a rise from 14.7 percent in 2000 to 26.5 percent in 2002 (Green, 2002, www.campuscomputing.net). Accordingly, the purpose of this study is to examine the processes undertaken by institutions that selected a Course Management System and to provide insight into participant experiences during the selection process. In order to gain a deeper understanding of the Course Management System selection process and experiences of stakeholders involved, the following central question will guide this research for data collection and analysis: What are the factors that guided the decisions in selection and use of a CMS within small liberal arts institution? The following subquestions will also be used to guide this study:

1. What were the issues leading to the need for a CMS?
2. What kinds of procedures were used in the evaluation process?
3. What were the roles of the administration, staff, and faculty in the evaluation and selection processes?
4. How was the CMS selected by the organization?
5. How is the CMS being used in the organization?

APPENDIX C

CONSENT FORM

I agree to participate in the research project titled Case Study: The evaluation, selection, and adoption of a course management system, being conducted by Phillip Powell, a graduate student at Northern Illinois University. I have been informed that the purpose of the study is to examine the processes undertaken by institutions that selected a course management system and to provide insight into participant experiences during the selection process. The estimated completion of this study is December of 2006.

I understand that if I agree to participate in this study, I will be asked to do the following: respond to interview questions related to your experience as described in the purpose of this study. The interview will be audio recorded and the process will take about one hour to complete.

I am aware that my participation is voluntary and may be withdrawn at any time without penalty or prejudice, and that if I have any additional questions concerning this study, I may contact Phillip Powell at 708-229-0409. I understand that if I wish further information regarding my rights as a research subject, I may contact the Office of Research Compliance at Northern Illinois University at (815) 753-8588.

I understand that the intended benefits of this study include providing stakeholders with information useful in planning for the evaluation and selection of a course management system.

I understand that all information gathered during this study will be kept confidential by referring to the participants generically as a Faculty, Staff, or Administrative member of the named institution, or given pseudonyms. In addition, all data collected from this study will be kept confidential and the researcher will be the only person with access to this information.

I realize that Northern Illinois policy does not provide for compensation, nor does the University carry insurance to cover injury or illness incurred as a result of participation in University sponsored research projects. I understand that my consent to participate in this project does not constitute a waiver of any legal rights or redress I might have as a result of my participation, and I acknowledge that I have received a copy of this consent form.

"I have read the information about the study and have been informed of it's general purpose. I am fully aware of the risks and benefits associated with participating in the study described to me. I acknowledge that I have received a copy of the informed consent form and agree to participate in the study. I understand that I can withdraw at any time without penalty."

_____

Signature of Subject/Date

Permission to Record Audio

_____ _____

Print Name Today's Date

Signature

APPENDIX D

E-MAIL INFORMING UNIVERSITY #1 FACULTY OF THE ADOPTION OF PROMETHEUS

Thu, 15 Feb 2001 10:33:31
From:
Subject: Prometheus Courseware
To: Faculty

Colleagues:

Many of you have been waiting for this. The University has committed itself to a new courseware package that, according to the task force, will change your life—at least transform your teaching! The announcement comes from XXX XXX, whom chaired the group. I am very grateful to our colleagues on this task force for their hard work. So READ on.

****Prometheus Courseware Selected for University #1****

Last summer, the Provost's Office established a task force to identify, evaluate, and recommend a courseware product for use in support of placing course materials online at University #1.The task force issued an RFP to 22 potential vendors. This week the task force made a recommendation to purchase Prometheus software for University #1 and the recommendation is being implemented. Prometheus is a database driven, web-based courseware application. Placing your course materials online is simple through its user-friendly, step-by-step electronic forms. You can customize the design to have the feel and look you want. You can send and track e-mail and class announcements, allow students to have round table type discussions on their own time schedule by posting messages, and create separate electronic bulletin boards for groups to discuss projects among themselves. You can communicate through class chat rooms, create and administer tests with multiple choice, true/false, short- and long-answer questions, have the computer generate test questions randomly for students taking the test side by side, let Prometheus grade your true/false and multiple choice answers, and put the results in your electronic grade book. These are just a few of the many features that will be at your disposal with Prometheus. For more information go to http://www.prometheus.com/. The staff is now working with Prometheus staff to get the courseware installed as soon as possible. Look for an announcement soon about open demonstrations of Prometheus, which will then be followed up with ongoing hands-on workshops so that you can put your course online. If you bring your course content to the workshops, your course will be online before you leave -- we guarantee it! Prometheus is an outstanding product that will help to enhance teaching and learning at University #1.June 27, 2000

APPENDIX E

UNIVERSITY #1 COVER LETTER AND REQUEST FOR PROPOSALS FOR WEB-BASED COURSE SUPPORT SOFTWARE

<name>
<address>

Dear <name>

We are pleased to offer the Request for Proposals from University #1 for a Courseware Support system for your consideration. We hope you will be interested in submitting a proposal for a system to enhance the use of instructional technology at University #1.

Enclosed is a paper copy of the RFP, and a Windows/Intel diskette containing the RFP in both Microsoft Word 6.0 and ASCII text format. The diskette also contains an Microsoft Excel 5.0 worksheet to aid you in preparing your response. We encourage you to use these resources. The README.TXT file on the diskette describes the contents of the diskette more fully.

We expect Vendors to incorporate this information in their responses. We assume Vendors will identify themselves fully in their responses; we have not included a place for Vendor identification on these forms.

In cases where Vendors do not feel comfortable quoting costs beyond their control (such as staff salaries), they must provide sufficient information for the University to calculate those costs.

Friday, July 7, 2000 is the deadline for questions if you wish to be sure of a response. Questions should be submitted in plain ASCII text via electronic mail with subject line containing RFP. E-mail attachments in proprietary format (e.g., Microsoft Word or WordPerfect) are not acceptable. Even if you have no questions, you should send a message if you want a copy of the questions and answers. Questions will be consolidated and vendor identification removed (unless the question itself reveals that information) and all vendors will receive a response by e-mail by Friday, July 14, 2000. Questions received after the deadline will be answered by e-mail Reply; all vendors on the mailing list will receive copies of the reply.

Friday, August 4, 2000, at 2:00 PM is the deadline for proposals. Proposals are to be delivered to the office of the Vice President for Administration and Finance of University #1.Vendors are solely responsible for ensuring that their proposals are delivered on or before this deadline.

You will find the complete anticipated schedule in Section 9.15 of the RFP.

We look forward to your response to this Request for Proposals.

Sincerely,

Executive Director, Electronic Information Services and
Campus Contact for the Course Support System
University #1

November 11, 2002

We are pleased to offer the Request for Proposals for a Courseware Support system for your consideration. We hope you will be interested in submitting a proposal for a system to enhance the use of instructional technology.

Enclosed is a paper copy of the RFP, and a Windows/Intel diskette containing the RFP in both Microsoft Word 97 and ASCII text/HTML format. The diskette also contains a Microsoft Excel 97 cost worksheet to aid you in preparing your response. We encourage you to use these resources. The README.TXT file on the diskette describes the contents of the diskette more fully.

We expect Vendors to incorporate this information in their responses. We assume Vendors will identify themselves fully in their responses; we have not included a place for Vendor identification on these forms.

In cases where Vendors do not feel comfortable quoting costs beyond their control (such as staff salaries), they must provide sufficient information for the University to calculate those costs.

Monday, November 25, 2002 is the deadline for questions if you wish to be sure of a response. Questions should be submitted in plain ASCII text via electronic mail with subject line containing RFP. E-mail attachments in proprietary format (e.g., Microsoft Word or WordPerfect) are not acceptable. Even if you have no questions, you should send a message if you want a copy of the questions and answers. Questions will be consolidated and vendor identification removed (unless the question itself reveals that information), and all vendors will receive a response via e-mail by Friday, December 13, 2002. Questions received after the deadline will be answered by e-mail reply; all vendors on the mailing list will receive copies of the reply.

Monday, January 6, 2003, at 2:00 PM is the deadline for proposals. Proposals are to be delivered to the Office of the Vice President for Administration and Finance of University #1. Vendors are solely responsible for ensuring that their proposals are delivered on or before this deadline.

You will find the complete anticipated schedule in Section 9.13 of the RFP.

We look forward to your response to this Request for Proposals.

Sincerely,

Executive Director, Electronic Information Services and
Campus Contact for the Course Support System RF
University #1

Web-Based Course Support Software
November 11, 2002

1. Overview of University #1

University #1 is an independent, church-related, residential university with a full-time equivalent student population of about 3200.

2. Objective

University #1 is seeking a standards-based, integrated course support software system which will:

- Support courses in all major academic areas;
- Be flexible and easily modifiable;
- Provide a consistent user interface and excellent tools for instructors and students to interact with the system;
- Suit University #1 size, staff, and institutional culture.

3. Current Status

3.1 Course Support

3.1.1 Course-support software based offerings

3.1.1.1 Approximately 100 faculty members use Prometheus.

3.1.2 Free-form offerings

A number of faculty currently use technology for instruction in a number of different ways.

3.1.2.1 Every course/section has a list-server-based mailing list.
3.1.2.2 Electronic mail is routinely used for class communication in about 80% of classes.
3.1.2.3 Web-based course materials such as syllabi and reading lists are used by approximately 40% of faculty.

3.2 Network

University #1 is fully networked, with fiber optic backbone and 10baseT Ethernet in the buildings. Currently, most of the backbone consists of 100Mb or 1000Mb Ethernet; Wireless networking will be phased in over the next several years (in addition to the fiber and wire). Protocols used are TCP/IP for UNIX servers and both TCP/IP and IPX for Novell servers.

3.3 Servers

3.3.1 Electronic Mail is supported by an IMAP4 server running on a SunFire 3800 under Solaris 8 (SunOS 5.8).

3.3.2 The Web is supported by Apache 1.3.26 running on a Sun Enterprise V880 server; web pages are submitted through a staging server, which is Apache 1.3.26 running on a Sun Enterprise 3000 server. Both servers are running Solaris 8 (SunOS 5.8).

3.3.4 The Library Online Public Access Catalog is Innovative Interfaces running on a Compaq Alpha AXP under DEC UNIX.

3.3.6 Databases are supported by Oracle 8i (8.1.7) running on a Sun Enterprise 450 server.

3.3.7 Authentication services are supported by Sun One LDAP Version 4.16 running on the same Sun Enterprise 3000 server as web staging.

4. General System Requirements

4.1 General Characteristics

4.1.1 Advanced Technology: System design and platform must allow for recent and future developments in computer technology. Both system and platform should be proven but close to the beginning of the product life cycle.

4.1.2 Integrated: There should be one authoritative source for each data element, and all modules using a given data element should retrieve it from the authoritative source. In the event system design dictates multiple copies of a given data element, the system should present a single-system image, and updating the authoritative source should cause all copies to be updated immediately and transparently; and updating non-authoritative copies should not be possible.

4.1.4 Open: System must permit easy import/export of information from/to a wide variety of other applications, including competing course support systems; desktop applications such as the Microsoft Office suite; World-Wide Web; the electronic mail system; the Datatel/Unidata administrative system; other DBMS-based systems, on and off campus; data warehouses; and executive information systems. System should permit direct access to information by other applications, and be capable of direct access to information stored in other applications.

4.1.5 Modular: The design of the system must facilitate rapid and correct response to changing needs at University #1.

4.1.6 Robust: the system should have sufficient intelligence to be able to warn the user when it receives corrupt or inconsistent data.

4.1.7 Stable: The software must be technically stable and relatively bug-free. We expect prompt notification by the vendor of bugs reported by other users and receipt of appropriate patches or upgrades to address the problems. Explain how this will be accomplished.

4.1.8 Frugal: the new system should simplify the maintenance of information to the point where individuals can organize and present their own information. This system should create new opportunities without encumbering the institution with specialized staff, maintenance overhead and rigid data and reporting structures.

4.1.9 Easy to Use: The system must have a consistent and lucid interface that facilitates use and simplifies complex activities; at the same time, sophisticated users should be able to apply their advanced knowledge. The supporting documentation (on-line and paper) must be accessible by nontechnical users and should facilitate the resolution of problems and the training of users. The vendor of the software will provide several levels of support including access to other users, timely telephone support, remote diagnostics of the system, initial on-site installation and training.

4.1.10 Maintainable: the system will have an underlying structure that enables the vendor to improve its function, to respond to changes in hardware and software design concepts, and to minimize "bugs." Updates and "fixes" should require minimal downtime and minimal alteration of the existing structure.

4.1.11 Secure: the system must ensure the confidentiality of key information. The system must provide various levels of security extending to individual data elements as well as security auditing of essential functions.

4.1.12 Divisible: the system should permit the University to treat separate divisions as entities for certain purposes, while still avoiding duplication of data and data entry. For example, the undergraduate division, the School of Law, and Graduate Studies need to be treated as separate entities for certain purposes.

4.1.13 Distributable: the system will function with full effectiveness in a heterogeneous LAN environment.

4.1.16 Focused on locally developed courses as opposed to "canned" courses.

4.3 Standards

4.3.2 Interface should be provided to

4.3.2.1 Internet, including campus web site, intranets as appropriate, etc.

4.3.2.3 Commonly-used portal systems (list all those with which your product interfaces naturally)

4.3.3 Content format must allow for simple transfer of text, graphics, test questions, etc. to/from any of these formats that apply:

4.3.3.1 another vendor's course support package (Prometheus, in particular)

4.3.3.2 plain text files

4.3.3.3 tab or comma-quote delimited flat files (for input to databases etc.)

4.3.3.4 word processing files

4.3.3.5 databases, including test questions

4.3.3.6 presentation packages such as PowerPoint

4.3.3.7 other test banks

4.3.3.8 XML

4.3.4 Content format will allow easy inclusion of the following file types

4.3.4.1 standard hypertext (HTML/XML)

4.3.4.2 standard ASCII text

4.3.4.3 PDF

4.3.4.4 images (.jpg, .gif, . . .)

4.3.4.5 Video (.mpg, . . .)

4.3.4.6 Audio (.wav, .mp3, etc)

4.3.4.7 ZIP, GZ, BZIP, and other compressed file formats

4.3.5 Open standard for communication with

4.3.5.1 University #1 Library resources (electronic reserves, databases, etc.)

4.3.5.2 Resources at other libraries

4.3.5.3 Existing University database (Datatel) applications for purposes such as importing class rosters of exporting grades

5. System Functional Requirements

The following subsections outline the requirements that are specific to the various system functions.

5.1 System Functions: The system shall be capable of the following:

5.1.1 Information Organization/Delivery

5.1.111 Incorporate web pages for syllabus, assignments, readings, etc.

5.1.1.2 Accommodate links to reference sites with ability to open new window at instructor's option

5.1.1.3 Accommodate image database(s)

5.1.1.4 Automated glossary tool

5.1.1.5 Automated index tool

5.1.1.6 Search tool for course content

5.1.1.7 Student presentations area

5.1.1.8 Support for special characters (foreign language, mathematics, science, music, phonetic, etc.)

5.1.1.9 Capable, well-integrated equation editor

5.1.1.10 Lectures section

5.1.1.11 Projects section

5.1.1.12 Course overview

5.1.2 Communication

5.1.2.1 Bulletin Board

5.1.2.2 Anonymous Bulletin Board

5.1.2.3 Whiteboard

5.1.2.4 Chat (synchronous communication)

5.1.2.5 Anonymous Chat (but identified and logged at system administrator level)

5.1.2.6 Logged Chat

5.1.2.7 E-mail (via existing campus system)

5.1.2.8 Threaded discussion list

5.1.2.9 Videoconferencing

5.1.2.10 Voice chat

5.4.2 Authorization

5.4.2.1 Authorization tools

5.4.2.2 Batch add instructors (from University database)

5.4.2.3 Batch add students (from University database)

5.4.2.4 Security access

5.4.2.5 Variable level of security

5.4.2.6 Guest account creation

5.4.2.7 Security features

5.4.2.8 Assignable administrator role

6.5 Customer Support

6.5.1 Help desk must be available, preferably on a 7x24 basis, for at least central technical staff, at no charge beyond normal annual maintenance charges. Describe this service and any limitations on who may call for help.

6.5.2 If not included in 6.5.1, Help desk should be available, preferably also on a 7x24 basis, for instructors and students. Describe this service, its cost, and any limitations on who may call for help.

6.5.3 On-line problem-solving (at your site or at University #1) must be accessible on 7x24 basis. World-Wide Web interface is preferred. Describe this service.

9.4 Proposal Submission

9.4.3 Ten (10) copies of the Proposal response shall be separately packaged in a sealed envelope and identified with the name of Vendor and the designation, "Sealed Proposal for University #1 Course Support System." These copies shall be delivered to the same place and at the same time as the original proposal.

9.4.4. Two (2) copies of any supplemental material are requested. These copies shall be delivered to the same place and at the same time as the original proposal.

9.13 Timetable

Key Dates/Anticipated Timetable

RFP published and available .....Nov 11, 2002
Vendors Send Questions .....Nov 25, 2002
University #1 Responses to Questions .....Dec 13, 2002
Proposal Delivery Date .....Jan 6, 2003
Selection of Proposal and Award of Contract .....Mar 7, 2003
System Delivery .....Apr 7, 2003
Test Period Begins.....Apr 7, 2003
Acceptance of Test Results .....May 7, 2003
Production Begins .....May 14, 2003
Acceptance of System .....May 14, 2003

11. Costs

The following cost tables are to be filled out and submitted with your proposal. A Microsoft Excel workbook is supplied on diskette for your convenience.

It is assumed your system may be run on a shared server with no penalty in software license costs (including database). If this assumption is not correct, explanation and estimate of cost penalties are required.

	FY03	FY04	FY05	FY06	FY07	Total
INITIAL COSTS						

	FY03	FY04	FY05	FY06	FY07	Total
System Initial Costs						
Initial License, Base (Itemize)						
Initial License, Per Site (Itemize)						
Initial License, Per Course (Itemize)						
Initial License, Per Capita (Itemize)						
Initial License, Modules (Itemize)						
Documentation, Base (Itemize)						
Documentation, Modules (Itemize)						
Training, Base (Itemize)						
Training, Modules (Itemize)						
Installation, Base						
Installation, Modules (Itemize)						
Conversion, Common (Itemize)						
Conversion, Modules (Itemize)						

	FY03	FY04	FY05	FY06	FY07	Total
Server Capital Costs						
Hardware (Itemize)						
Initial License Fees						
Operating System						
Utilities (itemize)						
Installation						
Training						
Startup Supplies (if any)						

	FY03	FY04	FY05	FY06	FY07	Total
Network Costs						
Hubs, Routers, Bridges (Itemize)						
Internal building wiring (Itemize)						
Intra-building cabling (Itemize)						
Network Servers (Itemize)						
Network Software (Itemize)						
Other (Itemize)						

	FY03	FY04	FY05	FY06	FY07	Total
Workstation Costs						
New or Upgraded Workstation Hardware						
Software Licenses, Base Apps						
Software Licenses Related to Proposal						
Network Connections						
Other (Itemize)						

	FY03	FY04	FY05	FY06	FY07	Total
Other Initial Costs (Itemize)	____	____	____	____	____	____
TOTAL INITIAL COSTS	____	____	____	____	____	____

OPERATING COSTS

	FY03	FY04	FY05	FY06	FY07	Total
FY07 Total						
System Operating Costs						
Annual Maint, Base (Itemize)						
Annual Maint, Per Site (Itemize)						
Annual Maint, Per Course (Itemize)						
Annual Maint, Per Capita (Itemize)						
Annual Maint, Modules (Itemize)						
Documntatn Updts, Base (Itemize)						
Documntatn Updts, Modules (Itemize)						
Continuing Trng, Base (Itemize)						
Continuing Trng, Modules (Itemize)						

	FY03	FY04	FY05	FY06	FY07	Total
	____	____	____	____	____	____
Server Operating Costs						
Hardware Maintenance (Itemize)						
Software Maintenance						
Operating System						
Utilities (itemize)						
Continuing Training						
Supplies						

	FY03	FY04	FY05	FY06	FY07	Total
	____	____	____	____	____	____
Network Operating (Reqd New Equipt)						
Hubs, Routers, Bridges (Itemize)						
Network Servers (Itemize)						
Network Software (Itemize)						
Other (Itemize)						

	FY03	FY04	FY05	FY06	FY07	Total
	____	____	____	____	____	____
Workstation Operating Costs						
Software, Base Applications						
Software Related to Proposal						
Other (Itemize)						

	FY03	FY04	FY05	FY06	FY07	Total
Staff Costs						
Staff Salaries (Itemize)						
Fringe Benefits						
	FY03	FY04	FY05	FY06	FY07	Total
Other Operating Costs (Itemize)						
	FY03	FY04	FY05	FY06	FY07	Total
TOTAL OPERATING COSTS						

APPENDIX F

UNIVERSITY #2 BLACKBOARD SURVEY

University #2 - Blackboard Survey - Spring 2006

SUBMIT

Blackboard Survey - Spring 2006

Basic Survey (Page 2 of 4)

This section will take approximately 5 minutes to complete.

6 In a given semester, in which of your classes do you use Blackboard?

	1 None	2 Some	3 All
For eReserves only?	1	2	3
For eReserves and other features?	1	2	3
For features other than eReserves?	1	2	3

7 What are you doing with Blackboard now?

8

What are the strengths of Blackboard?

9

What are the weaknesses of Blackboard?

SUBMIT

Blackboard Survey - Spring 2006

Basic Survey (Page 3 of 4)

10

What would you like to do with Blackboard? Why?

11

I am interested in participating in further discussions about Blackboard and/or course management systems. You can email me at

12

Would you like to provide us with details about your experiences?

- Yes, I want to continue with the survey.
- No

SUBMIT

Survey Page 3

Blackboard Survey - Spring 2006

Detailed Survey (Page 4 of 4)

This section will take approximately 10 minutes to complete.

13

Indicate if you use any of the following types of media in Blackboard. Please check all that apply.

- PowerPoint
- Images
- Audio
- Streaming Audio Reserves
- Video
- Other - Describe:

14

Indicate the factors that influenced you to use Blackboard:

- To enhance my classroom teaching.
- To improve student learning.
- To help with a pedagogical need or challenge.
- To complement my interest in technology.
- To keep up with my peers.
- To meet the expectations of my students'.

- To meet the expectations of my department chairperson.
- Other - Describe:

15

Has Blackboard been a positive enhancement to your face-to-face teaching?

YES NO

Why or why not?

16

When you use Blackboard, has your students' engagement with course materials and/or classroom discussions changed?

- They are more engaged.
- They are less engaged.
- No significant difference.
- Explain:

17

Do you think you are able to accommodate more diverse learning styles among your students since you started using Blackboard?

YES NO

Why or why not?

18

In your experience, how effective is using Blackboard for...

1 Very effective	2 Effective	3 Not effective	4 No opinion

...organizing your course material?

1 2 3 4

...allowing students to submit their work to you?

1 2 3 4

...allowing students to check class progress (grade book)?

1 2 3 4

...providing electronic reserves?

1 2 3 4

...preparing students for class?

1 2 3 4

...encouraging discussions outside of the classroom?

1 2 3 4

...communicating with students (email, announcements, etc.)?

1 2 3 4

...helping students to collaborate on group projects or assignments?

1 2 3 4

...challenging students to learn independently?

1 2 3 4

19

How important are the following features to you when considering using a tool such as Blackboard in your teaching?

1 Very important	2 Important	3 Not important	4 No Opinion

Announcements

1 2 3 4

Syllabus

1 2 3 4

Contact Information

1 2 3 4

Course Documents

1 2 3 4

Integration of Electronic Reserves

1 2 3 4

Quizzes or Assessment Tool

1 2 3 4

Email

1 2 3 4

Digital Drop Box (File Exchange)

1 2 3 4

Discussion Board

1 2 3 4

Groups

1 2 3 4

Grade Book

1 2 3 4

Wiki

1 2 3 4

Blog

1 2 3 4

Accessible from off-campus

1 2 3 4

Integration with eServices

1 2 3 4

Easy to learn and use

1 2 3 4

20

Describe any other features that are important to you when considering using a tool such as Blackboard in your teaching.

21

Indicate what you think are the major advantages of using a tool such as Blackboard in your teaching. Please check all that apply.

- Being able to organize and distribute classroom materials.
- Facilitating communication with students outside the classroom.
- Having course materials readily available to students at any time they want them.
- Having secure course materials, unless I choose otherwise (students must login to access your materials).
- Students being able to see their grades at any time.
- Other - Describe:

22

Indicate what you think are the major disadvantages of using a tool such as Blackboard in your teaching. Please check all that apply.

- Does not integrate with eServices.
- Not enough flexibility - there are limitations in functionality.
- It takes a longer amount of time to develop my class or classes.
- The system lacks reliability.
- It gets in the way of my teaching practices.
- The students know more than I do about the technology.
- Other - Describe:

23

Indicate what would change your mind about using Blackboard. Please check

all that apply.

- Additional training for me.
- Additional training for students.
- Make it easier for me to use.
- Make sure it's available all the time.
- Give me time for developing my class or classes.
- Give me more features.
- Other - Describe:

24

Indicate other online course tools like Blackboard that you have used. Please check all that apply.

- WebCT
- Discus
- On Course
- Wiki
- Sakai
- Moodle
- Blog
- Other - Describe:

25	Do you have any questions, comments or suggestions about Blackboard or course management systems?

APPENDIX G

CODES

University #1

Faculty

Evaluation

Cost

Support

Easy to use

User-friendly system

Pedagogical features

Simplicity

Selection

Positive process
Support vs. cost
Clear process

Adoption

Easy features

Caution

Encouraged to use
Fear of moving courses

Diffusion

Money to **support**
Anxiety to use
Reluctance amongst faculty

Staff

Evaluation

Ease of Use

Resistance to learn
Back end user

Pedagogical Features

Aligned with institution
Adaptation to faculty

Overwhelming

Costs

Security

Selection

Pedagogical Features

Cost

Ease of use

Transitioning courses

Adoption

Slow transition
Cost and funding issues
Interest in features

Pressure to adopt

Converting courses

Diffusion

Organized process
Faculty workshops
Reassured training
Quick process
Attitudes changed
New faculty required to train

Support issues

Administration

Evaluation

Network compatibility

Server compatibility

Demanding process
Meet needs
Technical requirements

Collaborative effort

Intensive

Selection

Support questions

Adoption

Pedagogical features

Incentives to adopt

Diffusion

Faculty Resistance

University #2 Case

Faculty

Evaluation

User friendly

Easy to use

Pedagogically useful

Selection

Support issues

Cost

Adoption

Pedagogical issues

Diffusion

Technical issues

Staff

Evaluation

Costs
Support faculty
Marry people using technology
Small group evaluation
Initiative to jump on board

Investigate new things

Selection

Holistic selection process

Systematic

Features that will support learning
Peer users

Institutional goals

Adoption

Targeted faculty users

Technical concerns

Pedagogical use

Technically frustrating

Pedagogical goals

Easy to use

Training

Support

Resistance to change

Diffusion

Conducted Workshops

No real goals

Overwhelming

Concerns with support
Incentives to **use**
Support in training
Personnel and resource concerns
Pedagogical feature problems

Administration

Evaluation

Broaden focus of technology
Issues with use
Support and reliability of product
Focus on Pedagogy

Selection

Costs-non factor

Adoption

Challenge of Transitioning courses

Support

Influence from early adopters

Diffusion

Pilot tests

Workshops

Support from implementation and technology group