

DISSERTATION

FACTORS AFFECTING INSTRUCTOR UTILIZATION OF AN ONLINE COURSE
MANAGEMENT SYSTEM

Submitted by:

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In partial fulfillment of the requirements

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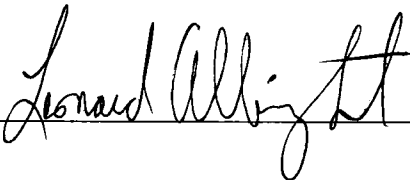
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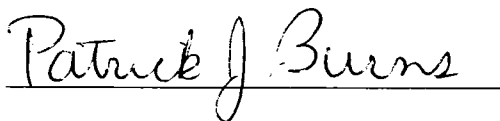
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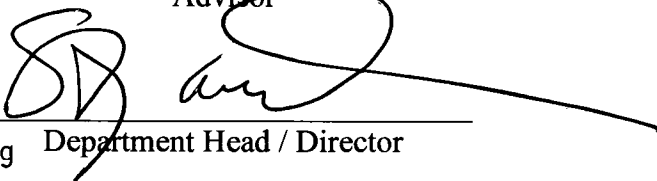








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ABSTRACT OF DISSERTATION

FACTORS AFFECTING INSTRUCTOR USAGE OF AN ONLINE COURSE MANAGEMENT SYSTEM

This study identified factors which contributed to greater utilization of a course management system (CMS) by instructors offering courses for academic credit at a large, public research university. The study used a survey to collect information regarding instructor utilization, motivations for usage, perception of effective use, barriers to usage, and a number of demographic and professional characteristics including experience, professional development, academic discipline, satisfaction, workload, and several demographic characteristics.

The amount of instructor utilization was analyzed for statistical significance between the respondents on a variety of independent variables including motivation, experience with use, years of experience, academic affiliation, and satisfaction with support. There were statistically significant differences in motivational factors, barriers to use, and perceived effectiveness. In addition, satisfaction with support and experience using the course management system had significant positive correlations with utilization. Lastly, perceived level of expertise with using the system also had a significant correlation with utilization. There was no significant difference in utilization based upon years of teaching, highest degree earned, age, or academic rank.

The descriptive results of the survey showed most of the instructors used the course management system to aid in the delivery of a traditional, on-campus course, not to deliver a course strictly online. The instructors were an average of 46 years of age with 11 years of teaching experience at this institution, they had an average of 1.13

academic appointments prior to their current positions, and most (66%) of the 178 survey respondents were assistant, associate, or full professors. Lastly, a number of themes were identified through the follow-up telephone interviews including: interest in additional on-demand how-to type training, a high level of confidence in their skill level related to using the CMS, and the need for effective support structures for assistance with the use of technology.

In summary, this study has resulted in the identification of several important factors related to the usage of a CMS. Instructors using a CMS are motivated by improved experiences of their students, convenience, and professional or financial incentives. Lack of understanding related to the features and functions, as well as lack of value to students, are the primary barriers which keep instructors from increased utilization. The longer they have been using the CMS, the more likely they are to utilize more functions of the technology, however their age and level of professional advancement is not a significant factor related to their utilization.

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CHAPTER 1: INTRODUCTION

There is little argument about the tremendous impact of information technology on the world during the past 20 years. Business, education, and government alike have changed the ways in which they provide services, communicate, and manage information. As the rapid development and infusion of information technology has continued, organizations have struggled to adapt. It is not surprising that, even after 20 years, these organizations have not yet fully integrated, and in some cases even fully implemented, information technology as a strategic component of their business functions.

Duderstadt (2004) implies institutions of higher education are among the slowest adopters of this type of strategic, fundamental change in the following quote:

...today's research universities may be like bathers sunning on the beach in the warm glow of the complacency engendered by past success, unaware that the gentle surf lulling them to sleep is the precursor of a 100 foot tsunami of technology-driven market forces beyond the horizon which could sweep over them before they can react or escape.

Person (1994) calls the establishment of campus computing a critical part of the academic enterprise and the most important development to have taken place in higher education over the last several decades. Despite similar statements made over a decade ago, many institutions are still struggling not only with the integration and adoption of technology by faculty, but simply with the creation of an information technology management structure (Zastrocky, 2000). Even though some institutions are grappling with the creation of this structure, Zastrocky urges Chief Information Officers (CIOs) of colleges and universities to be strategic contributors to the business strategies. In the ten years between Person's

statement about campus computing and Duderstadt's ominous prediction, the very idea of what constitutes technology has dramatically changed. Information technology is not simply a factor in improving efficiency, but an agent prompting fundamental change. This rapid technological advancement contrasted with some inability on the part of large, complex organizations such as universities to change, makes adoption and integration difficult. Within higher education, there still exists a fundamental debate about the extent to which technology should be adopted and/or integrated.

In contrast to Duderstadt's (2004) statement about complacency in higher education, some believe the value of technology has been overstated (Carr, 2003), and the impact has been far less than it should have been considering the vast resources which have been invested (Ayers & Grisham, 2003). Ayers and Grisham argue that despite the tremendous investments in infrastructure, systems, and support, the nature of the scholarly work in the classroom has not changed. They further discuss that the likelihood of this resistance to change is from the most prestigious institutions and individual faculty, therefore creating a growing resistance to the adoption of technology. More specifically, those with the most prestige and greatest resources, argue Ayers and Grisham, have lost the incentive to innovate.

While there is great value in the discussion of exactly the extent to which technology should change higher education, its impact is evident. The most recent survey by Caruso (2006) shows an astounding number of students and faculty utilizing technology. It is this trend of usage and resource investment which necessitates a better understanding of specifically how technology is impacting higher education as well as factors that influence its adoption and utilization. While many authors have investigated and characterized the organizational impact, quantified the value, and speculated the future in terms of information

technology's influence on organizations (Allen, 2003; Dillman & Hicks, 1990; Duderstadt, 1998; McClure, 1992; Ramirez & Melville, 1998), there is still a need to better understand how information and instructional technology is being utilized within institutions of higher education.

Institutions of higher education have continued to adopt and integrate technology during the past decade, and this technology has permeated all aspects of campus operations, but the area of instruction and course delivery has experienced some of the most significant changes. The changes in how courses are delivered, taught, and received have been characterized by Gilbert and Green (1995) as a significant evolutionary shift rather than a sudden revolution. There has been significant research investigating the impact of technology in higher education, including greater access, efficiency, demand by students, cost effectiveness, faculty satisfaction, student satisfaction, student perception, degree of technology use by faculty and students, demographic trends of technology use in faculty, learner characteristics, and student persistence in using online education (Tsai, 2001; Myers, 2003; Fox, 2000; Lao, 2002; Halsne, 2002; Vessell, 2000; Huang, 2001; Tello, 2002; Naert, 1997; Buzhardt, 2002; Iken, 2000). Despite this breadth of research, additional research is needed to provide a better understanding of the specific issues of large, complex technology systems. This is especially true with respect to online course delivery and the adoption and utilization of course management systems. Perhaps more than any other technology-related system, the course management system has been deployed as a one-size-fits-all system with little understanding of or appreciation for specific needs of the content, instructors, or students.

Course Management Systems

Online course delivery has continued to evolve during the past decade as the rapid development of technology and infrastructure has advanced. The technology systems used to facilitate the development of online courses are widely described in the literature as course management systems (CMSs). Course management systems provide a structure in which faculty or other content providers develop courses for online delivery. Typically, CMSs are implemented to provide a number of services such as content structure, assessment tools, announcements, or to respond to peer and/or administrative pressure (Carmean & Haefner, 2002; Oliver, 2001). The combination of these pressures has led to the development of many commercial as well as open source CMSs. An overview of these applications (Marsh, Price, & McFadden, 2000) in 2000 led to the identification of twelve commercially available systems. These early versions often emphasized tools for use in the development of the course itself rather than the student experience (Oliver). Since 2000, there have emerged two leaders in the area of CMSs providing services to higher education. Specifically, Blackboard and WebCT emerged as the most widely used CMSs in higher education environments. In July of 2005, these two companies announced they would merge as Blackboard Incorporated. Much of the impact of this merger is still unknown, but more details, including their developmental history will be discussed in greater detail in Chapter 2.

Statement of the Purpose

Throughout the development and early integration of information and instructional technology, much research has been conducted to investigate the general impact on instructors, students, and institutions. As an example, Green (2000) conducted a survey of higher education institutions in 2000 regarding, in general terms, the use of technology services such as email and websites. Though he notes only 15% of the institutions were

using course management software, nearly 58% had developed standards for its use which indicated its growing importance. A study by Kumari (1999) investigated this issue using a national survey of faculty to discover how technology was being used by investigating three different relationships: teacher-student, student-student, and student-resource. Though this study provided interesting and valuable data, it was somewhat limited with a focus on the relationships and without any complete data on the utilization of course management systems.

A study by Park (2003) attempted to better understand faculty adoption and utilization of web-assisted instruction. The author applied structural equation modeling in an effort to understand specific factors that influence the adoption of such technologies by faculty. Though the results were valuable, the author also called for greater understanding of the use of web-assisted instruction by faculty. Specifically, Park states "...a new measurement instrument for (faculty level of use) should be able to assess faculty members' actual levels of (use of web assisted instruction)..." (p. 73).

The call for this type of research has been made by numerous authors, including Huang (2001) and Tello (2002). Specifically, attempting to understand how, in terms of web-assisted instruction, the use by faculty varies as it relates to discipline and demographic characteristics. Though much effort has been given to understanding the factors involved in adoption, effectiveness, and other pedagogical factors, it is an understanding of how web-assisted instruction is being used and by whom that is critical to colleges and universities. As web-assisted instruction, and therefore course management systems evolve, colleges and universities need more information and understanding in order to provide appropriate technology support, professional development, and pedagogical resources to their faculty.

This issue has been raised by (Duderstadt, Atkins, & Van Houweling, 2002). Duderstadt (2002) also explains that colleges and universities have invested significant resources to provide course management systems without any clear understanding of how they are used or utilized by faculty.

Most recently, Caruso (2006) describes both the need and value for a better understanding of how course management systems are utilized. She further explains that a better understanding of how instructors use such systems allows for more successful deployments of CMSs, in addition to the inherent benefit this understanding brings to the institution and its students. With greater understanding of utilization, institutions, as well as individual faculty, could make a significant contribution to the areas of professional development and online pedagogy. For example, recognizing that engineering faculty and students are utilizing a combination of CMSs and traditional instruction, whereas a psychology course is using message boards and email, make it easier for the faculty, students, and the institution to design courses, provide training, and prioritize support staff, ultimately improving the learning experience.

The purpose of this study was to identify the level of course management system utilization by instructors as they provide web-assisted instruction. Specifically, this study identified factors related to an instructor's motivation to use the CMS, perceived barriers to usage of the CMS, and perceived effectiveness of the CMS which were predictive of increased utilization. In addition, levels of utilization were compared between instructors based upon experience, professional development, academic area, satisfaction, workload, and other demographic characteristics. Developing a better understanding of variables which predict utilization or significant differences between instructors may lead to more effective

use of existing resources as well as more information about the potential need for additional resources such as faculty training, additional support staff, and infrastructure. In addition, it may identify areas of need within the course management systems.

Research Questions

The primary research questions for this study are:

1. What factors related to instructor motivation, barriers to effective use, and perceived effectiveness of the CMS are predictive of increased utilization?
2. How do levels of utilization vary based upon experience, professional development, academic discipline, satisfaction, workload, and demographic characteristics?

Definition of Terms

The following definitions apply for commonly used terms:

Course Management System – an electronic, web-based system used to develop and deliver instructional content. For the purposes of this study, the course management system used by instructors at Colorado State University was WebCT.

Open Source – freely distributed software which can be easily modified by changing its source code.

WebCT – a specific type of content management system utilized by many institutions of higher education. As of the July 2005, this company and the product were acquired by Blackboard Incorporated. However, the installation used by Colorado State University during this study was WebCT.

WebCT Course – a specific course offering within the WebCT Course Management system. For the purposes of this study, this course must have been considered “active”. It

must have been accessed, be associated with a course offering University academic credit, and be populated with students during the Fall 2006 semester.

WebCT Usage – currently offering a course within the WebCT course management system. For the purposes of this study, all participants are considered to be using WebCT because they are identified as having an active course.

WebCT Utilization – the extent to which the features and functions of WebCT are being used by an instructor.

Blackboard – a specific type of content management system utilized by many institutions of higher education.

Significance of the Study

The implementation of CMSs in institutions has significantly impacted faculty as noted by Morss (1999), but there are many unanswered questions related to the delivery of online courses. This may explain why some believe the impact of this technology on universities has been far less than what should be expected from such a powerful change agent (O'Donoghue, Singh, Caswell, & Molyneux, 2001). The reason for the relatively limited impact, argues O'Donoghue et al., is the lack of skill and acceptance by faculty. However, there are likely various reasons why faculty have been reluctant to adopt these changes. In addition to skill level in the use of technology, there also has been concern about the lack of “personalized” interaction, a change or reduction in the role of faculty, and a concern that use of such technologies will reduce their numbers and salaries (Holden, 1999).

In addition to reluctance of faculty to adopt instructional technology, there are a number of other pedagogical impacts of course management systems. For example, the quantity and quality of interaction between students and instructors is a significant issue

(Procter, 2002). The use of technology in the context of CMSs changes this interaction in a variety of ways. For instance, course content can now be delivered synchronously, asynchronously, or as a combination of both methods. Prior to web-based courses and the subsequent CMSs, distance learning used primarily asynchronous methods such as videotape or printed materials (Hazari, 1998). With the development of more sophisticated technology such as bulletin boards and chat rooms, it is now possible to have synchronous, or a real-time, interactive, learning environment in an online course. Much research has been conducted to examine the usage of individual components of CMSs such as bulletin boards (Carmichael, 2001; Ingram, Conley, McDonald, Parker, & Rivers, 2003), and to understand the students' perceptions of online courses (Burgess, 2003; Ingram et al.; Mende, 1999), but the full impact of changes in content delivery are unknown and there has been little research comparing the utilization of such technologies based upon differences among instructors.

Though there has been little specific research on the impact of course management systems, there has been significant work regarding the impact of technology and online course offerings on faculty activities and perceptions (Huang, 2001; Patrick, 1997), which lend insight into the broader issue of pedagogical implications. Common themes throughout the literature include the concerns of faculty regarding increased time necessary to establish online courses (Austin & Mahlman, 2000), the availability of resources in terms of technology expertise and instructional technology awareness (Barker, 2002), the understanding of the change in the faculty role from content provider to facilitator (Barker), and the appropriate integration of the CMS into the specific course content to ensure communication and sharing of information consistent with any quality course (Austin & Mahlman).

Researcher's Perspective

The researcher of this study was also an employee of Colorado State University. In addition to being a doctoral student in the School of Education, the researcher held the position of Assistant to the Dean for Information and Instructional Technology in the College of Applied Human Sciences. In this role, the researcher did not directly interact with instructors as they utilize the WebCT course management system. The general support of instructors within the College of Applied Human Sciences, including assistance with the development of online courses, was the responsibility of the researcher, but indirectly in that the individual responsible for instructor support of WebCT development was supervised by the researcher. It is likely instructors within the College of Applied Human Sciences were included as part of the sample and were familiar with the author. Furthermore, the author had been an employee and student of Colorado State University for over ten years. This may have increased the likelihood of familiarity with an individual who was included in the sample. The letter (Appendix B) and email (Appendix C) included with the survey explicitly outline the voluntary nature of the survey and corresponding research. Because support of online course development at Colorado State University and within the College of Applied Human Sciences was not the primary responsibility, the survey response should not be significantly affected.

CHAPTER 2: LITERATURE REVIEW

This literature review describes the historical development of information technology within large, complex organizations. It then illustrates the specific impact of information technology as it developed a more specific focus on instructional technology within institutions of higher education, including organizational change, policy implications, resources, costs, and affect on students and faculty. To further define the impact of instructional technology and to define the scope of this research, the impact and efficacy of course management systems is presented. Specifically, a review of the development and evolution of course management systems within higher education, data related to the effectiveness of course management systems, and the current implication of such systems on higher education is presented.

Evolution of Information Technology

The diffusion of information technology occurred in the early 1960's with the invention of commercial mainframes (Cox, 1987). Throughout the 1960's and early 1970's the most significant advancements were the development of the relational database models by IBM scientists and the separation of software from operating systems (Cox). The late 1970's and early 1980's brought the move toward mini computers, micro computers, and ultimately distributed data processing (Cox), though most institutions continued to rely heavily on the mainframe computer during this time (Taylor & Eustis, 1999). Not until the early 1980's did IBM release the specifications for the personal computer network, and desktop computing began to gain wider acceptance. The move of information processing power from a single, centralized source to multiple, decentralized environments created the basis for the development of most current information

technology models of implementation (Michalak, Facelli, & Drew, 1999). This model of development was particularly remarkable at research universities in the areas of science, engineering, and medical specialties, and it was these fields of study that were largely responsible for the funding and development of computing capabilities (Michalak et al.). As these microcomputers continued to appear in various areas throughout research universities, there was some interest in increasing the communication between these systems to enhance, and perhaps change, the daily administrative tasks (Heterick, 1981; Michalak et al.).

One author offered suggestions, insights, and even predictions for higher education in terms of the impact of information technology on its function during the 1980's. Heterick (1981) suggested several applications of information technology for universities as a means to improve communication, expand the constituency of the institution, and to improve efficiency. His insight into the importance of interconnected computing systems was astonishingly accurate. Heterick predicted the need to move toward an electronic age of communication, virtually eliminating such administrative tasks as memorandums. He called for greater sharing of information, which would allow for better decision making. These suggestions go beyond just the application of technology and suggest new types of organizations through greater distribution of information and shared decision making. This theme of shared decision making and empowerment was made by organizational and management theorists (Nadler, 1992; Senge, Kleiner, Roberts, Ross, & Smith, 1994) as well as institutional leaders (Duderstadt, 1998), but not as early as 1981.

The concept of empowerment and shared decision making are fundamental to Senge's et al. (1994) introduction of learning organizations. Though Senge did not explicitly identify technology as an influencing factor for migration of an organization to this model, he implied many of the same principles as Heterick (1981). The empowering of the individual, sharing of information, and the creation of collaborative networks within organizations are remarkably similar. During the early stages of technology development within organizations, the primary focus was on the automation of processes. This would soon change as technology added the dimension of information.

Implementation of Information Technology

As the functionality of information technology continued to evolve, so too did the impact it had on the organization. In the early phase of implementation, information technology was seen very much as a tool of automation (Wigand, 1985). The emergence of networks, the personal computer, and other tools, created a call for the 'integrated office' by Wigand. He predicted the power of the integrated office would speed communication and reduce paper flow, thereby achieving gains in productivity. Though this was true to an extent, it limited the role of technology to that of a machine. The idea that computing would automate was correct, but the systemic impact was far beyond process improvement. The implementation of technology not only changed how tasks were performed; it changed the entire model of how business is done, for what purpose, and by whom.

Information technology has become not just another new technology. The information dimension enables business process reengineering in modern organizations (McGee, Prusak, & Pyburn, 1993; Wang, 1997). As an example, Wang uses the

evolution of electronic communications. Acting as more than a new tool, electronic communications are change agents as they allow individuals to overcome the limitations of time and distance. Again there are significant parallels with Senge's et al. (1994) learning organization in that information can be shared with many thereby allowing a more dynamic, efficient, organization (Senge et al.). In contrast to Wang's example of electronic communication becoming a change agent, the current leaders of organizations during this period were not yet appreciating the implications.

In a contribution to Peter Senge's Fifth Discipline Fieldbook (1994), the former Chief Executive Officer of Hanover Insurance Company and then member of the Massachusetts Institute of Technology's Center for Organizational Learning Board of Governors, presented four abilities needed by the next generation of leaders. William O'Brian listed empowerment, systemic understanding, voluntary followership, and communication as the four critical areas the leaders of future organizations will need to address. It is his description of the importance of communication that contrasts so markedly with the characterization by Wang (1997). O'Brian states that the single greatest learning tool in an organization is communication – more important than computers or sophisticated research. This brief statement implies a fundamental difference in the perceived role, and therefore value, of information technology. Communication and technology are viewed separately by O'Brian. The implication that communication in future organizations is separate from technology is an example of why many organizations have adopted and implemented information technology, but they have not yet integrated it into either their organization or business process.

Integration of Information Technology

Organizations are currently struggling to move from implementing to integrating technology, and the impact is a critical factor in considering the organizations of today. McGee et al. (1993) and Wang (1997), for example, implied the basic value of information technology investments create no more benefit than do machines themselves. Perhaps as the development of technology has allowed, or as the implementation has evolved toward integration, this attitude changed. Information technology may, in fact, be critical in that it can change the value of the information by making it more available and useful (Bernbom, 1999). The discussion regarding the value, either real or perceived, of information technology within an organization has recently become a significant one (Devaraj & Kohli, 2003; Ramirez & Melville, 1998; Sabyasachi & Chaya, 1996). Though the literature contains many references regarding the value of information technology, the debate was renewed in 2003 by an article in Harvard Business Review (Carr, 2003).

Carr (2003) stated that many organizations had overestimated the strategic value of information technology and questioned its importance. The definition of value with respect to information technology in an organization has been defined as productivity enhancement, profitability improvement, cost reduction, and competitive advantage, but recently the question of value was investigated comprehensively in an integration of quantitative empirical research, conceptual and empirical studies assessing the competitive advantage of information technology, and qualitative empirical research assessing general performance impacts (Melville, Kraemer, & Gurbaxani, 2004).

This extensive study analyzed the value of information technology specifically in terms of organizational performance (Melville, Kraemer, & Gurbaxani, 2004). The

researchers developed a theoretical framework for the discussion of information technology value within an organization. Using the resource-based view (RBV) of the firm, with grounding in economic and management theory, the authors surveyed the available empirical research related to information technology value to an organization. Though the details of this model are beyond the scope of this discussion, the general conditions used by the RBV model to determine a sustainable competitive advantage are value, rareness, imitability, and non-substitutability. Assessing information technology using the RBV model in the context of a series of research questions, the authors concluded there was evidence to support an economic value of information technology as an organizational component. In contrast to Carr's (2003) assertion, the authors concluded the value of information technology is in offering a number of benefits including flexibility, quality improvement, and cost reduction. Furthermore, they submit there are synergies developed between technical and human information technology resources that create competitive advantages for organizations.

Articulating the need for this change within higher education was begun through an effort by the National Academy of Sciences (i.e., the National Academy of Science, the National Academy of Engineering, the Institute of Medicine, and their umbrella research organization, the National Research Council). In terms of the struggle to integrate information technology, it again is the value which was the significant issue. Moving from the early perceptions of information technology as tool, and then as a means or mechanism to accomplish a task more efficiently, and ultimately to a strategic, integrated component of an organization requires the belief in the fundamental value. In

general, a three-year investigation was conducted to better understand how technology would likely affect research universities (Duderstadt, 2004).

The first phase of the Information Technology and the Future of the Research University (ITFRU) Project was to identify technologies that may have a major impact on research universities, examine the impact on the teaching, research, and service activities of these institutions, and determine the role, if any, of the federal government and other stakeholders in protecting the role of research universities (Duderstadt, 2004). The project included over 100 leaders in education, government, and the information technology industry including the presidents or chancellors, some emeritus, from the Universities of Michigan, North Carolina State, Cornell, and Vanderbilt. The results of this broad, collaborative investigation include three general findings. First, the development of information technology will not likely continue at the same rate, but will accelerate. Specifically, the number of people connected, the information managed and stored, and the quantity of the technology itself will all grow exponentially during the next 20 years. The second finding was that the impact of information technology on the university is likely to be “profound, rapid, and discontinuous,” and it will affect teaching, research, and service, organizational structure, culture, finance, and management. The development of infrastructure along with the change in the culture and organizational structure will affect the way in which information is collected and shared, thereby changing all aspects of the learning industry. The final finding of the ITFRU was that procrastination and inaction are “dangerous” courses for universities in a time of such rapid change. The authors suggest that the university culture and organization will continue to operate similarly to how it does now for the next decade, but the demands of

consumers and the emergence of competitors in the marketplace will force significant change. The predictions by ITFRU are significant, and it may be the course management systems which act as a primary change agent.

The Evolution of Course Management Systems in Higher Education

Institutions of higher education have continued to move toward offering online or web-based courses during the last decade (Burgess, 2003; Ely, 1989; Proctor, 2002; Smallwood & Zargari, 2000). In a recent survey by Allen and Seaman (2003), over 80% of the nearly 1,000 degree granting institutions surveyed now offer courses with all or a significant portion of content online. The move toward online courses and programs of study has been driven by a combination of demand for increased access to higher education and a significant advancement in technology (Twigg, 2003). Specifically, the evolution of course management systems (CMSs) has presented more efficient development of a variety of online courses and programs.

Course Management Systems

Online course delivery has evolved during the past decade because of the rapid development of technology and infrastructure. The systems used to facilitate the development of online courses are widely described in the literature as course management systems (CMSs). Course management systems provide a structure in which faculty or other content providers can develop courses for online delivery. Typically, CMSs are implemented to provide a number of services such as content structure, access to assessment tools, to make announcements, or in response to peer and/or administrative pressure (Carmean & Haefner, 2002; Oliver, 2001). The combination of these factors has led to the development of many commercial as well as internally developed CMSs. An

overview of these applications by Marsh, Price, and McFadden (2000) led to the identification of 12 commercially available systems. These early versions often emphasized tools for use in the development of the course itself rather than the student experience (Oliver). Since 2000, the number of providers may not have decreased, but there have emerged two leaders in the area of CMSs providing services to higher education. Specifically, Blackboard and WebCT are two of the more popular CMSs used in the higher education environment. These systems have many similarities, and it is helpful to understand their developmental history.

WebCT was developed by Murray Goldberg, a faculty member at the University of British Columbia, who had an interest and background in both teaching and computer science (“Murray Goldberg,” 2005). In 1995, Murray designed the first version of WebCT in response to the growing need of instructors to have a simple method for leveraging their teaching with online components.

By 1997, another company was being formed. Blackboard was created when a group affiliated with Educause partnered with an existing faculty-student team at Cornell University who already had begun developing a course management system scalable to the online course delivery needs of a university (“Our History,” 1995). Today, Blackboard offers its CMS to a variety of institutions including higher education, secondary schools, and government agencies. Both WebCT and Blackboard have their origin in higher education as the result of a demand from faculty to easily develop supplements or entire courses online, and this similar functionality led to the merger of these companies in 2006.

The current development of course management systems, however, is entering a new phase. As commercial products have evolved and the general purpose of the technology has migrated toward the educational experience as well as the course development tools, a “fourth wave” of CMSs is emerging (Boettcher, 2003). These systems are based fundamentally upon the Open Knowledge Initiative (OKI) and the associated design standards (Boettcher). There are a number of examples of these types of CMS systems, including Stellar from Massachusetts Institute of Technology, and Sakai. Sakai, for example, is a multi-institutional initiative to develop and deploy a CMS to provide not only online instruction, but also a forum for research collaboration (“About Sakai,” 2005). As these open source initiatives continue to evolve, this will create a new phase of implementation, and therefore additional concerns as higher education assesses the training, pedagogical, and policy implications of yet another generation of CMSs. Regardless of the specific technology, institutions are continuing to move toward online course delivery at a remarkable pace.

Usage Trends

There is little question that the number of online courses and the number of students in them has grown. The rate of the increase, however, is staggering. According to a 1995 study by the National Clearinghouse for Educational Statistics (NCES), one-third of higher education institutions offered distance education courses, and video was still the most frequently used method for delivering distance courses (Howell, 2000). By comparison, the NCES (“U.S. Department of Education,” 2002) reported in 2001 that 90% of the estimated 2,320 institutions offering distance education courses offered them via online courses. Looking more broadly and recently at higher education, the Sloan

consortium surveyed 3,033 degree granting institutions in the United States (Allen & Seaman, 2003). Of the 994 responses received, 81% of institutions offer either completely online courses, or a blended course delivery option with both traditional and online components. Perhaps even more remarkable, 34% of the respondents offer entire programs of study resulting in the awarding of degrees via online course delivery.

These data present an impressive trend in the usage of online course delivery as either a supplement to, or a replacement for, traditional higher education courses. A study by Morss (1999) sought to look more specifically at the usage trends at a single, private university. Using survey data collected over three semesters covering 60 classes, the researcher provided insights about student demographics, student resources for WebCT use, student opinions of the WebCT tools, student reactions to using WebCT, and student recommendations on continued use of WebCT. The surveys were made available to only 700 of the 1,000 students enrolled in courses utilizing WebCT due to resistance by some faculty. The completion of the surveys was not mandatory, but nearly 500 responses were received. The researcher presented several subjective conclusions from this survey including the general satisfaction of students and their willingness to use WebCT in the future. There are significant limitations of this study identified by the researcher in both its methodology and scope, but a number of important issues were identified for future research and could be used to further develop the information related to trends in usage. First, students had a stated preference for traditional printed text over the WebCT-based material. A better understanding of why students prefer traditional hard-copy text will be necessary if online course delivery will continue to grow. Morss also calls for a detailed assessment of the selection of WebCT tools by faculty as it relates

to subject matter and course objectives. This is an important pedagogical issue that also must be considered by course developers, faculty, and even university administrators as curriculum and resources are considered. Again, the policy and resource implications related to understanding these questions are significant. For example, the scope of instructional technology infrastructure and support may be quite different depending upon the type of CMS tools necessary for a given course. Each of these issues has implications for student usage, student satisfaction, policy, and faculty training, but perhaps most significant is the impact on teaching.

Pedagogical Implications

The implementation of CMSs in institutions has significantly impacted faculty as noted by Morss (1999), but there are many unanswered questions related to the delivery of online courses. This may explain why some believe the impact of this technology on universities has been far less than what should be expected from such a powerful change agent (O'Donoghue et al, 2001). The reason for the relatively limited impact, argues O'Donoghue et al., is the lack of skill and acceptance by faculty. There are various reasons why faculty have been reluctant to adopt these changes. In addition to the issue of skill in the use of technology, there also has been concern about the lack of “personalized” interaction, a change or reduction in the role of faculty, and a concern that technology will reduce their numbers and salaries (Holden, 1999).

In addition to reluctance of faculty to adopt instructional technology, there are a number of other pedagogical impacts of course management systems. For example, the quantity and quality of interaction between students and instructors is a significant issue (Procter, 2002). The use of technology in the context of CMSs changes this interaction.

Specifically, what are the implications of a course using primarily synchronous methods such as chat, primarily asynchronous methods such as bulletin boards and email, or a combination of both to deliver content? Prior to web-based courses and the subsequent CMSs, distance learning used primarily asynchronous methods such as videotape or printed materials (Hazari, 1998). With the development of more sophisticated technology such as bulletin boards and chat rooms, it is now possible to have synchronous, or a real-time, interactive learning environments in an online course.

This consideration with respect to instructors of online courses was presented in a case study by Barker (2002). After the development of a complete online curriculum, the author provided three basic observations about the move from a traditional to an online course. First, keeping the technology component as simple as possible was important for both the students and the faculty. Second, the courses were more effective as a blended model of delivery as this helped create a relationship among the students as well as between the students and the instructor. The author also noted the importance of faculty understanding their changing role in an online environment from being the source of content to being mentors, guides, and evaluators, which is a theme identified by previous researchers (Barker; Lee, & Dziuban, 2002).

Policy Implications

With the impact on the role of faculty and the pedagogical implications caused by online courses, institutions have struggled just to manage change in terms of guidelines and policies that facilitate the demands now placed on faculty. Because of the demands being placed on institutions to offer a greater variety of courses to a broader, more diverse constituency, faculty have been encouraged to use technology and CMSs (White

& Myers, 2001). This potential conflict between the traditional faculty reward structures of universities and a new set of demands has resulted in difficult policy concerns for many institutions. Faculty have specifically identified lack of time and heavy instructional load as barriers to the use of CMSs to deliver courses, but they also state that instructional support in the use of CMSs is more satisfying than institutional rewards (Huang, 2001). This theme of instructional support is repeated throughout the literature as an important, if not a critical, component to encourage faculty in the use of instructional technology and CMSs (Albright, 1996). Examples of specific policy implications have not been clearly documented in the literature, but can be implied by understanding the concerns of and impacts to faculty.

Though early in the evolution of online course delivery, Albright (1996) outlines a series of “faculty rights” related to the use of instructional technology. The following seven rights were identified: a reward system that places high value on teaching and innovative teaching methods in addition to research activities; an institutional climate that encourages the use of technology; an institutional commitment to technology in university planning documents and budget appropriations; an administration that sets the pace via its own use of technology; a campus wide instructional technology support infrastructure; easy access to technology-based display systems in the classroom; to course development resources; to consultation and production support services, and training programs related to classroom technology applications. Albright presented these rights after completing a review of the literature in an effort to understand how instructional technology could be better implemented and used by faculty. There are two consistent themes throughout these seven rights; a need to integrate technology rather

than simply to use it, and a need for the institution to value teaching in its reward system and support structure.

Though the seven rights were presented relatively early in the evolution of instructional technology, many of these same issues are currently identified in the literature as barriers to its effective use (White & Myers, 2001). These identified barriers in the adoption of instructional technology should serve as guidelines for institutions as they develop policy. By creating incentives or rewards, some faculty may be more inclined to adopt appropriate instructional technologies, seek innovative methods of course delivery, and ultimately move the institution toward a more integrated model of instructional technology use. Beyond simple incentives and even policies, however, is the potential need for fundamental change in the organizational structure of the university.

Organizational Impact

As many authors have found, the implementation of instructional technology requires significant support structures and resources beyond the individual faculty charged with online course development (Albright, 1996). This paradox between the need for the university to be innovative versus the existing administrative structure that defines productivity in a standardized way was identified by Burnett, Skamp, and Ellis (2002). Organizational change as well as a fundamental change in mission and attitude have been called for by a number of researchers examining the structure of universities (Cornell, 1999; Hopper, 1999; Kershaw, 1996). Common themes among these authors are the need for universities to adopt a more businesslike approach (Cornell) and to adopt a climate that fosters innovation and technological integration (Burnett et al.; Hopper).

One organizational change common among Universities during the past decade, perhaps indicating a move to support innovation and integration, is the creation of a Chief Information Officer (CIO) position. Barone (1989) argued relatively early in the evolution of technology that the role of the CIO should be to form linkages between technological infrastructure and academic goals. This, however, has not been uniformly adopted in institutions of higher education as CIO positions vary significantly (Zastrocky & Schlier, 2000). Because of the variation in how the CIO functions in the university environment, this may not be indicative of the organization's support of instructional technology. There is little information in the literature discussing organizational change as it relates specifically to higher education's support of instructional technology. Related, perhaps, both to organizational change and policy implications are the associated costs of implementing course management systems

With such a broad adoption of information and instructional technology within higher education, billions of dollars are being invested. Though true integration, and more specifically, utilization, remains somewhat indefinable, the costs have been estimated. Olsen (2004) recently estimated colleges and universities would spend over \$5.2 billion on information technology in the 2003-2004 academic year. With this type of investment, even minor refinements in terms of better understanding utilization could provide tremendous cost savings to institutions.

After describing the systemic issues related to instructional technology's impact in higher education in terms of policy, organizational structure, and cost, it is important to look at more specific applications of how online courses and CMSs are affecting students.

Student Interaction

Much of the motivation to implement Course Management Systems has been to reach a different type of student. Many of the students who utilize CMSs are those who are participating in primarily online courses and have chosen this type of format because of the flexibility it provides either in terms of their schedule or their location (Burgess, 2003; Mende, 1999), or because of an increased need for life-long learning and additional certifications (Paulson, 2002). This autonomy is an important asset of online instruction, but also can be a liability. One of the significant factors in student satisfaction with online courses is the ability to communicate effectively and share information (Ingram, 2003). And for those situations that provide an entire curriculum online, a sense of community also is an important factor for student satisfaction (Barker, 2002).

A more detailed description of student interactions was provided by Carmichael (2001) in a case study. Using a WebCT course module of an Information Technology in Business course, the author investigates the usefulness of a variety of WebCT tools in terms of the students' ability to interact. Because of the methodology, the number of students was relatively small, but a critical theme was identified. The author concludes that the course should be redeveloped to leverage only the key components of the resource, which is WebCT. Furthermore, the author states that the student must be the main "arbiter of successfulness." This study is unique in that it specifically identifies components of the WebCT software, seeks to understand their usefulness specifically with respect to student interaction, and then concludes the learning resource, which is WebCT, may not adequately focus on the student. The approach to this study is valuable in that it uses a known factor identified by students as a measure for a successful online

course delivery, and assesses a specific course on this attribute. A likely progression from this study is a better understanding of the successes and failures of CMSs such as WebCT and what factors influence the outcome.

Impact of Online Courses and Instruction

Research has clearly shown online course delivery is not simply an adapted version of a traditional course (Johnson, 1999). Instructors have faced significant struggles in moving to online instruction because of the time considerations and skill requirements (White & Myers, 2001). Furthermore, there are considerations with respect to administrative support, appropriate media, communication strategies, programmatic impact, student needs, and the role of the instructor (Johnson; Lee & Dziuban, 2002).

In an effort to better understand how a course may impact the role of the instructor as well as some of the issues related to the migration of a traditional course to online delivery, Shoenfeld-Tacher, McConnell, Schultheiss, Bowen, & Jones (2002) examined an existing, traditionally taught science course. By offering the same course content in both an online and a traditionally taught science course, the investigators were not only able to make comparisons between student performance and perception, but also to make recommendations in terms of the impact on instructors. The authors concluded that faculty and course designers must clearly conceptualize the desired outcomes as they relate to content knowledge and scientific thinking skills. These conclusions were similar to those reached by Glacken and Baylen (2001), who identified the need for a pedagogic framework as a “road map for all involved.” Shoenfeld et al. and Glacken and Baylen also discuss the importance of selecting the appropriate mix of teaching methods and media.

Another consideration with respect to instructors of online courses was presented in a case study by Barker (2002). After the development of a complete online curriculum, the author provided three basic observations about the move from a traditional to an online course. First, keeping the technology component as simple as possible was important for both the students and the faculty. Second, the courses were more effective as a blended model of delivery as this helped create a relationship among the students as well as between the students and the instructor. And third, the author noted the importance of faculty understanding their changing role in an online environment from being the source of content to being mentors, guides, and evaluators.

The changing role of faculty, and therefore the potential measure of quality, also was noted by Lee and Dziuban (2002). They also concluded that a shift in the primary function of instructors was from dispensing information to facilitating the process of learning. It was acknowledged this may create additional frustrations for faculty who, in traditional classrooms, were expert teachers, and now find themselves more as novice users of technology. This also has significant implications for how faculty who teach, or more appropriately facilitate, online courses can measure the quality and effectiveness of their efforts.

Characteristics of Quality Instruction

The shift in the role of faculty and instructors may be changing, but the general characteristics of quality instruction are still applicable, regardless of the method. A critical component to understanding a discussion of the evaluation of instructors, as well as the delivery of online courses, is an understanding of the general definition of quality as it relates to higher education courses. More specifically, what components should any

course have, regardless of the delivery method? In 1987, The American Association of Higher Education first published the *Seven Principles for Good Practice in Higher Education*, which supported principles presented by Chickering and Gamson (1983). The following Seven Principles of Good Practice were presented for undergraduate education: encourage student-faculty contact, encourage cooperation among students, encourage active learning, give prompt feedback, emphasize time on task, communicate high expectations, and respect diverse talents and ways of learning.

These widely known principles established a theoretical framework from which instructor and course evaluations have been developed and then applied to various settings. One such application is presented in the publication *Implementing the Seven Principles: Technology as a Lever* (Chickering & Ehrmann, 1996). This essay discusses various implications of technology as it influences the *Seven Principles*. As an example, the authors describe the use of technology to facilitate and enhance contact between students and faculty. By understanding the rationale from which quality indicators have been developed and the way in which various forms of technology can be applied to promote this rationale, it is possible to apply an evaluation to various types of online course delivery and instruction with consistent, theoretical grounding. Though the scope of this paper prevents a discussion of each, there are other theoretical frameworks from which initial online course and instructor evaluations have been developed. Some of the more notable examples in the literature are components of the input-environment-outputs model (Astin, 1993) and the development of pedagogical dimensions specifically used to evaluate “computer-based” education (Reeves, 2000).

In addition to the use of theoretical models as foundations for evaluation, there is significant research that uses student outcome. When looking at a change from a traditional classroom to an online course, many researchers have used the students' performance as the dependent variable, and therefore this data has been used to evaluate the impact of the online delivery method. This model has been replicated in many forms with variation both in the type and level of the independent variable: method of delivery. Most studies use two levels of the method of delivery: online and traditional (Shoenfeld-Tacher, et al., 2002; Barker, 2002; Dominquez & Ridley, 2001), and then compare outcomes.

Yet another common dependent measure in the evaluation of online courses is student satisfaction rather than student outcomes. Once again, using method of delivery as the independent variable with two levels, researchers look comparatively at student satisfaction as the measure of the impact, either positive or negative, of online course delivery and instruction. Many comparative and quasi-experimental studies have contrasted the satisfaction of students in a traditional classroom setting versus students in a predominately online course delivery model, and still others have combined both student satisfaction and student outcomes in an effort to evaluate online course delivery and instruction (Barker, 2002; Dominquez & Ridley, 2001; Duffy, Gilbert, Kennedy, & Kwong, 2002; Terenzini, 1989).

Summary of the Literature

The literature review for this study first looked at the evolution of information technology from its initial appearance at the user level in the early 1980's to the current broad adoption and implementation. This is of particular concern and interest to large

organizations as they struggle to modify business processes and adapt culturally to the technology workplace. More specifically, technology has moved beyond a tool with which efficiencies are gained, and instead has become an independent agent of change resulting in organizations with shared decision making, broad and immediate communication, and freedom from time and distance (Wang, 1997; Senge, Kleiner, Roberts, Ross, & Smith, 1994).

As technology has continued to be adopted by organizations of all sizes, true integration has remained elusive and challenging. Institutions of higher education, specifically large, public research universities have been especially slow to move from adoption to integration of technology. This is evident in business process as well as the teaching and research functions. Focusing specifically on the teaching aspect of higher education, the evolution and adoption of course management systems (CMS) have moved quickly. A recent survey by Allen and Seaman (2003) found over 80% of the nearly 100 degree granting institutions questioned now offer courses with all or a significant portion of content online. With such a wide impact in higher education, it also is important to understand the dynamic landscape of the CMS in terms of the available technology.

A course management system provides a structure in which faculty or other content providers can develop courses for online delivery. Typically, CMS include a number of features for posting information, quizzes, and various communication tools. Though there are a number of open source CMS available and/or in development, such as the Sakai, the most widely used commercial systems are Blackboard and WebCT. These two systems held a majority of the market share, and now have increased their presence when Blackboard acquired WebCT during the summer of 2006.

In addition to the technology adoption and the broad impact of course management systems, the literature review also presented the pedagogical implications of offering courses online. Specifically, it is important to understand the impact on the role and expectations of faculty (Morss, 1999) and the quality and quantity of interaction between students and instructors (Proctor, 2002). Both of these issues have also led institutions to struggle with related policy implications in terms of traditional faculty reward structures which may not align with the increasing demands to offer more courses and programs online.

Of specific interest in the literature was the concept of faculty rights related to instructional technology. Albright (1996) offers the following seven rights: a reward system that places high value on teaching and innovative teaching methods in addition to research activities; an institutional climate that encourages the use of technology; an institutional commitment to technology in university planning documents and budget appropriations; an administration that sets the pace via its own use of technology; a campus wide instructional technology support infrastructure; easy access to technology based display systems in the classroom; to course development resources; to consultation and production support services, and training programs related to classroom technology applications. The importance of these rights in the literature is seen as other authors present the most significant barriers to the adoption of instructional technology (White & Myers, 2001).

One of the most significant barriers preventing large organizations such as institutions of higher education from moving toward more complete integration of technology is the organizational structure. The literature suggests universities have been slow to create the Chief Information Officer position, and this has hindered their ability to integrate and utilize technology (Zastrocky & Schlier, 2000). Having reviewed the literature for the systemic

issues related to instructional technology's impact on higher education in terms of policy and organizational structure, the review focused on the specific impact of online course delivery on students and instruction.

It is evident from the literature that the primary motivation for the implementation of a course management system and for offering online course delivery has been to reach a new and different student population (Burgess, 2003; Mende, 1999; Paulson, 2002). In addition, reaching these students through online courses is not simply putting existing content into a CMS and assuming the experience and quality of instruction is similar (Johnson, 1999). Many researchers have investigated the factors important for the success of the online course in terms of the student outcomes. Almost without exception, a well designed, pedagogically grounded online course provides students with a learning experience which is at least as effective as a traditional classroom (Barker, 2002; Dominquez & Ridley, 2001; Duffy, Gilbert, Kennedy, & Kwong, 2002; Terenzini, 1989).

This literature review has outlined the historical development of information technology, its implementation and adoption within higher education, and ultimately its evolution into instructional technology and the course management systems widely used today. As CMSs have been widely adopted by institutions of higher education, there has been a considerable amount of research contrasting their effectiveness in terms of students, faculty, and even academic programs of study with other methods of course and content delivery. In the most general terms, they are effective in delivering course content, students who choose to receive content using CMSs find them as effective as traditional delivery methods, and CMSs contribute to an unprecedented level of access and availability for students in higher education. There still exists debate about these issues, and there is more

research to be done, but little focus has been given to understanding how CMSs are being utilized by instructors. More specifically, it is evident that faculty use CMSs, but it is not clear what differentiates those who do from those who do not, how they differ in terms of their levels of use, and what factors may exist within institutions as either encouraging or discouraging the use of these systems. Considering the scope with which institutions have introduced these systems, an understanding of how they are utilized by faculty, as well as factors influencing that utilization seems significant and necessary. Though this review has outlined several examples of researchers calling for this information, Caruso (2006) most recently outlined the need more specifically from an organizational perspective. She explains not only the value to the institution in terms of the deployment of CMSs, but also in the context of the ongoing need to improve the quality and efficacy of the services offered in an environment of ever-decreasing resources.

CHAPTER 3: METHODS

This chapter defines the research methods and presents rationale for the specific design approach. The methodology, population, sample, variables, instrument, measures, data collection, and statistical analysis techniques are described.

Research Methodology and Rationale

This study sought to identify the relationship between several demographic characteristics, professional development, academic area of study, and the utilization of the WebCT course management system at Colorado State University. Because this study analyzed the relationship between a single dependent variable, WebCT utilization, and several independent variables, data were gathered not only using a conventional survey, but also using a follow-up telephone interview. The survey instrument collected data on WebCT utilization, support, workload, experience, satisfaction, motivation, and several demographic characteristics. The second survey of 20 randomly selected participating instructors focused primarily on the instructors' satisfaction and support, and in addition their general attitudes toward the WebCT CMS at Colorado State University was investigated.

By investigating the potential relationship between these dependent variables and the utilization of WebCT, a better understanding could be gained about how course management systems were being utilized by instructors. With a better understanding of utilization, administrators and staff within institutions of higher education can be better informed, and therefore offer better support to instructors who may wish to use a course management system such as WebCT as a part of their instruction. Furthermore, a clear understanding of how utilization differs in terms of professional development, academic

discipline, and other characteristics of the instructor, provides guidelines for developing support models more suited to a specific individual.

Theoretical Population, Sample and Sampling Frame

Theoretical Population

The theoretical population of this study consisted of the academic faculty at large public universities. Colorado State University is land grant research institution with approximately 24,000 graduate and undergraduate students. It is located in the city of Fort Collins, Colorado with a population of approximately 150,000 residents. Fort Collins is located on the front range of the Rocky Mountains in Northern Colorado.

This theoretical population included both tenure track and non-tenure track faculty with an appointment of instructor, assistant professor, associate professor, or professor. For the purposes of this study, these individuals were collectively referred to as instructors. It did not include those considered as graduate teaching assistants or graduate research assistants. It also did not include those instructors who offered courses for non-academic credit, such as those with offerings through the University's division of continuing education.

Sampling Frame

The sample frame of instructors for this study included those instructors who offered courses for traditional university academic credit using the WebCT course management system during the Fall 2006 semester. All types of course offerings, in terms of traditional classroom, completely online, or mixed mode were included as the method of delivery is not identifiable from information within the CMS. Courses identified by the WebCT systems administrators as "inactive" were excluded. For

example, courses which were present on the server but were not populated with any active students, or courses which already had been completed but had not been removed from the server were excluded. Any courses without students currently enrolled also were excluded. The individual identified by the WebCT system administrator as the primary course designer had to have an active appointment as an instructor, adjunct, administrative professional, assistant professor, associate professor, or full professor with one of the 64 academic departments at Colorado State University during the Fall 2006 semester. Variable credit courses meeting all criteria outlined here were included in the sample. The sample frame included instructors offering either graduate or undergraduate courses.

Sample

After receiving approval from the Colorado State University committee for Human Research (Appendix G), the sample for this study was identified on October 30, 2006 by the WebCT system administrator using a series of computer scripts executing the criteria above. This allowed 15 business days after the final University course withdrawal deadline. The names of the primary course designers were verified by the researcher using a list of current University employees. Contact information including campus mailing address, telephone number, email address, and official University course number and title for the identified instructor also was also part of these data. Any instructor who could be confirmed as meeting these guidelines identified was excluded, which resulted in a sample size of 630 instructors for this study.

Instrument, Variables, Data Collection, and Data Analysis

Instrumentation

A survey is not only a method for collecting information to describe, compare, or explain knowledge, feelings, values, preferences, and behaviors, it is a valuable instrument in creating a portrait (Fink, 2006). For this study, a cross-sectional survey was developed (Appendix E), and used as the instrumentation. Cross-sectional survey methods are typically administered to the target population only once, and are preferable as a self-administered instrument (Fink, 2006). The general design of the survey followed those outlined by Fink (2006) and considers neutral language, communication protocol to enhance response rates, and techniques for simplified questions. The survey instrument used in this study was developed by the author and is based upon current quantitative studies related to the use of information and instructional technology. Specifically, common themes throughout the literature include the concerns by faculty of increased time necessary to establish online courses (Austin & Mahlman, 2000), the available resources in terms of technology expertise and instructional technology awareness (Barker, 2002), the understanding of the change in the faculty role from content provider to facilitator (Barker), and the appropriate integration of the CMS into the specific course content to ensure communication and sharing of information consistent with any quality course (Austin & Mahlman). In addition, questions regarding motivation for using the technology (Burgess, 2003; Mende, 1999), barriers to effective use (White & Myers, 2001), and general perceptions of faculty support (Albright, 1996) were developed for the survey.

Independent Variables

The survey instrument collected several demographic variables including academic rank, gender, age, highest degree earned, and number of years at Colorado State University. Total years of teaching experience, experience prior to appointment at

Colorado State University, types of professional development received, and type of professional development most preferred as it relates to WebCT also were collected using the survey (Appendix E). In addition, the instructor's perceived level of expertise with WebCT as it relates to their colleagues, total course they have taught using WebCT while at CSU, and the type of course they are offering; traditionally scheduled courses with regular meeting times, irregular, non-traditional meeting times, or no face-to-face meeting times also was gathered using the survey instrument.

Information related to the effectiveness of WebCT in communicating course logistics, disseminating course content, facilitating student-student interaction, facilitating instructor-student interaction, and assessment and/or feedback was collected. Motivation for using WebCT and barriers to the usage of WebCT were included in the survey. In terms of satisfaction, overall satisfaction during the Fall 2006, institutional support for WebCT, barriers to using WebCT, motivations for using WebCT, and the availability of additional support with WebCT also were collected.

In addition to the hard-copy survey, a follow-up phone interview was conducted to further explore issues related to WebCT utilization. Twenty instructors were randomly selected from the returned surveys which had given permission to be contact for the interview. The follow-up phone interview explored in greater detail the issues related to utilization, support, and related needs of instructors at Colorado State University. The questions for the follow-up phone survey are listed in Appendix F. These questions have been modified from the Student Technology Use and Skills survey conducted by the EDUCAUSE Center on Applied Research (Kvavik, 2004).

Dependent Variables

The dependent variable for this study was WebCT utilization. All participants in the study used WebCT as evidenced by their role as a primary course designer, and their level of utilization was measured by the survey instrument. Specifically, the measure was collected as the number of features used within WebCT by a given instructor; posting course materials, offering course content, bulletin board students only, bulletin board students and instructor, chat students only, chat students and instructor, quizzes / tests, posting of assignment grades, and posting of final grades.

Data Collection

The survey was sent on November 7, 2006 to the sample of instructors via the Colorado State University campus mail system using addresses obtained from the Office of Human Resources. The survey was printed on 8.5 X 11 white paper, stapled, folded, and then labeled with an address. The survey included a cover letter (Appendix B) signed by both the Associate Vice President for Information and Instructional Technology and the researcher. Also on November 7, 2006, the Associate Vice President for Information and Instructional Technology sent an email (Appendix C) to the selected sample of instructors. The email described the information which was being collected via the survey sent in campus mail on the same day. This provided the recipients with some background information related to the study, and outlined the goal of better understanding the needs of instructors as it relates to factors associated with WebCT usage. The surveys were sent on November 7, 2006 to insure they were delivered to all the instructors no later than November 9, 2006, which allowed at least one week prior to the fall recess for the sample group to complete and return the survey.

On Monday, December 4, a brief, follow-up email (Appendix D) was sent by the Associate Vice President for Information and Instructional Technology. The email served as a reminder to the recipients about the value of the survey, encouraged them to complete and return it as soon as possible, and expressed appreciation to those who already had completed the survey. This timeline was one week after fall recess and one week prior to the beginning of final examinations. Approximately 20 additional surveys were returned to the researcher after this email.

Twenty instructors were randomly selected to participate in the phone interviews, which were conducted between December 11, 2006, and February 5, 2007. The interview was conducted from an on-campus office and used the provided on-campus contact information. All phone interviews were conducted between 8 am and 5 pm. The questions for this standardized interview were designed to provide additional depth to the initial survey of instructors. The telephone interview provided the opportunity to further explore answers with respondents and provide greater depth to the data collected (Fink, 2006). This is of particular value as it relates to utilization and perception, institutional support, and general attitudes toward the course management system at Colorado State University.

Data Analysis, Reliability, and Validity

Data analysis for this study included descriptive data of several variables as well as the use of a number of statistical tools. The dependent variable for all of the statistical analysis was utilization. Because several of the independent variables were nominal scale data, multiple regression analysis was used. Multiple regression analysis is one of the most widely used statistical methods in the social sciences, and determines whether a

particular independent variable really affects the dependent variable (Allison, 1999). In addition, one-way analysis of variance (ANOVA) and Pearson correlations also were used for those independent variables which were ordinal and scale, respectively.

The survey for this study was developed by the researcher, and based upon general constructs found as a part of the literature review. Prior to distribution, the instrument was reviewed for content validity by a group of individuals who have experience using WebCT, but who were not part of the sampling group. Specifically, a group of administrators who were not currently offering a course in WebCT were pilot tested with the survey. Minor wording changes were made based upon feedback from this group. The survey was then reviewed by a Faculty member who serves as an expert in the methodology of survey research. She provided feedback regarding the general organization and layout of the survey. Questions related to the content area of WebCT utilization were moved to the beginning, and demographic questions moved to the end of the survey. In addition changes were made to wording related to experience from credit hours to number of courses.

CHAPTER 4: RESULTS

The purpose of this study was to identify factors affecting the utilization of a course management system at a public research university. As outlined in Chapter 3: Methodology, all instructors of the courses identified as active within the course management system WebCT during the Fall 2006 academic semester were surveyed. Two primary research questions were addressed in this study: 1) What factors related to instructor motivation, barriers to effective use, and perceived effectiveness of the CMS are predictive of increased utilization, and 2) How do levels of utilization differ based upon experience, professional development, academic discipline, satisfaction, workload, and demographic characteristics.

Several independent variables were used to answer the research questions. This chapter first presents the descriptive characteristics of the sample, and then addresses the relationships between the independent and dependent variables as it relates to answering the two primary research questions.

Descriptive Information

The accessible population with active courses during the Fall of 2006 was 630 instructors. A total of 178 surveys were returned for a 28% response rate. Table 1 shows a summary of the demographic characteristics of the survey respondents including gender, academic rank, and highest degree completed. There were 94 male and 80 female respondents. As Table 1 demonstrates, 117 (66%) of the survey respondent were at the rank of Assistant, Associate, or Full Professor. In addition, 129 (73%) hold a doctoral degree.

The type of course being offered is displayed in Table 2. Instructors indicated a majority (94%) of courses using the CMS were on-campus, approximately 3% were completely at a distance with no face-to-face interaction, and the remaining 3% were some type of mixed method of delivery.

Table 1

Means and Standard Deviation of Utilization by Gender, Academic Rank, and Highest Degree Completed of Respondents (N = 177)

Characteristic	<u>n</u>	%	M	SD
Gender				
Male	94	54	4.82	2.28
Female	80	46	5.09	1.81
Academic Rank				
Instructor	23	13	5.30	2.18
Adjunct	22	12	5.52	1.83
Assistant Professor	42	23	4.44	1.87
Associate Professor	33	19	4.90	2.12
Professor	42	24	5.17	2.13
Administrative Professional	4	2	3.50	1.73
State Classified Employee	1	1		
Other	10	6	5.10	2.51
Highest Degree Completed				
Bachelors	9	5	5.00	2.60
Masters	39	22	4.55	2.19
Doctorate	129	73	5.06	2.00

Table 3 shows the average age of the participants was 46, and they had taught a mean of 11 years at Colorado State University. In addition, respondents had an average of 1.13 previous academic appointments prior to their current position.

Table 2

Type of Course Offering (N = 177)

Meeting Type	Frequency	Percent
On-Campus Course	166	94
Course Meets Periodically (Regular Schedule)	1	0.6
Course Meets Periodically (Irregular Schedule)	1	0.6
No Course Meeting (Individual Meeting with Students)	3	1.7
No Course Meeting or Face to Face Interaction	6	3.4

Table 3

Age, Years of Teaching Experience, and Previous Academic Appointments of Respondents (N = 174)

Characteristic	<u>M</u>	<u>SD</u>
Age	46	12.21
Years Teaching at CSU	11	10.11
Number of Previous Academic Appointments	1.13	1.42

Normality of Data

The dependent variable for all data analysis was utilization. This variable was constructed from the survey responses (Question 11 in Appendix A) regarding utilization for each instructor. More specifically, a higher value indicated utilization of more functions within the course management system WebCT. For example, if an instructor utilized email and quizzes, they had a utilization sum of two. If they utilized email, quizzes, and posting course information, they had a utilization value of three, and etcetera. This value will be referred to throughout the results as simply utilization. Before data analysis was performed, it was important to analyze the data for normality.

The dependent variable utilization was first tested for normality and revealed an acceptable skewness level of less than ± 1 (Morgan, Griego, & Gloeckner, 2001). Each independent variable was then tested with utilization to verify the multivariate normality of the data prior to analysis. The only independent variable with skewness greater than ± 1 was age. With values less than two however, no exclusions were made.

Analysis of Research Question #1

The first research question of what factors related to instructor motivation, barriers to effective use, and perceived effectiveness of the CMS are predictive of increased utilization is best addressed by using multiple regression analysis. Before performing any analysis, it is important to confirm the underlying assumptions related to the data have not been violated.

In order to draw generalizations from data using regression analysis, there must not be any multicollinearity between the variables (Field, 2002). Multicollinearity, according to Field (2002), is the linear relationship between two independent variables,

which is the strong correlation between the variables. If the correlation between the variables exists, it then becomes impossible to achieve valid estimates of the regression coefficients. Field suggests a diagnostic named the variance inflation factor (VIF) as a method to check for multicollinearity. The VIF reveals whether one predictor variable has a linear relationship with the other predictor variables. This is particularly important in this instance as a number of predictor variables from instructors are being used each with utilization as the dependent variable.

Table 4 presents the results of the diagnostic tests performed to insure the underlying assumptions necessary for the multiple regressions have not been violated. According to Myers (1990), a VIF of 10 or greater indicates a concern with the multicollinearity of the predictor variables. In addition, a tolerance value, which is the reciprocal of VIF, below 0.1 are an area of concern. Table 4 shows the VIF and tolerance values for the individual items related to the three predictor variables: motivation to use the CMS, barriers to usage, and effectiveness. For each of the predictor variables, there are several individual questions, each of which was assessed for multicollinearity using the diagnostics of VIF and tolerance. Based upon the guidelines presented by Myers (1990) and Field (2002), none of the factors for the three predictive variables indicate any violation of the assumptions of multicollinearity as the VIF ranges from 1.00 to a high of 1.92 for Effectiveness of Student-Instructor Interaction. This is substantially lower than the value of ten, which indicates there is no violation to the underlying assumptions and the regression analysis can proceed.

Having verified the integrity of the underlying data, it is now possible to use multiple regression analysis to determine whether any motivational factors, perceived

Table 4

Variance Inflation Factor (VIF) and Tolerance for the Predictor Variables Motivation, Barriers to Usage, and Effectiveness

Variable/Factor	VIF	Tolerance
Motivation		
Convenience	1.02	0.98
Student Demands	1.00	1.00
Improved Student Experience	1.00	1.00
Dept. / College Demands	1.02	0.98
Financial / Professional Rewards	1.00	1.00
Grant / Research Activity	1.01	1.00
Barriers to Usage		
Understanding Features / Functions	1.00	1.00
Assistance with Questions	1.03	0.97
No Benefit for Instructor / Student	1.04	0.97
Unstable/Unreliable Tech.(WebCT)	1.05	0.95
Unstable/Unreliable Tech (Instruct)	1.03	0.97
Effectiveness		
Course Info. and/or Logistics	1.11	0.90
Communicating Course Content	1.19	0.84
Student-Student Interaction	1.00	1.00
Instructor-Student Interaction	1.92	0.52
Assessment and/or Feedback	1.13	0.89

barriers to effective usage, and/or functions perceived as effective had any predictive relationship to instructor utilization.

Motivation

Table 5 shows the stepwise regression analysis of the items related to instructor motivation as predictors of utilization. The regression analysis shows a significant predictive effect ($\text{Adj. } R^2 = .15$, $F = 11.49$, $p \leq .001$) for three specific factors of

motivation: Improved Student Experience, Financial or Professional Rewards, and Convenience for Instructor. The combination of these three motivational factors predicts 15% of the variance related to an instructor's utilization of the WebCT Course Management System.

Barriers to Usage

In addition to motivation, another variable of interest in terms of utilization is the instructor's perception of barriers to usage. More specifically, what are the main barriers, or factors which most inhibit the utilization of the WebCT course management system? Table 6 shows the results of the multiple regression analysis. Two primary barriers were identified by instructors as predicting 14% of the variance related to utilization ($Adj. R^2 = 0.14, F = 11.59, p \leq .001$). The two barriers with significant impact on utilization were Understanding the Features and Functions of WebCT and Providing no Significant Benefit for Instructors or Students.

Effectiveness

Lastly, the variable of perceived instructor effectiveness was analyzed as it relates to utilization. Table 7 shows the stepwise linear multiple regression analysis of the items found to have significant predictive impact on utilization. There was a large, significant Adjusted R^2 value of 0.31 for three of the effectiveness items. The items of student to student interaction, assessment and/or feedback, and course information and/or logistics accounted for 31% of the variance in instructor utilization of WebCT.

In summary of the first research question, there appear to be several predictive factors related to motivation, barriers to use, and effectiveness which influence the utilization of the CMS by instructors.

Table 5

Regression Analysis Summary of Motivation Factors Predicting Instructor Utilization

Variable Adj.R ²	<u>B</u>	<u>SEB</u>	<u>β</u>
Model 1			
.08			
Motivation – Improved Student Experience	4.37	.201	.29*
Model 2			
.12			
Motivation – Financial or Professional Rewards	4.29	.197	.28*
Model 3			
.15			
Motivation – Convenience for Instructor	3.81	.271	.260*

N = 178, *p ≤ .001

Analysis of Research Question #2

The second research question for this study is: How do levels of utilization vary based upon experience, professional development, academic discipline, satisfaction, workload, and demographic characteristics? In order to answer this question, survey data related to each factor were explored and analyzed using a series of correlations and one way analysis of variance (ANOVA) tests.

Table 6

Regression Analysis Summary of Barriers to Usage Predicting Instructor Utilization

Variable	<u>B</u>	<u>SEB</u>	<u>β</u>
Adj.R ²			
Model 1			
			.06
Understanding Features and Functions of CMS	5.57	.246	-.25*
Model 2			
			.14
No Benefit for Instructor or Students	5.93	.252	-.30*

N = 178, *p ≤ .001

Experience

Experience was measured by two different variables. The first was experience based upon the usage of the CMS, which was measured as the number of semesters having used WebCT at Colorado State University. The second was number of years teaching also was a measure of general experience. Table 8 shows the correlation between utilization and experience as measured by the number of semesters using

WebCT, and experience as measured by years teaching at Colorado State University. There exists a positive correlation between the number of semesters having

Table 7

Regression Analysis Summary of Effectiveness Factors Predicting Instructor Utilization

Variable Adj.R ²	<u>B</u>	<u>SEB</u>	<u>β</u>
Model 1			
.22			
Effectiveness – Student to Student Interaction	3.88	.204	.48*
Model 2			
.27			
Effectiveness – Assessment and/or Feedback	3.43	.233	.39*
Model 3			
.31			
Effectiveness – Course Information and Logistics	2.27	.419	.22*

N = 178, *p ≤ .001

used WebCT and the utilization ($r = .290$), but not between number of years teaching at Colorado State University and utilization ($r = .086$). In addition, there was a positive correlation ($r = .334$) between semesters of using WebCT and the number of years teaching at Colorado State University. Other factors such as academic rank, highest degree earned, and previous academic appointments also could be considered experience, but will be analyzed as demographic characteristics later in this chapter.

Professional Development

Data were collected about professional development in two forms. Survey question 3 asked what type of training had contributed most to the instructor's understanding of WebCT and survey question 4 asked what type of training had been completed prior to joining Colorado State University.

Table 8

Means, Standard Deviations, and Correlations of Utilization with Credit Hours Taught, Years of Teaching, and Number of Semesters Using WebCT (N = 174)

Measure	M	SD	Utilization	Yrs Teaching	Semesters of Use
Utilization	4.9	2.1		.086	.290**
Yrs Teaching	10.56	10.1			.334**
Semesters of Use	5.9	4.3			

* $p \leq .01$

Figure 1 shows the type of training which contributed most to the instructor's knowledge of WebCT. A majority of instructors identified self taught (N = 65, 37%), but the second most frequent type of training was formal, on-campus classes (N = 48, 27%). A one way analysis of variance (ANOVA) was performed and found no significant differences in the amount of utilization based upon type of training ($F_{(6, 169)} = .92, p = .479$).

The graph in Figure 2 shows the frequency of training instructors had received prior to Colorado State University. Most of the respondents (80%) indicated they were self taught,

had no interest, or it was not applicable. No other type of training was used by more than 5% of the instructors.

Closely related to professional development and experience was the instructor's self reported level of expertise. Question 7 of the survey asks instructors to rate their level of WebCT expertise related to that of their peers. Using this data, a Spearman correlation was performed with utilization.

The analysis found a significant correlation between self reported level of expertise and utilization ($r = .45, p \leq .01, N = 173$).

Academic Discipline

Analyzing the relationship between WebCT utilization and academic discipline is difficult. Academic discipline based only on departmental affiliation is not viable in this study as there are too few responses from the 23 different academic units represented in the study. Therefore, and though not necessarily the best representation, College affiliation was analyzed to compare utilization based upon academic affiliation. A one-way analysis of variance (ANOVA) was performed to compare the utilization by instructors across the eight academic colleges and no significant differences were found ($F_{(8,165)} = .636, p = .747$).

Satisfaction

Instructor satisfaction was solicited both as it relates to the WebCT CMS (Question 12) and as it relates to the institution's support for using WebCT (Question 13). These data are related, but represent different types of satisfaction and were therefore analyzed separately with respect to utilization. Table 9 shows the results of a Pearson Correlation. A significant correlation was found between both the satisfaction with WebCT and a

satisfaction with the institutional support of WebCT as it relates to instructor utilization.

Also, an expected strong correlation existed between the two measures of satisfaction.

Workload

Workload data were collected on the number of additional courses taught, the number of hours per week spent accessing this course in WebCT, and whether the instructor completing the survey was the only individual responsible for instruction of the course as it related to the CMS. Using a Pearson correlation, a significant relationship was found between the number of hours per week and utilization ($r = .35, p \leq .01, N = 177$). In addition, a significant positive correlation exists between the number of additional courses taught and utilization ($r = .260, p \leq .01, N = 177$). Lastly, whether or not the instructor has assistance with the course was analyzed. Means of utilization were compared between the two groups using a one way ANOVA and no significant differences were found ($F_{(1,173)} = .087, p = .768$)

Demographic Characteristics

A number of demographic and professional attributes were collected from the instructors. Of specific interest to this study were any differences based upon academic experiences and career advancement. Table 10 shows the results of two one way ANOVA tests comparing utilization based upon highest degree earned and academic rank. No significant differences were found. Figure 3 shows the graph of academic appointments prior to their current position at Colorado State University. Of the 175 instructors responding, 153 (87%) had two or fewer prior academic appointments.

Figure 1

Frequency of Training Which Contributed Most to Instructor's Knowledge (N = 176)

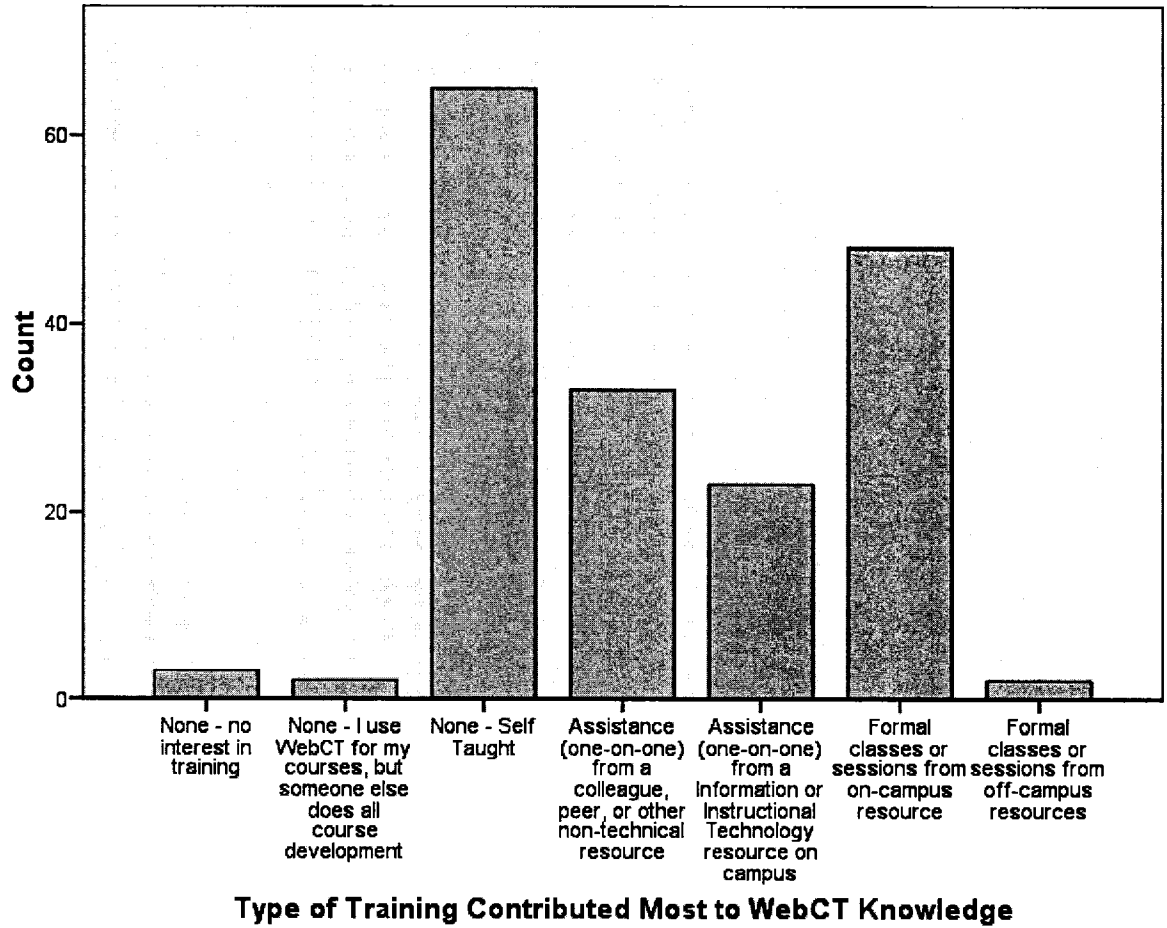


Figure 2

Frequency of Training Received Prior to Current Position at Colorado State University (N = 176)

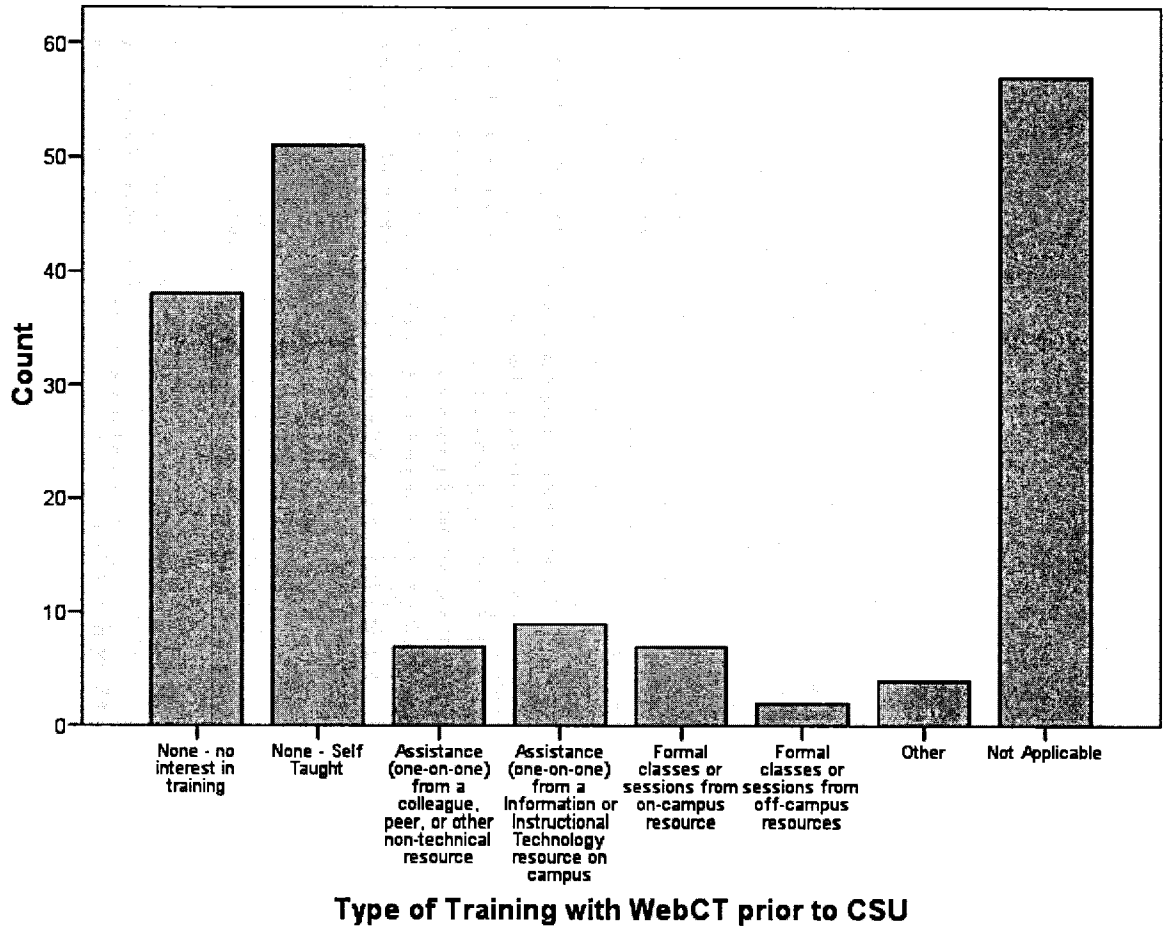


Table 9

Means, Standard Deviations, and Correlations of Utilization with Satisfaction of WebCT Course Management System and Satisfaction with Institutional Support for use of WebCT (N = 174)

Measure	M	SD	Util.	Satis.WebCT	Satis.CSU
Utilization	4.9	2.08		.232*	.236*
Satisfaction with WebCT	3.2	.847			.534*
Satisfaction with CSU Support	3.3	.684			

* $p \leq .01$

Interviews

In addition to the survey instrument sent to all current instructors of WebCT, ten follow-up phone interviews were conducted. The questions (see Appendix D) sought to bring increased understanding to the complex issue of utilization of the WebCT course management system. Specifically, these brief interviews helped identify attitudes related to support and satisfaction, and whether there were any underlying themes which could provide additional insight to the data collected from the survey.

Though 20 randomly selected individuals were selected for the phone interview, only ten could be contacted and ultimately completed the survey (see Appendix F: Phone Interview Responses). A review of the survey responses produces a number of general

Table 10

ANOVA Comparing Utilization by Academic Rank and Degree Earned

Characteristic	SS	dF	MS	F	sig of F
Highest Degree Earned					
Between Groups	6.79	2	3.395	.807	.448
Within Groups	732.396	174	4.209		
Totals	739.186	176			
Academic Rank					
Between Groups	39.770	7	5.681	1.373	.220
Within Groups	699.417	169	4.139		
Totals	739.186	176			

themes from instructors. When questioned about what additional support would be helpful, instructors predominately wanted more self help. Most respondents preferred to seek information independently. Specific comments included the need for more “self help” and “how to” documentation online.

In terms of general attitudes about how the technology of WebCT specifically supported the course offering, the general responses indicated the lack of an intuitive, easy to use interface. The terms crude, clunky, and cumbersome were used by five of the respondents referring to the interface, grade book, or effectiveness related to communication. At least three of the instructors described themselves as having a high level of knowledge, but indicated frustration with the inability to customize or manipulate the interface.

Though the majority of individuals interviewed indicated their preference for independent, self help support, there also were strong opinions about the general institutional support from Colorado State University. Four respondents spoke specifically of their

College person as very helpful, too busy, very good, or absent. Of the ten responses, four were clearly positive about support and four were somewhat negative or believed there needed to be additional, expanded support services available. One instructor indicated most dissatisfaction related to support is due to lack of effective use by faculty. The remaining instructor suggested the need for more pedagogically oriented training for faculty, and that existing workshops are too basic.

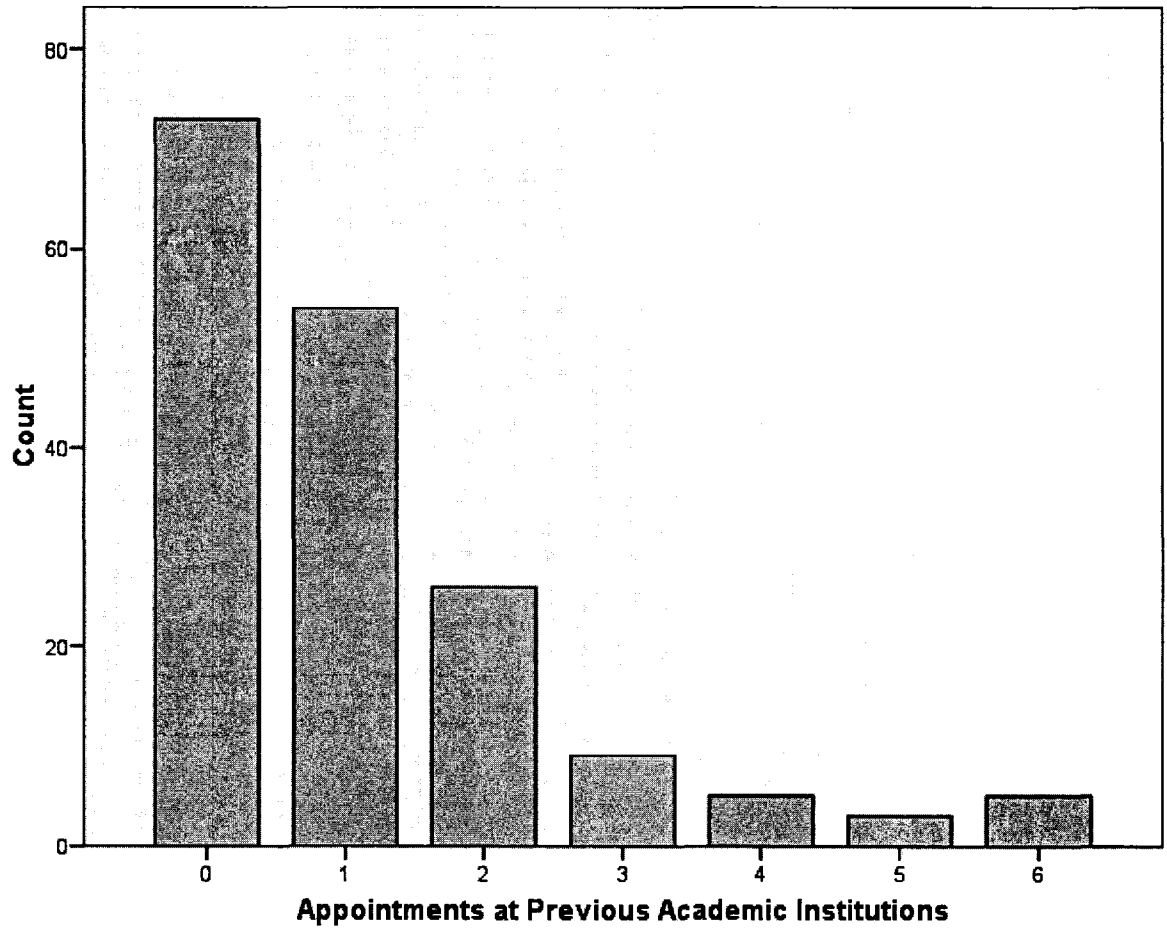
There were a variety of responses when instructors were asked about general comments or information which the researcher should know. Though there were a number of comments about more support, improved interfaces, and simplification, a couple of instructors offered different insights. There was an individual who expressed a strong concern related to cheating, which is a result both of the technology and the way in which it is being used. Another individual explained the need to educate the University administration about what can be done in WebCT and how it can be integrated into instruction.

Summary

The results of this study provide several insights into factors which influence the utilization of the WebCT CMS by instructors. In response to research question 1, instructors have a significantly higher utilization of the CMS if they are motivated by improved student experiences, rewards, and if it provides greater convenience for them. The primary barriers to

Figure 3

Number of Academic Appointments at Previous Institutions (N=175)



increased utilization are an understanding of the features and functions of the CMS and the instructor's perception that it provides no benefit for them or their students. Lastly, instructors are more likely to utilize the CMS if they perceive it to be effective in facilitating student to student interaction, providing assessment and/or feedback, and communicating course information and logistics.

In response to research question 2, instructors show a tendency to be self taught or seek an on-campus training class. The majority, however, have had no prior training or interest in training as it relates to using WebCT. Furthermore, their perceived level of expertise is a significant factor in the extent to which they utilize the CMS. There was not a relationship found directly between academic area as identified by College affiliation. Whether an instructor is satisfied with the support of their course offering by the CMS and with the University's support of the CMS is a significant factor in their level of utilization. Lastly, there was no relationship between the highest degree earned, academic rank, or number of years teaching at Colorado State University and the level of utilization.

The interview portion of this study reinforced some of the themes revealed in the survey. Specifically, instructors are independent, and seek much of their support independently. However, a support structure and perception of effectiveness as it relates to the technology is valued by instructors attempting to use the course management system WebCT.

CHAPTER 5: DISCUSSION

This chapter summarizes the major findings of this study as well as the implications. It presents a discussion and outlines the conclusions, limitations, and recommendations for future research. The general purpose of this study was to better understand factors that predict the utilization of the course management system (CMS) WebCT, and to determine if there are any differences between instructors who have a higher utilization of WebCT and those who do not in terms of experience, professional development, academic discipline, satisfaction, workload, and demographic characteristics. In addition, the study sought to provide some added detail about the issues of support and satisfaction related to WebCT by conducting a brief follow-up phone interview with a small number of the instructors who were surveyed.

Major Findings

This study has revealed a number of findings related not only to factors predicting utilization and differences among instructors who do use WebCT, but also a summary of who is using the WebCT CMS and for what general purposes. Specifically, the majority of the respondents were assistant, associate, or full professors, hold a doctoral degree, have been teaching at Colorado State University for a mean of 11 years, and had held, on average, 1.13 previous academic appointments prior to their current position. In addition, 94% of the respondents utilized WebCT in conjunction with an on-campus course. In contrast, only 3.4% used WebCT in support of a course with no face-to-face interaction between instructor and students. This finding is important in that it reveals those instructors using WebCT are generally not doing so in support of distance education. Rather, they are using the WebCT CMS to augment their current course, which is being offered in a traditional classroom

environment. Furthermore, it suggests they are not necessarily early in their career, but instead have some experience and likely have had a number of years experience on the faculty.

The results related to the first research question showed a significant predictive relationship between three motivational factors and utilization. Improved student experience, financial or professional rewards, and convenience for instructors accounted for a significant portion of an instructor's utilization of the WebCT course management system. There were two barriers to usage which were found to be significant in terms of utilization of WebCT: understanding the features and function of WebCT and providing no significant benefit for instructors or students. Lastly, in terms of perceived effectiveness, student to student interaction, assessment and/or feedback, and course information and/or logistics were found to be significant predictors of instructor utilization.

The second research question sought to identify differences in utilization by instructors based on several factors. Experience, professional development, academic discipline, satisfaction, workload, and demographic characteristics were all analyzed for differences in terms of utilization by instructors. Experience as it relates to number of semesters having used WebCT had a significant relationship with utilization, but number of years teaching did not.

In terms of professional development, no differences existed between the types of training which most contributed to, or the type of training which instructors had received prior to Colorado State University, and their level of utilization. The related measure of self-reported level of expertise with WebCT did have a significant correlation with utilization.

Academic discipline could not be well analyzed as there were too few respondents from any specific academic unit. An analysis by College affiliation revealed no significant differences in utilization.

The level of satisfaction an instructor had both with the WebCT CMS and with the University's support for using the CMS had a significant relationship with an instructor's utilization.

Workload for instructors was measured by the number of hours per week they spent using WebCT, the number of additional credit hours taught, and whether they had some other type of assistance with the WebCT course they were offering. The number of hours per week was correlated to an increase in utilization, and so too was the number of additional credit hours taught. Therefore, instructors utilized WebCT more as the number of credit hours they were teaching increased. There was no significant difference in utilization between those instructors who had additional help with their course offering and those who did not.

Lastly, the attributes of highest degree earned, academic rank, and prior academic appointments were analyzed. No significant differences were found based upon highest degree earned or academic rank. Of the respondents, 87% had two or fewer previous academic appointments.

A majority of instructors had received no formal training in WebCT and preferred to seek information on their own. This also was a common theme found in the follow-up telephone interviews. In addition, there was a strong need for more online, or self-help, resources in terms of WebCT usage and support. Perceived level of expertise did have a significant correlation to increased utilization.

Discussion

The major findings of this study can be applied to forming a better understanding of factors influencing the utilization of course management systems at public research universities. Caruso (2006) explains the need for a better understanding of how instructors use such systems as it would allow for more successful deployments as well as a general benefit for the faculty and students of the institution. Enhancing the need for such an understanding is the rate of adoption. A 2003 survey (Allen & Seaman, 2003) shows over 80% of 1,000 institutions surveyed offered courses with all or significant portions of content online. Though much research has examined the effectiveness and perceptions of online course delivery (Shoenfeld-Tacher, McConnell, Schultheiss, Bowen, & Jones, 2002), this study identified a number of factors which may be important as universities seek to improve the way in which CMSs are implemented, supported, and presented to instructors across campus.

The results of this study indicate there is no relationship between the academic rank, highest degree earned, or overall teaching experience and how an instructor utilizes the features of a course management system. In addition, the variable of College affiliation showed no significant difference between levels of utilization. No data in the research can be found to indicate a difference in utilization based upon academic area, which is reinforced by this research.

Though there have been studies which collected demographic data such as age and teaching experience (Park, 2003), they did not investigate the relationship between these variables and any measurement of utilization. The few studies investigating such relationships, such as Park (2003), have been focused on the adoption of the technology in

general. Barker (2002) also focused mainly on factors affecting basic adoption by faculty, rather than the extent to which the technology was utilized.

The predictive factors related to motivation for using the CMS, barriers preventing the utilization, and perception of effectiveness as it relates to the CMS revealed several findings which are consistent with previous research. Specifically, motivation based upon convenience (Burgess, 2003; Mende, 1999) was found to be significant. Previous research by both Burgess (2003) and Mende (1999), however, looked at the motivation to use online instruction primarily from the student's perspective. Furthermore, these studies looked at motivation as it relates to online instruction as a move away from traditional course delivery. Because the courses included in this study were overwhelmingly (94%) traditional courses which were using a CMS as a component, the concept of motivation was different. More specifically, instructors were describing their motivation to add the use of a CMS to their instruction, but not necessarily to move from traditional delivery to online delivery. Therefore, the three significant motivations of improved student experience, rewards, and convenience for the instructor were important in influencing traditional instructors to incorporate the use of a CMS into their current teaching practices rather than to completely change how they delivered their course. This is significant as it implies a need to integrate the use of a CMS as a component of general teaching development and pedagogical resources for the instructor.

The barriers identified in this study were also different in that they were considering a less dramatic change by the instructor. The results however were very similar to what has been identified in previous research. Lee and Dziuban (2002) identified administrative support, student needs, and the role of the instructor as considerations for moving courses

and programs online. The barriers identified in this study were more localized, or specific, in terms of what may prevent an instructor from utilizing the CMS to a greater degree.

Nonetheless, similar issues were found to be significant barriers. The instructor's ability to understand the features and functions as well as the CMS providing no significant benefit to the instructors or students were found to be significant predictors of utilization. There is a significant amount of research suggesting the need to keep technology simple (Barker, 2002), and consequently the need to develop the appropriate skill level by instructors who want to use the technology (White & Myers, 2001). This was reinforced during the phone interview portion of the study. A majority of the instructors interviewed described the user interface as "crude", "clunky", and/or "cumbersome." Although it is unclear specifically what type of benefit the instructors may want from using a CMS, the findings related to the effectiveness of the system may provide some insight.

Three specific factors related to effectiveness of the CMS were found to be predictive of increased utilization: Student to Student Interaction, Assessment and/or Feedback, and Course Information and Logistics. More specifically, instructors who indicated the CMS was effective in terms of these three functions were more likely to have higher levels of utilization. There has been much research investigating the need for and the value of student interaction as it relates to online course delivery (Carmichael, 2001; Burgess; Mende). The difference with this study and the previous research is the type of instructor and student. The instructors in this study were primarily experienced instructors who were offering traditional classroom instruction augmented with a CMS. However, they identified the facilitation of Student to Student Interaction as well as communication about logistics and assessment as the most effective service provided by the CMS. Previous research has clearly identified the

student experience as a critical component of online learning (Oliver, 2001), but not when considering the CMS as an additional component of a traditional course.

In addition to the predictive variables related to motivation, barriers, and effectiveness, there were also significant differences in instructor utilization based upon a number of other factors. The amount of experience an instructor had with using WebCT was significant as it related to utilization.

Related to this experience was the information about professional development and training. There was a strong usefulness indicated for self-taught, which was confirmed in the follow-up telephone interviews. Though 27% indicated formal, on-campus classes were valuable in developing their knowledge about WebCT, 80% indicate they were self-taught, had no interest, or training prior to CSU was not applicable (total is greater than 100% because respondents could choose all that apply). Several instructors spoke specifically to this issue during the phone interview where they identified their preference for more “independent” and “self-help” style support in terms of the technical “how-to” aspects of the CMS. Furthermore, they also spoke of the need for more “pedagogically oriented” training and resources. And while formal training is something the majority of instructors indicated was not a priority, their level of expertise was. The self-reported level of expertise with WebCT was significantly correlated with increased utilization. This finding is consistent with those by Odonoghue, Singh, Caswell, and Molyneux (2001), who found not only a lack of skill, but also a general lack of acceptance by faculty to have limited the impact of CMSs on instruction.

The general reactions to the WebCT CMS with respect to satisfaction also were significantly different amount instructors. For those who were satisfied, both with the

technology itself and with the institutions support of them in using the technology, utilization was higher. This also was evident in the interview portion of data collection as several individuals identified their satisfaction with the support and therefore with the way in which the technology supported their courses. For those who expressed frustration, they did so regarding the lack of available support when it was needed. Several of the instructors interviewed spoke to the level of support. There was a universal theme of valuing support, but the effectiveness of it ranged from “very helpful” to “absent.” Support of faculty and general availability of expertise has been identified by previous researchers as important factors in allowing for faculty to use new technology (Albright, 1996; Barker, 2002). This also has some relationship to the theme throughout the literature regarding the impact on faculty in terms of their changing role and the potential for increase time demands (Holden, 1999; Austin & Mahlman, 2000). More specifically, if instructors were not satisfied with how WebCT and/or the institution supported them, it may have been because of their perceived lack of support. This lack of support, coupled with a preference for independence in terms of learning how to use the CMS, perpetuates the instructors concerns of increased time demands.

It appears, however, those instructors who utilize the CMS most fully, may actually do so in order to reduce their workload and assist with increasing time demands. As would be expected, there was greater utilization by those instructors who spent more time in WebCT each week. What was perhaps less expected was greater utilization by instructors teaching greater numbers of credit hours. This is significant as it may dispel the notion that using the CMS requires a greater time commitment, but rather it provides additional efficiencies for the instructor. What did not influence the instructor’s utilization was direct

assistance. Those instructors who were solely responsible for their courses had no significant differences in utilization from those who had assistance such as from a graduate teaching assistant.

Implications

There are several potential implications based upon the findings of this research. It is evident the WebCT CMS at Colorado State University is being used to support traditional course delivery. This changes the way in which it should be implemented, supported, and to whom it is offered. Because the instructors using this system are traditional, on-campus faculty members, the WebCT CMS should be considered an instructional tool like many other available. If it is the desire of the institution to increase the utilization, and perhaps expand the usage, the impetus for doing so should come by addressing the predictive factors identified in this study through the traditional resources available to instructors. More specifically, engaging faculty about the value of the WebCT CMS to their students as a value-added component of instruction, and not as a mechanism for distance delivery, will allow them to view the technology as improving the student experience. Communicating how WebCT can provide conveniences and, perhaps, time savings, may encourage those individuals who have been unable to invest limited time in learning a new method to do so. In addition, incentives which reward instructors should be developed to encourage faculty use of the WebCT CMS. Though it is not explicitly clear from this study what those incentives should be, it is implied they should be at the individual instructor level.

The learning of the technology itself, and consequently the confidence to use it effectively are critical components to improving the utilization among faculty. Instructors identified clear preferences for on-demand style training as it relates to the technology.

There should be investments made in developing these resources, and, again, promoting them via existing avenues used by faculty seeking to improve their teaching. In addition, more information and resources should be made available about the sound pedagogy as it relates to the use of WebCT. Along with these instructional supports, instructors across campus need to be informed of the support resources available to them in terms of the technology. There is a clear desire for support to be available when it is needed, and if instructors do not believe it is available, they will be deterred from utilizing, and perhaps even using the WebCT CMS.

Limitations

There are a few limitations of this study which should be considered as future research needs are identified. All of the instructors in this study were offering courses for University credit, which therefore purposely excluded those offerings from the Division of Continuing Education. Because those courses are offered to a different audience of students and by a different group of instructors, the results of this study should not be generalized to those instructors or courses.

The sample for this study was a public research university. Because of the specific nature of the mission of this university, the results should not be generalized to institutions with different missions. Specifically, they should only be used with those institutions which include the teaching, research, and outreach functions similar to those of Colorado State University.

The courses included in this survey were overwhelmingly on-campus, resident instruction courses (94%). According the Vice President of Information Technology at Colorado State University, this is reflective of how the CMS is being used by the institution.

It is estimated, of the 1200 courses currently held in the CMS, approximately 100 are offered entirely in support of distance courses (P. J. Burns, personal communication, April 24, 2007)

Lastly, the dependent variable of utilization may not be the best measure of successful adoption of the CMS technology. It also is not clear whether utilization and adoption are influenced by the same factors. Therefore, it is not clear if influencing the factors from this study will have an impact in getting instructors who do not use the CMS at all to begin, or whether it will only influence those who are already utilizing it simply to change what functions they perform within the CMS.

Recommendations

There is significant need for additional research related to CMSs in institutions of higher education. The broad impact of these systems, the high cost of adopting and implementing them, and the consolidation of commercial providers, make the ongoing research of this type by independent researchers critical to better understanding the use and value of CMSs.

This study presented data from instructors teaching one semester of courses at a public research institution. Because of the very dynamic nature of information and instructional technology, a survey of instructors over a longer period of time should be conducted. Specifically, including more than one semester of courses would result in a greater diversity and, perhaps, different results.

More research is needed to understand the differences in how, or if, CMSs are used across different disciplines. A study using purposeful sampling of instructors from a few academic disciplines may provide more detailed data as it relates to differences between content areas. Specifically, further analysis of a small number from a set of disciplines

comparing levels of utilization may provide some insight with respect to differences. This also could aid in the development of a more comprehensive measure of adoption by instructors than simply utilization.

A continued review of the literature also is recommended. This will be especially important as the business climate related to course management systems (CMS) is undergoing a significant change. The consolidation of the two primary commercial providers of CMS will have an impact on the technology, and the way in which colleges and universities implement and adopt the technology. As a part of the continued review of the literature and monitoring of this consolidation, a metaanalysis should be performed regarding CMSs. CMSs have been used for nearly two decades, and this should provide common variables and implications for the implementation, use, and utilization of these systems.

In terms of the type of courses being offered within WebCT, the results of this study have significant implications. Because the overwhelmingly majority of respondents in this study used the CMS as a part of their traditional course offering, future researchers with a similar sample should be asking a different question as it relates to online course delivery. Much of the previous research has addressed traditional or online when investigating the effectiveness. Based upon data here, the question should be whether or not there is an online component to every course or not, and how that addition affects its quality and effectiveness. In addition, this research should identify more specifically the motivations which are most effective in encouraging instructor adoption and/or utilization. In terms of the impact of CMSs on distance delivery, there should be specific research done to compare the utilization found in this study with that in courses offered specifically and entirely at a distance.

Lastly, future research should be expanded to include the student. Though previous research has included students in terms of their satisfaction, student's perception with respect to effectiveness of the CMSs utilization should be investigated. This research also should consider the students' preferred learning style as a component of perceived effectiveness. Much like research investigating the use of various types of teaching methods including technology, students provide the best perspective as to what, specifically, is effective from a CMS in terms of learning outcomes and other relevant factors.

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APPENDIX A
SURVEY INSTRUMENT

Instructor Utilization of WebCT
Colorado State University
Fall 2006

According to the information obtained from WebCT, you are currently offering one or more courses. Specifically, it appears you are the instructor for the course _____. If you are not the instructor of this course, please provide the correct course number for one you are currently offering via WebCT _____.

Recognizing that you may be teaching more than one course using WebCT, unless otherwise noted, please consider only the course identified above when responding to the questions. This survey is intended to be completed by the course instructor, who may not necessarily be the course developer or an instructional technology expert.

When complete, please remove and discard the last page from this survey, then fold the completed survey in half, and place in campus mail for return to the researcher.

Please circle the response that best describes you, your experiences with WebCT, and/or your perceptions related to WebCT.

1. Approximately how many semesters have you used WebCT at Colorado State University? _____. Approximately how many courses were offered? _____
(Count the same course each time it was offered in WebCT.)
2. How would you rate your own knowledge of WebCT related to your peers?
 - a. Much more knowledgeable
 - b. Somewhat more knowledgeable
 - c. Somewhat less knowledgeable
 - d. Much less knowledgeable
3. What type of training and/or professional development has contributed the MOST to your knowledge of WebCT?
 - a. None – no interest in training
 - b. None – I use WebCT for my courses, but someone else does all course development
 - c. None – self taught
 - d. Assistance (one-on-one) from a colleague, peer, or other non-technical resource
 - e. Assistance (one-on-one) from an Information or Instructional Technology resource on campus
 - f. Formal class(es) or session(s) on-campus resource
 - g. Formal class(es) or session(s) from off-campus resource(s)
 - h. Other _____

4. What type of training and/or professional development related to WebCT have you had before coming to Colorado State University? (This may INCLUDE time as a student, GTA, GRA, or Post-Doctoral.)
 - a. None – no interest in training
 - b. None – I use WebCT for my courses, but someone else does all course development and interaction with students.
 - c. None – self taught
 - d. Informal assistance from a colleague, peer, or other non-technical resource.
 - e. Informal assistance from an Information or Instructional Technology resource on campus.
 - f. Formal class or session on-campus resource
 - g. Formal class or session from an off-campus resource
 - h. Other _____
 - i. Not Applicable

5. For the course identified above that you are currently teaching using WebCT, does the class meet face-to-face?
 - a. Yes, this is an on-campus course
 - b. Yes, the course meets periodically, but on a regular schedule (i.e. the last Friday of each month)
 - c. Yes, the course meets periodically, but NOT at a regularly scheduled time.
 - d. No, the class does not meet as a group, but as the instructor I do meet face-to-face with students as needed.
 - e. No, there is no face-to-face interaction between the instructor and students related to this course.

6. Approximately how many hours per week do you spend accessing this course in WebCT? (This includes all times within the course interacting with students, responding to requests, posting course materials, grading assignments, and other activities requiring you to be “logged in” to the WebCT system.) _____ hours.

7. In addition to the WebCT course you are describing in this survey, how many additional credit hours of courses are you teaching during the Fall 2006 semester? _____

8. Are you the only individual responsible for instruction as it relates to the course or section of a course you are offering in WebCT? For example, are there multiple instructors for this one course, is there a GTA, GRA or work study providing assistance, or is there some professional staff person responsible for doing some of the course development.
- Yes, I am the only individual responsible for the course
 - No, I have direct assistance with the WebCT component of the course

9. Thinking only of the course identified at the beginning of this survey, how would you rate the effectiveness of WebCT in each of the following functions:

(Very Effective=4, Very Ineffective=1, Not Applicable=0)

Providing Course Information and/or Logistics (i.e. syllabus, meeting times, etc.)	4	3	2	1	0
Communicating Course content	4	3	2	1	0
Facilitating Student to Student interaction	4	3	2	1	0
Facilitating Instructor to Student interaction	4	3	2	1	0
Assessment and/or Feedback	4	3	2	1	0

10. What are the most significant barriers to your using WebCT? Please circle all that apply.

- Understanding the features / functions of WebCT
- Assistance in the department / college / university when I have a question or need help
- No benefit for the instructor or students
- Unstable / Unreliable technology as it relates to WebCT availability (i.e., WebCT is unavailable or unreliable)
- Unstable / Unreliable technology available for me (i.e., connectivity, personal computing, etc.)
- Other _____

11. Which of the following features/functions have you utilized for the current course you are offering via WebCT? Please respond only for the current, Fall 2006 course and circle all that apply.
- a. Posting course information such as syllabus
 - b. Offering course content either via posted documents, links to other sources of content, or some type of multimedia content.
 - c. Bulletin Board students only
 - d. Bulletin Board students and instructor
 - e. Chat – students only
 - f. Chat – students and instructor
 - g. Email
 - h. Quizzes / Tests
 - i. Posting of assignment grades
 - j. Posting of exam grades
 - k. Posting of final grades
 - l. Other _____
12. Overall, how would you rate your satisfaction with WebCT in terms of how the technology and features support your course offering during the Fall of 2006?
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied
13. Thinking of your experiences at Colorado State University, how would you rate your satisfaction with the institution's support for use of WebCT?
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied
14. What was your primary motivation for using WebCT during this semester? Please circle all that apply.
- a. Convenience for you
 - b. Student demands
 - c. Improved Student experience / learning
 - d. Departmental / College demands
 - e. Financial or other professional reward incentives
 - f. Grant / research related activity
 - g. Other _____

15. What is your age? _____
16. What is your gender?
- a. Male
 - b. Female
17. What is the highest degree you have completed?
- a. Associates
 - b. Bachelors
 - c. Masters
 - d. Doctorate
 - e. Other _____
19. What is your academic rank?
- a. Instructor
 - b. Adjunct
 - c. Assistant Professor
 - d. Associate Professor
 - e. Professor
 - f. Administrative Professional
 - g. State Classified Employee
 - h. Other _____
20. For how many years have you been teaching at Colorado State University? _____
21. In what academic department at Colorado State University is your faculty appointment (or the major portion of your appointment)?

(NOTE: This may be different from the department through which you are offering this course.)

22. At how many other institutions have you had an academic appointment?
(Please do not include graduate work such as GTA, GRA, or post-doctoral appointments.)

- a. 0
- b. 1
- c. 2
- d. 3
- e. 4
- f. 5
- g. 6 or more

23. In order to clarify and further explore the utilization of WebCT at Colorado State University, may we contact you for a five question, ten minute follow-up telephone interview during the week of December 11-15?

- a. YES
- b. NO

APPENDIX B
SURVEY COVER LETTER



Knowledge to Go Places

School of Education
Fort Collins, Colorado 80523-1501
(970) 491-6317
FAX: (970) 491-1317
www.soe.cahs.colostate.edu

November 6, 2006

Dear Colorado State University Faculty Member:

In an effort to better understand how Faculty at Colorado State University use the online course management system WebCT, the attached survey is being sent to the instructors of all courses active during the current semester. This data will be used as part of a doctoral research study titled *Factors Affecting Instructor Usage of an Online Course Management System*. Completing this survey will provide valuable data in understanding how individual instructors are using the WebCT course management system, and ultimately allow for more effective professional development opportunities and support resources.

Your participation in this survey is completely voluntary and confidential. You are receiving this survey because you currently have an active, for-credit course being offered via WebCT. If you choose to complete, or partially complete, the survey, please do not include your name on the survey. The survey should take no more than 20 minutes to complete. After completion, please return the survey in the enclosed self-addressed stamped envelope to *Factors Affecting Instructor Usage of an Online Course Management System, 215 Gibbons Building, Fort Collins, CO 80523-1501*.

As a follow-up to this survey, 20 individuals will be randomly selected for a brief follow-up telephone interview. Participation in this process also is completely voluntary and confidential, and if you would prefer not to be contacted if you are selected you can answer no on question 19 of the attached survey. If you are selected and choose yes on question 19, you will be contacted during business hours the week of December 11 – 15.

It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safe guards to minimize any known and potential, but unknown, risks. If you have any questions about your rights as a volunteer in this research, please contact Janell Meldrem, Human Research Administrator, at 970-491-1655.

If you would like a copy of the results of this research, or if you have any questions concerning this study, please contact James Lyall at 970-491-6837 or James.Lyall@Colostate.Edu.

Sincerely,

Patrick J. Burns
Associate Vice President for Information
and Instructional Technology
Colorado State University

James M. Lyall
Ph.D. Candidate
School of Education
Colorado State University

APPENDIX C
EMAIL INTRODUCTION TO SURVEY

Dear Colorado State University Faculty Member:

In an effort to better understand how Faculty at Colorado State University use the online course management system WebCT, we are conducting a survey of all instructors currently offering a for-credit course via the WebCT course management system. You will receive the survey via campus mail within the next few days.

This data will be used as part of a doctoral research study titled *Factors Affecting Instructor Usage of an Online Course Management System*. Completing this survey will provide valuable data in understanding how individual instructors are using the WebCT course management system, and hopefully allow for more effective professional development opportunities and support resources.

Your participation in this survey is completely voluntary and confidential. If you choose to complete, or partially complete, the survey, please do not include your name on the survey. The survey should take no more than 20 minutes to complete. Detailed instructions about the study will be included with the survey.

This email is simply to alert you that the survey will be delivered.

Sincerely,

Patrick J. Burns

Associate Vice President for Information and Instructional Technology

Colorado State University

APPENDIX D
TELEPHONE INTERVIEW

Instructor Use of WebCT
Phone Interview
Colorado State University
Fall 2006

Introductory Script:

My name is James Lyall and I am a doctoral student in the School of Education at Colorado State University. You received a campus mailing with a survey regarding your usage of WebCT at CSU. You have been randomly selected for a follow-up telephone interview. You returned the survey and indicated it was acceptable to be contacted for a follow-up phone interview consisting of five questions. Your participation is completely voluntary, and you still may elect to not participate. May I ask you five follow-up questions regarding the survey you returned?

Questions:

1. With respect to additional support in assisting you with your usage of WebCT, can you explain what would be helpful?
2. You described your level of satisfaction with WebCT as to how the technology specifically supported your courses as (very satisfied – very dissatisfied). Can you please describe why you gave this rating?
3. You rated the institutional support from Colorado State University as (Excellent – Poor). Please explain why, and how you believe CSU could better support your use of WebCT?
4. Are there any other concerns about using WebCT or recommendations for improvements you would like to share with me?

APPENDIX E
EMAIL REMINDER

December 4, 2006

Dear Colorado State University Faculty Member:

This email is a simple reminder regarding a survey you received earlier regarding your utilization of the WebCT Course Management System at Colorado State University. The survey seeks to better understand how Instructors use WebCT.

In an effort to better understand how Faculty at Colorado State University use the online course management system WebCT, a survey was sent to the instructors of all courses active during the current semester. The data from this survey will be used as part of a doctoral research study titled *Factors Affecting Instructor Usage of an Online Course Management System*. Completing this survey will provide valuable data in understanding how individual instructors are using the WebCT course management system, and ultimately allow for more effective professional development opportunities and support resources.

Your participation in this survey is completely voluntary and confidential. You received this survey because you currently have an active, for-credit course being offered via WebCT. If you have already completed the survey, thank you for your participation. If you have not, and choose to complete, or partially complete, the survey, please do not include your name on the survey. The survey should take no more than 20 minutes to complete. After completion, please return the survey in the enclosed self-addressed stamped envelope to *Factors Affecting Instructor Usage of an Online Course Management System, 215 Gibbons Building, Fort Collins, CO 80523-1501*.

As a follow-up to this survey, 20 individuals will be randomly selected for a brief follow-up telephone interview. Participation in this process also is completely voluntary and confidential, and if you would prefer not to be contacted if you are selected you can answer no on question 19 of the attached survey. If you are selected and choose yes on question 19, you will be contacted during business hours the week of December 11 – 15.

It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safe guards to minimize any known and potential, but unknown, risks. If you have any questions about your rights as a volunteer in this research, please contact Janell Meldrem, Human Research Administrator, at 970-491-1655.

If you would like a copy of the results of this research, or if you have any questions concerning this study, please contact James Lyall at 970-491-6837 or James.Lyall@Colostate.Edu.

Sincerely,

Patrick J. Burns
Associate Vice President for Information
and Instructional Technology
Colorado State University

James M. Lyall
Ph.D. Candidate
School of Education
Colorado State University

APPENDIX F
PHONE INTERVIEW RESPONSES

Phone Interview responses

Q1: With respect to additional support in assisting you with your usage of WebCT, can you explain what would be helpful?

#1 self taught - know what I need to

#2 help files easier to follow. I'm user savvy but better online help

#3 should be CSU idiot's guide to WebCT. Example: Here is how you.....

#4 College has a general lack of computer support - including WebCT. No time for classes, rely on online support, documentation

#5 I'm on top of most things and do the research myself, but more communication regarding changes

#6 support or interaction, general usage is confusing. Never been to training, self-taught, difficult to customize

#7 expert but don't use complex usage. Post PDF, bulletin board feature, primarily a communication tool to save class time

#8 try things and wouldn't seek help unless desperate, self-serve

#9 more advanced needs - pedagogical construction: what works for faculty, student, and online instruction

#10 good support as it is now. Should look at other places. Easy now, but difficult when I first started

Q2: You described your level of satisfaction with WebCT as to how the technology specifically supported your courses as (VS-VD). Can you please describe why you gave this rating?

#1 categorize myself as advanced tech person but WebCT is not as easy as could/should be, update lag, no html editing, every change is multi-step

#2 seems cumbersome, faster to do in class or on a board. If easier to use or navigate I would use more

#3 very computer literate, but WebCT not intuitive at all.

#4 not exactly supported, mainly grades and posting articles, clunky interface

#5 little things from time to time. Grade book is crude, not HTML tags in content pages

#6 love it. Being able to post notes

#7 clumsy for communication purposes. Slow to upload individual files, equation calculator is a mess

#8 little annoying technical issues. Grade sheet - grades are cumbersome, deploying content

#9 new version seems to offer better support for my needs - chat, white board more effective

#10 given so much to offer to class

Q3: You rated the institutional support from Colorado State University as (E-P). Please explain why, and how you believe CSU could better support your use of WebCT?

#1 not great but don't need much. College person is too busy so not immediate support available, so nothing if need explanation

#2 support is helpful and fast

- #3 support is not widely available...more of a designated person would be helpful
- #4 general computer support services need to be expanded. More efficiencies and more general support related to WebCT
- #5 dissatisfaction is due to lack of effective use by faculty
- #6 support was responsive, trainings are available, wish local IT was WebCT trained
- #7 fast solution from College to resolve problems - very good support
- #8 permissions and support - College representatives were very helpful
- #9 workshops are too basic - make more about online pedagogy not how to file or post
- #10 dedicated staff in the College for support but no major problems with operation

Q4: Are there any other concerns about using WebCT or recommendations for improvements you would like share with me?

- #1 huge need for decent, flexible survey tools for teaching...data collection/survey, not graded. Presentation evaluations, data collection
- #2 help files
- #3 substantial amount of cheating with test banks and WebCT. Pictures of screen shots, emailed to other students. Testing without proctor. Print screen is still available....bad design.
- #4 more online support, better interface with drag and drop functionality
- #5 understanding it is a learning management approach, different and can be more effective
- #6 more simplification for common functions. Anxious about RamCT
- #7 for what I use it for, it is fine, easier
- #8 many features I don't use or have experience with
- #9 training for more advanced users - more toward pedagogy, not mechanism of WebCT. Make services available to build content. How do I better serve students
- #10 administration needs to be aware of what can be done with WebCT - what is capable and how can be integrated

Appendix G
Human Subjects Approval



COPY

Office of Regulatory Compliance
Office of Vice President for Research
Fort Collins, CO 80523-2011
(970) 491-1553
FAX: (970) 491-2293

Notice of Approval for Human Research

Principal Investigator: Brian Cobb, Education, 1588
Co-Principal Investigator: Jane M. Lyall, Col of Applied Human Sci., 1501
Title: Factors Affecting Instructor Utilization of an Online Course Management System
Protocol #: 06-251H **Funding Source:** N/A
Number approved: 100 Surveys and 20 Interviews
Committee Action: **Approval Date:** October 18, 2006 **Expires:** October 9, 2007
HRC Administrator: Janell Meldre *Janell Melchen*

Consent Process:

Because of the nature of this research, it will not be necessary to obtain a signed consent form. However, all subjects must receive a copy of the approved cover letter printed on department letterhead. The requirement of documentation of a consent form is waived under § ___.117(c)(2).

Investigator Responsibilities:

- It is the PI's responsibility to obtain consent from all subjects.
- It is the responsibility of the PI to immediately inform the Committee of any serious complications, unexpected risks, or injuries resulting from this research.
- It is also the PI's responsibility to notify the Committee of any changes in experimental design, participant population, consent procedures or documents. This can be done with a memo describing the changes and submitting any altered documents.
- Students serving as Co-Principal Investigators must obtain PI approval for any changes prior to submitting the proposed changes to the HRC for review and approval.
- The PI is ultimately responsible for the conduct of the project.
- A status report of this project will be required within a 12-month period from the date of review. Renewal is the PI's responsibility, but as a courtesy, a reminder will be sent approximately two months before the protocol expires. The PI will be asked to report on the numbers of subjects who have participated this year and project-to-date, problems encountered, and provide a verifying copy of the consent form or cover letter used. The necessary continuation form (H-101) is available from the RCO web page www.research.colostate.edu/rcoweb/.
- Upon completion of the project, an H-101 should be submitted as a close-out report.
- If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice. This approval is issued under Colorado State University's OHRP Federal Wide Assurance 00000647.
- **Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.**

Please direct any questions about the Committee's action on this project to me for routing to the Committee. Additional information is available from the Regulatory Compliance web site at <http://www.research.colostate.edu/rcoweb/>.

Attachment

Date of Correspondence: October 24, 2006

Animal Care and Use · Drug Review · Human Research · Institutional Biosafety
321 General Services Building · www.research.colostate.edu/rcoweb/