JASHODA SANGHVI BOTHRA
How faculty members design and implement complementary online course management systems in graduate face-to-face instruction
(Under the Direction of DR. RONALD M. CERVERO)

The purpose of this study was to describe how faculty members identify and account for the pedagogical design factors when incorporating online Course Management Systems (CMS) in graduate face-to-face instruction

The methodology employed was a qualitative design with interviews, documents, and observation as data sources. Participants included ten faculty members from southeastern, northwestern, and southwestern United States. This faculty sample represents maximum variation as they teach different disciplines at either public Masters I or Research I state funded institutions.

Pedagogical design factors considered by faculty included (1) nature of the CMS, (2) student background, and (3) institutional support. The participants incorporated those CMS features which addressed their pedagogical beliefs and expectations. The design factors were implemented by (1) diversifying instruction, (2) providing in-depth instruction, (3) modeling effective teaching and learning and (4) blending instruction in three phases. Faculty implemented their CMS along a three phase continuum. They first, offered duplicate or diversified versions of course materials, second, implemented course management functions and third, built a learning community. The CMS features helped them extend classroom boundaries, provide customized guidance, encourage critical thinking, and build a sense of community in their classes.

Participants situated the design and implementation of CMS-augmented graduate instruction by, (1) adapting to a blended instructional environment, (2) trial and error course design, (3) increase in preparation time, and (4) changes in course interactions. The constant

re-design of the course within the CMS involved extra time. Facilitating learning in the blended environment changed the interactions among faculty-students and in most cases increased the amount of student participation in course discussions.

The four conclusions were:

1. Faculty learn the pedagogical practice of blended instruction in situated environments.
2. Faculty design and incorporate the CMS features that offer clear pedagogical benefits for their instructional contexts.
3. Faculty need different types of support (technical, institutional, and collegial) depending on their level of involvement with the design and implementation of the CMS.
4. As a result of implementing CMS, faculty experience enhanced interaction with and among their students.

This study offers research recommendations for faculty developers, adult educators, higher education administrators, and researchers.

INDEX WORDS: Reflective Practice, Situated Learning, Communities of Practice, Course Management Systems, Blended Instruction, Pedagogy, Adult Education, Faculty Development, Higher Education, Graduate Faculty, Web Course Tools (WebCT), WebBoard, Learning Space, The West Education Network (TWEN), Blackboard, Qualitative Research.

HOW FACULTY MEMBERS DESIGN AND IMPLEMENT COMPLEMENTARY ONLINE COURSE MANAGEMENT SYSTEMS IN GRADUATE FACE-TO-FACE INSTRUCTION

by

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DEDICATION

This dissertation is dedicated to my parents Jaswanti and Mahendra Sanghvi.

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CHAPTER 1

INTRODUCTION

It is increasingly common to see entire sections of online newspapers, university websites, and web-based magazines dedicated to complementary online learning issues. Exemplars of popular online newspapers and magazine websites include technology-dedicated sections of The Chronicle for Higher Education, The University of North Carolina at Chapel Hill, and Change: The Magazine for Higher Learning. These magazines and sites attend to the interests of a growing number of faculty audiences to enhance face-to-face instruction with web-based technologies. Higher education faculty are a group of adult learners faced with the challenges of exploring, analyzing, integrating, and incorporating web-based complementary online resources in their instructional practices.

Most research-based institutions provide easy access to the Internet and multiple online mediums for faculty members to facilitate web-based instruction (Downing & Rath, 1996-7; Soderberg, 1997). According to Reeves (1998) a growing number of faculty use the World Wide Web (WWW) to provide several beneficial resources for their students including: (a) enriching access to course materials, (b) facilitating group work, (c) documenting course discussions and, (d) providing tutorials, simulations, and drills. These technologies foster student to instructor correspondence beyond the walls and time limits of the class. Course Management Systems (CMS) like Web Course Tools (WebCT), Top Class, Learning Space, and Web Course in a Box are a few examples of several online environments that allow instructors to maintain the privacy of student records while providing global resources to complement the content of their course (Landon, 1998).

Reports of faculty time (Plater, 1995) and work (Baldwin, 1998), indicate an evolutionary change in higher education's approach to teaching and learning due to the increasingly common presence of technology-based instructional resources and tools.

Even though institutions offer various forms of instructional and technical support for faculty members, from a pedagogical perspective, there are several issues of enhancing instruction with web-based resources that remain unresolved (Ehrmann, 1998; Gillespie, 1998; Schrum, 1998). One of these issues involves faculty deciding which features of the WWW may be appropriate to assist a specific student population. Another challenging factor for faculty is selecting and customizing content that is appropriate to the medium and nature of the WWW. In order to incorporate the WWW in their instruction, faculty members may need to make dramatic changes to their pedagogy. Often strategies and methods applied with other instructional technologies do not translate conveniently to the web. For example, interaction on the WWW during a class session calls for a unique set of guidelines compared to interacting via videoconferencing sessions. In order to maximize the potential of the WWW, faculty have to revisit, reconsider, and revise their approaches to facilitating instruction.

Statement of the Problem

Most of the research literature for complementary online instruction addresses the needs of K-12 faculty. In a recent review of the literature, Jones and Paolucci (1998) studied the effectiveness of technology as a substitute or partial substitute for traditional teaching methods. The researchers classified and analyzed the content of 834 articles published over a period of three years in eight major educational technology journals, including Educational Technology Research and Development and the Journal of Educational Computing Research. The seven categories of content in journals reviewed for this study were

technology, applications, development, implementation, pedagogy, evaluation of instructional process, and evaluation of learning outcomes. Pedagogy ranked fourth among the frequently published studies included in this review most of which were primarily conducted in a K-12 context. Despite their high occurrence, studies related to pedagogy do not include personal accounts of faculty members' perspectives on the pedagogical aspects of designing and facilitating online instruction.

The majority of the literature related to on-line instruction and learning provides descriptions of distance education courses. The scarce literature on institutional attempts in higher education focuses on the views of technical support staff who assist faculty to integrate technology in the classroom (Gandolfo, 1998; Gillespie, 1998; Gillespie & Contributors, 1998). From a pedagogical perspective, there are even fewer accounts of higher education faculty members' experiences with enhancing face-to-face instruction with online technologies in a blended instructional environment. Enhancing face-to-face instruction may involve practices such as providing an online syllabus or engaging students in online simulations to complement the theoretical aspects of the course. Designing, delivering, and implementing online instruction is a time and resource consuming activity (Heath, 1997; Noble, 1999). According to Windschitl (1998) and Reeves (personal communication, August 25, 1999), faculty should critically reexamine the purpose of using technology, the pedagogy, and the expected learning outcomes in order to maximize student learning. Faculty who are attempting to learn and adapt their instruction encounter multiple problems in designing technology enhanced components for the classroom context. These problems include:

1. Selecting which technology (or specific feature) is appropriate for achieving the instructional goals of their class;

2. Determining the usability and effectiveness of on-line resources offered to the students;
3. Acquiring software skills to customize the on-line medium's features for the content and purpose of their course; and,
4. Seeking appropriate administrative, technical, and social support to customize the on-line component of a face-to-face course.

In addition to the technical, human, and social skills, faculty members need to consider a variety of context-sensitive design factors including the course content to facilitate appropriate instruction for their learners. Combining sound pedagogy with web-based technologies in classrooms requires faculty to rethink the presentation of the content, revise evaluation criteria for learning, and often remodel a face-to-face course (Ehrmann, 1998; Gandolfo, 1998; Pallof, & Pratt, 1999; Reeves, 1998; Schrum, 1998). As they are translating existing course content and instructional methods to an online format there are many areas where faculty members have to reconsider, renew, and reflect upon their instructional design to make effective use of the medium. Incorporating web-based tools in the classroom introduces involves blending the requirements of face-to-face and online mediums of facilitating teaching and learning.

Faculty members who are learning to teach in blended environments are often practicing their teaching profession in unfamiliar contexts. To adapt to the unfamiliar blended instructional environment, faculty members may need to change their teaching practices. While they are teaching, faculty members may identify, problematize, and learn to resolve pedagogical issues related to the CMS. Student reactions to content, strategies in the instructional environment provide authentic situations allowing faculty members to reflect upon their pedagogy. In the unknown and unfamiliar CMS-augmented environment, some faculty members learn to refine their practice by acting upon assumptions, explore alternate

solutions, and assess the effectiveness of the pedagogical solutions. Faculty members, like other professionals learn to resolve unknown situations (e.g., CMS-augmented instructional environments) by acting, doing, and reflecting upon their practice. As faculty members change their instructional practice this may alter their pedagogical views about using technology in the classroom. It is this altered pedagogy which can be problematic for those faculty members who are not knowledgeable about employing and modifying technological features to suit their instructional contexts.

According to Schon (1987) professionals learn by doing, action, or practice. Schon's (1987) model of reflective practice provides a detailed description of how professionals learn by engaging in problem solving and reflecting on their experiences of solving work related dilemmas. The reflective practice literature has been applied in the fields of nursing (Daley, 1999), teacher education (Newman, 1999), extension educators (Ferry & Ross-Gordon, 1998) and practitioner research (Jarvis, 1999; Jacobson, 1998). It has also been used to capture the practice of adult and continuing education (e.g Brookfield, 1988; Cervero, 2001; Jarvis, 1999). Daley (1999) mentioned the unexplored connections between expertise in professional development and expertise in learning. Faculty members are professionals who constantly revise their teaching practices in the classroom context. This connection may surface in my attempts to relate to the teaching and learning experiences of the faculty members and their experiences with designing and solving the pedagogical problems of using online CMS. Hence, Schon's (1987) model of reflective practice serves as a suitable theoretical framework to capture the practice of higher education faculty who teach in blended environments. In addition, situated learning, situated cognition, and communities of practice literature may provide additional details about the context relevant aspects of blended instruction missing in Schon's (1987) theory.

Situated learning (Lave & Wenger, 1991), situated cognition (Brown, Collins & Duguid, 1989; Wilson, 1993), and communities of practice (Brown & Duguid, 1996; Wenger, 1998) perspectives on learning provide a comprehensive insight on the role of context, culture, authentic activity, and forms of participation, in learning communities. These perspectives may provide a contextual view of how faculty as a community of learners practice teaching and learning in blended instructional contexts. While there are pedagogical design solutions for implementing technology in the classroom, a better understanding is needed of how faculty members learn to implement these factors in their institutional contexts. Currently, in higher education, there are minimal accounts of how faculty members take into account pedagogical design factors when complementing their face-to-face instruction with online CMS (Jones & Paolucci, 1998).

Purpose of the Study

The purpose of this study was to describe how faculty members identify and account for the pedagogical design factors when incorporating online CMS in graduate face-to-face instruction.

Research Questions

1. What pedagogical design factors do faculty members take into account when incorporating online CMS in graduate instruction?
2. How have faculty members taken into account design factors when implementing CMS to augment their face-to-face instruction?
3. How does situated activity shape the pedagogical practice of faculty members' design and implementation of blended instructional environments.

Significance of this study

There are several implications of this study for different stakeholders in adult and higher education institutions who are involved in the technology-integration process. This section describes implications of this study for higher education researchers, adult educators, faculty, administrators, and technical support staff.

Experts and researchers of online and distance education recommend that faculty adopt new ways of customizing their content, remodel their teaching style, and incorporate interaction in their complementary online instruction (Collins & Berge, 1996; ; Paloff & Pratt 1999; Paulsen, 1995; Reeves, 1998). These suggestions are helpful but not comprehensive. They do not help faculty to make context-sensitive decisions regarding the advantages and disadvantages of using technology, match their teaching preferences and content within a technological context, or evaluate learning outcomes suited for an online environment of teaching and learning. This study provides a detailed description of how a select group of faculty learned to enhance their face-to-face instruction by employing CMS.

This study may assist adult educators (including faculty themselves), to use their personal experiences to justify the need to seek out pedagogical, technical, and social incentives to facilitate complementary online instruction. Changes regarding access to equipment, validity of online instruction, and support structures for faculty need to be made at the institutional level to justify the use of technology in classrooms. This study may also help establish the need for individual and institution-wide evaluation guidelines to ensure the effective and ethical use of technology in classroom instruction. It may help administrators critique and validate the vast amount of finances being invested in technology infrastructures on college campuses. This study focuses on the role and practice-based experiences of faculty members in higher education. The findings may help technical support staff who are

primarily educators of adults, understand the pedagogical needs of their adult learners, the faculty members.

Definition of Terms

This study includes terms that are used in many different contexts. The following definitions provide the specific context of two of the common terms included in this study:

Complementary Online Instruction

Most of the research in distance education is based on the premise that technology is the only bridge of communication between the instructor and the learner. Contrary to the complete switch from traditional to virtual teaching, this study is similar to Mason's (1996) use of the Internet as an extension of the (traditional) teaching and learning environment, thus emphasizing the complementary role of this technology. It is congruent with Willis and Dickinson's (1997) definition of distance education which "takes place when a teacher and student(s) are separated by physical distance and technology (i.e. audio, video, data, and print), often in combination with face-to-face communication, that is used to bridge the instructional gap" (p. 81).

Course Management Systems (CMS)

CMS are secure (password-protected) environments containing bulletin boards, private e-mail, quiz modules, presentation areas, and chat rooms all of which are accessible via the WWW. CMS are menu-based systems on the WWW, where faculty members can publish course-related information and resources.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter includes a review of the existing literature on issues related to complementary online instruction and the reflective practice and situated learning theoretical perspectives used in this study. The first half of this chapter is a collection of a variety of literature sources (including journals, magazines, and websites) on pedagogical issues related to complementary online instruction. Relevant information from national, state, and local surveys, studies and personal accounts of complementary online education are presented and analyzed in the following section. Databases such as ERIC, PsycInfo, ABI Inform, and Dissertation Abstracts International were used to filter the sources included in this review. The second half on relevant theories addresses the underlying issues including reflective practice, and the social context of designing, developing, and implementing complementary online instruction.

Complementary Online Instruction

The following three sections are main areas of literature on (a) assessment, (b) design, and (c) implementation issues related to complementary online instruction. A separate section on pedagogical issues related to complementary online instruction summarizes the emerging conceptions of teaching with existing guidelines for faculty to address the overall pedagogical issues related to complementary online instruction. Below is a report of the evolving status of online instruction - it includes available assessment studies of the role of online technologies in higher education.

Assessing Complementary Online Instruction

Since 1990, The Campus Computing Project has been implemented annually to collect data from a wide range of two and four year colleges and universities throughout the United States. The survey findings inform various policies and implications of the use of information technology in higher education institutions (“Distance Learning”, 1999; Green, 1998). A total of 571 and 557 institutions that responded to the 1998 and 1999 surveys respectively indicated their topmost challenge was to help faculty integrate technology in their instruction. At the same time, the 1999 survey revealed that only 13.7% of the institutions have reward structures to encourage and support the faculty who use technology in their instruction. This survey includes statistics on the use of technology by students and faculty, fee structures, and intellectual property policies on campuses. In an interview about this survey, Kenneth C. Green, director of the Campus Computing Project acknowledged the lack of hard evidence to support the use of technology and how it directly benefits student learning. Despite the lack of evidence, Green recommended that institutions should still consider investing in technical and support infrastructure for information technology to reap other benefits such as "individualized instruction, asynchronous learning, enhanced content, and information rich resources that are not limited to one physical copy that resides in only one location" (Morrison, 1999, p. 3). Few details of how and why the few faculty members integrate technology in their instructions are furnished in this survey. Green’s (1998) annual survey captures an institutional view of technology integration at a national level. Two other surveys discussed below reveal faculty perspectives on complementary online instruction

A statewide survey reported the results of the faculty development component of a needs assessment conducted by the Central Florida Consortium of Higher Education

(CFCHE) (Moskal, Martin & Foshee, 1997). Two thousand surveys were sent out to faculty in the seven institutions in CFCHE. The response rate was 19% for five community colleges and 8% from the faculty at the University of Central Florida. Statistics were collected to identify faculty experiences and perceptions about distance education, educational technologies, and instructional design. Factors that promote the use of educational technologies were based on improved student learning, student motivation, availability of equipment, and demonstrated advantage over traditional delivery. Computer-based, two-way video/audio, and desktop video were the three highest-rated delivery mediums. Lack of information on the profile of respondents (their rank and personal perceptions of these technologies), the pedagogical use of the technologies, in addition to the low response rate of this survey reduce the implications of the results for those who wish to learn about faculty experiences and perceptions of these issues.

Owston (1997) critically reviewed the scope and application of the WWW in public and higher education contexts. Based on three issues related to access, quality, and costs of online learning, Owston (1997) provides examples to chronicle the use of the WWW in education. The advantages of web-based learning include access to flexible learning opportunities for remote and non-traditional learners. In some cases, the web has allowed instructors to provide authentic and collaborative learning experiences for online learners. Instead of emphasizing technology, Owston (1997) strongly attributed the success of the web in providing improved learning "because of the way the instructor simulated and orchestrated the environment made possible by the medium" (p. 29). Web-based learning also has several limitations including (a) the costs of hardware and software for the institutions and, (b) instructional and technical support for faculty members. Owston (1997) warns readers against the blind adoption of web as a magical tool to solve instructional

dilemmas. His critique offers yet another framework for institutions and instructors to analyze and apply the WWW effectively in education.

A yearlong study by the University of Illinois (1999), Teaching at an Internet Distance, focused on the pedagogical benefits and limitations of online teaching and learning. This study includes the views and experiences of 16 faculty from different colleges at the University of Illinois, who participated in seminars and presentations related to the pros and cons of online instruction. The group of participants included faculty members who identified themselves either as proponents or opponents of using technology for teaching. During the yearlong discussions the group attempted to distill the pedagogical aspects of online instruction from the multiple issues affecting online instruction. The first part of the report includes a review of the literature on the various issues affecting online instruction including its status, comparisons with traditional instruction, costs of delivery, faculty resistance, and evaluation. The second part addresses elements of good teaching and learning, online teaching evaluation, conclusions and recommendations based on the findings of the study.

Among the findings of this seminar are two sets of practical considerations, one for faculty and the other for administrators. Faculty participants emphasized the need for faculty members to make pedagogical decisions related to the use of technology based on four major criteria: (a) whom do I teach? (b) how do I teach? (c) how many do I teach? and (d) how do I ensure high quality of online teaching? In response to these questions, participants in this study categorized and identified their perceptions of traditional and non-traditional learners, the collaborative and constructive paradigms of teaching, a maximum of approximately 20 learners in each online classroom, and having faculty members own the course materials to ensure the high quality of instruction. The report provides considerations

for administrators to help them evaluate the instructional and financial worth of integrating online technologies for teaching and learning. Administrators should be aware that online courses are costly and not a cheap alternative to face-to-face instruction. High quality of online instruction may be dependent on the type of students (e.g., traditional and non-traditional), levels of instruction (undergraduate, graduate or professional), and context of classes (totally online or adjunct mode). One of the strong recommendations for the successful implementation of technology was entrusting pedagogically competent teachers to be responsible for developing, delivering, and owning online course materials. In addition to the above issues participants emphasized the need for faculty to provide a human touch and respond attentively to the needs of the learners. The findings highlight the most effective use of technology as an adjunct (or complement) of the traditional (or face-to-face) mode of instruction. This report is a pioneering attempt to focus on the pedagogical issues related to complementary online instruction. It is a unique representation of faculty perspectives (as in a seminar format), as well as a comprehensive review of limited research on the pedagogical implications of using technology in the classroom.

To summarize the research discussed above, there is a strong need for models to assist faculty in designing, developing, and implementing complementary online curricula. Institutions, faculty members, and instructional designers need to consider multiple issues related to access, effectiveness, and costs of providing online learning opportunities for their learners. The next section includes studies related to the design of online instruction in higher and adult education contexts.

Designing Complementary Online Instruction

This section provides descriptions of individual case studies of researchers who were personally involved in the design, delivery, and implementation of complementary online

(Downing & Rath, 1996-97; Hodes, 1997-98) and virtual courses (Heath, 1997; Paloff & Pratt, 1999). It also includes studies of instructors' experiences with complementary online teaching (Bostrom, Clawson, & Watson, 1996; Lee, 1996).

Hodes (1997-98) developed web pages to complement the print-based version of a distance education course on nuclear engineering. The web pages were designed to enhance instructional-content, learner-instructor interactions, provide additional resources, and answer frequently asked questions. Results indicated that lack of student access to the WWW impeded the use of this resource. Downing and Rath (1996-97) studied two classes as embedded multiple case studies to examine the role and effects of the Internet (incorporated as an Intranet) on class dynamics. Four units of analysis were used: (a) student demographics; (b) electronic postings made to the bulletin board by students and instructors; (c) Intranet time usage logs; and (d) observation logs maintained by the instructor and teaching assistant. A bulletin board was used to provide the text of the quiz, the correct answers to the quiz, student scores, and students' rank in the class quiz curve. This study reveals successful use of online quizzes to save-in-class time while exposing students to Internet and Intranet concepts.

Heath (1997) provided a detailed report of her experience with the design, development, and implementation of a virtual online classroom. Her study serves as a good template for courses taught completely via the Internet. Her study highlights the design considerations in designing online instruction. These include faculty members' need for customized training, technical, and institutional support to deliver pedagogically sound, learner-centered technology-mediated courses. Paloff and Pratt (1999) guided and researched an electronic community of doctoral students in a graduate seminar to build a framework for the delivery of distance education. They found that "facilitators and participants need to

become equal partners in the development of an online learning community, as it is the participants who are the experts when it comes to their own learning" (p. 20). Promoting a learning community is the central feature of their framework. They also provided other guidelines that are discussed in a later section of this review of literature.

Conferencing technologies such as bulletin boards are designed to encourage students to generate content collaboratively. Bostrom, Clawson, and Watson (1996) interviewed and studied business faculty to identify 16 facilitator role dimensions with relation to the use of Group Support Systems (GSS). Facilitators perceived planning and designing meetings as the most important dimension among all the dimensions examined in this case study. Lee (1996) studied the factors affecting teachers and trainers who used a bulletin board system to implement a course on information and communication technology education. Faculty who taught this class emphasized pedagogy over the use of technology by offering a broader conceptual framework to ensure that students were able to understand the issues and implications of the technology.

All the above case studies provide several considerations while highlighting the gaps in the design and delivery of complementary online instruction. Both students and faculty need well-supported and continuous access to technological tools to effectively integrate technology in the classroom. These tools can provide conveniently accessible class notes, syllabi, and assignments. In the instances where faculty used bulletin boards and listservs, interaction with students and among students was enhanced. Guided interaction and collaboration among students and student-faculty is what encourages the concept of a learning community. The biggest challenge for facilitators is to plan and design activities that engage the student in interactive and meaningful activities. The above reports offer informational, not critical reports to help faculty determine the role, benefits, and limitations

of complementary online instruction. The following section includes two samples of the numerous case studies of complementary online instruction available on the WWW.

Implementing Complementary Online Instruction

The World Lecture Hall and Technology Tools for Today's Campuses are two large collections of online instruction examples. A review of web-based literature on this topic reveals that most of the sources are faculty members' personal (versus research-based) accounts of integrating technology. This section includes two of the most common examples of faculty who have integrated web-based technologies in their instruction. The third study listed in this section addresses the perceptions of 25 faculty members who used the WWW to support classroom instruction.

At Lansing Community College the WWW was integrated in the class activities to increase student participation and to familiarize students with the Internet. The instructor incorporated a web-based exploration assignment that students completed with their peers. The collaborative efforts of completing the assignment reduced the anxiety of techno-phobic students (Codde, 1999). Another chemistry instructor Moody (1998) designed a combination of electronic lectures, virtual office hours, web-based activities, and online tutorials in his first attempt at integrating CMS and other multimedia software in his classes. In addition to ensuring convenient access to course materials, the instructor focused the instructional objectives on the learners and their needs. He conducted usability interviews and end of the class surveys to test the effectiveness of the online component of the class. The evaluation efforts helped him record and publish (electronically) details of course design issues.

Reeves and Dehoney (1998) analyzed 25 course web pages and interviewed seven of the instructors who designed some of the course pages included in their qualitative study.

The purpose of their study was to describe how the participants used and perceived the WWW to support classroom instruction. Analysis of the web pages led Reeves and Dehoney (1998) to identify and categorize five major functions of the course web pages including: (a) course management, (b) instructional text, (c) internet resources, (d) software, and (e) communication. In addition to offering the above primary task management functions the web pages also served as a social learning environment where students learned about behavioral expectations (e.g., class participation), course philosophy, class community, and instructor persona (e.g., non-academic information about the instructor). Interview results revealed the equalizing and humanizing effects of the course web pages that allowed students to relate to the instructor as a person, hence enhancing the student-teacher interactions. Reeves and Dehoney (1998) found their participants supported collaborative models of instruction. They also mention the changing views and perceptions of these instructors among their peers as an important outcome but leave the issue unexplored for future research. This study does not provide any details about the design and implementation factors considered by the participants to use online resources to support their instruction.

The above section reflects three examples of complementary online instruction and learning. Although such models of improving teaching and learning with information technology are available, "… access to good descriptions of those models, training for them, and reports of their strengths and weaknesses are not easy to find" (Gilbert, 1996, p. 11). To summarize, faculty members who incorporate web-based resources tend to support collaborative models of instruction. Course web pages serve not only as task management tools to administer the course but they may also have a humanizing and equalizing effect on the student-instructor relationship. The most common uses of web-based technologies

include online versions of syllabi, class notes, homework assignments, and discussions areas (Farrington, 1999). Some other common uses include (a) web-based tutorials and simulations, (b) online postings of student projects for peer review, and (c) enabling reflection and metacognition (Reeves, 1998).

The studies above have provided a wide spectrum of the planning, design, and implementation issues related to complementary online instruction. Be it saving in-class time, answering frequently asked questions, or establishing a need for theoretical and empirical data that examines online instruction effectiveness – more research is required to emphasize effective online pedagogies to complement face-to-face instruction. There is a lack of research data to demonstrate the changing conception of teaching in complementary online environments in higher education institutions (Ehrmann, 1995, 1999; Farrington, 1999; Gillespie, 1998). This review considers assessment, design, and implementation focused literature on complementary online instruction. The following section is a synthesis of emerging conceptions and guidelines on this topic to highlight the pedagogical issues related to complementary online instruction.

Pedagogical Issues Related to Complementary Online Instruction

Farrington (1999) reviewed the advantages and disadvantages of web-based technologies in residential undergraduate education. He acknowledged the impersonal nature of technology, and suggested that it is one aspect that makes it a good complement (not the only medium), for students to interact with the teachers and other students. “In fact, it will take quite some time and a great deal more research before the best uses of new technologies in education are sorted out” (p. 79). Accounting for the high usage of computers and instructional technology in higher education, Geoghegan (1994) noted the lack of instructional technology as a tool to visualize, analyze, and synthesize information. There are

few instances of technology as a tool to access remote sources of information to "enable and encourage active, exploratory learning on the part of the student" (p. 3). Models and guidelines for faculty to use the technology infrastructure, plan curriculum integration, and seek appropriate support are scarce (DeLong, 1995; Ehrmann, 1995; Katz and Associates, 1999; Roberts, 1995). The following section provides the slowly emerging conceptions of teaching and learning pertaining to complementary online instruction.

Emerging Conceptions of Teaching and Learning

This section includes several recommendations from researchers who have focused primarily on the pedagogical issues related to complementary online instruction. Duderstadt (1999) and Plater (1995) both discuss the changes in teaching, research, and service for higher education institutions and faculty. For colleges and universities to survive the information age, they should consider a paradigm of ubiquitous learning to provide lifelong "learning for everyone, in every place, all the time" (Duderstadt, 1999, p. 24). According to Reeves (1998) faculty will be expected to serve as guides on the side as opposed to sages on the stage. As facilitators and coaches they will be expected to "become designers of learning experiences, processes, and environments" while coaching and consulting with students on collaborative learning ventures (Duderstadt, 1999, p. 7). These roles may allow faculty to achieve the goal of providing opportunities for students to think critically (DeLong, 1995; Richards, 1996).

Addressing a group of faculty members in a web-based conference Teaching over the Web, Winn (1998) presented issues related to teaching and learning from constructivist, situated, and social learning perspectives of knowledge construction. According to Winn (1998) "knowledge is constructed through iterative interactions with material that force students to work with the information, to view it from different points of view and to

associate it with what they already know" (p. 9). After establishing his theoretical view of teaching and learning Winn (1998) offered strategies for instructors to provide web-enhanced learning contexts and activities. These strategies include communicating with students and providing guidance via audio and visual cues, tutorials, external links to information sources, electronic mail correspondence. Winn (1998) established the flexibility of the WWW as a medium to offer simulated environments, anonymous forums, and informal avenues for students to engage in socially authentic learning activities. He also warns the instructors about the limitations of the WWW. These limitations may surface when it is not designed effectively to support instruction. These limitations include (a) lack of visual cues from students learning in a primarily text-based environment, and (b) different ways to attract and retain the attention of students from different learning and social cultures. Winn (1998) clearly stated how the WWW "is completely incapable, on its own, of supporting knowledge construction, of providing a context for learning and of providing the kind of learning communities that universities have always nurtured" (p. 9). From a pedagogical perspective then, faculty serving as instructional designers and facilitators play a crucial role in the online context.

There have been several attempts to propose a shift in the traditional conceptions of teaching (Collins & Berge, 1996; Paulsen, 1995; Reeves, 1998). One of these proposals requires the instructor to adopt a combination of pedagogical, technical, social, and managerial roles (Collins & Berge, 1996). These roles ask instructors to facilitate the learning goals of community of learners, provide a friendly learning environment, display comfort with the use and applications of technology, and manage all these aspects of a course. Various modes of interaction (e.g., listservs, chat rooms) available on the WWW may be used to implement online versions of one-alone (e.g., journals), one-on-one (e.g.,

apprenticeships), and one-to-many (e.g., symposiums) pedagogical techniques (Paulsen, 1995). Ehrmann (1995) recommends authentic project-based, collaborative, synchronous and asynchronous activities with continuous student-student, and student-faculty interaction. These strategies allow the learner to engage in authentic acts of discovery, exploration, practice, and reflection (Pallof & Pratt, 1999; Richards, 1996).

Reeves (1998) offers a conceptual model to help faculty use the WWW appropriately. The model encourages faculty to consider the aptitude, cultural background, and source of motivation of the learners when designing learning activities. The learning activities should allow students to construct their own learning experiences with support from faculty and peers. The WWW provides a powerful sense of audience, as it is an open forum for learners to publicize and share their work. Faculty should transfer the ownership of the learning onto the learners and engage them in authentic learning activities. Instructional designers and adult educators may also consider Reeves and Reeves's (1997) model of interactive dimensions of learning. According to Reeves and Reeves (1997) instructional designers needs to consider the (a) pedagogical philosophy, (b) learning theory, (c) goal orientation, (d) task orientation, (e) source of motivation, (f) teacher role, (g) metacognitive support, (h) collaborative learning, (i) cultural sensitivity and (j) structural flexibility dimensions of interactive learning. These dimensions serve as a framework to assist instructional designers' map multiple issues related to teaching and learning on the WWW. Each of the dimensions in Reeves and Reeves (1997) model are presented as a continuum of contrasting values to accommodate the different approaches of designing instruction. For example, the teacher may play various roles as a didactic and facilitative instructor. She may have a constructivist (versus instructivist), cognitive (versus behavioral), orientation to offer authentic (versus academic), general (versus sharply focused), learning tasks and goals to attend to the intrinsic

(versus extrinsic) sources of motivating her students. Other factors related to the learning strategies and structure should be attended to while designing instruction. This model offers a holistic approach for instructional designers to gauge and plot the pedagogical value of complementary online instruction. So far there are no studies of this model in the literature that indicates the emerging role and importance of pedagogical issues related to complementary online instruction. The tools and strategies for delivering complementary online instruction are endless; the challenge for the instructor is to select, design, and implement the most appropriate combinations for his or her students.

Guidelines for Designing Complementary Online Instruction

This section first includes the issues and recommendations offered by various authors involved with the pedagogy of complementary online learning. In the last half of this section is a list of specific guidelines and examples for faculty who are considering or have just begun incorporating technology to accomplish their instructional goals. According to Reeves and Dehoney (1998) faculty members may choose to start small, from offering an online syllabus, followed by using a class listserv to increase student interaction, to building interactive simulations to explain a complex concept. Duchastel (1996-97) proposed a model with six functions encouraging faculty to (a) specify goals to pursue, (b) accept diversity of outcomes, (c) request production of knowledge, (d) evaluate at the task level, (e) build learning outcomes, and (f) encourage global communities.

Specifically for online contexts, Gillespie (1998) proposed instructional design as a "process based on teacher awareness of content resources available to the students and consisting of identifying higher-order thinking skills to explore, identifying areas of exploration in general terms, describing learning tasks, incorporating cognitive strategies, and sharing evidence of completion of learning tasks with others" (p. 50). In this case the role of

the instructor is to help learners to synthesize and apply the knowledge. On the WWW, Roberts (1995) and Richards (1996) offer similar templates of designing web-based complementary teaching and learning. Their sites include links to several resources, design tools, and samples of online courses.

Schrum (1998) offers pedagogical, organizational, and institutional guidelines for readers who are beginning to create online components or courses. Identifying learning goals, revising teaching and learning philosophies, reconceptualizing the teacher's role, evaluating student and instructor, and incorporating interactive learning activities comprise the main pedagogical issues. Organizational issues deal with the logistics of the course including timing, prerequisites, and group interaction. Regarding institutional issues, Schrum (1998) raises concerns about access to computers and course materials, credit hours for students, workload for faculty, and technical support. In a critical examination of the design of complementary online instruction, Gandolfo (1998) states "the design of the instructional event is the critical issue, and that design must be holistic to include all the components of the teaching and learning process" (p. 35).

The views and recommendations offered in this section document a wide range of pedagogical issues related to complementary online instruction. Few of them emphasize the critical role of the faculty and their experiences with designing, developing, and implementing the online component of instruction. The list below offers a synthesized version of the above guidelines with specific examples for those who want to incorporate technology to accomplish their instructional goals. These guidelines are most applicable for those faculty members who have just begin to incorporate technology in their courses.

1. Consider the aptitude, cultural background, and source of motivation of the learners when designing learning activities (Reeves & Reeves, 1997).

2. Determine the pedagogical not technological benefits of using technology in the classroom (Ehrmann, 1995; Gandolfo, 1998; Pallof & Pratt, 1999; Richards, 1996).
3. Consider a wide range of instructional techniques that may be implemented with appropriate technical resources (Ehrmann, 1995; Gillespie, 1998; Paulsen, 1995; Reeves, 1998).
4. Consider the social aspects of using technology to enhance instruction (Collins & Berge, 1996; Pallof & Pratt, 1999).
5. Consider the organizational aspects of using technology to enhance instruction (Schrum, 1998).
6. Consider the technical aspects of using technology to enhance instruction (Heath, 1997; Reeves, 1998; Schrum, 1998).

Section summary

Overall teaching and learning issues are being revisited as institutions invest in and establish technological infrastructures. The media hype of complementary online teaching and learning has brought the role and practices of faculty into the limelight. They are being asked to revisit their pedagogy and enhance learning experiences for a diverse group of learners. Surveys and case studies on distance education indicate the deficit of models for faculty to plan and implement complementary online curricula. The WWW includes numerous online magazines, discussion lists, and personal websites to illustrate the issues and applications of complementary online instruction. There is scattered research-based evidence of the pedagogical evolution and paradigm shift in teaching and learning. The first half of this review was an attempt to patch together the different pieces of literature on complementary online instruction and pedagogical issues related to complementary online

instruction. The second half below addresses the theoretical aspects most suitable for this study.

Relevant Theories

In this section I present the reflective practice model and specific aspects of the situated learning (communities of practice) perspectives to weave together the two theoretical threads of this study. In separate sections of this half of the chapter I present a contextual background, the basic constructs, and reviews of the reflective practice model and situated cognition perspectives on teaching and learning.

Reflective Practice

Schon's (1987) model of reflective practice offers insights on an experience-based model of the practice of teaching and learning. A contextual background, summary, other reviews and studies of this model, and features relevant to this study are discussed in the following three sections.

Contextual Background

Schon's (1987) model of reflective practice is primarily situated in the world of architectural design. This model has also been tested on the experiences of coaches and students in other fields including law, public administration, management, education, and engineering. The philosophical roots of the reflective practice model originated in Dewey's (1974) ideas on the role of experience in education. It promotes a constructionist versus an objectivist view of the world. A constructionist view is one "that leads us to see the practitioner as constructing situations of his practice, not only in the exercise of professional artistry but also in all other modes of professional competence" (Schon, 1987, p. 36). The objectivist view relates the practitioner to his or her reality, and recommends problem-solving based on facts of the profession. Knowing-in-action and reflection-in-action capture

the essence of how the learning dialogue occurs between coach and student. These constructs are described in the following section.

Summary of the Model of Reflective Practice

In the reflective practice model all learning is viewed as some form of professional artistry. The art of learning requires doing, action, or practice. Knowing-in-action refers to those actions that reveal the "spontaneous, skillful execution of the performance" of the artist (Schon, 1987, p. 25). Practice consists of "chunks of activity, divisible into more or less familiar types, each of which is seen as calling for the exercise of a certain kind of knowledge" (Schon, 1987, p. 32-33). Reflection-in-action is the process of thinking about the action while in action. Schon's (1987) description of the reflective practicum is designed to simulate the real world of practice for learners so that they may learn by doing. The reflective practicum is based on the underlying paradox of learning where "a student cannot at first understand what he needs to learn, can learn it only by educating himself, and can educate himself only by beginning to do what he does not yet understand" (Schon, 1987, p. 93).

Current models of education approach learning from the technical rationality perspective, which regards all practice as being carried out on the basis of preset rules that define a profession. According to Schon (1987), technical rationality does not address indeterminate zones of practice where practitioners require more than the professional norms and rules to address complex and new problems in practice. It is here that the artistic nature of practice defined by knowing-in-action and reflection-in-action helps practitioners and aspiring practitioners (the students) build on their reservoir of solutions to problems. After establishing the need for a different approach to learning, Schon (1987) describes the ladder of reflection.

The ladder of reflection consists of four rungs, (a) designing, (b) a description of designing, (c) reflection on the description of designing, and (d) reflection on the reflection of description of designing. The goal for the faculty member as the coach of diverse learners is to converge on meaning while working on the different rungs of the ladder of reflection. Through actions like telling and listening, demonstrating, and imitating, the coach and student exchange their personal meaning of the problem and possible solution(s). Rather than assessing the student's ability to successfully overcome the different rungs of the ladder of reflection, the goal of the whole experience for coach and student is to negotiate a coherent meaning of the problem setting and problem solving process. The coach plays a dual role, one as a guide who is solving problems with the students, and the other as an artist practicing his profession. Practitioners solve problems by experimenting with possible solutions.

Practitioners undergo three different phases of experiments when solving problems. These are exploratory, move-testing, and hypothesis-testing experiments. Exploratory experiments involve the inductive approach to problem solving where the professional identifies and attempts to understand and establish initial assumptions of the problem. Move-testing experiments are those during which the practitioner acts on or implements the assumptions formed in the exploratory phases. Hypothesis testing experiments allow the practitioner to draw conclusions based on the consequences of the actions, thus extending his or her theoretical knowledge of the practice. On the ladder of reflection professionals may engage in one or more types of experiments simultaneously. In contrast to the dominant model of technical rationality, reflective practitioners shape the problem by acting in the situation rather than maintaining an objective distance. While testing different solutions for a problem the professional "understands the situation by trying to change it,

and he considers the resulting change to be not a defect of experimental method but the essence of its success" (Schon, 1987, p. 73).

Reflective practice presents different challenges for the coach practitioner compared to the traditional model of teaching and learning. The reflective practicum is an opportunity for both coach and student to engage in learning together, versus the coach teaching the student. The negotiation between coach and student is a "web of projected moves and discovered consequences and implications, sometimes leading to reconstruction of the initial coherence – a reflective conversation with the materials of the situation" (Schon, 1987, p. 42). The student has to assume the role of a risk taker to engage in a practice with limited or no knowledge of practice. The role of the coach or faculty member is to guide the process by allowing the student to find the coherent solution amidst the unfamiliar practice environment, but not tell the desirable qualities of practice. The coach works with the student to explore, move-test, and hypothesize different solutions to practical problems while reflecting on the technical and procedural aspects of his practice. The learning or design process is described as a type of knowing-in-action, is holistic and creative in nature, and results in the designer's ability to recognize desirable and undesirable qualities. To summarize, reflective practice is the "ensemble of problem framing, on-the-spot experiment, detection of consequences, implications, back talk and response to back talk that constitutes a reflective conversation with the materials of a situation" (Schon, 1987, p. 158). The robustness of a model is determined by its application in other studies in the literature. Below are related studies and reviews of reflective practice available in the adult and continuing education literature.

Reviews and Studies of Reflective Practice

Schon's (1987) model of reflective practice is based on examples from the field of architecture education. Following are reviews and studies of reflective practice literature in many areas of adult and continuing education. In a recent collection of influential thinkers in the field of adult education, Cervero (2001) chronicled the widespread use of reflective practice in adult, continuing, and professional education. Cervero (2001) remarked how Schon's (1987) model of reflective practice is a popular lens to: (a) capture the role of problem solving in professional education literature, (b) help adult educators use critical reflection (Brookfield, 1995), (c) establish a framework of continuing and graduate programs in adult education (Peters, 1991; Brookfield, 1988), and (d) understand theories of adult learning (Jarvis, 1999). The reflective practice literature has been applied in the fields of nursing (Daley, 1999), teacher education (Newman, 1999), extension education (Ferry & Ross-Gordon, 1998) and practitioner research (Jarvis, 1999; Jacobson, 1998). A few of these studies are reviewed below to establish the need and appropriateness of this model to study faculty members' reflections on complementary online instruction.

Daley (1999) conducted a qualitative study with 10 novice and 10 expert nurse participants to explore the learning processes, supporting, and limiting factors that affected the professional development of her participants. Narratives about learning experiences and semi-structured interviews with participants revealed differences between novice and experts based on their feelings, learning strategies, and relationship to the context of the nursing practices. Expert participants were more confident practitioners and aware of their learning processes while novices were fearful of making mistakes and sought more direction and validation to learn how to solve problems. Findings also revealed practitioners' learning process is a continuum "from being overwhelmed by events to creating a narrow focus for

themselves and finally, to expanding their learning in multiple areas" (p. 142). Daley (1999) mentioned the unexplored connections between expertise in professional development and expertise in learning. Considering the emerging nature of using online CMS in higher education I avoid labeling participants as experts or novices, instead I used the reflective and non-reflective characteristics determined by Ferry and Ross-Gordon (1998) in their study of extension educators' reflective practices.

Ferry and Ross-Gordon (1998) used the think-aloud protocol in qualitative research to interview novice and experienced extension educators to determine the reflective and non-reflective characteristics of their participants. The purpose of their study was to understand the role of experience in the development of expertise and reflective decision-making. The researchers designed a questionnaire based on the six indicators described in Schon's (1987) reflection-in-action process. Based on thematic analysis of a problematic situation, Ferry and Ross-Gordon (1998) categorized 52 novice and experienced extension educators as reflective (those who demonstrate more then four of the six indicators) and non-reflective (those who demonstrated less than two indicators). Findings revealed differences and similarities among reflective and non-reflective practitioners based on how they identified, solved, tested, dealt with inconsistencies, and reflected on the process of problem solving and decision-making. Reflective educators in this study tended to understand, problematize, mentally rehearse, and involve others in the decision-making process. Non-reflective practitioners moved straight to the decision-making stage and tried to solve the problem immediately. Both the reflective and non-reflective practitioners did not engage in reflection-on-action after the problem was solved. The use of reflective and non-reflective characteristics instead of their years of experience helped Ferry and Ross-

Gordon (1998) establish “the key to expertise does not seem to reside merely in gaining experience, but in how the individual uses experience as a learning mechanism” (p. 107).

Brookfield (1995) offers four different lenses for teachers to engage in critical reflection via their (1) autobiographies as teachers and learners, (2) student eyes, (3) collegial perceptions, and (4) the literature to understand the adult learning process of critical reflection. In the section of reflecting upon the literature, Brookfield (1995) presents and critiques the role of adult education theories that influence the process of critical reflection. According to Brookfield (1988) reflective practice is “viewing teachers as adult learners means that we focus on how they learn to make critically reflective judgments in the midst of action and how they change subsequent actions to take account of these insights” (p. 222). In this way, reflective practice, which focuses on the professional development of adult educators as teachers, practitioners, and learners, is considered a unique form of adult learning. According to Brookfield (1995), culture directly influences the choices that teachers make while engaging in their practice, and as a result the practitioner’s “reflective activities need to be understood within the social context that has shaped them”(p. 217). The above social-political aspects crucial in Brookfield’s (1988) are missing in Schon’s (1987) interpretation of reflective practice. Another strong critique of the reflective practice model, Newman (1999) traces the roots of reflective practice model to the Wittengstein philosophy on language games to illustrate the lack of empirical evidence of Schon’s (1987) view of tacit knowledge in knowing-in-action. According to Newman (1999) the significance, value, and ease of understanding teacher practices of learning new language games specific is minimized due to the lack of contextual details in the reflective practice model. Jarvis (1999) has also written extensively on reflective practice, especially practitioner research in an adult education context.

Jarvis (1999) explores and builds a bridge between the two worlds of practice and research to chronicle the use of reflective practice literature specifically in the world of adult education and the professions. The Practitioner Researcher is written specifically to assist professionals who seek graduate education to understand their practice and to become better researchers. What Schon (1987) identified as a problem, Jarvis (1999) labels as a disjuncture, a situation when there is a gap between the practitioners' knowledge, skills and past biography of experiences to perform a new action. According to Jarvis (1999) reflective practice is "a necessary approach to learning how to become an expert practitioner" (p. 70). Practice is both a site and opportunity for learning " (p. 70). Practice is "characterized as unique, transitory, individualistic (in terms of knowledge, skills, and reasoning), habituating, tacit, and patterned" (p. 72). Reflective planning, reflection-in-action, and retrospective reflection are three forms of reflective practice. These three forms are simplified categorizations of the reflection-in-action process in stages, from considering the alternatives available (reflective planning), to the practitioner to making decisions while acting in the situation (reflection-in-action), and finally reflecting on the action after it is completed (retrospective action). Jarvis (1999) attends to both the psychological and social dimensions affecting reflective practice. From a psychological perspective Jarvis (1999) categorized practitioners as reflective and impulsive personality types. Impulsive practitioners tend to be more action oriented versus their reflective counterparts who engage in reflection prior to action. The social dimensions directly and indirectly influence the "individual collection of knowledge, action and feelings associated with a specific set of conditions" (p. 64). Jarvis (1999) labeled these socially constructed experiences and outcomes of reflective practice as the habitus of practitioners. Jarvis's (1999) work on reflective practice for practitioner-researchers illustrates the role of reflection, knowing-in-action, and contextual nature of

learning in the professions. It provides a common framework for researchers from different backgrounds to understand their practice.

The above studies and views of reflective practice reflect the popularity of reflective practice in adult and continuing education contexts. So far, studies have been conducted in numerous areas including nursing, extension education and practitioner-research. There is a lack of research to represent how faculty learn, experience, and reflect upon complementary online instruction. Schon's (1987) model acknowledges the learning context but it revolves around a problem setting and problem solving view. To acknowledge the importance of the context and authentic learning, the following section addresses situated learning and communities of practice perspectives of learning.

Situated Learning and Communities of Practice

This section presents perspectives of learning, knowing, knowledge, and how they all play out in the context of learning communities. Selected background information on these perspectives are presented to highlight the important role of these perspectives in this study. Situated learning (Lave & Wenger, 1991), situated cognition (Brown, Collins & Duguid, 1989; Wilson, 1993), and communities of practice (Brown & Duguid, 1996; Wenger, 1998) perspectives on learning provide a comprehensive insight on the role of context, culture, authentic activity, and forms of participation, in learning communities. Lave and Wenger (1991) analyzed the work and lives of communities of midwives, tailors, quartermasters, butchers, and nondrinking alcoholics to illustrate legitimate peripheral participation. Brown, et al. (1989) described two examples of mathematics instruction to support their views of situated cognition. Wenger (1998) presented a theory of communities of practice via the design of learning architectures and framework. In this framework, "instruction does not cause learning; it creates a context in which learning takes place, as do other contexts" (p.

266). Brown and Duguid (1996) extend their perspectives of communities of practice and its relevance to higher education in the digital age. How is learning viewed, what is the role of the teacher, and what is the role of authentic activity, are aspects of the situated learning perspectives discussed below.

Situated learning is rooted in the situation or context where learning takes place. The process of learning is called legitimate peripheral participation with the goal of producing communities of practice. Learning is a form of membership, while legitimate peripheral participation is the process of how the membership evolves. According to Lave and Wenger (1991) "legitimate peripheral participation is an analytic view of understanding the learning process that facilitates the change in persons and communities" (p. 55). Wilson (1993) delineates three main principles of situated cognition. First, the situated nature of learning implies that learning is a social activity. Second, situationally provided tools help adults learn and think within the context. Third, the structure of learning is significantly influenced by the context. Learning, knowledge, and knowing surface in forms of participation in this perspective. "Learning occurs through centripetal participation in the learning curriculum of the ambient community" (Lave & Wenger, 1991, p. 100). One of the conditions for the effectiveness of learning is the participation of learners in the practice. Forms of practice include cognitive apprenticeships and authentic activity (Brown, Collins & Duguid, 1989). Authentic activity is "best understood as ordinary cognitive practices that are situationally defined, tool dependent, and socially interactive" (Wilson, 1993, p. 77). Brown et al. (1989) define authentic activity as "ordinary practices of the culture" (p. 34). They say that knowledge "indexes the situation in which it arises and is used. The embedding circumstances efficiently provide essential parts of its structure and meaning" (p. 36) Hence authentic activity in the practice environment is an integral part of knowing in order for

learners to form the indexical representations of the activity. Contrary to the teacher-centered view of learning the situated nature of learning promotes a curriculum based on resources from the world of practice, one that is "viewed from the perspectives of the learners" (Lave & Wenger, 1991, p. 97, emphasis in original). In this model of learning the role of the teacher is to structure and provide the learning resources.

The impact of technology is also being explored to promote communities of practice in higher education. Brown and Duguid (1996) discuss their visions of communities of practice in Universities in the Digital Age. Rather than take sides on the distance or face-to-face education debate, their vision of the effective use of technology is "to arrange things so each student can divide his or her career between time better spent on campus or in communities and time better spent on-line" (p. 12). Communities of practice "are essential and inevitable building blocks of society" (p. 14). In their perspective learning occurs by immersing oneself in the community's culture. The role of technologically enhanced knowledge communities is to encourage interaction not delivery. Examples of newsgroups, bulletin boards, annotation systems, and shared on-line systems encourage students to participate in multiple authentic communities to solve real problems in the online environment.

Section Summary

The above sections include different theoretical aspects of learning and reflection most relevant to this study. The reflective practice model and situated learning perspectives represent two threads to help weave together the theoretical fabric of my study. Schon's (1987) problem setting and problem-solving lens of practitioners' design of learning experiences helped me to capture the pedagogical design process of faculty. I filtered the

social, cultural, and contextual elements of this study via the lens of situated learning and communities of practice perspectives.

CHAPTER 3

DESIGN AND METHODOLOGY

This chapter includes details of the qualitative methodology employed for the study. Sections on the design of the study, data collection, participant selection criteria, data analysis, study limitations, and researcher bias and assumptions are discussed below. The purpose of this study was to describe how faculty members identify and account for the pedagogical design factors when incorporating online Course Management Systems (CMS) in graduate face-to-face instruction. The following section presents the rationale and framework of a qualitative design most suited to learn about the design, implementation, and reflective process that faculty experience when incorporating online CMS in their instruction.

Design of the Study

Denzin and Lincoln (1994) defined qualitative research with an emphasis on "things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meaning people bring to them" (p. 2). I chose a qualitative design to capture the perspectives of faculty members who have incorporated CMS in their instruction. Qualitative researchers are interested in "how people interpret their experiences, how they construct their world, what meaning they attribute to their experiences" (Merriam & Simpson, 1995, p. 98). Specifically I was interested in describing and understanding the pedagogical factors that faculty members considered when incorporating CMS features in their instruction. According to Merriam (1998) qualitative studies have five characteristics which include: (a) the researcher serving as the primary instrument for data collection, (b) working in the field

to collect data (c) gathering the insiders or emic perspective of participants' views of a phenomenon, (d) employing an inductive research strategy and, (e) presenting richly descriptive findings of the study (p. 11). The above qualitative design provided ample opportunities to represent the inner (emic) perspectives of faculty members on how they incorporated CMS in their instruction. An inductive research strategy refers to "building abstraction, concepts, hypotheses, or theories rather than testing theory" (p. 7). I employed such an inductive strategy to represent the reflective process that participants in my study experience. Findings in a qualitative study are richly descriptive; likewise, all the data I gathered from participant interviews, observations, and CMS environments provided ample opportunities for me to synthesize and present details about "the context, the players involved, and the activities of interest" in a comprehensive form (p. 8). Since the emphasis is on meaning and processes, a qualitative design was the most appropriate research strategy to address the questions in my study. In the following section I present a review of data collection methods employed in my study.

Data Collection Procedures

Interview, observation, and documents are three of the most common types of data or information used by qualitative researchers (LeCompte, Preissle & Tesch, 1993; Merriam & Simpson, 1995). According to Lincoln and Guba (1985), all these methods are congruent with the naturalistic nature of qualitative research, where the researcher is the primary instrument of data collection and analysis. Merriam and Simpson (1995) also consider human instruments as most suitable for understanding and capturing qualitative research phenomena as they can respond and adapt to the circumstances. Bogdan and Biklen (1992) describe data as rough materials, evidence, and clues to help the researcher identify, understand, and explain sound and deep aspects of his or her world of study.

In order to provide a holistic description of my participants and make meaning of their perspectives on this issue, I adopted interviews as the primary source, with observations and documents as the secondary sources of data to inform my research questions. Patton (1990) provides a comprehensive comparison of observation, interviews, and document analysis to illustrate how each of these methods has unique strengths and weaknesses. Interviews are a good means to collect data that is hard to reproduce. At the same time, interview data can be distorted due to the interviewee's ignorance, emotional state, or reaction to the method. I was interested in accounting for the perceptions of faculty members who adopt CMS in their instruction, hence interviewing them was the only direct source of acquiring their views of this process. I also provide supporting evidence by using documents and observations. I proposed and implemented this combination to maximize the strengths of each method. The three types of data collection methods, their strengths, and limitations are discussed below.

Interviews

Interviews are the most common and sometimes the only source of data in qualitative studies (Merriam, 1998). Interviews often serve as the most effective strategy to capture, reconstruct, or seek an explanation of the interviewee's perspective on an issue or an event (Merriam, 1998; Patton, 1990). Interviews involve steps related to creating the questions or interview guide, identifying the participants, conducting, recording, transcribing, and analyzing the conversation that occurs between the researcher and participant(s) (Kvale, 1996).

There are three basic types of interviews. On the interview structure continuum these interview types range from highly structured at one end to semi-structured to open-ended interviews at the other end. At one end of the continuum, standardized or highly

structured interviews include a fixed set of questions posed to all interviewees. These types of interviews yield data to fit the "investigator's [italics added] preconceived notion of the world" (Merriam, 1998, p. 74). Semi-structured interviews occur when the researcher employs a combination of some structured and some open-ended questions in the interview guide. Semi-structured interviews allow interviewers to be flexible in recording and accounting for the different perceptions of various respondents. In the semistructured format the interviewer can add a new topic or address a missing area that needs to be explored.

To begin the interview process I received approval from the Institutional Review Board on my campus and conducted the interviews based on questions in an initial interview guide (Appendix A). This guide helped me seek information pertinent to the research questions in my study. At the beginning of each interview I secured permission from each participant to tape-record our conversation. During the first six interviews, I asked participants to begin the interview by asking questions about their teaching philosophy and style. During my fourth and fifth interviews I received strong reactions to these questions as they had to be answered with long and intense responses from participants. Most of the faculty members were providing answers to these questions during the remainder of the interview. To avoid negative reactions from remaining participants, I revised my interview guide and eliminated the first three questions from the second interview guide (Appendix B). The interview guide helped me gain interviewing experience and allowed me to continuously refine my attempts to understand and interpret my participants' perspectives. I employed the above format of semistructured interviews to ask different types of questions.

In order to collect comprehensive data in any interview one can design questions that yield data about experience or behavior, opinion or values, feeling, knowledge, sensory

perceptions, background or demographic information (Patton, 1990). Each type of question captures a different dimension of human perceptions. Experience questions allow one to ask about the past actions of the interviewee and opinion questions seek the respondents' views. Feeling questions seek the emotional responses while knowledge questions are intended to yield facts. In order to "enter the sensory apparatus of the respondent" (p. 292), one can ask sensory questions. Background or demographic questions help the interviewer situate the respondent in relation to others. To select the most suitable type of questions, I made decisions based on the research questions and theoretical framework of the study and the type of data that fit the research focus.

Interviews are a good means of collecting data that are hard to observe and reproduce, including the perceptions, opinions, and attitudes of participants in their own words. Interviews are a good source of recording the "native's point of view" [italics added] (Glesne & Peshkin, 1992, p. 92). A disadvantage of using interviews is the likelihood of data being distorted due to the ignorance, emotional state, or reactions of the interviewee to the method. Fieldwork and field study are terms that represent the combination of interviews with observations (Merriam, 1998). Observation can also serve as a primary source of data, especially in the ethnography tradition of qualitative research (Creswell, 1998). The purpose, process, advantages, and disadvantages of observations as a secondary data collection method for my study are discussed in the following section.

Observations

Patton (1990) succinctly states the purpose of observational data is "to describe [italics added] the setting that was observed, the activities that took place in the setting, the people who participated in those activities, and the meaning of what was observed from the perspectives of those observed" (p. 202). The researcher can use his or her expertise,

experience, and judgment to make meaning of the setting and present a first-hand account of the phenomena being observed. It is also suited to collecting data when participants are not willing or unable to provide an account of the phenomena under study. The next issue is to identify what one can observe.

One can adopt LeCompte, Preissle, and Tesch's (1993) guidelines for recording and organizing observational data by answering in great detail questions related to the who, what, when, where, how, and why aspects of the observation activity. Likewise, researchers can collect data related to the physical setting, participants, activities and interaction, conversation, subtle factors, and the researcher's personal behavior during the observation (Merriam, 1998).

The process of observation can be explained via its three stages – entry, data collection, and exit. The entry stage is when the investigator gets permission and approval from the appropriate authority to observe the setting. In the next phase the researcher actually participates in the observation and collects data to finally exit (the third stage) the observation environment (Merriam, 1998). The purpose of the study, the research questions, and the preferred structure of observations guide the type and role of the observer. Spradley (1980) mapped the role of the observer on a continuum of participation. This continuum spans five types of roles from nonparticipation to complete participation based on the degree of the observer's involvement with the people and the activities. A nonparticipating observer is someone who is most disengaged from the observation setting or participants. A passive participant is an observer who is present but has no interaction with the people or the setting itself. In moderate participation the researcher attempts to balance his or her role as participant and observer. An active participant learns to interact in the same way as others in the setting. At the extreme end of the participant observation continuum is complete

participation. This is the type where the researcher observes his or her ordinary activities as a setting for collecting data. Fieldnotes are a log of the descriptive notes and reflective insights into the data mined in an observation. They also contain direct quotes, beginning analyses, and working hypothesis of the researcher's observation in the setting (Patton, 1990). Several experts including Bogdan and Biklen (1980), Glesne and Peshkin (1992), LeCompte, Preissle, and Tesch, (1993), Merriam (1998), Patton (1990), and Spradley (1980) provide detailed examples of rigorous and diligent methods to record field notes.

There are several advantages and disadvantages of using observations as secondary source of data for this study. An advantage of observation is the opportunity for me to collect first-hand data from the field of study. Observations offer another advantage as they allow the observer to gain new insights of the phenomena being studied and help him or her understand the setting and background of the study. Among the disadvantages of using observation is the sensitivity of data to the presence of the observer in the setting. Expressing their concerns on observer effects and bias in observations, Adler and Adler (1994) recommend that this strategy be used in combination with other methods. Data collected via observations allow researchers to ask more meaningful questions in the interview and present the phenomena being studied in a holistic manner. Observations allow the researcher to verify issues discussed in the interview but they do not allow one to observe internal behaviors.

For my study, I had proposed to first observe the CMS setting myself, second have the faculty members demonstrate the course environment to me right before the third event, the interview. When I started collecting data, seven of the ten participants preferred to first begin with the interview and conclude our meeting with a live demonstration of their CMS. After the interview they created a guest account for me to observe and access the CMS at my

leisure. Two of the remaining participants, Marie and Rebecca were unable to create a guest account for me, so they demonstrated their CMS to me right after the interviews. Rebecca provided printed versions of several sections of her CMS to compensate for the lack of access to the online version. I was unable to retrieve a guest account from Geraldine the second participant, hence I did not have any opportunity to view her CMS. During the demonstration session with participants, I asked them to show me specific features in the CMS and how those features are used in their instruction. This demonstration session allowed me to understand the context and rationale of the faculty members' CMS design and implementation. The observation and analysis of the faculty members displaying their work helped me gain insights of the faculty's role in integrating CMS in their instruction. Navigating the CMS environment as a virtual document and setting allowed me the opportunity to gain an insider view of the course design. Following is a review of documents as another source of data for this study.

Documents

Artifacts, documents, and records all serve as the third most common type of data. Documents include all those information sources that investigators can identify, collect, analyze, and evaluate in the most unobtrusive or nonreactive manner (LeCompte, Preissle, & Tesch, 1993). Documents include public (e.g., internal or external organizational memos, student records, personnel files, photographs) and personal (diaries, letters, autobiographies, photographs) artifacts primarily written or produced by subjects other than the researcher (Bogdan & Biklen, 1992). Merriam (1998) also includes researcher-generated documents "prepared by the researcher or for the researcher by participants after the study has begun" (p. 119) as a source of qualitative data. Online documents have recently been added to the different types of document sources. Depending on the purpose of the study, documents

may be identified as primary (first-hand account) or secondary (compiled later by someone other than participant) source of information. For example, the CMS environment if designed by faculty members would serve as a primary source, and if designed by a graduate assistant or another office on the campus would be a secondary source of information.

Online data include web sites, virtual interactions between participants, and virtual worlds created by software designers (Smith & Leigh, 1996). Issues related to the authenticity and ethical use of online data also apply to online documents. Documents are pre-recorded accounts of the participants' perceptions or events, hence, it is the researcher's role to make meaning and extract relevant information from them. When using documents, one has to take into account the source of the document, the author and his or her objectives, biases, truthfulness, as well as the intended audience (Merriam, 1998). In order to use documents as data it is important to understand their strengths and limitations.

Hodder (1994) illustrates the prime advantage of documents as easily accessible sources that provide unspoken, text-based, historical insights on the phenomena being studied. Drawing attention to the fact "what people say is often very different from what people do"[emphasis added] (p. 395), investigators can use documents as mute material evidence of the spoken and unspoken social interaction between participants and their world. As long as they are relevant and easily accessible, documents can unobtrusively or objectively "furnish descriptive information, verify emerging hypotheses, advance new categories and hypotheses, offer historical understanding, track change and development and so on" (Merriam, 1998, p. 126). Limitations of documents surface when they lack the potential of yielding useful and insightful information for the study. Another limitation is when investigators may feel challenged with the responsibility of determining the authenticity and accuracy of documents. Document analysis allows the researcher to gain

insights into the topic, yet there is a possibility of inaccuracy in this source. I sought permission and password access to visit and review the CMS environment as an online document cum setting prior to conducting my interview. Within a week of each interview I accessed and reviewed the CMS environments of seven of the 10 participants. I printed copies of the main areas of each CMS to create a log of my review of the online documents. I also created a chart to determine the similarities and differences in the CMS features used by each of the participants. The results of this chart are presented in the participants' profiles in the next chapter.

To summarize the proposed design of this study, I collected data in the following order. First, I interviewed the faculty members to capture their perceptions of the design and implementation experiences with CMS. Second, as nine of the 10 faculty members demonstrated their CMS, observations were conducted to gain insights of their pedagogy as reflected in the course design. Third, within a week of conducting the interview I accessed and observed seven of the CMS environments as a virtual document cum setting to take fieldnotes. I also browsed the online CMS to validate my interview notes about the (a) online interactions among faculty-students, student-student interaction, (b) layout of the course environment, and (c) CMS features employed by each faculty member. The combination of all the three methods allowed me to interpret my data and findings in a holistic manner. The following two sections address the contextual and sampling decisions.

Setting

I interviewed 10 faculty members who have incorporated various CMS's in graduate instruction. These participants teach at state-funded graduate institutions, in northwestern, southwestern, and southeastern parts of this country. Participants used a variety of CMS to

augment their instruction. Table 1 lists the pseudonyms, career stages, CMS of all ten participants including their academic context.

TABLE 1

Participant Career Stages, CMS, and Academic Context

Name	Career Stage	CMS	University	Location
Marie	Professor	Webboard	Masters I	Northwest
Geraldine	Professor	Blackboard	Masters I	Northwest
Robert	Associate professor	WebCT	Research I	Southeast
Jim	Professor	Learning Space	Research I	Southeast
Mark	Associate professor	WebCT	Research I	Southeast
Mike	Professor	TWEN	Research I	Southeast
Debra	Assistant Professor	WebCT	Research I	Southeast.
Rebecca	Professor	WebCT	Masters I	Northwest
Priya	Assistant Professor	WebCT	Masters I	Southwest
Brendan	Associate Professor	WebCT	Masters I	Southwest

Sampling Selection

According to Miles and Huberman (1994), the purpose of sampling in a qualitative study is to help the researcher "create a frame to help uncover, confirm, or qualify the basic processes or constructs" that define the study (p. 27). Purposeful sampling was the most suitable strategy to solicit participants who would help me illustrate the research questions of this study. According to this strategy one needs to select a sample "from which the most can be learned" (Merriam, 1998, p. 61) or look for cases that are "information rich" (Patton,

1990, p. 169). I proposed two criteria to select participants most suited to answer the research questions of this study. All the participants included in this study fulfilled the following two selection criteria to be considered for the study.

The faculty members selected:

(a) have used CMS on two separate occasions to complement their face-to-face graduate instruction; and

(b) have made instructional revisions in their CMS environment.

In order to gain insights on the pedagogical issues I needed to interview faculty members who have already designed and implemented CMS in their instruction. A group of faculty members who have made revisions in their CMS environment were in a position to reflect and comment on their approach to designing web-based instructional resources. Pilot studies where I have interviewed faculty members on their use of CMS, revealed most faculty members are familiarizing themselves to the environment during the first attempt at designing instruction in the CMS. It is in the second attempt that they make changes in the CMS after reflecting on their initial experience. Interviewing and observing faculty members who have made at least two attempts at designing instruction in CMS served as the most suitable sample to provide details about the pedagogical implementation of CMS. I chose to include faculty members who use CMS specifically in graduate (versus undergraduate instruction). Needs of graduate instruction vary from undergraduate instruction. These needs may very vary due to the nature of the content, the student profile, assessment strategies, and various other factors. These criteria helped me draw specific implications for members of the graduate faculty and their complementary use of CMS.

All the above criteria added diversity to the sample of faculty members who were willing to participate in this study. My sample resembles Patton's (1990) maximum variation

sampling where the researcher selects several participants to represent a range of variation and looks for common patterns. The variation in the sample, during analysis led to information rich, core themes, and common patterns that inform the research questions. Finally, below are described the details about how I found suitable faculty members and the number of participants included in the sample.

I was able to find all my participants through the following three leads. First, I placed announcements for faculty subscribers in campus-based and statewide electronic listservs specifically related to technology and faculty development issues to solicit participants for this study. Second, I contacted faculty developers at institutions in states close to my residence and requested them to circulate my request among their faculty. Third, I contacted professors I knew at other institutions and asked them to refer names of their colleagues who may qualify and be willing to participate in my study. Generally the number of participants included in a sample "depends on the questions being asked, the data being gathered, the analysis in progress, the resources you have to support the study" (Merriam, 1998, p. 64). I relocated to three states while conducting this study. Hence, I had the unique opportunity to include a sample from northwestern, southwestern, and southeastern United States. Considering the nature of this study I adopted Patton's (1990) practical suggestion to specify a minimum number and provide a rationale for the same. I included 10 participants to inform this study because I was beginning to see redundancy in the responses.

Data Analysis

According to Patton (1990) the purpose of qualitative research is to "produce findings" (p. 371). Data analysis "involves consolidating, reducing, and interpreting what people have said and what the researcher has seen and read"; it is primarily the "process of making meaning" (Merriam, 1998, p. 178). According to Merriam (1998) there are three

levels of data analysis ranging from descriptive accounts, to category construction, to theory building. Descriptive accounts include compressed forms of data in a narrative to explain the phenomenon. At the category construction level the researcher identifies common themes or categories in the data. At a more conceptual level, theory building involves linking categories in a meaningful manner to "explain some aspect of educational practice that allows a researcher to draw inferences about future activity" (p. 188). I analyzed data at category construction level by employing one of the most common forms of data analysis, the constant comparative method. I used a combination of Merriam (1998) and Creswell's (1998) interpretations of Glaser and Strauss's (1967) constant comparative method to analyze my interview data. I employed the above method of data analysis to generate exhaustive, mutually exclusive, sensitizing, and conceptually congruent categories of data that reflect the findings of my research. This inductive method is where "the researcher begins with a particular incident from an interview, field notes, or document, and compares it with another incident in the same set of data or another set. These comparisons lead to tentative categories that are then compared to each other and other instances" (Merriam, 1998, p. 159). I personally transcribed three of the ten interviews. While I was having another transcriber prepare the hard copies of the interview, I listened to all the audio recordings of each interview six to seven times to make notes about responses of each participant. I maintained a journal to jot down my observations of each participant and their views throughout the interview and analysis phases of the study. After drawing significant quotes from the hard copy of the interview transcripts, I generated another document which contained the open coded data. "In open coding the researcher forms initial categories of information about the phenomenon being studied by segmenting information" (Creswell, 1998, p. 57). Applying Creswell's (1998) recommendation of dimensionalizing the properties,

I derived several categories of data, by grouping them under labels, and collating several categories to form major themes. Corbin and Strauss (1990) explain the process of axial coding where "categories are related to their sub-categories, and the relationships tested against data" (p. 13). The design, data collection, analysis, and interpretation of this study were filtered through the lenses of my social, cultural, and theoretical frameworks.

Reliability and Validity

In qualitative research reliability and validity are issues related to "whether the results are consistent with data collected" (Merriam, 1998, p. 206). To ensure the findings of this study are reliable Merriam (1998) suggests three techniques, (a) the investigator's position, (b) triangulation and, (c) audit trail. Triangulation, member checks, peer examination, researcher biases, long-term observation, and participatory research are six basic strategies to enhance the internal validity of a study. Four of the above techniques and strategies applicable to my study are discussed below. Stating researcher bias is discussed in the next and final section of this chapter. I triangulated the findings by employing different sources of data collection and analysis.

Triangulation

Miles and Huberman (1984) offer a crystallized definition of triangulation as a " way to get to the finding in the first place – by seeing or hearing multiple instances [italics added] of it from different sources [italics added] by using different methods [italics added] and by squaring the finding with others it needs to be squared with" (p. 267). Squaring the findings (Miles & Huberman, 1984), convergence (Mathison, 1988), or corroborating the evidence (Creswell, 1998) are descriptive labels of the purpose of triangulation, which is to merge the findings to enhance the internal validity (Merriam, 1998). In order to triangulate my data and findings, I employed between-method triangulation by collecting data from interviews,

observations, and documents. Reviewing the CMS environments as document helped me validate the interview conversation with the participants. Observing faculty members demonstrate the CMS helped me experience and record details about their design considerations. Triangulation then, is a strategy for the researcher to adopt diversity in data collection methods and avoid reliance on one source.

Member Checks, Peer Examination, and Audit Trail

In addition to triangulation three more strategies discussed below were employed to enhance the validity of my study. In order to enhance the credibility of my findings I conducted member checks, engaged in peer examination, and present an audit trail of my research. Conducting member checks involves going back to participants with data and analysis of the findings to validate the researcher's interpretation of the phenomenon being studied. I conducted member checks via email with two participants to clarify questions which arose after my observation of their CMS. After writing up the findings, I shared them with three of the participants, by providing them a summary or the complete results. I then contacted all three participants by telephone to validate the findings. During the discussions with the three participants I verified the accuracy of their profile and sections of findings related to their responses. As the findings emerge during data collection I discussed them with my peers and committee members. Peer examination helped me analyze and interpret my findings comprehensively. Finally, the detailed written account of this study which includes conceptual, data collection, and data analysis helps me to validate the findings derived from the data. The written account also serves as an audit trail for other researchers. In qualitative designs, the researcher is the primary research instrument, hence it is necessary to state my assumptions, limitations, and biases as a researcher. The final section of this chapter provides details on my position, assumptions, limitations, and biases as a researcher.

Assumptions, Limitations, and Researcher Bias

Several assumptions, limitations, and biases may affect this study. One assumption is my view of prospective participants as proponents and enthusiasts of technology. I attempted to minimize this assumption by emphasizing the personal views of participants and their role as instructors who use technology in their classroom. Another assumption is my view of teaching and learning as student-centered. I shared my views of teaching and learning with my participants during the interview with the first few participants. To avoid imposing my views during our discussion I learned to ask participants for examples and clarification on their views of teaching and learning. The open communication with these participants helped me to express my views and distinguish them from the views of the participants. In the following chapter on participant profiles and findings I provide rich details of this study by employing triangulation to minimize these assumptions.

There are two limitations of this study. First, this study focuses on pedagogical aspects versus the contextual, political, and organizational factors that also influence the adoption and use of CMS in graduate instruction. The second limitation of this study is my limited experience as an interviewer, observer, and researcher. I have conducted two pilot studies prior to this study and kept refining my research strategies during this study to overcome the above limitations.

CHAPTER 4

PARTICIPANT PROFILES AND FINDINGS

This chapter presents findings of the study in two parts. The first part presents a profile of the participants, the second addresses findings related to the research questions. The purpose of this study was to describe how faculty members identify and account for the pedagogical design factors when incorporating online Course Management Systems (CMS) in graduate face-to-face instruction. The following research questions guided the study:

1. What pedagogical design factors do faculty take into consideration when incorporating online CMS in graduate instruction?
2. How have faculty members taken into account design factors when implementing CMS to augment their face-to-face instruction?
3. How does situated activity shape the pedagogical practice of faculty members' design and implementation of blended instructional environments.

Ten faculty participants from a variety of college campuses in the southeastern, northwestern and southwestern United States participated in this study. These participants responded to requests I e-mailed directly to them, or via referrals from their peers, or their faculty development center. The findings represent maximum variation resulting from a sample of faculty who teach different disciplines to a variety of student populations.

Part I: Participant Profiles

The profiles below include each faculty participant's academic profile, pedagogical beliefs, student population characteristics, and the CMS features employed in their courses. To maintain their confidentiality pseudonyms are used to refer to each participant. Table 2

provides contextual information about each of the participants including their pseudonym, discipline, academic and student levels.

TABLE 2
Participants, Disciplines, and Student Levels

Name	Discipline	Student Levels
Marie	Elementary Education	Master's level students who are K-12 teachers returning for graduate studies and re-certification
Geraldine	Public Administration	Master's level students from varied disciplines
Robert	Occupational Studies	Graduate students (masters and doctorate) from the College of Education
Jim	Management Information Systems	Graduate students (masters and doctorate) from business corporations
Mark	Educational Psychology	Graduate students (masters and doctorate) from the College of Education
Mike	Law	Graduate students (masters and doctorate) pursuing their law degrees
Debra	Social Work	Undergraduate & graduate students (masters and doctorate) pursuing their social work degrees
Rebecca	Special Education	Master's level students who are K-12 teachers returning for graduate studies and re-certification
Priya	Curriculum & Instruction	Master's level students from varied disciplines
Brendan	Management of Technology	Master's level students from varied disciplines

Marie

Marie is a Caucasian tenured professor at a Master's granting state university in the northwestern United States. She has been offering teacher-education courses for elementary

education graduate students for several years and using CMS since the last two years. When I interviewed Marie, she was using WebBoard in two classes, one on science methods and the other as a seminar course for her student-teachers. One of her peers turned faculty developer introduced Marie to WebBoard. Prior to selecting this CMS for her instruction, Marie enrolled in two commercial online courses and a university-based course to experience learning in an online environment.

Most of Marie's students are K-12 teachers (student-teachers) who have enrolled in the elementary education graduate program to acquire higher credentials in their teaching careers. Other students are professionals from non-educational backgrounds who are interested in pursuing a teaching career. Most of them have rarely taken science methods classes or used technology in the classroom.

Marie sets high expectations for her students and emphasizes the graduate program's entrance criteria requiring students to be technologically literate to use CMS in her classes. Her goal is to educate and update the student-teachers with new ways of teaching children in elementary schools. One of her teaching and research interests is visual literacy. She has been using technology in her classes to offer text-based, visual, and audio representations of content to empower her students. In her continuous efforts to encourage student-teachers to adopt new instructional strategies, Marie keeps creating and revising the online versions of her courses based on informal feedback from her student-teachers.

At the time of the study, Marie was offering online versions of her course syllabi, assignment details, and a discussion forum to complement her face-to-face instruction. She was using these features within WebBoard CMS to offer multiple ways for student-teachers to construct their knowledge and to model effective instructional strategies. Marie requires

her students to use WebBoard actively in her classes. One of the ways she encourages online participation is by posting course assignments within the discussion forum in WebBoard.

Geraldine

A Caucasian female, Geraldine is a professor and administrator in the public administration program at a Master's granting university in the northwest. Since the beginning of her ten-year career as a professor, Geraldine has been employing conferencing systems and more recently the BlackBoard CMS to enhance her instruction. Early in her teaching career, Geraldine led the initial efforts to promote the use of technology in the classroom among her peers at her university. She considers CMS and other online features as crucial tools to help her students in her field to find, evaluate, and use information related to public organizations.

Students in Geraldine's classes come from a variety of disciplines and professions. They include undergraduates who are considering public administration as a career and master's level students who are completing their graduate studies. A majority of Geraldine's students are professionals who enroll in her classes to further their academic credentials or those who are considering public administration as a future career.

Geraldine prefers an applied learning environment where her students learn by doing, interacting, and engaging themselves. Geraldine shared that she enacts her pedagogical role as the content expert who "want(s) to give the student what I [italics added] think they need know to be successful." One crucial aspect of Geraldine's pedagogy is to prepare her students for their professions as information technology literate public administrators. Geraldine considers time spent in updating the course materials with the latest information in her field, as an important responsibility towards her students.

At the time of the study Geraldine was teaching two courses, one was Public Sector as a Career and another on Budgeting. She was using Blackboard CMS to complement her face-to-face instruction for both of these courses. The primary online features used in her classes include conferencing, private email, guided web searches, and text-based essays embedded with hyperlinks to reference materials.

Robert

Robert is a Caucasian male in the department of Occupational studies at a southeastern university. He has been using Web Course Tools (WebCT) since it was introduced on his campus to complement his courses. Robert considers himself an early adopter of technological tools. He is fascinated by these tools and likes to experiment with them in his classroom. He continuously improvises the course materials within the WebCT CMS environment to innovate and facilitate the "meaning making" process among his community of learners.

Robert's students are mostly graduate students pursuing their masters or doctoral degrees in the College of Education. Even though he has offered courses to undergraduates, most of his students at the time of this study were returning adults and graduate students.

Robert considers himself a progressive educator whose role is to participate in the meaning making processes of a community of learners. He portrays his pedagogical role as a facilitator and one who encourages students to think critically about the content. He regularly uses online discussion as a medium to facilitate learning in his courses.

In addition to offering online versions of the syllabus, reference materials, and an online glossary of difficult terms in the text books, Robert actively uses the bulletin board within WebCT to help students prepare for their face-to-face discussions. He posts

questions related to the next class within the bulletin board and requires students to post their reflections prior to attending the live class discussion. Robert then uses the student reactions in the classroom to facilitate face-to-face discussions of concepts among the students.

Jim

A Caucasian professor, Jim teaches in the Management Information Systems (MIS) department of the Business school at a southeastern university. During his teaching tenure he has experimented with several group support systems to facilitate interaction among a group of learners and himself. He led the selection and adoption processes of using Learning Space CMS as a complementary online environment for his department. Jim learned how to use Learning Space and other online tools as an effort of his ongoing research on collaborative group support systems. At the time of the study Jim was in his second year of using Learning Space for a part time MIS program.

At the time of the study, Jim offered two CMS-based classes designed for a special program created and offered to business professionals who wish to pursue a MIS degree. These students met in person a limited number of times and worked in virtual groups the rest of the semester to complete their academic requirements.

Jim shared with me Kolb's (1984) model to illustrate his teaching philosophy. Similar to the abstract and applied phases of this learning model, Jim presents brief conceptual information to his students before introducing concrete exercises to help them apply the knowledge. His research on Group Support Systems influences the peer learning prevalent in his courses. He commented on how he has evolved from a lecturer to a facilitator who transfers the ownership of learning to his students. Jim considers the nature of the content

when deciding the most appropriate instructional strategies. He awaits more advanced learning environments that are transparent to the location of the users, allowing learners to access experts, materials, and resources ubiquitously.

Jim uses Learning Space CMS to organize and present a detailed syllabus with weekly assignments, readings, and assessments integrated into the online course schedule. He also uses the CMS to manage the announcement, progress, and submission process of course assignments. Within his Learning Space environment, there is room for students to join both class-wide and group-based virtual discussions. An area called the media center serves as a repository of textual, audio, and visual versions of course reference materials.

Mark

Mark a Caucasian male, is a professor of educational psychology at a Research I southeastern university. He teaches several statistics courses in the College of Education. Since his university adopted WebCT as the standard CMS for the entire campus, Mark has been using WebCT to provide additional resources for his students. Mark considers himself a techno-geek. He was fascinated with computers since his college days and used them to automate repetitive tasks. At the time of this study, I learned how Mark had taught himself how to automate the entire process of uploading the audio-visual version of his lectures and archiving them within WebCT.

Mark's students come from a variety of disciplines within the College of Education. They enroll in his classes to complete the statistics requirements for masters and doctoral level degrees in humanities and social sciences. Among the students are several learners who are intimidated by statistics as a discipline. Some of his students commute long distances

from their homes to attend his classes. These students take advantage of the online access to course materials in Mark's CMS.

Mark considers his role as an instructor to simplify and illustrate abstract statistical concepts and help his students learn to use statistics in their disciplines. He considers himself a very traditional lecturer who uses WebCT as an instructional tool to provide students with access to course and reference materials. Mark prefers addressing student questions and concerns face-to-face in the classroom environment versus writing long answers to statistical problems via email.

In addition to a schedule of topics and related assignment details, the primary online feature in Mark's CMS are the audio-visual recordings of his course lectures. A heavily used secondary feature are the web-based versions of past and current exams. Mark also posts reference materials, data sets, charts, and software tutorials within WebCT.

Mike

Mike, a Caucasian male, is a professor in the law school at a Research I university in southeastern United States. He experimented with two different CMS before selecting The West Education Network (TWEN) as the most suitable online complement to his law courses. He learned to incorporate a variety of online tools from two primary sources. One was the university's faculty development center and the second was a state-based agency that offered opportunities for faculty to enhance face-to-face instruction. At the time of the study Mike shared with me his experiences from teaching an introductory course and another advanced level course for ten years in the law school. He had been offering online components of these classes for five of the ten years he has taught them.

All of Mike's students are graduate students pursuing degrees in law. Most of these students conform to the law school's academic culture and spend long hours mastering their discipline and future profession. These reserved students often refrain from interacting spontaneously, instead they prefer to present knowledgeable and well researched responses to online questions posed by the instructor and their peers. According to Mike, most law students prefer to use the private email to directly ask him questions related to the content, versus raising their hand in class or posing a question online.

Mike spends considerable time refining his instructional strategies to address learning needs of his students. He likes to display care for his students by providing access to his expertise, law databases, and other course materials in a convenient manner. His pedagogy also involves providing a variety of instructional aids including samples of previous exams to reduce the anxiety of the students in his class. His teaching goal is to prepare his students to learn how to access legal resources and practice ways to learn about the profession of law.

The TWEN CMS implemented in Mike's course includes a syllabus, bulletin board, email format of assignments, and samples exams from previous offerings of the class. This law school customized CMS also provides convenient access to a commercial legal database of cases related to topics being covered in the class.

Debra

Fascinated by technology, Debra spends long hours preparing materials which are visually and mentally appealing for her students. Debra is a Caucasian professor of Social Work in a Research I southeastern university. She considers herself a beginner in adopting the WebCT CMS to complement her courses. A year before this study, Debra had the opportunity to attend a state-funded faculty development seminar to learn how to use

different instructional tools to create online complements to her face-to-face curriculum. This faculty development program was offered to a group of faculty to collectively brainstorm and design online components of their courses using a variety of instructional technologies.

Debra's students are pursuing their bachelors, masters or doctoral degrees in Social Work. Many of them wish to pursue Social Work as a career. According to Debra, her students neutrally accepted the use of the CMS in their courses. They were neither resistant nor enthusiastic about the use of CMS in the classroom. Some of these reactions may be attributed to the beginning stages of CMS features used in Debra's classes. Another reason students were not resistant to using the CMS maybe due to the fact that Debra did not require them to use the CMS in her courses. During the member check Debra revealed to me that some of her students were resisting the use of the CMS when she started requiring them to use the bulletin board to submit select assignments.

Debra considers respect for students as the primary focus of her teaching profession. She continuously asks students to provide feedback on their learning experiences in her classes. Her pedagogical goal is to enable those students who may not have access to research and professional resources at work and show them how to find this information easily.

Debra had included the syllabus, course objectives, hyperlinks to reference materials, relevant quotations, and glossary of difficult terms in WebCT to complement to her face-to-face class. The glossary feature was embedded in WebCT as an assignment for students to create and submit online.

Rebecca

Rebecca is an Asian professor in the Special Education and Rehabilitation program at a Master's granting university in the northwest. Rebecca requires her students to participate in the online component of her classes. At the time of the study, she had been using the discussion and informational functions of WebBoard for a year and half to provide students global access to credible instructional resources on the web. Rebecca learned about these tools from her peers, a professor turned faculty developer, and her experiences taking online courses.

The graduate students in Rebecca's classes are primarily teachers from K-12 and high schools pursuing further teaching credentials. According to Rebecca, the elementary education student-teachers in her classes are often very resistant to the use of technology in the classroom.

To address her teaching philosophy and a technology-resistant student population, Rebecca provides clear and defined instructions in her CMS environment. She offers them multiple ways to access and interact with the online versions of her course content. These options allow students to gradually familiarize themselves to the online environment by watching their peers, working in teams, and engaging in hands-on learning activities. According to Rebecca, her university and the state require her to coach student-teachers to become advocates of the pedagogical use of technological tools in public schools. She is also an active member of several committees and organizations of educators and legislators who establish standards and guidelines for effective teaching.

Rebecca employed CMS features in WebBoard including the syllabus, assignment details, and reference sites in the online version of her class. She actively uses the discussion

forum as a medium for students to post their reflections on the content.

Priya

A Caucasian, Priya is the only professor in the department of Curriculum and Instruction at a southwestern university, who teaches instructional technology courses. She is also the only professor in the College of Education who uses online tools to require students to complete specific assignments in her courses. Priya's doctoral discipline area was Instructional Technology. Considering her academic background, Priya enjoys challenging herself and her students to experiment with online tools to invent unique ways to construct knowledge.

Most of Priya's students are graduate students who have had minimal exposure to the World Wide Web (WWW) and other online tools. They generally commute to school and have part time jobs. Most of Priya's student spend their holidays and weekends to complete school related work and use the CMS to keep up with her courses.

Priya identifies herself as a constructivist. She believes in creating customized environments to offer authentic learning experiences for her students. Priya incorporated a skills-assessment activity in the beginning of her courses to help her understand the background and knowledge of her students. She used the same activity at the end of the course to help her students reflect on their learning over the duration of the class. Priya approaches her teaching role as an opportunity to experiment, and have fun with new instructional strategies while challenging her students. These instructional challenges or teachable moments help Priya modify her curriculum to address specific needs of her students. For example, in one of her classes about distance learning, some of her students did not know what moderating a forum meant. Using this challenge, Priya constructed an

activity for groups of students to research and establish guidelines for moderating online forums.

An online syllabus, assignment details, common reference sites, and instructions on submitting their electronic assignments are the basic features in Priya's online CMS. In addition to these features, Priya also provides detailed reading guides in the form of web-based tables to simplify complex concepts from the course material.

Brendan

Brendan is a Caucasian professor at a Master's granting university in the southwest. He teaches graduate students in the Management of Technology department within the school of business. Brendan has been using technology-based systems to cater to many of his commuter students who need access to course materials. An instructional technologist provides administrative support and designs the curriculum according to Brendan's pedagogical needs. Unlike other participants, Brendan draws a clear line between his role as the instructor and the instructional technology support staff who administers the online aspects of his courses for him.

Graduate students enrolled in Brendan's classes come primarily from mathematics, science, and engineering fields. These students are often very open in their interactions with their peers in the online forums and discussions areas. These students are habituated to being given homework assignments for each class. In WebCT these students also expect being assigned a specific number of online postings they need to make in the course bulletin board.

Brendan, who has been teaching since 1973, commented on the evolution of his pedagogy over time with the advent of new instructional tools. He started as a lecture-

oriented instructor and now considers himself more of a facilitator spending time to draw from the experiences of his students. He places a lot of importance on the linear, clearly defined, and organized nature of his course materials to meet the cultural expectations of his science and engineering students. The nature of the Management of Technology covers a spectrum of technologies - genetics, biotechnology, energy, materials, and information technology. Considering the controversial nature of his course materials, Brendan spends considerable time making decisions about the ethical and logistical aspects of the content he includes in his courses.

Brendan facilitates the online CMS of his course to provide a very detailed syllabus and course schedule in the form of a spreadsheet. Within the online course schedule, Brendan also presents guiding aphorisms for the topic to be covered during each class, related reading materials, and assignment details. Other features within his CMS include links to reference materials, and a discussion area for students to share their reflections on the content. An area within the CMS is dedicated to archives of the video and slide presentation that Brendan facilitated during the face-to-face class.

Part II: Findings

This part of the chapter presents findings of the study in three sections. Sections on (1) pedagogical design factors, (2) implementation of pedagogical design factors, and (3) situating the practice of blended instructional environments, address the similarities and differences in the responses to each of the three research questions respectively. The themes and categories for each research question are presented in the order of importance to the majority of the participants. Table 3 outlines the themes related to the design, implementation, and reflections on faculty pedagogies of CMS-augmented graduate instruction.

Table 3

Situated Practice of Design and Implementation of CMS-augmented Instruction

Pedagogical Design Factors
Nature of the CMS
Student Characteristics
Institutional Support
Implementation of Pedagogical Design Factors
Diversifying Instruction
Providing In-depth Instruction
Modeling Effective Teaching and Learning
Blending Instruction in Three Phases
Situating the Practice of Blended Instructional Environments
Adapting to a Blended Instructional Environment
Trial and Error Course Design
Increase in Preparation Time
Changes in Course Interactions

Pedagogical Design Factors

Nature of the CMS, student characteristics, and institutional support are the three themes which capture the responses to the first research question. The first research question was, what pedagogical design factors do faculty take into consideration when incorporating online CMS in graduate instruction? Table 4 includes the themes and

categories which emerged after sorting, categorizing, and analyzing the responses related to the first research question.

TABLE 4

Pedagogical Design Factors

Nature of the CMS
Pedagogical Appropriateness
Convenient Access
User-friendliness
Student Characteristics
Academic Background
Attitude Towards CMS
Institutional Support
Peer Support
Administrative Support

Nature of the CMS

Nature of the CMS includes three categories, (1) pedagogical appropriateness, (2) convenient access, and (3) user-friendliness. Several participants had strong preferences on the pedagogical appropriateness, providing convenient access to course materials, and user-friendliness of the CMS as reasons for selecting and using CMS to complement their instruction. The categories related to the nature of the CMS theme are discussed below to illustrate each participant's pedagogical design considerations.

Pedagogical appropriateness.

Departmental policies, the need to enhance interaction, easier course administration and suitability to the content, were some of the issues the participants raised in my conversations with them. These issues are presented below with examples of how they affected the course design of the CMS for each faculty member. Marie, Rebecca, and Robert who work with K-12 teachers as their student populations, expressed a strong need for designing pedagogically sound CMS environments.Their design choices reflected their personal and departmental goals to raise the technology literacy, critical thinking, and web-awareness of the students. Marie provided three reasons for incorporating the CMS in her courses:

> First it expands the opportunities for learning, and for self reflection and from the learner's perspective it has some real advantages, (second) it helps students grow in terms of technology literacy. Third reason is that the state department of education mandates technology literacy to award teaching credentials. So computer-based instruction is something that we are now accountable for.

Rebecca considered using the online environment after she had assessed how it fit three major instructional needs:

> When I design a seminar online (first) I use KWL, I use, what you know, what you want to know more, what you (will) learn? So I tap into what they know, bring their background information up, kind of tune them up, and that kind of fit into the standards of teaching. (Second) what has to be done in class, so I have on-going session, what can be done online as totally independent work, and then another third

> is what has to be done in collaboration with the others. So once I get that settled then I feel even more comfortable that online environments are feasible.

Robert uses CMS because "I do try to model technology, my students are teachers, and many of them will seek technology for the first time and use it, some people are more likely to connect."

Two of the participants who were striving to enhance interactivity in their courses incorporated a CMS. Jim shared how, "you can get more people involved, you get a better discussion, you get more involvement, you get the students more active and so I mean to me it's a great way to do it." Mike expressed how the:

> teacher and the students can have extra opportunities to interact with each other and one way that students can perceive this particular teacher cares about the subject matter and about how the students are doing enough to communicate with them extra.

Brendan did not want to overwhelm his teaching role with the technicalities of designing and updating the CMS features. He uses the tool to administer assignments, bulletin board discussions, and access to course archives. Jim "off-loads" many of the time consuming instructional activities such as keeping up on student progress in team projects, to the tracking features available in Learning Space. Geraldine, Robert, Jim, Mark, and Mike decided the design of their courses based on the content they were teaching. These faculty members changed the course design to fit the conceptual, applied, and technical aspects of their content.

Geraldine who teaches Public Administration courses stated "It really depends on, it totally depends on the subject matter." She used hyperlinked essays and discussion forums

to provide her students with conceptual or theoretical aspects of the content along with guided searches to illustrate the applied nature of her field. Robert struggles to raise the appreciation for theory especially among students who want the digest version in two weeks. He uses the CMS environment so his students "have to deal with reasons why some tools are appropriate and why some tools are not appropriate for some situations and so I want them to have the theoretical knowledge." Mark discussed the dilemma of illustrating abstract statistical concepts for his students:

> I tend to view statistics as a context that for most people is extremely unfamiliar, and especially so with respect to doing statistical tasks and figuring out if something is "statistically significant" or not. It reflects a perspective on information that is mostly completely lacking in most normal people's experience.

Jim was the only faculty member who taught both technical and non-technical courses. One of the reasons he considered CMS features to design and deliver his courses as he was "…teaching a lot of technical things and that kind of fits."

Convenient access.

The courses designed by the ten participants were for graduate students. A majority of these students were professionals juggling responsibilities of work, school, and their families. My faculty participants designed the CMS component to make their students' learning experience in the classroom more convenient and efficient. Priya and Brendan had the most mobile of all the student populations in this study. Priya was concerned about some of her students' computer and network access abilities in order to use the online CMS for her class:

> I know that some of my students who live out in the country and have access to a 56K modem, (they) can't participate in the chat like I can where I have Roadrunner, I have a T-1 connection here at the university. And I think, that's hard to remember.

Brendan considered the CMS to help his commuter students by archiving class presentations. He offered virtual access to students who were unable to attend in person. According to Brendan the access to the CMS allowed students to:

> Keep up with the assignments and get a feeling for what was happening in the class … (it) made a life a lot easier in terms of keeping track … so they would have a better chance of seeing what was covered in class.

To provide convenient and timely access to course materials, Mark and Mike posted online samples of past exams, and test-taking instructions, to help reduce the test-taking anxiety of their students. Mark also provided online access to course quizzes and answers right after students completed the same in class. The online archives of tests helped students review and prepare for the final exam. Detailed examples of how faculty members used the CMS to provide multiple versions of the content are described in the section related to implementation of pedagogical design factors.

User friendliness.

Four of the participants in my study considered the user-friendliness of the CMS for themselves and their students as a crucial factor when designing the online component of their course. Even though he likes experimenting with different features, Mark said "I wanted something that I could keep a handle on myself." Mike stated "what I cared about the most was not having to learn too much about the system in order to use it quickly and then having a system that was both free, well organized, flexible, and relatively easy to use."

Jim shared with me how his department selected Lotus Learning Space CMS versus other CMS' because their students were Notes (another Lotus application) literate. To provide a user-friendly CMS for the students meant having to teach the new CMS to all the faculty members in his department. Jim described the user-friendly nature of his CMS "the nice thing about Learning Space is I don't have to know anything about the web and I don't have to know anything about how it delivers it automatically to the web or to a notes client."

Priya raised other usability issues in relation to the amount of time she spent preparing her courses:

> I want to be very careful that I am not doing something that I am going to have trouble with, that's difficult for me to keep up and maintain, so I tend to go low-tech, I don't use streaming video, I don't use anything …. (except) basic html, …
>
> we do online chats.

Faculty members were very sensitive to student-abilities to access and use the CMS, when they were designing the environment. Beyond access issues, participants realized the importance of other student related concerns to ensure effective use of their CMS. These concerns included student characteristics such as their backgrounds and attitudes towards the CMS.

Student Characteristics

The academic backgrounds and attitudes of students toward the CMS strongly influenced the pedagogy of some participants in my study. These factors affected the success of the class as a learning community and provided opportunities for faculty members to keep refining their design.

Academic background.

Marie, Geraldine, Rebecca, Priya, and Brendan work in universities that cater to a large commuting student population. In Jim's case, the department created a special program for professionals who attended school on a part-time basis. Beyond providing access to materials, these faculty members were influenced by the gender and culture of their student populations. Geraldine noticed the interaction in her virtual class meetings was reversed where female students versus the male students made more active contributions. Marie, Rebecca, Robert, and Priya all had K-12 teachers in their classes. A common observation among these four participants was student resistance to instructional technology, especially those who were elementary education teachers. The rejection of the CMS by these student teachers affected the course design efforts of Marie, Rebecca, Robert, and Priya. For example, Priya shared her subjective perceptions of student reactions to her course:

> I think that elementary school teachers handle online classes differently than secondary school teachers than do military people. I think culturally African Americans are different in these environments than those who are Latino/Hispanics or Caucasian. I haven't had any Oriental or any other ethnicities but I do notice some characteristics, this is completely subjective, what I find in different groups and I am trying not to label people but to be proactive.

She elaborated how she uses her perceptions about the cultural background of her students to address specific student needs early in the duration of the course. Priya believes this helps her reduce the anxiety and stress of some of her students who feel challenged and intimidated by the new course environment. Similar reactions from Rebecca, Robert, and Mike are described in the following section related to student attitudes towards the CMS.

For Brendan, the academic background of his students led him to use the CMS as a course administration tool:

> There is a provision in science and technology, math, and other places where you do homework so there is that component, so I wanted to make sure that I can keep track of that and it's certainly easier to keep track of submissions.

Attitude towards CMS.

In addition to the cultural background of their students some faculty's instructional choices were influenced by student attitudes toward CMS. Based on the amount of required or suggested activities, faculty members expected from their students, they found students were either very resistant, somewhat accepting, or very appreciative of the CMS. Rebecca found her elementary education student-teachers were the most resistant towards technology-enhanced instruction because they found no application for the same in their classrooms. Her students reflected their dislike for the CMS in her course evaluations such that:

> It can be a very detrimental factor for those non-tenured faculty who want to move ahead with the tenure and if they fool around with something they are not familiar with, or (if) they are eager to but the students are not ready for it, it can be devastating.

In the same class, the middle and high school teachers appreciated the use of the CMS, as they had few educational opportunities to engage themselves in online activities, and because "their students had challenged them so they really had to be on top of things so they welcome (the CMS features)." Robert, who has used CMS with returning adults and undergraduates expressed how:

> returning adults say that they don't want to be embarrassed and they feel insecure sometimes in their knowledge and they feel like they have been out of school for a long time and so they feel a little put on the spot.

Mark found his students voluntarily using most features within CMS but rejecting the use of the bulletin board as a time-consuming activity. His students requested him not to require the use of the bulletin board as they were burdened with the mandatory use of this feature in other classes. Likewise, Debra's students who were not required to use the CMS, voluntarily accepted the option to find course materials and submit assignments online to complement their face-to-face interaction with their professor.

Jim, Priya, and Brendan catered to students who were unable to attend all their classes in person. These students were most accepting of the CMS as it helped them keep up with their course work and access the instructor anytime, anywhere. Another unique design factor in these classes was how Jim, Priya, Robert, and Brendan had integrated the online activities during the class time. Robert used threads from the virtual discussions to set the context for the classroom discussions. Jim, Priya, and Brendan allowed students to build course content during class time. All four of these faculty members designed the CMS to reduce the administrative time during the face-to-face class and dedicate more time to address specific questions, concerns, and clarifications from individual and groups of students. The type and amount of administrative and peer support available to faculty participants was another important factor influencing faculty members' pedagogical design of the CMS.

Institutional Support

Peer and administrative support were important factors contributing to the extensive course design efforts undertaken by my faculty participants. Marie, Geraldine, and Priya were the pioneer CMS designers within their departments. Marie and Geraldine attributed their interest in designing complementary CMS features due to the encouragement and acknowledgements they received from their peers, departments, and institutions. Priya shared her personal interest as the primary motive for designing CMS-based courses. The support factors important to the participants are described below.

Peer support.

Marie learned how to integrate Webboard's conferencing feature from a faculty member turned faculty developer. His approach to modeling the use of the technology worked so well for her, she used the same to demonstrate the CMS among her peers:

> He showed me in half-an-hour everything I needed to know to put it in action and then everything else I could learn. He just showed me some basics, he modeled a very efficient way of getting somebody engaged. And I've used that same model with my peers, one-on-one I'll just go in and sign them on the webboard, show them how to operate it let them do the work so that they learn.

Geraldine mentioned her involvement in the efforts to establish a faculty development center to promote the use of technology on her campus. These efforts led her to develop an interest in the instructional use of conferencing systems, apply for research grants, and conduct research related to study the use of conferencing systems. During his tenure as the department head, Jim led the decision-making process of selecting the appropriate CMS for their part time MBA program. Faculty members in Jim's department overcame their

technology illiteracy by using their pedagogical expertise to teach each other and support the customization of the CMS environment of their program:

> We went after the best teachers some of them, … that had just begun using email I mean there were technologically very illiterate and a couple of them are now probably the biggest advocates in the college and have done some of the most interesting things with the technology just because they keep doing that they go how can I do this, how do I do that.

Rebecca used the help of a faculty developer who served as a "… a personal coach and he's one of the faculty and he's very comfortable with both computers, and very friendly, very patient."

Administrative support.

Nine of the ten participants in my study received some form of administrative support to use the CMS in their instruction. All nine had one or more options to select CMS systems suited to their instructional goals. None of them were required by their institution to incorporate university-based CMS systems. The only exception was Priya who lacked peer and administrative support. Her motivation to incorporate CMS in her courses is described in the section related to trial and error course design. The different types of support available to the nine faculty members included access to faculty development workshops, release time, support staff, and grants. Marie earned release time from her department, and a grant from the state to design CMS supported courses. Geraldine had the flexibility to team teach a course and experiment with different CMS features while redesigning her course. Robert sought technical help from CMS support staff on his campus to automate the mid-course evaluation he designed for his courses. He also received a graduate student's support to help

him build a comprehensive glossary of terms in his CMS. Mark took advantage of the CMS supported by his university to upload audio-visual course archives of the content.

Rebecca was able to use CMS in her courses because of the institutional, administrative, and peer support on her campus. She remarked, “I found the support is there, the need is there, so I jumped in.” Four types of support available to Rebecca included (1) access to workshops, (2) online courses offered by her peers, (3) release time to design the CMS content and (4) graduate student support. Before offering the CMS version of her course Rebecca sought CMS related support from four different sources. She first attended faculty workshops offered by the faculty development center on her campus, second, she enrolled for an online class to gain hands-on experience with online learning, third, she spent a year planning and designing her course, and finally fourth, she earned the support of a graduate student who taught her how to design web pages and monitor her CMS, “... if you don’t have this kind of support I think it would be hard on a lot of teachers to go on. I think all the support worked out.” Brendan was assigned an instructional technologist support staff from his department to manage all the technical responsibilities of creating and updating his CMS environment. Debra and Jim had the opportunity to attend a summer workshop offered by a state-based faculty development center. They brainstormed and worked on instructional projects with their peers from other state institutions during this workshop.

To summarize, the findings related to pedagogical design factors, participants in my study considered and used CMS when it (1) met their pedagogical needs, (2) was easy for faculty to administer and students to use, and (3) was supported by their peers and institutions. During the design phases of their CMS environment faculty members identified features of the CMS which met their pedagogical needs. One of the factors that led faculty

members to consider and use CMS was the convenience it offered students in accessing faculty and the course materials outside the bounds of the classroom. Some faculty members incorporated the CMS features that were easy to use for them as designers, and for their students as users. Those faculty members who received some form of peer or administrative support were motivated to consider the CMS in their instruction. Nine of the ten participants received some form of technical support for the CMS from their institutions. All ten participants had access to CMS-augmented instruction offered either by the state, their institution, or academic department. Two members received administrative support such as instructional technology staff and graduate students. Six faculty members were encouraged to use the CMS after discussing and learning about it from their peers. The next section addresses how the participants implemented these design factors within the CMS environment.

Implementation of Pedagogical Design Factors

How have faculty members taken into account design factors when implementing CMS to augment their face-to-face instruction? Diversifying instruction, providing in-depth instruction, modeling effective teaching and learning, and blending instruction in three phases are the four themes that address my second research question. Faculty participants modified the CMS features to create and offer multiple versions of course material, extend the boundaries of the classroom, and model effective instructional strategies. Blending instruction in three phases is the theme that captures the continuum of how faculty members implement the CMS in their classroom instruction. Table 5 lists the themes and categories that emerged from the findings related to how faculty members implemented their pedagogy.

TABLE 5

Implementation of Pedagogical Design Factors

Diversifying Instruction
Providing different versions of content
Extending classroom boundaries
Providing In-depth instruction
Encourage more critical thinking
Customized guidance
Build a learning community
Modeling effective teaching and learning
Provide clear and defined instructions
Consider ethical and practical issues
Blending Instruction in Three Phases

Diversifying Instruction

To accomplish their pedagogical goals, faculty participants were able to offer several types and versions of the content when designing the CMS. Types of content include course materials, field experts, and reference materials. Versions of content included visual (audio and video), and interactive aspects of their courses. Faculty members were also able to offer their expertise to students and extend the teaching and learning experience beyond the boundaries of the classroom.

Providing different versions of content.

Debra, Rebecca, and Geraldine all wanted to introduce their students to resources in the field. Debra wanted to prepare her students to learn how to find professional resources and said, “They may not have time to go to the library and look up a journal article, they can get information on the web and I think they can stay abreast.” She designed a reference page within the CMS to point her students to professional websites in Social Work. Rebecca was very selective in the types of online sites she referred to her students:

> We are essentially training a new generation of special ed. leaders because a lot of times old, traditional special-ed teachers are not familiar with a new law or resistant to the change in the law or practices, so the web search becomes a very powerful tool.

She limited the type of websites to government or other credible organizations as reference materials for her course:

> I use only three types of web-sites, one is government sites such as the US Department of Education, State Department, associations, professional associations and the research centers. So I don’t just go on any web search, I only go on the reputable, credible sites.

The paper-based copies which Rebecca provided to me include detailed citations and notations for all the links listed on the web pages in her CMS.

Geraldine wanted her students to meet accomplished public administrators as alternate subject matter experts. When the speakers were at remote locations she used the CMS conferencing feature to invite the speaker virtually to her classroom. The virtual presence of the speaker allowed students to pose questions without being intimidated by the presenter’s credentials. Geraldine recalled how some of her students asked the presenter

confidential questions about their role and Geraldine commented “I know that the students have asked this one speaker some questions I don’t think they would have ever [italics added] asked of somebody who was sitting right in front of them.” Geraldine shared with me how the issue of sexual harassment came up during one speaker’s presentation. She noticed how the presenter felt comfortable sharing private information in a virtual setting with the students, versus someone who was speaking with the students in person.

Mark and Mike wanted to help their students overcome test-taking anxieties. They provided copies of sample quizzes, past exams, and test instructions within the CMS. Mark’s students were also able to review answers within the CMS shortly after completing the test in class. Mike needed convenient access to legal databases so he could include cases related to a topic he was covering in class. One of the primary reasons he selected TWEN as his CMS was because it offers direct access to one of the commercial legal databases. Mike was able to find relevant cases within TWEN and hyperlink them to his course modules. The direct online access to a legal database helped Mike significantly reduce the photocopying costs and time required to obtain special copyright permissions.When I visited TWEN I noticed the layout and sections of the CMS were organized to appeal to students of law. I noted how Jim provided references to three or more cases for each topic addressed in the discussion and course module areas.

Mark offered audio-visual archives of his class presentations within the CMS. He uploaded the class recording right after their face-to-face meeting so students could access the audio-visual recording to review difficult sections and pose questions for the next class. Brendan provided video clips of his class presentation for those students who missed a class or were at a remote location during class meeting times. Priya posted reading guides within the CMS to serve as customized reference notes for chapters from the course textbooks.

The above examples identify the many ways in which faculty members were able to realize their pedagogical goals of sharing their expertise with their students. The participants also spent significant time and effort in extending access to learning beyond the classroom.

Extending classroom boundaries.

Eight of the ten participants were able to engage their students and help them prepare for the live discussions in the classroom. They distributed (via email or bulletin board), course instructions asking students to read sections of the text book, visit websites, find information, and come prepared to share the same in class. Marie provided assignment details and comments via the bulletin board in the CMS. Robert and Jim allowed students to build content within the CMS. Priya said:

> Not only did they have to read, they had to be prepared to answer (during) the discussions, the questions that I ask about their reading. I give them some kind of reading prompt, I have them go through, most of them have printed this out, they have to go through these sites and come to class and be ready to discuss about how these three things relate.

She also helps them gain in-depth understanding of the text book material via reading guides and comments "…. these examples are actually mentioned in the book so I have taken things out of the book so they can go here and actually click and see what the book is talking about." Brendan provided guiding aphorisms on his online course syllabus to help students focus on the section of the content assigned for course meetings.

Mike and Jim used the bulletin board and private mail feature in their CMS to follow up on issues they were unable to address during class. Mike explained:

> The ability to extend a discussion from the classroom setting into an online setting or course web page setting I think is valuable if at the end of a class there are some

> questions raised or unanswered that it's good to get people to think about before the next class or to give them some further guidance for answers.

He was no longer restricted to waiting for the next class meeting to communicate with his students. Jim used the home page of the CMS to post messages to update his students. Except Mark and Debra who did not need continuous correspondence with their students, all the rest of the participants monitored the virtual discussion forums in the CMS. Monitoring the forums offered them the opportunities to intervene during a discussion and respond with comments and resources on an ongoing basis. Debra and Mike gathered student information at the beginning of their courses to contact students via email. Marie, Geraldine, Rebecca, and Priya taught at institutions with a primarily commuting student population. Their students were able to use the CMS to access their instructors and the course materials. Rebecca and Brendan allowed students who were commuting long distances to participate virtually for some of the course meetings. The extended discussions among students as a group, and among students and faculty, made it easier for some faculty members to facilitate in-depth instruction.

Providing In-depth Instruction

Faculty members were able to use the CMS to explore the content in-depth. Some of the ways they offered their content and pedagogical expertise helped them encourage critical thinking, provide customized guidance, and build learning communities among their students. These design strategies are described in the following three sections.

Encourage more critical thinking.

Brendan explained his rationale for asking students to comment on course readings so "… that they develop their own view of what it is and they get insights on how they might learn more from others and learn more somewhere else and again teach themselves

when they leave me." Four other faculty participants used CMS to encourage critical thinking among their students. Robert uses group-based learning and reflective teaching practices:

> At the end of almost every class I've tried to have ten to fifteen minutes of meaning making where we try to review what we've talked about or have been reading about or had some written assignment about and then to ask questions like what does that mean to you.

Debra integrated CMS to engage her students in a content analysis activity to present different aspects of the fundamental concepts:

> Where you read something and you're looking for, you might read like five articles and you're looking for how to use the words "child abuse" and how they present it. And so what I have them do is I found four websites that had content about different things on them and I sent the class downstairs to our computer lab and they had five questions to answer about each website.

Rebecca wanted to implement a teaching best practice called know, want, and learn (KWL). The KWL practice is designed for instructors to identify what the students know, what they want to know more, and what the may learn. She designed a critical thinking activity in the online environment, based on KWL:

> In the assignment of a web search they have to instantly utilize all those research techniques, they have to generate a good question of what they want to search for and how to go about searching for it. Then they have analysis, they have to compare data, read it. It's a very interactive process and it cultivates a lot more than textbook and classroom discussion.

Priya used critical thinking activities to bridge the gap between novice online learners who were not as familiar with instructional technology compared to experienced learners who were very comfortable with the medium. In her course related to distance learning she asked her students to come up with criteria for moderating an online forum. The results of this activity produced a valuable list of criteria including simple things from the novice, and well developed issues which came from the experienced online learners:

> What I did then is I took all the tips and put in a kind of little check list for them and I emailed it to everybody and said okay, you are going to be a moderator, you are to print this out and when you moderate you are going to be checking off whether you have done these things. So it's kind of they have created a guide for themselves when they moderate. Now, people who are experienced don't need it , but the novices now have some kind of template to reflect on.

The group-based activities encouraged students to collaborate and reflect on course content. The extended interaction among faculty and students offered more opportunities for them to draw on each other's life experiences. The asynchronous and synchronous nature of their courses provided ample opportunities for faculty to offer customized guidance to each student.

Customized guidance.

Several faculty members prefer the ability to offer custom guidance to their students. For example, Jim shared the benefits of guiding each student virtually versus attending to individual requests in the classroom:

> I give them guidance to go through the material for particular things that I'm looking for again I can't do that in a normal class -- your syllabus would look chaotic. And so you can give them really specific kinds of things to look through and walk them

> through a sequence which they do, … again its going to make the class to class time a lot richer and if they don't do it its very easy for me to put in the end of that a little assessment that demonstrates whether they've got it or not and I don't have to waste the time with it in class quiz. I will just nail them if they don't have it, so I mean I have a lot of flexibility to put the way I design things.

Marie, Geraldine, Robert, Jim, Debra, Priya, and Brendan used the bulletin board to facilitate virtual discussions and respond to individual or group-based questions from students. They used the bulletin board to present new directions, different aspects, and ethical dilemmas when students were discussing the course materials. For example, Robert actively used the bulletin board to seek interaction from and among his students:

> Typically I used the bulletin board to try to enrich their readings and understanding of the readings and use that as a origin to our classroom. … what I want is dialogue and dialogue going both ways. Then as students read the material I ask them to pick out one or two of the questions that I've asked or someone else has asked and respond to them.

Those faculty members who used PowerPoint as a content organizer within the CMS observed changes in their instruction. For instance, Robert remarked "Well PowerPoint was a revelation." He explained how he uses this presentation software to embed pictures of students and use the same to encourage a friendly and humorous learning environment in his courses. He also embeds student work and other resources within the electronic presentations to facilitate his course discussions. Debra explained that prior to using the presentation software to deliver her lectures she would write the entire lecture for her students. She mentioned:

> I don't need to do that now because I use the PowerPoint notes, it all comes back. Part of it is I taught the same thing for a little while, but part of it is with PowerPoint my teaching style has become much less formal.

Brendan shared the importance of using Power Point to present linear and comprehensive versions of the content in a virtual environment:

> If you don't have something like PowerPoint, then it's hard for them (the students) to kind of make much sense of what's been covered, if you don't talk and you don't have to some degree enforced what's been said, if you don't have it presented in at least a way that seems logical to you at the time that you put it together, then it just becomes very difficult for them to follow along with what you are trying to do.

CMS features such as the online syllabus, modular content, electronic monitoring and submission of assignments, allowed faculty members to address the administrative and logistical issues outside the classroom. As a result they had more time to conveniently address content related issues in class. Jim commented:

> Things don't have to be turned into class. They are turned in electronically. I can have them do (things) anytime I want to, which gives me the flexibility to have a lot more focused discussions in class. I don't have to take up time with announcements, they are all out there. All that's stuff out there. We come in, we work.

He also demonstrated sections of the instructor view of his CMS that allows him to monitor individual and group-based progress of the course assignments. During my virtual visit to Jim's CMS environment I found announcements and areas where Jim addressed the administrative issues related to his course. Marie, Robert, and Priya all accepted visual, text-based (essays, PowerPoint presentations) online versions of assignments from their students.

Mike used the CMS announcement area to follow up on incomplete live discussions with his students:

> I think having it makes me less concerned in the classroom with having to cover everything comprehensively and within the hour I thought I needed to complete the material. I like having this as a resource that has given me the sense that I have more freedom in the classroom to make changes, to cover some topics of discussion in more detail because I know that if I don't finish something and I decide after the hour that it's important to either change the syllabus or to give them through the course page additional information I know I have that particular opportunity.

Access to the CMS provided faculty more time and space to build a sense of real and virtual communities in their courses. Examples of how faculty members build learning communities in their CMS-augmented courses are described in the following section.

Build a learning community.

Marie actively solicits feedback from her students to revise the CMS features of her class. Beyond completing the academic requirements, Marie stated:

> I enjoy building a sense of community where, all have our in jokes based on our common experience what we find amusing and what we find interesting. What problems we find interesting within the community and that's not something I import for each class – that is the same for each class. My goal is that we can have a commonality in experience and they (the students) can succeed and everybody can succeed about this in a certain way.

Geraldine observed "…other people can be important sources of information and knowledge and experience for them. In fact that's really true of our students. Our students have incredible experiences in their life and we have a really interesting group of students."

Jim builds a sense of learning community by incorporating peer review within the CMS:

> You can get people to assess and grade other papers or grade other tests. So I can make all those instead of me looking at the cases, I can make them public and strike (identify) people to read other people's and actually make comments before they get to class.

Robert, Jim, Priya, and Brendan use their students as resources to build the content as they were progressing through the class. Robert had a huge amount of theoretical content he wanted to cover in his course. He shared this challenge with his students who assumed responsibility as members of a group to cover and present sections of the content within the CMS. These student projects were used to add value to the current and future format of the class. This approach to organizing content in Robert's learning community "… would lead two or three of the students to inevitably put their papers on the website and then I could take a page of their link and put their web sites on the WebCT site." Jim posted samples of assignments completed by students in the course and used them to define the assignment criteria for a new content area:

> I've got a lot of case discussions, I haven't done this because I haven't done much case work before, but I'll probably take the first case assignment and post what an "A" is and I will also post what a "C" or a lower is so they can see the difference. That stuff is easy to do. So [italics added] you can actually use students as resources and put it out there, I do this same thing with their presentations.

Two faculty members, Marie and Mike were considering ways to build an ongoing learning community by archiving their course discussion forums. They planned to make the archived forums available to other faculty in their program or their peers in the field. Marie forwarded the virtual discussions in her class to faculty who had the same cohort of students

she taught. Mike explained how he had the option to share his CMS content with law professors who teach at other universities and use the TWEN CMS to complement their instruction.

Model Effective Teaching and Learning

Several participants who were coaching student-teachers in their classes were sensitive to how they designed the CMS. Their CMS design and instructional strategies served a dual purpose for the students, (1) to encourage learning the course content and, (2) to learn how to teach effectively. Considering the virtual nature of the CMS, faculty members had to make sure they provided clearly defined instructions and addressed the ethical and practical issues of teaching their content.

Provide clear and defined instructions.

Based on their teaching experiences with the CMS, six of the ten participants learned to provide explicit and defined instructions for any instructional activities in the classroom and CMS environments. Marie and Rebecca described situations where the lack of instructions or technical knowledge of her students led to confusion and frustration among them. Marie compared the differences in her professorial role in the classroom and as a virtual facilitator:

> I think certain students need an external set of guidelines – the advantage of online is you can go on whenever you like, whereas when you have a class on campus every Thursday you have to be there as an external regulator. When you don't have that so how do I provide that external regulator to those who need it and not make it inflexible for those who don't need it?

In these situations Marie found her students often helped each other resolve issues before contacting her to resolve the technical issues. Rebecca was prepared to accept poor course

evaluations from technology resistant students in her classes and challenged them to use the CMS, “I said I am a risk taker. I believe strongly if we don’t model, even if sometimes it’s very threatening, how can we expect our teachers to do anything different in their classrooms?” Rebecca then used the qualitative feedback from her students to identify the need to recreate the CMS environments as “very linear, because internet is about linear things.” to address the instructional needs of students asking her “… I want something very clear, very linear, very systematic that I can follow.” The layout of the online CMS that Rebecca demonstrated to me reflects her beliefs of presenting content in a linear and systematic manner. The online copies of different sections of her course have a consistent layout with the same level of headings in each section and features throughout the CMS.

Similarly, Geraldine commented, “with the online classes you gotta require it and you have to give very set beginning and ending dates for each module.” She found when the students were not required to complete a set number of criteria within a time period, they tended to postpone all work to the end of the semester, became overwhelmed and failed to complete their course requirements. Robert commented “over the course of the semester I required them to have twenty five postings for every course. They can do that all in one week if they want to but most people don’t.” Robert clearly defined his minimum participation expectations and flexibility about the type of postings, and said, “no they are not required to post questions, they can if they want, and I want them to feel free to do that and they are not required to do so every week.” Priya provided specific directions to help her students accomplish the course objectives:

> So I have to construct things like you are going to do these activities, go to this website, do this reading, observe these three things, interview ten people at your school, whatever the activity might be and then summarize, compare this to what

> our chapter says and then e-mail this to one of your peers and have them give you feedback and then you e-mail all of that to me.

Brendan defined participation guidelines to manage and prevent students from faltering in their contributions in the course:

> They could just basically wait and try to review all the stuff that had been posted you know, and try to do a cram if you will as so many students are used to doing before an exam. And so from the beginning we tried to prevent that to where you have to keep up from week by week. And so I get an indication week by week of how things are.

Consider ethical and practical issues.

Faculty members in my study were coaching their students to identify ethical and practical issues to understand the broader social and logistical aspects of their field. They were also modeling how to research, critique, and voice knowledgeable opinions of the subject matter. As a result they designed instructional strategies and CMS features to challenge students to reflect on the course and apply the theory in their professional lives. Marie explained how important it was for her students to have an:

> understanding of the process and when they have an experience online as part of the course, part of it is to reflect on what they experienced … (and) to project what kinds of thinking goes on in the children's heads when they interact with computer-based instruction. So that they can help kids succeed.

For those taking courses in public administration, Geraldine wanted her students to "…learn the broader social and legal and ethical, political implications of information management." Rebecca used reflective activities to empower her students to find new ways to find information so that they "can access the right links, you have to be able to solve problems

on line." She also required her students to "monitor what they do in the classroom because that is primarily where teachers are interns." Rebecca uses her CMS course environment to help student-teachers experience and validate "if they are doing the same thing in the (K-12) classroom, have they challenged (their) students?" Priya wanted her students to observe, reflect, and critique the process of constructing meaning from the content. She used a metaphor to explain her goal, "While you are brushing your teeth, you are trying to explain to somebody how you're doing it and that's very introspective on my part and on my students' part." Brendan used instructional strategies to help graduate students prepare for lifelong learning:

> Rather than just being stamped on the forehead at the end of their degree program with whatever their masters degree is, … they are trying to ask themselves these questions and end up with a protocol that they are comfortable with so that they can continue to learn for thirty more years.

The findings related to design and implementation practices of faculty members represent a three phase continuum of blending instruction. This three phase continuum is described in the following section.

Blending Instruction in Three Phases

When instructing in a blended environment, faculty implemented CMS along a three phase continuum. They tended to first, offer duplicate or diversified versions of course materials, second, implement course management functions and third, build a learning community. I determined this continuum after comparing the design and implementation of the CMS environment of all 10 participants. During the first phase faculty consider and explore factors related to the design of CMS-augmented instruction. I found faculty members exploring a variety of instructional strategies before adapting the most suitable

ones for their students. For example, Mark experimented with two different types of CMS before adopting TWEN as the most suitable CMS for his courses. Jim was able to link to relevant legal cases drawn from the commercial database within TWEN and associate them with topics he was covering in his courses. Robert, Priya, Brendan, and Rebecca required students to post their comments in the bulletin board to ensure all students participated in the virtual discussions in his CMS. Robert determined 25 as the minimum number of postings per student. He established this realistic number after exploring the discussion activity in the bulletin boards of his classes. Priya, Brendan, and Rebecca provided clear guidelines for the type of postings they expected their students to make within the bulletin board in their CMS. Mark provided reference materials and tutorials for statistical software he used in his classes. Priya provided Microsoft Word versions of the reading guides after discovering her students were unable to download and print the web-based versions. She modified instructional activities to suit the technical literacy and varied academic backgrounds of her students. Jim and his colleagues often had discussions about their instructional experiences with the CMS. The continuum of faculty diversifying, managing, and building blended instructional environments also applies to the implementation of CMS. The findings related to the implementation of CMS-augmented instruction are discussed below.

Initially all faculty members provided reference materials, course assignment details, announcements, and a discussion area to duplicate their face-to-face classroom. Most of the faculty members in this study provided their remote and non-traditional learners the flexibility to access classroom resources via the CMS. Some examples of CMS use in this study included Mark offering online tutorials; Jim, Robert, and Priya posting student work in the CMS; and Rebecca providing guidelines for assignments. Priya required her students to

maintain a journal of their pre and post reflections in the course. Rebecca and Marie offered opportunities for student teachers to experience teaching their K-12 students with a CMS. Geraldine offered a forum for students to interact with field experts. Eight faculty members in this study (Marie, Geraldine, Robert, Jim, Mike, Rebecca, Priya, and Brendan), facilitated instructional opportunities so that their students could continue course discussions and create projects seamlessly in the face-to-face and online environments. For example, Debra, Rebecca, and Priya's CMS and course activities encourage students to mine credible data from the web and formulate responses to questions for course assignments.

In the second phase of the continuum, faculty begin to manage the administrative functions of their course via the CMS. As they and their students become comfortable with the blended environment of the course, they use the CMS to exchange course assignment details and accept electronic format of assignments from students. Geraldine, Debra, Jim, Mike, and Brendan managed administrative functions of the course to gain valuable time in the face-to-face classroom for content related discussions. Brendan relied upon his administrative staff to promptly attend to student concerns. The added responsibilities which faculty assumed to manage their courses are related to the common finding related to increase in preparation time. This finding is described in detail in the following section dedicated to the third research question. Marie, Priya, and Geraldine commented on the extra time they had to devote to respond to their students beyond the limits of the classroom.

In the third phase of the continuum, finally when faculty have completed designing a stable CMS environment to complement their face-to-face classroom, they feel comfortable giving students the ownership to build the virtual classroom as equal members of a learning community. Geraldine and Robert commented on the interest among their students to drive

the course interactions. Faculty often build learning communities by modeling effective teaching and learning strategies for their students. These strategies include providing clear instructions and considering ethical and practical issues. Marie, Rebecca, and Robert modeled effective instructional strategies for their student-teachers. Examples of effective instructional modeling included providing challenging, clearly defined, and authentic activities within the CMS.

To summarize, the above sections illustrated how faculty members implemented a blended environment by providing virtual and classroom access to course materials and resources. The CMS features helped them extend classroom boundaries to attend to each student as an independent and self-paced learner. They were also able to provide customized guidance and encourage critical thinking while building a sense of community in their classes. The course format represented instructional models for some students who were K-12 teachers, allowing them to experience the use of CMS and online resources in the classroom. The interactive nature of the course environment allowed faculty members to address ethical and practical issues of their content and the use of the CMS. Faculty implemented CMS along a three phase continuum. They first, offer duplicate or diversified versions of course materials, second, implement course management functions and third, build a learning community. The above section included strategies of how faculty integrated the CMS in their face-to-face instruction. The ongoing use of CMS led nine of the ten participants to situate and adapt to the differences between the classroom and the CMS version of their courses. Integrating the CMS within their face-to-face classrooms required faculty to rethink the course format and redesign the blended versions of the course to suit their instructional context. The next section includes themes related to faculty members' situated practices of designing and implementing CMS-augmented face-to-face instruction.

Situating the Practice of Blended Instructional Environments

The third research question was, how does situated activity shape the pedagogical practice of faculty members' design and implementation of blended instructional environments? Four themes capture the responses to this research question: (1) adapting to a blended instructional environment, (2) trial and error course design, (3) increase in preparation time, and (4) changes in course interactions. The first theme represents how faculty members learned about adapting to the complementary or blended environment to their instructional context. Their experiences related to experimenting with the course design are described in the second theme related to trial and error course design. The third theme, increase in preparation time, addresses the extra amount of time spent for course preparation. In the theme on changes in course interaction faculty observations about peer and student-faculty interaction are described. Table 6 lists the themes that capture the responses and findings related to the third research question.

TABLE 6

Situating the Practice of Blended Instructional Environments

Adapting to a Blended Instructional Environment
Trial and Error Course Design
Increase in Preparation Time
Changes in Course Interactions

Adapting to a Blended Instructional Environment

This section includes the pedagogical dilemmas faculty members encountered, their experiences with the blended instructional environment, and how they learned to adapt the

CMS to suit their teaching environments. Robert claimed, “the course content I don’t think has changed. I think that the environment of course has changed a lot.” Relating to experiences of faculty in his department who were teaching CMS versions of their courses, Jim noted:

> I think everybody’s struggling with the whole issue of blended, how do you blend, who do you blend different roles (with), even when I’m teaching a face to face course it’s what do I have them do outside of the class and what do I have them do in the class so and I think everybody’s grappling with this issue of blended so how do you mask technology and that is what we talk about in the MIS world. So you got a learning activity what technology do you use?

Jim learned to modify the CMS environment to match the instructional goals, objectives, and expected outcomes of the course. Faculty members learned to assess and revise their face-to-face teaching style, and resolved some of the pedagogical dilemmas that arose as a result of integrating the CMS in their courses. Brendan and Geraldine noted how their teaching roles changed from being lecturers to facilitators. Brendan remarked:

> It certainly hasn’t remained the same, … I’m certainly sensitive to and aware of the communication flow … I’m more the person that is trying to draw out from the expertise that’s in the room to make sure that everyone is contributing in the room, whereas twenty-five years ago I would not have worried about that.

Geraldine found her role in the virtual sections of the course was slightly diminished from being the only expert to a participant and facilitator:

> I try to engage them. I think the thing that’s happened online with my role has become more diminished, (it) has made me more aware of how important it is for

> the students to offer and engage more. And to try consciously to actually diminish my role in the classroom. So I would say it's really made me a better teacher.

Marie experienced pedagogical dilemmas related to the nature of their virtual interactions with students. She was concerned about the amount of time her students spent online and in class. One of the way she addressed this concern was by placing "meaningful assignments, because students don't have time for busy work."

Priya shared what she learned from her reflections on evaluating the CMS design:

> It's the things that I have really thought about, what's the real objective here, what is it I really want them to get out of this. I can come up with all kinds of fun, cutesy ideas and they tend to like them but they tend to not learn anything from them. So the ones that work the best are the ones that I've really thought through and often taken on pen and paper or whatever and really thought through how they need to make connections or come up with some kind of generalization or principle or framework.

One faculty member commented that his pedagogy remained the same after incorporating CMS in graduate instruction. Mark, the educational psychology professor, claimed his style and pedagogy remains the same since he continues to teach the way he used to before incorporating the CMS. He claimed, "I still do a lot of lecture, I still ask people for questions and try to respond to their questions." One of the reasons why Mark may not have noticed any changes in his pedagogy is due to his perception of:

> learning as sort of a human social interaction and that without the humans and the social interaction it's kind of cold and remote and uninteresting. … . I think there's certain things about teaching that a virtual environment can't replace. I think that for

> many students part of what helps keep them motivated is in the nature of the social interaction between them and the teacher, and between them and the other students in the classroom context.

Mark chose not to encourage students to use email within his CMS to pose questions, because he often needed more specifics about the questions, and writing detailed answers was more time consuming versus providing verbal explanations to everyone in class. Mark was able to hold off responding to questions emailed by students "…because we meet at least twice a week rather than one of these once a week or less frequent class formats." The frequent class meetings with students allowed Mike to maintain continuous face-to-face interaction with his students with or without the CMS. The remaining nine participants in my study observed several changes in their pedagogy. To incorporate these changes in the CMS, faculty participants spent time experimenting with their course design.

Trial and Error Course Design

Faculty noticed how they kept toying with strategies and the overall course format until they saw the instructional benefits of the changes. Marie said:

> I am never happy with where I am and as I learn more it is interesting for me too because I learn new skills and I find a challenge there is again to incorporate the visuals and to make it a multimedia experience than just a verbal.

One of the reasons Marie kept revising the CMS design was to implement her reflections on issues such as:

> What is the experience here, is it taking the place of what I used to do, and seeing if that is appropriate. Finding out how much time people need to do something. How

> complicated should an assignment be, how many should there be, how difficult and not only the logistics are important.

Robert incorporated student feedback actively and was willing to risk failure in front of his students "I say well that didn't work so well and I mean I try let's do this or this." Rebecca found she spent more time gathering student feedback to refine and revise her CMS course details several times because "you thought it was very clear, but no it's not to some of them and then you have to see from their point of view and modify it." Priya commented on the revised sections of her CMS to demonstrate to me how she incorporated student feedback to improve the CMS:

> The way this is organized is basically how students suggested it be organized. So I have changed a little bit, I didn't have it quite like this, like there were icons here where you could click and they really didn't want the icons, so I changed that and they wanted some different links here and I changed that.

Jim, who had offered the CMS version of his course three or more times, was able to focus on his new role as a virtual and classroom expert by spending, "… a lot more time gathering information, sequencing it together so it's a lot more time in (the) electronic environment getting that right."

A common thread in my discussions with all the participants was their personal interest, dedication, and enjoyment in experimenting with the CMS features to enhance their instruction. Priya shared her motivation and pride in designing CMS-based courses, "because I really love it, I mean I think it's just really great and I know that it works." Robert and Mark described their love for technology identifying themselves as early adopter and techno-geek respectively. Robert likes to play with CMS and other instructional technologies

just as one does with toys. He also likes to model early and effective use of technology by staying "ahead of the curve on most of the technologies" especially because his students are teachers. Marie, Jim, Robert, and Mark used the CMS to design courses to incorporate multi-sensory learning options including, audio, text-based, and visual learning preferences of their students. Marie shared the importance of offering visual representations of her content as an alternate to the primarily text-based format of most courses, "a picture is worth a thousand words and a good design and a well-developed internet web site is worth ten thousand words." Debra expressed her personal preferences of learning visually, hence she spent efforts to design a visually appealing course. When I browsed through Debra's CMS I found several animations, visuals, and text effects which reflected her personal design preferences. Marie and Jim found the CMS features as a medium to further explore their research interests in visual literacy and group support systems respectively. Marie said:

> There are some people who go to universities to carry out research, but here definitely our mission is to teach well. So studying our selves as teachers is fun. Now we have a new context in which to do that.

Thinking through these strategies and identifying the most suitable ones for their students required extra hours of faculty members' preparation time and efforts. This theme is discussed in the following section with comments from several faculty participants.

Increase in Preparation Time

Creating, re-designing, and updating the CMS version of their courses required faculty members to spend a significant amount of extra preparation time. Robert updates his course content regularly, "… something that I think is impact all of this a lot of time and work." He developed an extensive glossary to help his students situate the meaning and

context of difficult words within the course content. Robert indicated that the labor intensive effort of building and updating "a good glossary in two or three different courses is very time consuming to put together." When I visited the glossary section in Robert's CMS I found an extensive list of terms available to the students. Marie spends considerable time prioritizing her course development and delivery time among efforts to "… keep track, for example I have to plan to visit this web board … at least once a day or twice so I can give a quick response, otherwise the wheels start to turn more slowly." Geraldine remarked how she chooses not to upload all the course content at the beginning of her class. She spends time outside class participating in the virtual discussion everyday, but her involvement, "… peaks when I have to put up another module. I don't put up all the modules at once, so definitely, the perception on my part is that it takes more time." Priya shared an example of how she spends extra time to create the electronic versions of the reading guides for her students:

> When I first did it I saved them all in Microsoft Word and I saved them as a doc so I knew people could download them. Well, first of all people didn't understand how to do that, even if it's just click, they didn't understand what was happening. So I finally figured that part out and I created two. I created and html version so all they have to do is click on the html and they can print it or a Word one. Now this is a lot of work.

Jim and Brendan also acknowledged the extra time required to develop the initial CMS versions of courses. Their previous experience offering courses with a CMS component and continued access to support allowed them to view the initial preparation time as benefit. Jim admitted:

> Ramp up time is large. But I find that once I get a course out there in a format like courses I'm teaching next year I mean I've got the version I did least year and so I

> get something, I grab it, and I just stick it out there so I mean I have my own little entries that when I start a class up I just go through ok what do I want to change, what have I found, what are new resources, and I plug them in and we go. So in terms of maintenance or ramping up for teaching it the second or third time, it's easier and easier, because it's easier to plug stuff in.

Brendan shared his reflections on designing and instructing with the CMS environment:

> I would say there's certainly more time spent in class preparation that's unrelated to the course content itself because your looking at trying to get all the pieces together … you can't just at the last second rip something out, although I learned ways to sneak things in.

He had the advantage among all the participants to access a dedicated staff member who helped him with the technical aspects of maintaining the CMS. Faculty participants had to reconsider their pedagogy and make appropriate changes to facilitate learning in the blended instructional environment. Faculty members observed another shift in their role from the only expert and lecturer in the classroom to that of a facilitator and participant in the live and virtual discussions among students.

Changes in Course Interactions

The next and final theme in this chapter includes faculty members' reflections on the changes in interaction with and among their students. Marie, Priya, Mike, and Debra had more opportunities to interact with each student on an individual basis. Marie was able to offer a more self-paced environment where students could take time to reflect and respond virtually to classroom dialogues:

> I think one thing that it does is to help you to make the interaction between instructor and student richer during say the assignment period, say when an

> assignment was given and when the final was given. In between, you have more opportunities to communicate with each other, between classes, if the student chooses, then there's more a chance for me to say well, give me a brief outline and or clarify something, whatever it takes to help the student go deeper and have a better experience. I think that's improved.

Priya appreciated the value her students added when they had more time to reflect and present written versus verbal representations of their reactions in the CMS, "when I give that to them as a task outside of class inevitably they bring something back that is something that I haven't considered, that was important , didn't think, or thought they already knew." Mike commented:

> You and the students can have extra opportunities to interact with each other and one way that students can perceive this particular teacher cares about the subject matter and about how the students are doing enough to communicate with them extra.

After using Power Point to organize and present her lectures, Debra learned her teaching style and interaction with students had changed. She commented "my teaching style has become much less formal I think and allowed me to interact at a different level with the class. PowerPoint keeps you more focused too."

Robert, and Priya had more opportunities to draw from the experiences and varied background of their students. The virtual and extended version of the classroom allowed students time to reflect and react to the content in meaningful ways. Robert shared his observations about CMS enhanced classroom interactions:

> I think that conversation is richer. I hear less of the excuse I didn't read the material [emphasis added] than ever before and people come to class prepared and that helps the conversation on the bulletin board and helps the conversation in class. So I think its richer, in fact, I know its richer, I think it does contribute to community.

Geraldine, Brendan, and Robert learned about the limitations of virtual interactions with and among their students. Geraldine noted how "when I teach face-to-face I rely a lot on eye contact and body language to see if what I am doing is working." When she was interacting with her students online she found, "I don't know when they have a need for more structure, and when they have a need not to, that's something I would be able to tell if I were teaching face-to-face." To address this change in her interactions with students, Geraldine gathered face-to-face and virtual feedback from her students to make appropriate changes within the CMS version of the class. Brendan noted that in his face-to-face interactions with students, he was "… able to use eye contact and stare at them to give them a cue that maybe I wanted them to contribute something to the conversation that was ongoing." In the virtual interaction with students in his CMS-enhanced classes, Brendan compensates for the lack of visual cues to and from his students by setting aside time to virtually:

> Go around the world … and ask people how they are doing … I actually have to stop and have to have that built in at certain points in terms of what it is that we are trying to talk about otherwise they will just sit there.

Considering the somewhat anonymous nature of communication among students Robert concluded:

> I think that we have the potential to revoke community. I think one of the things that I've come to realize in the last year or so is that the use of community for learning, is a good and a bad thing.

He provided an instance where virtual discussions among students led to racial tensions among students. As a facilitator he was faced with the challenge of steering his learning community away from causing any harm to other members in the class.

To summarize, after designing and implementing the CMS faculty members practiced their pedagogy of blended instructional environments by (1) adapting to a blended instructional environment, (2) trial and error course design, (3) increasing their preparation time, and (4) changing course interactions. In the process of adapting to the blended environment faculty participants identified and acknowledged the differences between their face-to-face and CMS-augmented pedagogy. They integrated their personal research interests with the feedback from students to redesign the blended course environments. Faculty found that the constant re-design of the course within the CMS has a downside - the extra time required to create multiple versions and formats of the course. Facilitating learning in the blended environment changed the interactions among faculty-students and students as a group. It also increased the amount of student participation in course discussions. The next and final section provides a summary of all the findings described in this chapter.

Summary

The first part of this chapter presented profiles of each participant. The profiles include the faculty and student backgrounds, participants' history of using the CMS, their pedagogical beliefs, and the CMS features employed by each participant. The second part of the chapter is organized by findings related to each of the three research questions.

Pedagogical design factors considered by faculty members included (1) nature of the CMS, (2) student background, and (3) institutional support. Faculty members implemented the above factors by (1) diversifying instruction, (2) providing in-depth instruction, (3) modeling effective teaching and learning, and (4) blending instruction in three phases. Faculty members' situated activities of designing and implementing CMS-augmented graduate instruction revolved around four themes, (1) adapting to a blended instructional environment, (2) trial and error course design, (3) increase in preparation time, and (4) changes in course interactions. The next chapter addresses the conclusions drawn from the findings. It also presents implications of this study and recommendations for future research.

CHAPTER 5

SUMMARY, CONCLUSIONS, DISCUSSION, AND IMPLICATIONS

The purpose of this study was to describe how faculty members identify and account for the pedagogical design factors when incorporating online Course Management Systems (CMS) in graduate face-to-face instruction. The following research questions guided the study:

1. What pedagogical design factors do faculty take into consideration when incorporating online CMS in graduate instruction?
2. How have faculty members taken into account design factors when implementing CMS to augment their face-to-face instruction?
3. How does situated activity shape the pedagogical practice of faculty members' design and implementation of blended instructional environments.

This chapter presents a summary, the conclusions, and discussion drawn from the study, its implications for practice and research, and recommendations for future research.

Summary

The methodology employed was a qualitative design with interviews, documents, and observation as data collection methods. Ten faculty members from southeastern, northwestern, and southwestern United States participated in this study. These participants teach at a variety of Masters I or Research I state-funded institutions. Interview, observation, and document data were collected from the participants. Data collection involved three steps. First, a face-to-face interview, second, observation of the CMS while each participant

was demonstrating it, and third, a virtual review of the CMS after the interview ended. All interview conversations were recorded and transcribed verbatim. Pseudonym were assigned to each participant to maintain their confidentiality. I also tape recorded the discussion with nine of the 10 participants and noted their design related rationale during the CMS demonstration. After accessing and reviewing seven of the ten CMS designed by participants I printed paper-based copies of the main areas of each CMS as a log of my review of the online documents. The constant comparative method was employed to analyze interview data.

Analysis of the data revealed the findings including a profile of each participant and descriptive responses to the three research questions. CMS and interview data helped me to create profiles of each participant including their personal, pedagogical, and student background. Faculty profiles offered a snap shot of the academic, student background, pedagogical beliefs of each participant including a list of the CMS features employed in his or her CMS. The CMS served as online documents used to analyze and validate the findings from the interview data. I created a chart to draw the similarities and differences in the CMS features used by each of the participants. All of the interview data and CMS observations provided the findings related to each of the three research questions. Relevant quotes from the interview transcripts were extracted to form the open code of data. These data were then sorted, analyzed, and synthesized to form major themes. Results of this comparison were also used to triangulate the participant profiles, document data, and notes from the observations of the CMS demonstration.

Pedagogical design factors considered by faculty included (1) nature of the CMS, (2) student background, and (3) institutional support. Faculty selected and incorporated those CMS features which addressed their pedagogical beliefs and expectations. The nature of the

CMS includes factors related to the pedagogical appropriateness, accessibility, and user-friendliness of the CMS. The student background includes the academic culture and student attitudes towards CMS. Faculty displayed sensitivity to student access and acceptance of the CMS as one of their design factors. Peer and institutional support affected the intensity of faculty efforts to design CMS-augmented instruction. All ten faculty members received technical support for their CMS from their institutions, three received administrative support, and six faculty had the opportunity to access pedagogical support from their peers. Faculty implemented the design factors by (1) diversifying instruction, (2) providing in-depth instruction, (3) modeling effective teaching and learning, and (4) blending instruction in three phases. Each of them were able to customize necessary CMS features to provide students with multiple versions of the content while extending their classroom boundaries. The virtual extension of the classroom offered opportunities for faculty members to provide customized guidance to individuals and encourage critical thinking among all students. The collective experiences of building and using course content within the CMS led to a stronger sense of community for some participants. Some faculty also used the CMS to model instructional strategies for their student-teachers. The virtual nature of the CMS required faculty to provide clear and defined instructions to help students accept and use the CMS. When instructing in a blended environment, faculty implemented CMS along a three phase continuum. They tended to first, offer duplicate or diversified versions of course materials, second, implement course management functions and third, build a learning community.

The situated pedagogical practices of designing and implementing CMS-augmented graduate instruction revolved around four themes, (1) adapting to a blended instructional environment, (2) trial and error course design, (3) increase in preparation time, and (4) changes in course interactions. Faculty who found differences between the face-to-face and

CMS versions of their courses learned to adapt to the blended instructional environment. To address their instructional objectives, participants often made several design attempts while experimenting with the CMS component of their courses. Designing, implementing, and facilitating the CMS consumed extra hours in addition to the time spent preparing for the face-to-face course for several faculty. One of the consequences of their design efforts were the changes in course interactions. Some faculty found their role as an expert was diminished to that of a facilitator, others appreciated the increased level of student interactions within and outside the CMS environment.

Conclusions and Discussion

Findings of this study led to four conclusions related to the pedagogical experiences of the participants. The conclusions of this study are:

1. Faculty members learn the pedagogical practice of blended instruction in situated environments.
2. Faculty design and incorporate the CMS features that offer clear pedagogical benefits for their instructional context.
3. Faculty members need different types of support (technical, institutional, and collegial) depending on their level of involvement with the design and implementation of the CMS.
4. As a result of implementing CMS, faculty experience enhanced interaction with and among their students.

The next four sections present a discussion of these conclusions to support, contradict, and add to the existing body of literature on complementary online learning, reflective practice, and situated learning.

Reflective CMS-Augmented Pedagogy

Faculty members learn the pedagogical practice of blended instruction in situated environments. Aspects of the reflective practice model such as move-testing, hypothesis testing, and exploratory movements are mirrored in the practices of faculty members in this study (Schon, 1987). These aspects were evident in their design and implementation phases of CMS-augmented instruction. To illustrate the reflective practices of the participants, a discussion of the design factors is presented before the factors influencing the implementation of the CMS. To design blended instructional environments, faculty members initially transfer strategies from their face-to-face instructional practice while exploring how to teach in the face-to-face and online or blended environment. This phase mirrors the exploratory experiments described in Schon's (1987) model. Exploratory experiments involve the inductive approach to problem solving where the professional identifies and attempts to understand and establish initial assumptions of the problem. Reeves' (1998) conceptual model to help faculty use the WWW appropriately encourages faculty members to allow students to construct their own learning experiences. Contrary to Reeves' (1998) view that faculty members should assess the instructional objectives and implement them such that students can construct their own learning; the faculty members in this study implemented the CMS in three phases. They first duplicated the face-to-face course based on their personal assumptions, second administered select features in the CMS, and finally refined the CMS design to allow students to participate in learning communities and take ownership of their learning.

According to Schon (1987), move-testing experiments are those during which the practitioner acts on or implements the assumptions formed in the exploratory phases. Hypothesis testing experiments allow the practitioner to draw conclusions based on the

consequences of the actions, thus extending his or her theoretical knowledge of the practice (Schon, 1987). Similarly, in this study, faculty members determined the relevance of the CMS features based on their instructional context. It is noteworthy that all the faculty members in this study needed to practice teaching with the CMS before they were able to make decisions about the appropriateness, and in some cases irrelevance of, the use of various features in their CMS-augmented classroom. Further examples of faculty members' selective use of CMS features are described in the following section on pedagogical benefits. The contextual elements missing in Schon's (1987) model are the focus of the situated learning and communities of practice literature.

Faculty members needed authentic contexts and a support infrastructure to practice and reflect upon CMS-augmented teaching. The instructional context and support community available to faculty members influenced their level of involvement and attempts at designing and implementing blended instruction. I found that faculty members who had minimal support from the faculty and institutional community, were the least involved (e.g., Mark and Priya). Faculty members' teaching contexts including student background and academic background also determined their level of involvement with the CMS (e.g., Debra, Brendan). The section below addresses the contextual factors which influenced the design and implementation of CMS-augmented instruction. The findings of this study helped me relate to the learning processes of faculty designing and revising the online CMS. The above discussion was an attempt to analyze the findings of this study via the primary theoretical framework of reflective practice of faculty members in this study. The following three sections provides further examples of CMS-augmented pedagogy via the second theoretical lenses of situated learning and communities of practice literature used in this study. The

following conclusions highlight the importance and relevance of context and community for both the faculty members and students.

Pedagogical Benefits

Faculty design and incorporate the CMS features that offer clear pedagogical benefits for their instructional context. Before designing and implementing a blended instructional environment, faculty in this study considered the instructional benefits of using CMS in their classrooms. They considered CMS when it provided convenient access to course materials and resources in a user-friendly format for their students. Faculty wanted to address the accessibility issues and student attitudes towards the CMS. Rebecca and Priya allowed students to work in groups so they could help each other overcome the technical hurdles of using the CMS. Codde (1999) incorporated collaborative strategies to help students complete course assignments and reduce their anxieties of using online technologies. It is noteworthy that a majority of the graduate students (in Marie, Robert, Mike, Rebecca and Priya's classrooms) were somewhat resistant to using CMS to interact with the instructors and their peers. Faculty took extra measures to help the technologically challenged students adapt to the unfamiliar CMS environment. Implementing these measures led to more interaction among faculty and students. Helping their students to learn how to use the CMS offered extra opportunities, especially for Marie and Robert who were able to empower their students.

Reeves (1998) encouraged faculty to consider the aptitude, cultural background, and source of motivation of the learners when designing learning activities. Bostrom, Clawson, and Watson (1996) interviewed facilitators who designed conferencing systems for collaborative projects among their students. The facilitators perceived design and planning phases as the most important dimension of implementing group support conference

technologies. Similarly, faculty members' selective use of CMS features in this study reflects their pedagogical design choices. For example, Debra used the glossary feature to allow students to submit explanations of terms as an assignment, while Robert used the same glossary feature to archive explanations or definitions of difficult terms from course textbooks. Downing and Rath (1996-97) studied two courses to find that successful use of online-quizzes saved in class time for other activities. Likewise, participants in this study administered course assignments, group projects, peer discussions, and student questions via the CMS. In Downing-Rath's (1996-97) study the bulletin board was used to display the text of the quiz. Marie and Mike used the bulletin board feature in their CMS to pose assignment details in addition to facilitating discussions among students. Except Mark and Debra, the rest of the faculty used the bulletin board feature to facilitate the virtual course discussions.

For some faculty the pedagogical benefits of using CMS meant implementing academic standards defined by their departments and encouraging student interaction in the blended classroom. Thus, faculty members' design and implementation of the CMS environments were influenced by their instructional contexts. Jim and Priya used the CMS home page to provide updates to students on course announcements, while Brendan and Mark used the same area to provide archives of course lectures and presentations respectively. These variations in the use of the CMS indicate how faculty modified CMS features to suit their instructional contexts. Reeves and Reeves (1997) offered advice related to teaching and learning on the World Wide Web (WWW) for instructional designers. They recommend that designers use the contrasting values on each of the ten dimensions of their framework to address (a) pedagogical philosophy, (b) learning theory, (c) goal orientation, (d) task orientation, (e) source of motivation, (f) teacher role, (g) metacognitive support, (h) collaborative learning, (i) cultural sensitivity and (j) structural flexibility dimensions of

interactive learning. After comparing the findings against the Reeves and Reeves (1997) model, I found the instructional context and level of involvement influencing some of the instructional dimensions addressed in this study. For example, Rebecca emphasized her pedagogical philosophy by requiring elementary education graduate students from a non-technological culture to use her CMS. On the other hand the emphasis on updating students with latest tools and information sources indicated importance of the teacher role dimension for Geraldine. Lee (1996) found that teachers and trainers who used a bulletin board system, emphasized pedagogy over the use of technology by offering a broader conceptual framework to ensure that their students were able to understand the issues and implications of the technology. For example, Geraldine and Rebecca drew their students' attention towards ethical and logistical issues of using CMS and other online resources. Robert, Priya, and Brendan closely moderated virtual discussions to find the right opportunities and pose hypothetical ethical dilemmas for their students. In doing so they were sharpening the critical thinking skills of their students.

The University of Illinois (1999) conducted a study based on a year-long faculty seminar on the pedagogical benefits and limitations of online teaching and learning. This study recommended that faculty decide the use of technology based on four major criteria: (1) whom do I teach? (b) how do I teach? (c) how many do I teach? and (d) how do I ensure high quality of online teaching? The seminar results also revealed the more effective use of technology as a complement to the face to face mode of instruction. In my study the participants incorporated only those CMS features that offered clear instructional benefits for them and their students. They could be selective about the features within the CMS as it was a complement to their face-to-face instruction. Likewise, survey results of the Central Florida Consortium of Higher Education's (CFCHE) (1997) study identified the factors that

promote the use of educational technologies. The promotional factors included, demonstrated advantage over traditional delivery, availability of equipment, improved student learning, and student motivation. In relation to the results of the CFCHE (1997) study, faculty members in this study had access to CMS in their institutions, which allowed them to integrate select CMS features not available in their classroom. Except Rebecca who had some very resistant students, most faculty members were able to motivate their students to use relevant CMS features. Whether the CMS improved student learning is partially addressed in the discussion about the conclusion related to enhanced interaction. A discussion on the conclusions about crucial support issues raised by the faculty members is presented in the following section.

Support Infrastructure

Faculty members need different types of support depending on their level of involvement in the design and implementation of the CMS. Three types of support necessary for faculty use of CMS include technical, institutional, and collegial support. First of all faculty who are at the beginning stages of designing the CMS need technical support to build the virtual complement to their face-to-face course. Heath (1997), Owston (1997), Karlin (1994), and Schrum (1998) all expressed concerns about access to technical support for faculty who are beginning to create online components or courses. They emphasized the need for customized training, technical, and institutional support to deliver pedagogically sound, learner-centered, technology-mediated courses. Collins and Berge (1996) established guidelines for online instructors. They proposed the instructor to adopt a combination of pedagogical, technical, social, and managerial roles. These roles ask instructors to facilitate the learning goals of community of learners, provide a friendly learning environment, display comfort with the use and applications of technology, and manage all these aspects of a

course. Since I interviewed faculty members who had offered their course twice or more, all the faculty members in this study had initially accessed technical support from their institutions. I found that all of the institutions involved in this study provided the basic infrastructure to offer technical support for the campus-wide CMS available to their faculty members. The technical support offered by these institutions was often limited to maintenance of the CMS as an application. It did not necessarily include customized instructional support for each faculty member who used the CMS. This mirrors the results of The Campus Computing Project (1999) which indicated that only 13.7% of the total 557 institutions surveyed offered a reward structure to support faculty who use instructional technology. The reward structure described in The Campus Computing Project (1999) includes institutional support, the second type of support required for successful implementation of CMS-augmented instruction.

Once faculty have designed the CMS, they are involved with implementing their CMS and managing the blended course. At this level faculty need administrative and instructional support to maintain the virtual component of their course. Six of the 10 participants had access to different forms of institutional support to design and maintain their CMS. The institutional support available to participants included release time, research grants, and graduate student support. Schrum (1998) addressed the need for institutional support towards the workload of faculty who are integrating technology in their courses. Despite the available support, participants raised concerns about the amount of extra time and efforts they had to spend to maintain their CMS environments. Specifically, Mark, Mike, and Priya were selective in their level of involvement with the CMS. Their involvement with designing and implementing the CMS was based on the type of administrative support available to them. They preferred to adopt the simple and generic versions of the CMS

versus employing highly customized and hard to maintain features. Owston (1997) described the lack of technical and instructional support as one of the limitations impacting the scope of the WWW in higher education. Beyond the technical and institutional support faculty who have offered blended courses multiple times, seek help from their peers. They need the third type of support, collegial support, to continue modifying their blended pedagogy.

Faculty who have progressed from designing and implementing their CMS often seek the support and experiences of other faculty who have experienced similar pedagogical dilemmas of facilitating blended environments. Brown and Duguid (1996) and Pallof and Pratt (1999) promote the use of virtual communities of practice among students in higher education. There is an equally important need for institutions and faculty development centers to create and support communities for faculty members who wish to discuss pedagogical issues with their peers. The situated learning (Lave & Wenger, 1991), situated cognition (Brown, Collins & Duguid, 1989; Wilson, 1993), and communities of practice (Brown & Duguid, 1996; Wenger, 1998) are the three lenses which capture the authentic learning opportunities and collaborative support that faculty experience when integrating technology.

Situated learning perspectives describe how faculty members in this study learned to design CMS enhanced instruction situated within an authentic context such as their classroom and their institution. Wilson (1993) defined three aspects of the situated cognition theory. First, the situated nature of learning implies that learning is a social activity. Second, situationally provided tools help adults learn and think within the context. Third, the structure of learning is significantly influenced by the context. According to Brookfield (1995), culture directly influences the choices that teachers make while engaging in their practice, as a result the practitioner's "reflective activities need to be understood within the

social context that has shaped them"(p. 217). Marie and Debra made instructional choices in their courses to conform to their departmental cultures of updating the technology literacy skills of the student teachers. Faculty need to learn to use the CMS in their university, classrooms, and within the CMS where they teach.

Faculty members in this study learned to use CMS via their experiences in several authentic teaching and learning contexts. Online courses offered by other faculty, instructional seminars, forums, and informal discussions with members of their community offer opportunities for faculty to brainstorm and refine their pedagogy. Lave and Wenger (1991), Wenger (1998), and Wilson (1993) address the need for adult learners to engage in social interactions in a relevant context. A collegial support structure allows faculty to learn from the best practices of their peers, and provides them opportunities to share their pedagogical interest and ideas. Faculty like Marie, Rebecca, and Debra who chose to incorporate a CMS in their course, did so after they interacted with other colleagues who taught online. Marie, Debra, Geraldine, Jim, and Mike all joined the community of faculty members in their department or institution to engage in pedagogical dialogues with their colleagues. Hence, technical, institutional, and collegial support structures are necessary to help faculty build, maintain, and revise their CMS.

Enhanced Interaction

As a result of implementing CMS, faculty experience enhanced interaction with and among their students. The virtual nature of the CMS environments provided students opportunities to express their opinions, and provide critiques and reviews of course content. It also allowed them opportunities to employ interactive skills with their peers while exchanging visual and text-based information. According to Winn (1998) "knowledge is constructed through iterative interactions with material that force students to work with the

information, to view it from different points of view and to associate it with what they already know" (p. 9). A facilitator role may allow faculty to achieve the goal of providing opportunities for students to think critically (DeLong, 1995; Richards, 1996). Priya and Rebecca established clear guidelines to help their students critique, analyze, and share interpretations of course materials within the CMS. The extended nature of the blended classroom allowed students more time to reflect and present comprehensive critiques of material discussed in the face-to-face classroom. Priya and Geraldine both acknowledged how their students shared valuable experiences and insights on the course content, after they had some time to reflect on course discussions.

The use of CMS in graduate instruction changed the role of faculty members like Geraldine, Robert, Jim, Mark, and Marie from being the only expert in the room to a facilitator. The changes in instructional roles of these faculty members is similar to the participatory role of senior members of a learning community socializing with the new members to collectively create knowledge. It also represents the distribution of power and authority from the faculty members to the students while they are making meaning and building content in the blended environment (Wenger, 1998). According to Reeves (1998) faculty will be expected to serve as guides on the side as opposed to sages on the stage. Duderstadt (1999) remarked those who teach online as facilitators and coaches will be expected to "become designers of learning experiences, processes, and environments" while coaching and consulting with students on collaborative learning ventures. Robert challenged his students with the responsibility to build content in the CMS. Geraldine invited public administrators to virtual forums, so her students may interact with and learn from other experts. Jim provided examples of similar work from previous classes to boost the creativity and raise the academic standards of his students. University of Illinois (1999) seminar

participants emphasized the need for faculty to provide a human touch and respond attentively to the needs of the learners. The web pages analyzed by Reeves and Dehoney (1998) served as a social learning environment, in addition to offering the above primary task management functions. Reeves and Dehoney (1998) found that students learned about behavioral expectations (e.g., class participation), course philosophy, class community, and instructor persona (e.g., non-academic information about the instructor). Web pages used by faculty in the Reeves and Dehoney (1998) study had an equalizing and humanizing effect that allowed students to relate to the instructor as a person, hence enhancing the student-teacher interactions. Reeves (1998) recommended faculty should transfer the ownership of the learning onto the learners and engage them in authentic learning activities.

There were two faculty members in this study who did not find enhanced interaction among their students due to the CMS in their courses. Mark and Mike noted how their roles as the only experts in the classroom did not change as a result of the CMS. Mark's students were often intimidated by the complexity of statistical concepts and expected him to guide them with additional resources. Mike's students were reserved and hesitant in expressing their opinions about law related content. Despite the lack of interaction among students, Mike's students frequently used the private mail feature in the CMS to pose questions to him without having to raise their hands in the classroom.

The virtual nature of the student-faculty and student-student interactions in the CMS posed instructional challenges for faculty members. Brendan, Marie, Geraldine, and Rebecca were faced with a new dilemma of addressing and communicating with a virtual student population. The lack of body language and eye contact required faculty members to spend more time monitoring the virtual progress of their students as well relying on alternate feedback mechanisms. Brendan incorporated time during the virtual class meetings to stop

and check with his students, while Marie and Geraldine watched for emails from students having problems in the CMS. Rebecca had to allow technically challenged students to partner with their peers in the classroom to learn how to participate in online activities. Winn (1998) warned the instructor about the limitations of the WWW. These limitations included (a) lack of visual cues of from students learning in a primarily text-based environment, and (b) different ways to attract and retain the attention of students from different learning and social cultures.

Implications for Practice and Future Research

This study provides a detailed analyses of pedagogical issues related to complementary online instruction. The findings of this study provide inferences which address some of the practical concerns of faculty, faculty developers, and institutions. The next two sections address implications for practice and recommendations for future researchers.

Implications for Practice

This study provides a detailed analyses of how a select group of faculty members learned to enhance their face-to-face instruction by employing CMS. This study may assist faculty members, faculty developers or adult educators, and institutional administrators in a variety of ways. Daley (1999) reported that practitioners' learning process is a continuum "from being overwhelmed by events to creating a narrow focus for themselves and finally, to expanding their learning in multiple areas" (p. 142). This study highlighted the extensive efforts of 10 faculty members practicing their teaching profession while learning to integrate the CMS environment with graduate students. Faculty members reflected on their experiences exploring, applying, and modifying their existing teaching and learning practices in a new and unique blended instructional context. The perceptions and experiences of

faculty members in this study validate the self-directed and reflective learning experiences of adult educators in higher education. Faculty members in this study learned to design and implement CMS based on factors such as personal interest, peer recommendations, and institutional support. Several of them incorporated CMS to address specific instructional needs of their students. These factors support the necessity of authentic learning opportunities for faculty members to undertake the time consuming efforts of designing blended instruction.

Details about how a group of faculty members implemented their CMS to augment the face-to-face classroom provide concrete examples of the frequently mentioned instructional strategies in the literature. Faculty who are looking for comprehensive examples of blended instruction, may find in this study; examples of how their colleagues have addressed similar pedagogical issues in graduate instruction. It also provides details of the customized application of CMS features in a variety of disciplines and types of institutions. The type of CMS did not bind this study. It offers descriptions of how five different CMS including Blackboard, Learning Space, Web Course Tools (WebCT), WebBoard, and The West Education Network (TWEN) CMS were used in graduate instruction. The complementary use of CMS in graduate instruction may be useful for institutional stakeholders interested in investing and supporting a CMS on their campus.

Another inference of this study is the first hand report from faculty members at a variety of institutions needing technical, institutional, and collegial support to design and implement blended instruction. The support related issues might be relevant for faculty developers who are struggling with identifying and providing the most appropriate type of services to faculty in their institutions. Institutional support for individual faculty members is a must for the successful implementation of pedagogically sound courses. In addition to

technical support, there is a need for offering authentic collaborative communities to faculty, so they may learn from their peers about the pedagogical use of CMS and other online technologies. Faculty need customized support to adapt their pedagogy to the CMS environment. The existing support infrastructure at most institutions is scattered among pockets of departments, schools or a faculty development center offering limited support services to a vast range of faculty practitioners. Depending on where they may be on the continuum of pedagogical experiences, the type of support required to encourage faculty may vary.

Recommendations for Future Research

While conducting this study, I was able to identify other gaps in the area of complementary online instruction that are not covered in the scope of this study. The following gaps may help future researchers contribute to the limited research on pedagogical issues of blended instruction.

Faculty Motivation

This study addresses questions related to how faculty members designed and implemented CMS, not why. Faculty members' personal interest and motivation were factors that influenced the design and implementation of their CMS. These factors positively impacted the level of faculty involvement in addition to their face-to-face course preparation time. The nature of what motivates faculty members to design CMS environments, needs to be studied. A study of the motivational factors related to designing blended environments, may help faculty developers and institutions encourage and support the use of CMS among their faculty. To further narrow down this area, future researchers may want to study a sample of non-tenured faculty and how their motivation is affected due to their career stage.

A study of a non-tenured sample may help researchers highlight the need for additional resource needs for faculty who are juggling teaching, research, and service related duties.

Instructional Evaluation of the CMS Features

There is a need to study aspects specifically related to if and how CMS instructional environments encourage learning in blended courses. This study focused on how faculty members implemented CMS in graduate instruction. It does not directly attend to issues surrounding the effectiveness of CMS to complement graduate face-to-face instruction. McGreal (1998) conducted a comprehensive survey of 15 different CMS and labeled these systems as IDLEs. The researcher identified the development history and key features of different products or online learning environments including Forum, Virtual-U, Learning Space, Learning Server, Symposium, WebCT, First Class/ Learn Link and Top Class. McGreal's (1998) study offers technical details related to the CMS versus a pedagogical evaluation. Considering the high cost of offering and maintaining CMS in institutions, there is a need to study the impact of CMS on student learning.

Institutional Comparison of Support Infrastructure

I learned about the support infrastructure available to faculty members who are using CMS in graduate instruction from their individual perspectives. A qualitative study comparing a variety of institutions and the support services they offer to faculty may help the development of effective technology support strategies and investment efforts for the entire faculty population not just select departments and schools in higher education.

A Concluding Note

I designed and conducted this study to emphasize the role and contributions of faculty incorporating complementary online instruction. In the past few years, several institutions have jumped onto the bandwagon of offering online resources for their on-

campus students. The overreaching demands of addressing technical issues of online instructional mediums, in some ways, minimized the importance of pedagogically sound instruction in higher education. This study was also an attempt to refocus the attention to faculty practitioners, their pedagogy, experiences, and their urgent need to learn how to offer pedagogically sound instruction in the blended environment. This document offers experiences of 10 highly motivated and self-directed practitioners. It tells stories of how professors from a variety of academic contexts combined their personal interests and academic resources to offer their students a customized and often interactive instructional environment. It also documents the constantly emerging nature of their blended classrooms and evidence of communities of learning among student learners. The descriptions of learning to teach with the CMS while teaching in the classroom, serves as an authentic context for faculty to reflect on their teaching practices. This context also allows faculty to share their experiences with their colleagues and learn from each other. Their instructional contexts and level of involvement with designing and implementing CMS represent faculty perceptions of pedagogical benefits, support infrastructure, CMS-augmented pedagogy, and enhanced interaction.

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APPENDICES

Appendix A: Original Interview Guide

Interview Guide for First Six Faculty Participants

1. Please describe your teaching style.
2. Please describe your teaching strategies.
3. Describe your teaching philosophy.
4. What are some of the reasons that led you to incorporate technology in the classroom?
5. How have you incorporated online technologies to complement your classroom instruction?
6. What factors did you take into consideration when designing and implementing the CMS component of your face-to-face class?
7. How different is your course after integrating the online component?
8. How did you address the differences of teaching with an online component versus teaching only face-to-face?
9. Have you noticed any changes in your teaching style as result of using technology?
10. Based on your experience, what has worked as result of using online CMS in the classroom?
11. What hasn't worked?
12. Is there anything else you would like to add?

Appendix B: Revised Interview Guide

Interview Guide for Last Four Faculty Participants

1. What are some of the reasons that led you to incorporate technology in the classroom?
2. How have you incorporated online technologies to complement your classroom instruction?
3. What factors did you take into consideration when designing and implementing the CMS component of your face-to-face class?
4. How different is your course after integrating the online component?
5. How did you address the differences of teaching with an online component versus teaching only face-to-face?
6. Have you noticed any changes in your teaching style as result of using technology?
7. Based on your experience, what has worked as result of using online CMS in the classroom?
8. What hasn't worked?
9. Is there anything else you would like to add?